

RECORD OF AMENDMENTS

Weekly Notices to Mariners (Section IV)

[illegible]

All charts and publications should be kept up to date with the latest amendments.

NP 56

NORWAY PILOT VOLUME I

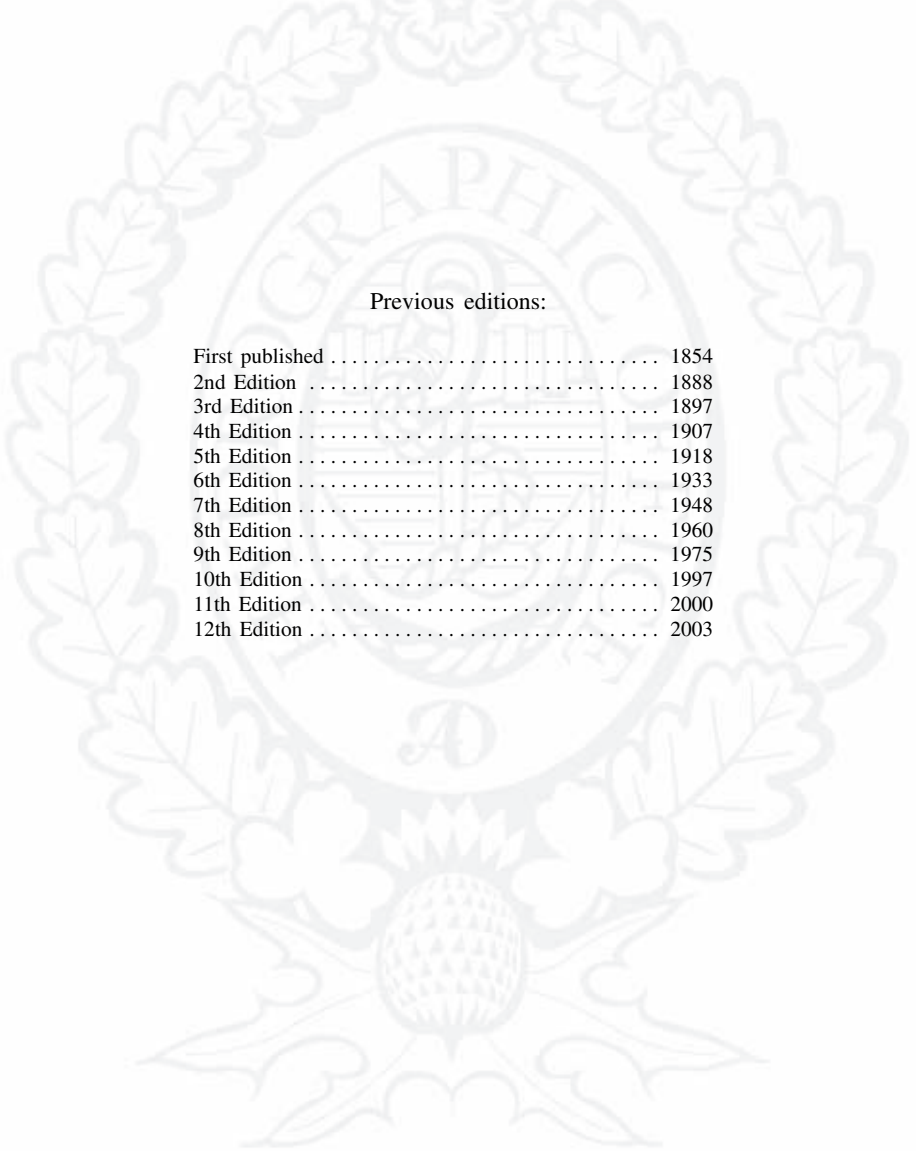
**South coast of Norway eastward from
Lindesnes, and the west coast of Sweden
southward to Marstrandsfjorden**

**THIRTEENTH EDITION
2005**

PUBLISHED BY THE UNITED KINGDOM HYDROGRAPHIC OFFICE

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Previous editions:

First published	1854
2nd Edition	1888
3rd Edition	1897
4th Edition	1907
5th Edition	1918
6th Edition	1933
7th Edition	1948
8th Edition	1960
9th Edition	1975
10th Edition	1997
11th Edition	2000
12th Edition	2003

PREFACE

The Thirteenth Edition of *Norway Pilot, Volume I*, has been revised by Captain T R J Popplewell, B.Sc., Master Mariner, Commander G. D. Niven, Royal Navy and P. C. McManaway, Master Mariner, from the latest information received in the UK Hydrographic Office to the date given below.

This edition supersedes the Twelfth Edition (2003), which is cancelled.

Information on climate and currents has been based on data provided by the Met Office, Exeter.

The following sources of information, other than UKHO publications and Ministry of Defence papers, have been consulted:

Norwegian:

Charts

Den Norske Los, Bind 1, 2005

Den Norske Los, Bind 2A, Svenskegrensen–Langesund, second edition 1993.

Den Norske Los, Bind 2B, Langesund–Jærens Rev, third edition 2005.

Swedish:

Charts

Svensk Lots del A 1992

Svensk Lots del 1: Skagerrak, Kattegat, Öresund and Southern Baltic Sea, 1996.

Svensk Kusthandbok: Svinesund – Marstrand, 1995.

Svensk Kusthandbok: Marstrand – Kullen, 1995.

Other publications:

Lloyds Register Fairplay Ports & Terminals Guide 2005–2006.

Lloyds List Ports of the World 2005.

The Statesman's Yearbook 2005.

Whitaker's Almanac 2005.

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24th November 2005

PREFACE to the Tenth Edition (1997)

The Tenth Edition of Norway Pilot, Volume I, has been compiled by Commander R.A. Fisher, OBE, Royal Navy, and contains the latest information received in the United Kingdom Hydrographic Office to the date given below.

This edition supersedes the Ninth Edition (1975) and Supplement No. 11 (1995), which are cancelled.

Information on climates and currents has been based on data provided by the Meteorological Office, Bracknell.

The following sources of information, other than United Kingdom Hydrographic Office Publications and Ministry of Defence papers, have been consulted:

Norwegian:*Charts*

Den Norske Los, Bind 1, 1986

Den Norske Los, Bind 2A: Svenskegrensen — Langesund, second edition 1993.

Den Norske Los, Bind 2B: Langesund — Jærens Rev, second edition 1993.

Swedish:*Charts*

Svensk Lots del A 1985

Svensk Lots del 1: Skagerrak, Kattegat, Öresund and Southern Baltic Sea, 1996

Svensk Kusthandbook del 1: Svinesund — Kullen, 1990

British:

Fairplay Ports Guide, 1996

Ports of the World, 1995

The Statesman's Year-book (1996/97)

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Rear Admiral
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England
13th February 1997

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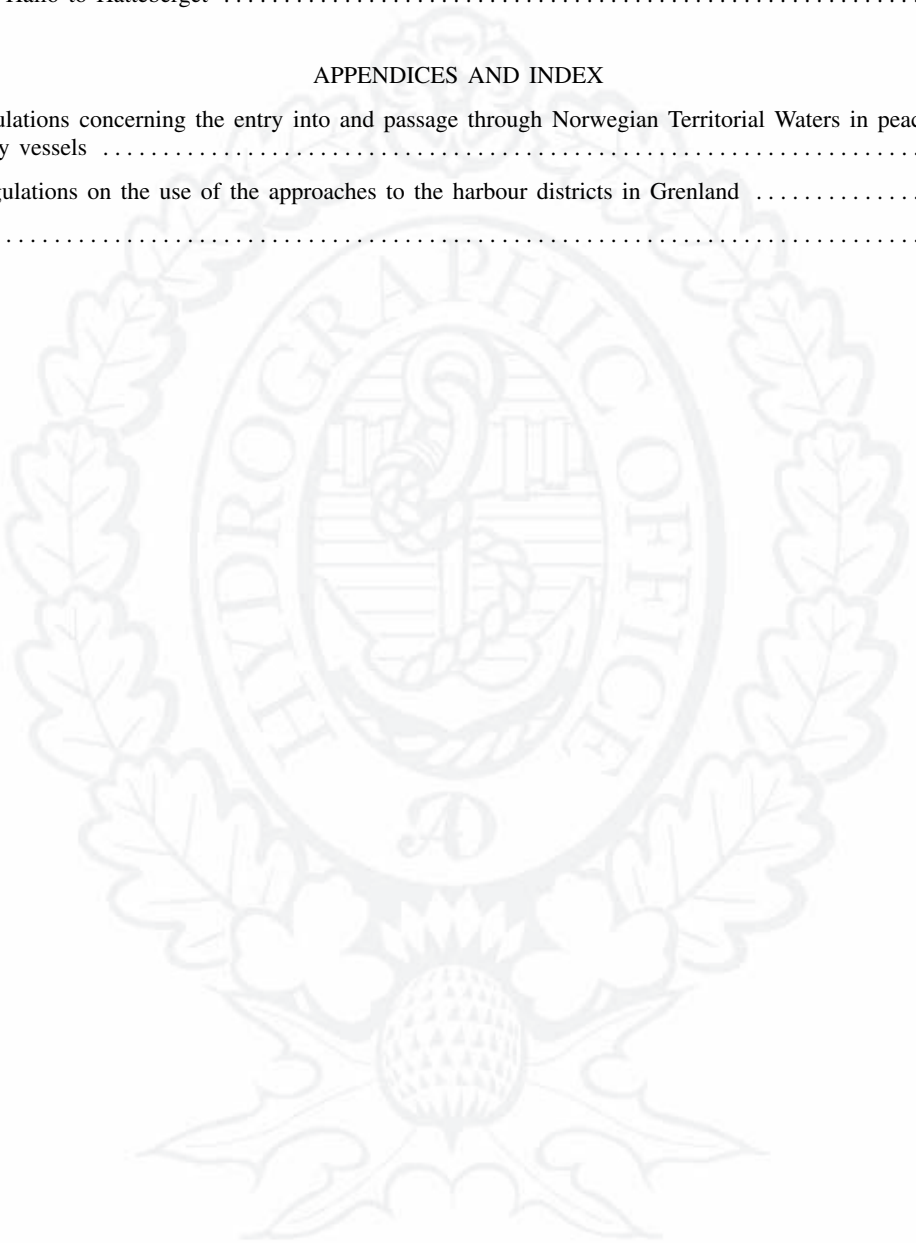
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EXPLANATORY NOTES

Admiralty Sailing Directions are intended for use by vessels of 150 gt or more. They amplify charted detail and contain information needed for safe navigation which is not available from Admiralty charts, or other hydrographic publications. They are intended to be read in conjunction with the charts quoted in the text.

This volume of the Sailing Directions will be kept up-to-date by the issue of a new edition at intervals of approximately 3 years, without the use of supplements. In addition important amendments which cannot await the new edition are published in Section IV of the weekly editions of *Admiralty Notices to Mariners*. A list of such amendments and notices in force is published quarterly. Those still in force at the end of the year are reprinted in the *Annual Summary of Admiralty Notices to Mariners*.

This volume should not be used without reference to Section IV of the weekly editions of Admiralty Notices to Mariners.

CD-ROM

Status. A compact disc is provided at the back of this volume. The paper publication of Sailing Directions satisfies the requirements of Chapter V of the International Convention for the Safety of Life at Sea. The CD version does not satisfy these requirements and should only be used in conjunction with the paper publication and any amendments affecting the paper publication. Where any discrepancy exists between data on the CD and in the paper publication of Sailing Directions, the paper publication (inclusive of amendments) is to be relied upon.

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References to hydrographic and other publications

The Mariner's Handbook gives general information affecting navigation and is complementary to this volume.

Ocean Passages for the World and *Routeing Charts* contain ocean routeing information and should be consulted for other than coastal passages.

Admiralty List of Lights should be consulted for details of lights, lanbys and fog signals, as these are not fully described in this volume.

Admiralty List of Radio Signals should be consulted for information relating to coast and port radio stations, radio details of pilotage services, radar beacons and radio direction finding stations, meteorological services, radio aids to navigation, Global Maritime Distress and Safety System (GMDSS) and Differential Global Positioning System (DGPS) stations, as these are only briefly referred to in this volume.

Admiralty Maritime Communications is a comprehensive guide on all aspects of maritime communications for the yachtsman and small craft user. It provides general information on Global Maritime Distress and Safety System (GMDSS), the management of VHF, Maritime Safety Information, NAVTEX, Inmarsat and Radio Facsimile, and detailed information and procedures for marinas and harbours used by small craft.

Annual Summary of Admiralty Notices to Mariners contains in addition to the temporary and preliminary notices, and amendments and notices affecting Sailing Directions, a number of notices giving information of a permanent nature covering radio messages and navigational warnings, distress and rescue at sea and exercise areas.

The International Code of Signals should be consulted for details of distress and life-saving signals, international ice-breaker signals as well as international flag signals.

Remarks on subject matter

Buoys are generally described in detail only when they have special navigational significance, or where the scale of the chart is too small to show all the details clearly.

Chart index diagrams in this volume show only those Admiralty charts of a suitable scale to give good coverage of the area. Mariners should consult NP 131 *Catalogue of Admiralty Charts and Publications* for details of larger scale charts.

Chart references in the text normally refer to the largest scale Admiralty chart but occasionally a smaller scale chart may be quoted where its use is more appropriate.

Firing, practice and exercise areas. Submarine exercise areas are mentioned in Sailing Directions. Other firing, practice and exercise areas maybe mentioned with limited details. Signals and buoys used in connection with these areas maybe mentioned if significant for navigation. Attention is invited to the Annual Notice to Mariners on this subject.

Names have been taken from the most authoritative source. When an obsolete name still appears on the chart, it is given in brackets following the proper name at the principal description of the feature in the text and where the name is first mentioned.

Tidal information relating the daily vertical movements of the water is not given; for this *Admiralty Tide Tables* should be consulted. Changes in water level of an abnormal nature are mentioned.

Time difference used in the text when applied to the time of High Water found from the *Admiralty Tide Tables*, gives the time of the event being described in the Standard Time kept in the area of that event. Due allowance must be made for any seasonal daylight saving time which may be kept.

Wreck information is included where drying or below-water wrecks are relatively permanent features having significance for navigation or anchoring.

Units and terminology used in this volume

Latitude and Longitude given in brackets are approximate and are taken from the chart quoted.

Bearings and directions are referred to the true compass and when given in degrees are reckoned clockwise from 000° (North) to 359° Bearings used for positioning are given from the reference object.

Bearings of objects, alignments and light sectors are given as seen from the vessel.

Courses always refer to the course to be made good over the ground.

Winds are described by the direction from which they blow.

Tidal streams and currents are described by the direction towards which they flow.

Distances are expressed in sea miles of 60 to a degree of latitude and sub-divided into cables of one tenth of a sea mile.

Depths are given below chart datum, except where otherwise stated.

Heights of objects refer to the height of the object above the ground and are invariably expressed as "... m in height".

Elevations, as distinct from heights, are given above Mean High Water Springs or Mean Higher High Water whichever is quoted in *Admiralty Tide Tables*, and expressed as, "an elevation of ... m". However the elevation of natural features such as hills may alternatively be expressed as "... m high" since in this case there can be no confusion between elevation and height.

Metric units are used for all measurements of depths, heights and short distances, but where feet/fathoms charts are referred to, these latter units are given in brackets after the metric values for depths and heights shown on the chart.

Time is expressed in the four-figure notation beginning at midnight and is given in local time unless otherwise stated. Details of local time kept will be found in *Admiralty List of Radio Signals Volume 2*.

Bands is the word used to indicate horizontal marking.

Stripes is the word used to indicate markings which are vertical, unless stated to be diagonal.

Conspicuous objects are natural and artificial marks which are outstanding, easily identifiable and clearly visible to the mariner over a large area of sea in varying conditions of light. If the scale is large enough they will normally be shown on the chart in bold capitals and may be marked "conspic".

Prominent objects are those which are easily identifiable, but do not justify being classified as conspicuous.

ABBREVIATIONS

The following abbreviations are used in the text:

AIS	Automatic Identification System	kHz	kilohertz
ALC	Articulated loading column	km	kilometre(s)
ALP	Articulated loading platform	kn	knot(s)
AMVER	Automated Mutual Assistance Vessel Rescue System	kW	kilowatt(s)
°C	degrees Celsius	Lanby	Large automatic navigation buoy
CALM	Catenary anchor leg mooring	LASH	Lighter Aboard Ship
CBM	Conventional buoy mooring	LAT	Lowest Astronomical Tide
CDC	Certain Dangerous Cargo	LF	low frequency
CVTS	Co-operative Vessel Traffic System	LHG	Liquefied Hazardous Gas
DF	direction finding	LMT	Local Mean Time
DG	degaussing	LNG	Liquefied Natural Gas
DGPS	Differential Global Positioning System	LOA	Length overall
DW	Deep Water	LPG	Liquefied Petroleum Gas
DSC	Digital Selective Calling	LW	Low Water
dwt	deadweight tonnage	m	metre(s)
DZ	danger zone	mb	millibar(s)
E	east (easterly, eastward, eastern, easternmost)	MCTS	Marine Communications and Traffic Services Centres
EEZ	exclusive economic zone	MF	medium frequency
ELSBM	Exposed location single buoy mooring	MHz	megahertz
ENE	east-north-east	MHHW	Mean Higher High Water
EPIRB	Emergency Position Indicating Radio Beacon	MHLW	Mean Higher Low Water
ESE	east-south-east	MHW	Mean High Water
ETA	estimated time of arrival	MHWN	Mean High Water Neaps
ETD	estimated time of departure	MHWS	Mean High Water Springs
EU	European Union	MLHW	Mean Lower High Water
feu	forty foot equivalent unit	MLLW	Mean Lower Low Water
fm	fathom(s)	MLW	Mean Low Water
FPSO	Floating production storage and offloading vessel	MLWN	Mean Low Water Neaps
FPU	Floating production unit	MLWS	Mean Low Water Springs
FSO	Floating storage and offloading vessel	mm	millimetre(s)
ft	foot (feet)	MMSI	Maritime Mobile Service Identity
g/cm ³	gram per cubic centimetre	MRCC	Maritime Rescue Co-ordination Centre
GMDSS	Global Maritime Distress and Safety System	MRSC	Maritime Rescue Sub-Centre
GPS	Global Positioning System	MSI	Marine Safety Information
GRP	glass reinforced plastic	MSL	Mean Sea Level
grt	gross register tonnage	MV	Motor Vessel
gt	gross tonnage	MW	megawatt(s)
HAT	Highest Astronomical Tide	MY	Motor Yacht
HF	high frequency	N	north (northerly, northward, northern, northernmost)
HMS	Her (His) Majesty's Ship	NATO	North Atlantic Treaty Organization
hp	horse power	Navtex	Navigational Telex System
hPa	hectopascal	NE	north-east
HSC	High Speed Craft	NNE	north-north-east
HW	High Water	NNW	north-north-west
IALA	International Association of Lighthouse Authorities	No	number
IHO	International Hydrographic Organization	nrt	nett register tonnage
IMO	International Maritime Organization	NW	north-west
ITCZ	Intertropical Convergence Zone	ODAS	Ocean Data Acquisition System
JRCC	Joint Rescue Co-ordination Centre	PEL	Port Entry Light
		PLEM	Pipe line end manifold
		POL	Petrol, Oil & Lubricants
		PSSA	Particularly Sensitive Sea Areas
		PWC	Personal watercraft

ABBREVIATIONS

RCC	Rescue Co-ordination Centre	UHF	ultra high frequency
RMS	Royal Mail Ship	UKHO	United Kingdom Hydrographic Office
RN	Royal Navy	ULCC	Ultra Large Crude Carrier
Ro-Ro	Roll-on, Roll-off	UN	United Nations
RT	radio telephony	UT	Universal Time
		UTC	Co-ordinated Universal Time
S	south (southerly, southward, southern, southernmost)	VDR	Voyage Data Recorder
SALM	Single anchor leg mooring system	VHF	very high frequency
SALS	Single anchored leg storage system	VLCC	Very Large Crude Carrier
SAR	Search and Rescue	VMRS	Vessel Movement Reporting System
Satnav	Satellite navigation	VTC	Vessel Traffic Centre
SBM	Single buoy mooring	VTMS	Vessel Traffic Management System
SE	south-east	VTs	Vessel Traffic Services
SPM	Single point mooring		
sq	square	W	west (westerly, westward, western, westernmost)
SS	Steamship	WGS	World Geodetic System
SSE	south-south-east	WMO	World Meteorological Organization
SSW	south-south-west	WNW	west-north-west
SW	south-west	WSW	west-south-west
		WT	radio (wireless) telegraphy
teu	twenty foot equivalent unit		
TSS	Traffic Separation Scheme		

GLOSSARY OF NORWEGIAN GEOGRAPHICAL TERMS AND WORDS

(See Language and Orthography at 1.144)

Norwegian English

Advarsel warning
 aktsomhetsområde precautionary area
 alltid above water
 ankerplass anchorage
 ankre anchor
 åpen open
 au, austre east
 avfallsplass spoil ground
 avløpsledning outfall pipe, sewer

Badeplass beach
 banke bank
 båe sunken rock, skerry
 båke beacon, landmark
 båtehavn boat harbour
 båtverksted boatyard
 bb, babord port (side, hand)
 berg, bierg, bjerg mount, hill
 blå blue
 bløt soft
 bøye buoy
 bøyestake spar buoy
 bratt steep, cliffy, abrupt
 bre glacier
 bru bridge
 brygge jetty, pier
 bukt bay, cove, bight
 bunkersstasjon fuelling berth
 Bunn seabed
 bunnbeskaffenhet nature of the seabed
 by town
 bygning framework structure, pylon

Dal valley
 den norske los sailing directions
 dumpfelt dumping ground
 dyb deep
 dybde depth
 dypgående draught

Elv, elva river
 etterretninger for sjøfarende notices to mariners

Fast fixed
 fartøy vessel
 farvann fairway, waters
 fastland mainland
 fem five
 ferje ferry
 fin fine
 fire four
 fiskeoppdrett marine farm
 fiskevær fishing station
 fjære ebb tide
 fjell mountain, rock
 fjord arm of the sea
 flo flood (tide)
 flu rock (submerged)
 Flytebrygge floating stage
 flytedokk floating dock
 flyplasser airport
 forberg promontory
 forbudt prohibited
 forbudt sjøområde restricted sea area
 fortøyningsbøye mooring buoy
 fortøyningsring mooring ring
 fortøyningsbolt mooring bolt
 friareal recreation area

Norwegian English

friseilingshøyde minimum vertical clearance
 friseilingsméd clearing line
 fyr light
 fyrliste list of lights

Gat, gap mouth, channel, deep
 gjesteplass visitors' berth
 godt synlig conspicuous
 gradnett graticule
 grå grey
 grovkornet coarse
 grønn green
 grunne rock, bank, shoal
 grus gravel
 gul yellow

Halvøy peninsula
 hav sea
 havbruk marine farm
 havn, hamn harbour, haven
 havnedistrikt harbour district
 havnegrense harbour limit
 havnekontor harbour office
 havnekart harbour chart
 havnekisse harbour plan
 hefte obstruction
 holme islet
 høyvann (HW) high water
 høyde altitude, height
 høydekurve height contour
 huk point, headland
 hundre hundred
 hvit, hvitt white

Indre inner
 innenfor within
 innløp entrance, inlet
 innseiling approach
 innsiden inside, inner side
 is ice
 isbre glacier

Jernstang iron perch
 jernbane railway

Kabellengde cable, cable length
 kai quay
 kaiskisse quay stretch
 kanal navigation channel
 kart chart
 kartnull chart datum
 kirke church
 kjennemerke mark, sign
 klippe reef, cliff pinnacle rock
 Kloakkledning outfall pipe, sewer
 knaus crag, rock
 knop knots
 kran crane
 kyst coast
 kystkontur coastline

Landtoning coastal view
 landtunge head, headland
 langgrun shelving bottom
 lav low
 lavvann (LW) low water
 lei, led recommended channel
 leire (–bunn) clay (–bottom)
 leistrekk, ledstrekk recommended track
 lengde length

GLOSSARY

Norwegian *English*

lengre (om avstand)	longer distance
lengst	longest
lille, litle, liten	little
linje	line
livbåt	lifeboat
loddskudd	sounding
lodret	vertical
lokalkunnskap	local knowledge
los	pilot
loskontor	pilot office
løp	channel, passage
luftspenn	overhead cable
lydbøye	sound buoy
lykt	light
lykte-/fyrkarakteristikk	light characteristics
lysboye	light-buoy
lystbåt	pleasure craft
Målestokk	scale
méd	leading line
mellom	between
mellomstore steiner	cobbles
merke	mark
middelvann (MW)	mean sea level
midtre	middle
mindre	smaller
minste dybde	least depth
misvisning	magnetic variation
molo	mole, breakwater
mørk	obscured (of a light)
mudret	dredged
munning	mouth or estuary
mur, murvek	brick, brickwork
Natt	night
nautisk mil, n mil, (M)	international nautical mile
navigering	navigation
nes	point, cape, ness
ni	nine
nip	neap tide
Nord (N)	north
nordre, nordlig (N)	north, northern northerly
nødhavn	harbour of refuge or distress
nut	mountain peak
ny, nytt	new
Odde	point, headland
olje	fuel oil
område	area
omtrentlig	approximate
oppmerket	marked
oppmåling	survey
oppmudret	dredged
os	river mouth, outlet
ovenfor	above, higher
oversvommit	submerged
overettlinje	leading line
overettlyker	leading lights
overettmerker	leading marks
øst, østlig	east, eastern
øvelsefelt	exercise or practice area
øverst	above
øvre	upper
øy	island
øygård, øygruppe	archipelago
Passasje	passage
peiling	bearing
pele	post
pelebukk	dolphin
peleverk	piling, groyne
pir	pier
poll	bay, fjord, cove
pynt, pynten	point, headland

Norwegian *English*

Red, rei	road, roadstead
redning	rescu
renne	channel
retning	direction
rettvisende	true, related to true north
rev	reef
rød	red
rørledning	pipeline
rygg	seamount chain, spur, ridge
Seks	six
singel (–bunn)	shingle (–bottom)
sjø	sea
sjøflyhavn	seaplane harbour
sjøkabel	submarine cable
sjøkart	nautical chart
sjømerke	beacon
sju	seven
skjær, skjer	above-water rock, skerry
skipsverft	shipyard
skjær i vannflaten	drying rock
skjærgard	archipelago, skerries
skolt, skolten	peak
skvalpeskjær	rock awash
slepebåt	tug
slipp	patent slip
slott	castle
sluse	sluice, lock
smal	narrow
små	small
småbåter	small craft
småbåthavn	small craft harbour
småtein	pebbles
søle (–bunn)	mud (–bottom)
søndre, søre, sør, syd (S)	south
stake	spar buoy
stasjon	station
sted	place
stein	stones, rock, shoal
steinbunn	stones
stengt	closed
sterk	strong
stikke (dypgående)	draught
stor, store, st	large, great
strand	beach, shore
strøm	stream, narrows
strømmuttak (el)	power supply
styrbord	starboard
sund	channel, cove, sound
svart	black
Tang/tare	seaweed
tange	low point, spur, peninsula
tegn	character, sign, symbol
tent	lighted
ti	ten
tid	time
tidevann	tides
tilleggsside	alongside berth
tind	mountain, sharp peak
to	two
toalett	toilet
topp	summit, peak
tørr	dry
tørredokk	dry dock
tørrfall	foreshore dries
trang	narrow
tråling	trawling
tre	three
tusen	thousand
tvers	abeam
tydelig	conspicuous

GLOSSARY

Norwegian *English*

Undervanns below-water
 urent farvann foul ground
 utenfor off
 utløp mouth, outlet, estuary
 utstikker jetty

Vandret horizontal
 vann water
 vannfylling water tap
 vannledning water pipe
 vannstand sea level
 varde cairn
 værforhold weather condition

Norwegian *English*

våg small bay
 våt wet
 verksted (mar) boatyard
 vesle little
 vestre west, western
 vik bay, cove, creek, inlet
 viltreservat nature preserve
 vind wind
 vindretning wind direction
 vrak wreck

Ytre, yt outer



GLOSSARY OF SWEDISH GEOGRAPHICAL TERMS AND WORDS

Swedish *English*

Å	river, stream
ås	moraine, ridge
älv	river
ankarplats	anchorage
Backe	hill
båda, både	islet, sunken rock
båk	fixed beacon
bank	bank
berg	mountain
bergkulla	hummock
block	boulder
borg	castle, fortified place
bränning	rock awash
bro	bridge, pier
brygga	landing place, wharf, jetty
bukt	bay, bight
by	village, town

Dal	valley
djup	deep

Farja	ferry
farled	channel, passage
farvatten	waters, fairway
fastland	mainland
fishehamn	fishing harbour
fiskeläge	fishing station
fjäll	mountain, plateau
fjärd	loch
fjord	firth, inlet
flak	flat, shoal
flöd	river
fyr	light

Gamla	old
gap	mouth, opening
gatt	gut, narrow inlet, narrows
grön	green
grund	ground, shoal
grunklack	shoal head

Hals	neck
hamn	harbour
häll	rock
hav	ocean, sea
hög	height, hill
holm	high, hill
holme	islet
huggeri	quarry
hus	house
huvud	head

Inlopp	entrance
innerst	innermost
inre	inner

Kai	quay
kalv	calf
kanal	canal, channel
kapell	chapel
klabb, klubb	islet, rock
klipp	rock
kobb, kubb	islet, rock
kulle	hill
kummel	beacon, cairn
kvarn	mill
kyrka	church
kyst	coast

Swedish *English*

Land	land, shore
lastageplats	landing place
lera	clay
lilla, liten	little
ljudpipa	whistle
lots	pilot
lund	grove
Mellan, mellem	between
mun, mynning	mouth
mudder	mud

Nabbe, nebbe	projection, point
näs	cape, point
nedre	lower
norra, nord	north
ny	new

Ö	island
öre	tongue or spit of land
Öresund	The Sound
ost, öst	east
Östersjön	Baltic Sea
östra	eastern
övre	upper

Ränna	pass, channel
redd, red	road, roadstead
reflektor	reflector
rev	reef, sandbank
röd	red
rös	heap of stones

Såg	sawmill
sand	sand
sjö	sea
sjöfarande (U.f.s)	Notices to Mariners
skär	rocky islet, reef, skerry
skärgård	cluster of reefs
skog	a wood
skorsten	chimney
slott	castle
sluss	lock, sluice
små	small, little
södra	south, southern
stad	town, city
stång	beacon, pole
sten	stone, stones
stor, stora	great
strand	shore
ström	current, stream
strömmar	rapids
svart, svarte	black
syd, söder	south

Tång	tongue
tavla	beacon, board
torn	tower
tullhus	customs house

Udde	cape, point
utkik	lookout tower

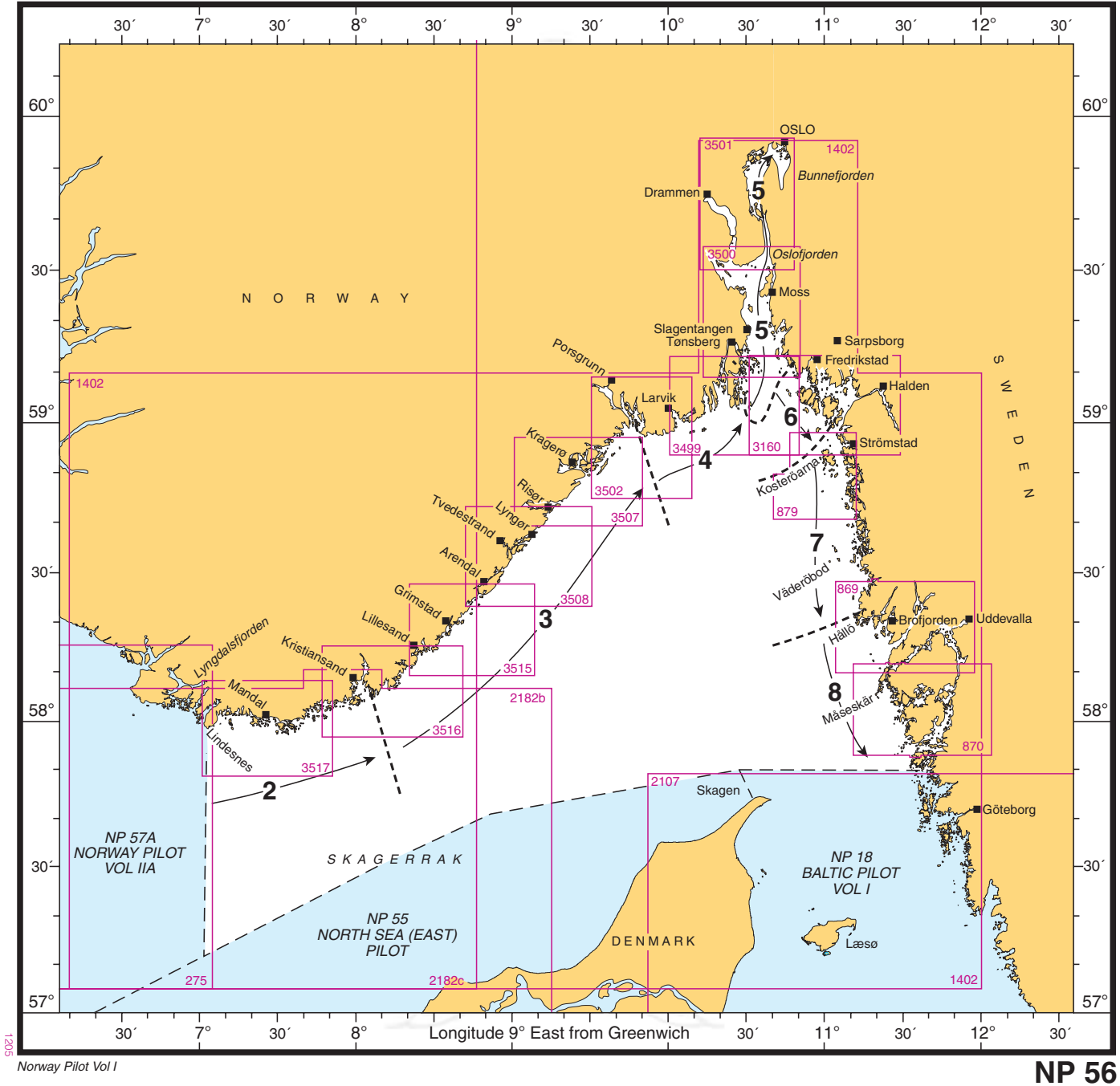
Väderkvarn	windmill
vägbrytare	breakwater
varv	shipyard
väst, västra	west, western
vette	hill
vik	cove, inlet, creek
vitt, vitte	white
vrak	wreck

Ytterst	outermost
yttre	outer

NOTES



Chapter Index Diagram



LAWS AND REGULATIONS APPERTAINING TO NAVIGATION

While, in the interests of the safety of shipping, the United Kingdom Hydrographic Office makes every endeavour to include in its hydrographic publications details of the laws and regulations of all countries appertaining to navigation, it must be clearly understood:—

- (a) that no liability whatever will be accepted for failure to publish details of any particular law or regulation, and
 (b) that publication of details of a law or regulation is solely for the safety and convenience of shipping and implies no recognition of the international validity of the law or regulation.

NORWAY PILOT

VOLUME I

CHAPTER 1

NAVIGATION AND REGULATIONS COUNTRIES AND PORTS NATURAL CONDITIONS

NAVIGATION AND REGULATIONS

LIMITS OF THE BOOK

Chart 1402

Area covered

1.1

- 1 This volume contains Sailing Directions for the coastal and inshore waters bordering the S coast of Norway from Lindesnes (57°58'·8N 7°03'·3E) to Halden (59°07'N 11°23'E) (Chart 3160); and along the W coast of Sweden from Strömstad (58°57'N 11°10'E) to Marstrandsfjorden, 65 miles S. It includes Kristiansandfjorden, Langesundsfjorden, Oslofjorden and Tønsbergfjorden in Norway; also Gullmarn and the chain of fjords leading to Uddevalla, in Sweden.
- 2 The sea area covered is defined by the following limits:
 From Lindesnes (57°59'N 7°03'E) S to 57°40'N 7°00'E;
 Thence S to 57°10'·5N 6°56'·2E;
 Thence ENE to 57°41'N 8°53'·3E;
 Thence generally E to 57°50'N 10°30'E;
 Thence E along the latitude of 57°50'N to the coast of Sweden;
 Thence N and W along the coasts of Sweden and Norway to Lindesnes.

International boundaries

1.2

- 1 The area given above includes three international boundaries, as given below.
Norway–Denmark boundary, from a position 45 miles S of Lindesnes, extends generally ENE for 64 miles to position 57°42'N 8°53'E; thence generally NE for 49 miles to position 58°16'N 10°02'E, as shown on the chart.
- 2 **Norway–Sweden boundary**, from the end position, above, extends NNE for 15½ miles to position 58°31'N

10°09'E; thence NE for nearly 21 miles to position 58°46'N 10°36'E; thence generally NNE for 8 miles to position 58°54'N 10°38'E; thence generally ENE for about 14 miles, as shown on the chart, where it is marked as given at 6.3. From the centre of the S entrance to Sekken (58°59'N 11°05'E) (Chart 3160) (6.129) the boundary continues along the centre-line of the channel to position 59°04'·8N 11°09'·2E; thence ENE into and along the centre-line of Svinesund, Ringdalsfjorden and Iddefjorden.

- 3 **Sweden–Denmark boundary**, from position 58°16'N 10°02'E, at the NE limit of the Norway–Denmark boundary and the SW limit of the Norway–Sweden boundary, extends ESE for 17¾ miles to position 58°08'N 10°32'E, thence SE for 24 miles to 57°50'N 11°02'E.

NAVIGATIONAL DANGERS AND HAZARDS

Coastal conditions

Norwegian coast

1.3

- 1 In general the coast of Norway is very irregular, rocky and steep. It has the appearance of a chain of mountains, with ragged peaks and abrupt points intersected by numerous fjords. In comparison with the rest of the Norway the S coast is comparatively low, tame and monotonous. Even so, these mountains can be seen at a great distance in clear weather.
- 2 On closer observation the coast appears as a wild broken shore of grey, rounded, rocky ridges, with smooth, sloping surfaces and low promontories. There are no sands or pebble beaches along the coast nor in the approach to fjords. Many of these fjords or arms of the sea are both wide and deep and afford excellent shelter to vessels of every description, being protected by the Skjærgården.

- 3 The Skjærgården, or rock-rampart, is a vast fringe of innumerable islands and rocks which stretches along most of the S coast. When approaching this coast, it is difficult at first to identify these islands, as they frequently rise abruptly from the sea to the same elevation as the mainland.

Swedish coast

1.4

- 1 The west coast of Sweden covered by this volume is fronted by Skärgård, a belt of islands and rocks which extends from 4 to 8 miles seaward and complicates the navigation. Although the coastline is very irregular, the fjords do not extend very far inland and the scenery is less interesting than that in Norway. The small islands, as a rule, consist of little more than bare rock; but the very large islands of Orust (58°10'N 11°40'E) and Tjörn, close S, are reasonably covered with vegetation and are, in places, well cultivated.

Navigation in ice

Sea ice

1.5

- 1 **Effect on navigation.** Along the S and SE coasts of Norway, the sea starts to freeze earlier and with greater severity at the E end of the area; however, in normal winters navigation is seldom seriously impeded by ice. Most of the outer harbours are generally open and will provide shelter when there is still ice in the inner harbours. For general information see 1.198 and for a table of ice dates at specified harbours, see 1.201.
- 2 **Accumulation of ice on ships.** The concurrence of strong winds, precipitation and spray in sub-zero temperatures may be encountered on rare occasions within the area covered by this volume. This is most likely to occur in the E part of the Skagerrak during January or February. The resultant accumulation of ice on a vessel's hull and superstructure can constitute a serious danger, as described in *The Mariner's Handbook*, which also contains advice on the appropriate avoiding action.
- 3 **Icebreaking Service.** See 1.95. Regulations for working with icebreakers are given at 1.107. Signals for use with icebreakers are given at 1.109.
- Ice Reporting System,** using the Baltic Sea Ice Code, is described in *Admiralty List of Radio Signals Volume 3 (1)*.

Overhead cables

1.6

- 1 Overhead cables are mentioned in the text where the clearance beneath them may be a hazard to navigation. Some of these cables carry high voltages and sufficient clearance must be allowed when passing underneath them. In winter, the published clearance may be varied by ice or snow conditions. See also 1.9.
- See *The Mariner's Handbook* for information on safety clearances and the radar responses to be expected.

Chemical munitions

1.7

- 1 Certain wrecks in the vicinity of 58°15'N 9°35'E, not all of which are charted, may contain cargoes or part cargoes of chemical munitions.
- A number of vessels containing chemical munitions are known to have been sunk in an area 20 miles from the Swedish coast, in approximate position 58°10'N 10°45'E.
- 2 Although these wrecks do not pose a direct hazard to surface navigation, an additional risk may exist with regard

to anchoring, fishing or any form of submarine activity in their vicinity.

Navigation in Norwegian waters

General information

1.8

- 1 **Coastal navigation.** Navigation off the Norwegian coast is difficult and requires great caution. The offshore islands which protect the harbours also render them difficult of access, despite the deep-water channels which usually lead between the rocks. These channels are often intricate and sounding is seldom of much help; however they are generally well marked by buoys and beacons. Pilots are usually available.
- 2 A deep trench, which extends NE along the SE coast of Norway to a position about 5 miles S of Oslofjorden, has general depths from 275 to 640 m. This is significant as, in heavy gales, the sea tends to break in depths of less than 37 m, especially if the depth is greater on the side from which the swell comes. Such a situation occurs along the inner edge of the trench with an onshore wind.
- Note:** These areas may be indicated by a gathering of sea-birds fishing over the shallower patch.
- 3 **Inshore route.** There is no continuous inshore route along the S coast of Norway but small coasters can be taken along routes within the islands, as mentioned in the geographic text. These channels are generally too narrow and intricate to be used for larger vessels or without a Pilot.

During the long winter nights, with stormy weather the landmarks are often obscured by snowstorms, or rendered virtually indistinguishable by a uniform covering of snow, making an approach to the coast both hazardous and dangerous. During the long summer days the reverse is also true.

Vertical clearances for overhead obstructions

1.9

- 1 Analysis of 30 to 40 years of tidal observations have shown that tidal levels may be higher than the reference levels for vertical clearance heights (autumn equinox spring HW). This applies especially to the area from the Swedish border to Lindesnes (57°59'N 7°03'E), at the W extremity of this volume; and includes Indre Oslofjorden, where 22% to 28% of all HW levels exceed the reference level for vertical clearance heights.
- 2 There will be sufficient clearance, in most cases, when using the safety margins given below:
- Swedish border to Lindesnes: 50 cm.
Indre Oslofjorden within Drøbaksundet (59°40'N 10°38'E): 80 cm.
- Levels may be even higher under extreme conditions of low pressure and onshore winds.

Dangerous waves

1.10

- 1 Dangerous waves may be encountered in the following areas, as shown on the chart:
- Near Ryvingen (57°58'N 7°30'E) (2.20).
In the vicinity of 57°37'N 7°20'E.
Between Tvistein (58°56'N 9°56'E) (4.19) and Færder (59°01'N 10°31'E) (4.17), 19 miles ENE.
- For details see 1.192.

Small craft escort service

1.11

- 1 During the summer months, the Norwegian Lifeboat Institution coastal patrol operates an escort service for

yachts and pleasure craft. The lifeboats provide a convoy service between harbours, covering most of the sea areas or difficult waters around the Norwegian coast, and can be contacted on VHF.

Navigation in Swedish waters

Swedish coast

1.12

- 1 The dangers of coastal navigation along the W coast of Sweden have sometimes been exaggerated. These reports do not allow for the many places of refuge, some of them fairly easy of access; and the many navigational aids available for use.
- 2 Navigation within the islets and dangers of the Skärgård (Inner Coastal and Archipelago Routes) is through channels which are continuous and sheltered but often narrow and intricate, as described within the geographic text. In difficult circumstances strangers are advised to seek the help of Pilots or fishermen who are familiar with the local area.

Severe weather

1.13

- 1 As a result of the shipping catastrophes which have occurred in the Baltic due to severe weather conditions and icing, all ship's captains, particularly those who have not experienced icing, are strongly recommended to contact the nearest Swedish coastal station as soon as difficulties arise for their ships at sea off the Swedish coast. They should report their difficulties, together with the ship's position, course and other information which may be of importance. In this way their situation will become known to the various bodies included in the sea rescue service (1.132) allowing early action should the situation worsen. Safety measures of this type are available free of charge for ships.

Mine danger areas

1.14

- 1 Areas dangerous due to mines laid during the war of 1939–1945 were formerly published in NEMEDRI, which publication was withdrawn in 1974. Due to the lapse of time, the risk to surface navigation from mines in these areas is considered to be no more than the ordinary hazards of navigation. However, a risk does still exist with regard to anchoring, fishing or any form of submarine activity close to the seabed.
- 2 Within the limits of this volume areas regarded as having a residual danger are situated as follows:
Over a large area centred on 57°30'N 8°00'E.
On the W side of the entrance to the Kattegat, bounded by the parallels of 57°48'N and 57°57'N, and the meridians of 10°02'E and 10°22'E.
Two areas in the SW approach to Lysekil as given at 8.67.
Three areas in the approaches to Marstrandsfjorden, as given at 8.95.
- 3 These areas are shown on British Admiralty charts and mentioned in the geographic text in accordance with the policy adopted by the coastal state adjacent to the danger area concerned. They are shown on Danish and Swedish charts, and promulgated in the *Notices to Mariners* of those countries.
- 4 See 1.46 for Swedish defensive minefields. Instructions for the disposal of mines picked-up at sea are given in the *Annual Summary of Admiralty Notices to Mariners*

TRAFFIC AND OPERATIONS

Traffic

Coastal waters

1.15

- 1 The coastal waters covered by this volume are clear of the main shipping routes which link the North Sea with the Baltic. In the main, therefore, only coastal traffic is likely to be encountered with additional concentrations of vessels in the following places:
- 2 Traffic separation schemes, see 1.82.
Deep draught tankers, see 1.83.
Seaplane harbours, see 1.85.
Fishing vessels, see 1.22.

High speed ferries

1.16

- 1 High speed ferries operate in the area covered by this volume and Mariners are advised to keep a good lookout.

Ship movement reporting systems

Norway

1.17

- 1 A mandatory vessel traffic system is established covering the entire Oslofjord area. For details see 5.9 and *Admiralty List of Radio Signals Volume 6 (2)*.

Sweden

1.18

- 1 The Swedish coastal waters described in this volume, from the international boundary between Sweden and Norway to Hätteberget (57°52'N 11°28'E), 68 miles SSE, lie within the areas covered by VTS Strömstad, VTS Lysekil and VTS Marstrand. Participation in the VTSs is compulsory.
- 2 For details of the limits of each VTS and for a list of reporting points and other information see *Admiralty List of Radio Signals Volume 6 (2)*.

Fishing — whole area information

General

1.19

- 1 Fishing is carried out throughout the year with seasonal concentrations in various localities; much of it occurs in coastal and fjord waters but there has been a great extension seaward in recent years. The seasonal aspect is most marked in coastal waters, in parts of which there may be large gatherings of vessels and much fishing gear. Other vessels should then take care if passing through these areas and avoid the fishing harbours due to congestion.

Methods of fishing

1.20

- 1 The principal methods of sea fishing in the area covered by this volume are drift-net, purse seining, seine netting, trolling and trawling. A description of the methods is given in *The Mariner's Handbook*
- 2 In certain areas fishing may be carried out using fixed gear which is usually defined as being an appliance, including bottom nets, fitted in rows and made fast to piles or other moorings. The catchment area often extends over several kilometres from the shore; or the appliances may be established in shoal areas away from the land.

Marine farms

1.21

- 1 **Charting.** Marine farms are an increasingly common feature within the coastal and inshore waters. As they are

frequently established on a temporary basis, and may be moved without notice, not all are shown on the charts or mentioned in the text. They may be fixed or floating structures, and are usually marked by buoys or beacons, which may be lit.

- 2 Additional farms may be established without notice.
Avoidance. Fishing nearer than 100 m or passing within 20 m of a marine farm installation is prohibited.

Fishing in Norwegian waters

Areas and seasons

1.22

- 1 **Mackerel fishing** with drift-nets takes place from May to August off the coast of Norway S and E from Egersund (58°21'N 6°00'E) to Oslofjorden in an area from 7 to 30 miles offshore. The nets, marked with floats and lights and between 5 cables and 3 miles in length, are set parallel to the coast in the evening and hauled between 0200 and 0400. Normally, navigational warnings concerning heavy concentrations of drift net fishing vessels will be broadcast through Coast Radio Stations as given in *Admiralty List of Radio Signals Volume 1 (1)*. The fishing vessels may be contacted on VHF channel 16.
- 2 **Salmon fishing** takes place along the same stretch of coast as the mackerel fishing but from the national baseline out to 4 or 5 miles offshore. This fishing is by drift-net and is carried out by day and night with nets from 6 cables to 1 mile in length, set at right angles to the coast. These nets are marked as for mackerel fishing.
- 3 **Sprat fishing** takes place throughout the summer and autumn in the fjords of Southern Norway; with Oslofjorden being considered a good area. Fishing is carried out partly by purse-nets and partly by land-nets.
- Coal fish and Tunny** fishing take place off the coast from May until autumn using purse-nets which may extend up to 146 m.
- 4 **Trawling** generally takes place outside the fishery limit (1.140) but shrimp and float trawlers may be met inside it. When working in pairs at night, each trawler uses a searchlight trained in the direction of the other vessel.

Fishing in Swedish waters

Methods and seasons

1.23

- 1 **Drift nets** are used for catching salmon, herring and mackerel. The nets, of up to 2 miles in length, may be laid in a straight line or on the perimeter of a circle, with their effective depth, usually between 6 m and 8 m, being regulated by float lines. They are normally marked by radar reflectors, lights, and buoys displaying flags.
- 2 The salmon season lasts from September to June. The herring season is in the early spring and from June to November, but is now of little importance in the Kattegat.
The season for mackerel fishing lasts from the beginning of May to the end of June, and is carried out in the area N of 56°50'N.
- 3 **Trawling** takes place all the year round in depths from 25 to 350 m.
Long line fishing for cod, haddock and eels, is now mainly limited to the coastal area where the lines are laid on the bottom during the winter half of the year.
- 4 **Whiffing or spinning** for mackerel is carried out from July to September; the boats towing a number of lines from out-riggers.

Seine netting is carried out along the whole of the W coast of Sweden and in the Skagerrak and the North Sea.

- 5 **Eel fishing** with fixed and floating gear also takes place along the coast of Sweden. The equipment, which is normally established at right angles to the shore, can extend several miles seaward. However, by keeping 1½ miles offshore, the chance of encounter will be reduced. Eel fishing is not permitted on leading lines nor within the white sectors of entrance lights; however, fishing activity is frequently found very close to them.

Exercise areas

Firing practice and exercise areas

1.24

- 1 Military exercises and firing practices take place from time to time in the waters covered by this volume and the more important areas are mentioned in the text. However, detailed descriptions are not given, as warnings of firing practices and exercises are promulgated by local notices to mariners, by coast radio stations, or by both.
For general information on such areas see *Annual Summary of Admiralty Notices to Mariners*.

Submarine operations

1.25

- 1 **General information.** Submarine operations, involving the submarines of several nations, may take place in the waters covered by this volume. A good lookout is to be kept for them when passing through these waters.
Details of warning signals used to indicate the presence of submarines and the navigation lights they show are given in *The Mariner's Handbook* and the Annual Summary of Admiralty Notices to Mariners. The latter also describes the procedures in the event of a dived submarine being unable to surface.
- 2 **Navigation lights** for all submarines follow the pattern given in *The Mariner's Handbook*. The additional anti-collision light displayed by some submarines is as given for British and Norwegian submarines. Other nationals likely to be seen in the area of this volume may display anti-collision lights as follows:
- 3 Denmark: blue light at about 115 flashes per minute.
France: yellow light at 100–120 flashes per minute.
Germany: orange light at about 100 flashes per minute.
USA: yellow (amber) light, one flash per second for 3 seconds, followed by 3 seconds darkness.
Sweden: rotating yellow light.

Norway — marine exploitation

Seismic surveys

1.26

- 1 Seismic surveys are conducted throughout the area of the Norwegian Continental Shelf. The survey vessels, which display the appropriate signals, may be towing a cable of several thousand metres in length which should be avoided. Normally the time and place of such surveys are widely promulgated; however it is not possible to guarantee promulgation of them all.

Oil and gas fields

1.27

- 1 Production platforms and associated structures including tanker moorings, storage tankers and platforms on pipelines, generally exhibit Mo (U) and aircraft obstruction lights, and sound fog signals. These installations are usually protected by Safety Zones which may extend up to 500 m from their outer edges.

Vessels must navigate with caution when passing close to offshore installations and structures.

CHARTS

Admiralty charts

1.28

- 1 British Admiralty charts covering the area of these Sailing Directions are adequate for use on passage, for entry into the principal ports and harbours, and to reach a required pilot station.

All British Admiralty charts of the coastal waters described in this volume are derived from the latest Norwegian or Swedish Government charts.

- 2 In Swedish waters Admiralty Charts show routes through inshore waters, and into ports, which are authorised for vessels drawing 3·6 m or more, although occasionally routes authorised for less than 3·6 m on charts adopted from other countries. These tracks, together with their adjacent areas, are often the only routes adequately surveyed and marked. Masters are recommended to adhere to them strictly.
- 3 Admiralty charts and publications can be obtained from Admiralty Chart Agents listed in the *Catalogue of Admiralty Charts* and other hydrographic publications published annually.

Mariners are advised that due to the age, quality and origin of some of the source material, positions obtained from some Satellite Navigation Systems may, in certain areas, be more accurate than those on the chart.

Foreign charts

General information

1.29

- 1 In certain areas, where the British Admiralty charts show insufficient detail for navigation close inshore, these Sailing Directions have been written using foreign charts. These are not quoted as reference charts in the text, which has been written on the assumption that mariners wishing to navigate in these areas will have provided themselves with suitable charts on which to do so.
- 2 This applies in particular to the coastal passage in Swedish waters from Ramskär (58°45'N 11°00'E) to Hållö (58°20'N 11°13'E) and in the inner channels from Kosterfjorden (58°51'N 11°06'E) to Sotefjorden (58°29'N 11°10'E).

Publishing authorities

1.30

- 1 Foreign charts may be obtained from the publishing authorities shown below and in the *Catalogue of Admiralty Charts*. These charts are not issued by the UK Hydrographic Office nor are they corrected by *Admiralty Notices to Mariners*.
- 2 **Norway:**
Statens Kartverk Sjøkartverket,
Lervigsveien 36
Boks 60
N-4001 STAVANGER
- 3 **Sweden:**
Sjöfartsverket,
Sjökartavdelningen,
S-601 78,
NORRKÖPING

Datums

Horizontal datum

1.31

- 1 **Admiralty charts.** The datum in use in the majority of the charts for the area is ED50 (European Datum); however in Swedish waters Admiralty charts generally use Swedish Datum. These datums are gradually being changed to WGS84 (World Geodetic System 1984). Correctional information, according to the datum in use, is shown on the charts.
- 2 **Norwegian charts.** Over the years Norwegian charts have been produced on various datums, earlier charts being based on a Norwegian datum and later charts on ED50. Both systems are of mixed quality. New charts are referred to WGS84, while reprints of older charts will retain their existing datum. Shifts from ED50 to WGS84 are typically of the order of 100 m, and shifts from Norwegian datum to WGS84 may be as much as 400–500 m.
- 3 **Swedish charts.** Swedish Datum, previously in use, has been replaced by WGS84.

Vertical datum

1.32

- 1 **Norwegian charts.** From January 2000, Norway joined other countries bordering the North Sea in using LAT as the common reference level for charted depths. In the area affected by this volume tidal range is small, and a greater effect is caused by meteorological conditions. For long periods on the S coast of Norway tides may fall below LAT, and for safety reasons the new chart datum will be set 30 cm lower than LAT in inner Oslofjord, and 20 cm below LAT over the remainder of the S coast.
- 2 **Swedish charts.** Charted depths are reduced to MSL in Swedish waters. These depths are subject to a decrease of about 0·2 cm per year due to the general land rise effect throughout the N part of Scandinavia. There is no appreciable tidal range.

AIDS TO NAVIGATION

General information

Landmarks

1.33

- 1 **Caution** is necessary when evaluating the descriptions given in this volume concerning landmarks, such as trees, and the colour and shape of buildings and other marks. New buildings may have been erected and old trees or houses destroyed, so that the marks, which may at one time have been conspicuous on account of their isolation, shape or colour, may no longer exist or may now be difficult to identify.

Lights

1.34

- 1 The S coast of Norway and the W coast of Sweden are well marked by navigational lights, many of which contain coloured sectors, as shown on the charts and detailed in *Admiralty List of Lights*. The object of the sectors is generally apparent with, as a rule, white sectors avoiding danger and often leading in the fairway. Where such sectors have been used in the text of this book to assist with Directions it is on the assumption that the mariner remains in the middle of the sector unless otherwise stated.
- 2 **Caution.** In ice conditions the windows of lights may be covered with frost or ice, which will greatly reduce the sighting range.

3 In cold weather, and more particularly with rapid changes of weather, the moisture, ice or snow on the glass may blur the sector limits producing a larger sector of uncertainty in which coloured lights may appear more or less white. This effect is greatest in green sectors and with weak lights. Under these conditions white sectors tend to extend into coloured and obscured sectors, and occulting lights into flashing ones.

4 As, for the most part, the directional sectors of lights lead close to shoal areas, it is imprudent to place too much reliance on them alone for guidance. Mariners are therefore recommended to determine their position with the help of other navigation aids when such conditions prevail.

Buoyage

1.35

1 **System.** Both Norway and Sweden have adopted the IALA Maritime Buoyage System, Region A, which is in force throughout the area described in this volume; for details of this system see *The Mariner's Handbook*.

Direction. For positioning Lateral Marks the Conventional Direction of Buoyage is indicated on the appropriate chart of the area.

2 **Radar reflectors** are not charted but it can be assumed that most major buoys are fitted with radar reflectors.

Winter buoyage

1.36

1 In winter, certain buoys are withdrawn or replaced by winter buoys. When ice conditions are expected, racon-buoys are generally replaced by light-buoys. When ice conditions compel the withdrawal of light-buoys, they are replaced by winter seamarks fitted with retroreflector material, which, when illuminated, will show the colours in which the seamarke is painted. Further details are given for each country, below.

2 **Caution.** The position of floating marks cannot be relied upon during winter as they may be shifted or even submerged when ice masses move. In actual ice conditions these marks must be regarded as extremely unreliable and time must also be allowed for the restoration of marks after the ice melts.

Ocean Data Acquisition (ODAS) Buoys

1.37

1 ODAS buoys (special) may be encountered within the area covered by this volume. These buoyage systems, which vary considerably in size, are used for environmental research purposes; they are marked "ODAS" with an identification number. The large systems should be given a clearance of at least 1 mile, and in the case of vessels towing underwater gear this distance should be increased to 2½ miles.

For further information see *The Mariner's Handbook*.

Norway

Indirect lighting

1.38

1 In many places along the coast, as an aid to safe navigation, fixed yellow or white lights have been established on pillars to mark protruding points and sounds along important channels. Such lights are referred to as "indirect lighting" and are shown by the symbol of a quarter fan on some Norwegian charts.

Marking of bridges

1.39

1 For the protection of bridge structures and transiting vessels, many bridges in Norwegian waters are marked to indicate vertical clearance, water depth and channel width.

In accordance with IALA recommendations, bridges may be lit as follows:

Red and green lights as lateral markings;

White lights marking the centre of the channel;

Indirect lighting of the bridge pillars.

A radar beacon may be used to indicate the best place for passage under the bridge.

Fixed marks

1.40

1 Fixed marks, placed in the vicinity of navigable waters, consist of beacons, usually of masonry resembling a tower (varde or søyle); iron beacons (jernsøyle or jernbåke); wooden beacons (trebåke); iron perches (jernstang); and perches (stang). These marks are usually furnished with arms, which indicate the side on which the channel is to be found; where the channel passes on both sides of the beacon it is fitted with arms on both sides.

2 Many iron perches and posts are, for the sake of visibility, fitted with topmarks. However, marks exposed to the sea have neither arms nor topmarks.

Caution. Because of the large number of fixed marks, mariners must expect that some will be damaged. In particular, iron beacons may become twisted and their arms point in the wrong direction.

Buoyage

1.41

1 **Retroreflectors** are not included with the descriptions of individual buoys in this book. However, they are normally fitted to most of the important buoys using reflective bands of 20 cm width in the same colour as the background to which it is to be fixed, although blue replaces black. The following system is used:

TYPE OF MARK AND CODE APPEARANCE

Green lateral marks

A green band or a green shape, ie conical Green

Red lateral marks

A red band or a red shape, ie cylindrical Red

Yellow special marks

A yellow band, a yellow cross or symbol Yellow

Centre channel marks

A combination of red and white horizontal bands or vertical stripes. At least one band or stripe of each colour. Red
White

Isolated shoals/danger marks

Blue and red horizontal bands. At least one of each colour Blue
Red

North cardinal marks

A horizontal blue band on the black part of the mark and a horizontal yellow band on the yellow part of the mark Blue
Yellow

East cardinal marks

Two horizontal blue bands on the upper black part of the mark Blue
Blue

TYPE OF MARK AND CODE APPEARANCE

South cardinal marks

A horizontal yellow band on the yellow part of the mark and a horizontal blue band on the black part of the mark

Yellow
Blue

West cardinal marks

Two horizontal yellow bands on the upper part of the mark

Yellow
Yellow

1.42

- 1 **Topmarks.** Few buoys in Norwegian waters carry topmarks. Even when they are fitted they are not shown on Norwegian or British charts and are not referred to when such buoys are mentioned in this book.
- 2 **Damage.** Buoys are constantly damaged by collisions which are not reported. This can have a drastic effect on their function as a navigation aid to shipping. Mariners are requested to give all floating marks as wide a berth as possible; and defects, or any need for inspection which may be observed when passing, should be reported to the Coast Directorate, Postboks 8158 Dep, 0033 Oslo; or the nearest Coast Radio Station, see *Admiralty List of Radio Signals Volume 1 (1)* for details. Floating or other seamarks are not to be used for moorings.
- 3 **Ice.** Light-buoys are kept on station in winter unless withdrawal is necessary due to weather or ice. In ice conditions buoys may be forced beneath the surface or sunk. Ice also wears the colour off buoys and coloured lights may be seen as white lights due to over-icing, snow or hoar frost. The range of lights can also be greatly reduced or disappear for the same reason. These buoys are then replaced in some cases by spar buoys and are re-instated in spring.
- 4 **Caution.** Mariners are cautioned that in winter, on account of storms and ice, no reliance should be placed on floating marks retaining their appearance or position.

Sweden

Fixed marks

1.43

- 1 **Leading beacons** are, in general, fitted with equilateral triangles as topmarks; that on the front beacon, point up; that on the rear beacon, point down.
- Swedish sea route marks** are boards which, by their markings, indicate a caution, a prohibition, an ordinance, or give advice to the mariner.
- 2 Cautionary and speed restriction marks have a white background, red border and black symbols; prohibition marks are the same but with the addition of a red diagonal stripe. Advice marks are blue with white symbols.
- 3 These marks are erected on land at the outer edge of the relevant areas; in exceptional circumstances they may be found on buoys (special).

Buoyage

1.44

- 1 **Direction.** In general, the main direction of buoyage in Swedish waters, within the limits of this book, follows the coast from N to S; otherwise from sea into the harbours.
- Retroreflectors.** In Swedish waters the method of retroreflective marking is that of the IALA Comprehensive Code.
- 2 **Warning.** When important marking is withdrawn due to ice conditions within Swedish waters covered by this volume navigational warnings will be promulgated by radio and *Notices to Mariners*.

ANCHORAGES

Norway — mooring rings

1.45

- 1 Mooring rings, which are established on the rocks in many places in Norway, generally opposite anchorages, are marked by a white circular patch with a small black ring in the middle. No payment is necessary for their use except within the principal harbour areas.

Sweden — prohibited anchorage

1.46

- 1 Along the Swedish coast there a number of areas where, in certain cases, mines are already laid in peace time. The mined areas are usually to be found in harbour entrances and archipelago channels where the waters can be observed and the mines controlled from observation places on land. The mines laid are not activated and detonation can only be controlled from the observation place.
 - 2 Anchoring in the mined areas, which may damage the equipment on the bottom, is prohibited by the local provincial authority.
- When mariners are forced to anchor within the area, the Master must ensure that the anchorage position is as far from the centre as possible, with the purpose of reducing the amount of damage to the mine equipment.

PILOTAGE — NORWAY

Regulations

General information

1.47

- 1 Regulations on compulsory pilotage, pilotage exemption certificates (PEC's) and pilotage service dues came into force on 1st May 1995.
- 2 These regulations apply, with certain minor exemptions, to all coastal waters within the baseline. The baseline consists of a straight line drawn from one outermost point to the next along the entire Norwegian coast.

Compulsory pilotage

1.48

- 1 Whilst in waters inside the baseline the following are required to have a State Pilot embarked:
 - Vessels exceeding 500 grt, as stated in the vessel's *International Certificate of Registered Tonnage* pursuant to the 1969 *International Convention on Tonnage Measurement*. The minimum limit is 200 grt in the approaches to the Harbour Districts in Grenland (59°00'N 9°48'E) (3.142).
- 2 Vessels pushing or towing one or more objects exceeding a total length of 50 m.
- Vessels, irrespective of size, carrying particularly hazardous and/or polluting bulk cargo such as condensed gases, all substances in pollution categories A and B (as defined in *Annex II to Marpol 73/78*) and all other substances requiring Type 1 ships or Type 2 ships (as defined in *IBC Code chapter 17* and *BCH Code chapter VI*).
- 3 Vessels exceeding 100 grt with a single bottom and those exceeding 300 grt with a double bottom that are carrying hazardous and/or polluting cargo. (This entails substances mentioned in *Marpol Annex I* for petroleum oil, all substances requiring Type 3 ships and all liquids with a flash point below 23° C).

- 4 Nuclear powered vessels.
Vessels with a maximum length of 24 m or more and not holding a valid international certificate of registered tonnage pursuant to the *1969 Convention on Tonnage Measurement*.

Non-compulsory pilotage

1.49

- 1 The regulations do not apply to the following:
Vessels licensed for carriage of persons in accordance with the Norwegian law of June 4th, 1976 No. 63 on transport.
- 2 Vessels exclusively engaged in domestic trade, where the person responsible for navigation must have at least 12 months service in domestic trade on the same or similar vessel during the past 30 months, except when they are carrying hazardous and/or polluting cargo.
- 3 Fishing vessels registered in Norway.
Vessels under military command and vessels operated by Norwegian military authorities.
Foreign fishing vessels based in Norway may enter and depart from harbours without a pilot on board if the vessel and shipmaster have entered and departed from such a harbour on at least 12 occasions over the preceding 12 months under the guidance of a pilot.

Pilotage Exemption Certificate

1.50

- 1 Holding a Pilot Exemption Certificate, referred to as a Sea Lane Certificate (SLC) in Norway, may give exemption from the obligation to use a State Pilot. A SLC applies to one or more specified vessels and can only be issued when justified in terms of safety.
- 2 Persons holding a SLC are exempted from using a pilot in those fairways to which the exemption applies and on the conditions set out in the SLC, which include a requirement to report to the Pilot Control Centre on entering and leaving waters subject to compulsory pilotage.
- 3 A SLC may be issued to the shipmaster and other of the vessel's navigators provided they have documented their familiarity with the waters in question and with coastal navigation in general. They must also have been in charge of navigation on at least six passages in both directions in the fairways to which the certificate is to apply and the passages must have taken place in the past 12 months. At least two such passages in both directions must have taken place in darkness.

Pilotage dues

1.51

- 1 The Norwegian National Coastal Administration administers the following dues:
General coastal dues to partially cover expenses on lighthouses, beacons, buoys etc as well as icebreaking.
Safety dues payable on approaching Grenland, Sture and Mongstad. These dues cover the operating of the Vessel Traffic Services at Brevik and Fedje.
- 2 **Pilotage readiness dues** which, with certain exceptions, are payable in the following cases:
For passage inside the baseline when the vessel falls within the regulations requiring the use of a pilot or possession of a SLC, irrespective of whether or not a pilot is on board.
When the vessel uses a pilot.
- 3 **Pilotage dues**, payable by all vessels which actually use a State Pilot irrespective of the waters involved, are payable in addition to pilotage readiness dues.

Administration

Pilotage districts

1.52

- 1 State Pilotage comes under the Ministry of Fisheries. Pilotage is normally carried out by State Pilots (*Statslos*), although certain vessels are allowed to use company employed "line" pilots (*Rutelos*). The Norwegian coast is divided into pilotage districts which are served by Pilot Associations. The districts which fall into this volume are as follows:
- 2 **Oslofjorden.** The waters in Oslofjorden between the national border with Sweden and a line from Tønsberg Tønne (59°03'N 10°19'E) to Sydostgrunnen (58°59'N 10°19'E).
Grenland. The waters between Tønsberg Tønne and Sydostgrunnen and the county boundary between Telemark and Aust-Agder (58°45'N 9°21'E).
- 3 **Agder.** The waters between the county boundary Telemark and Aust-Agder and Kvasheim Light (58°33'N 5°41'E) (*Norway Pilot Volume IIA*).

Pilotage Booking Centre

1.53

- 1 Pilotage services are arranged through a Pilot Booking Centre. For the pilotage districts covered by this volume arrangements are made through Oslofjorden (Horten) Pilot Booking Centre. Shipmasters requiring a pilot should make an advanced booking with at least 24 hours warning. This should be followed by another warning at least 5 hours before the pilot is required; and finally by confirmation 2 hours before arrival at the pilot boarding place, or departure from harbour.
- 2 Shorter time limits may be acceptable in some circumstances, but will incur additional fees. Where pilots are required to wait due to an error in arrival/departure time, waiting fees will be charged. Also if vessels are late the pilot, who is bound by working-time regulations, may have to withdraw; in which case a new pilot booking will need to be made giving exact times of arrival/departure.
- 3 For further details see *Admiralty List of Radio Signals Volume 6* (2).

Pilot boarding places

1.54

- 1 State pilot boarding positions for each district are as follows:

<i>District/Place</i>	<i>Position</i>
Oslofjorden	
Herføl	58°58'.8N 11°04'.0E
Vidgrunnen	59°01'.0N 10°56'.0E
Færder	59°04'.5N 10°34'.5E
Grenland	
Langesundsfjorden	58°56'.6N 9°47'.7E
Agder	
Torungen	58°23'.6N 8°50'.5E
Oksøy	58°03'.3N 8°05'.6E

Pilot vessels

1.55

- 1 Pilot vessels have the word "LOS" on the bow in black on a white background. International flag "H" in a pilot vessel indicates that State Pilots are embarked. In restricted visibility, pilot vessels make sound signals in accordance with *International Regulations for Preventing Collisions at Sea* (1972).

Anchorage

Stern moorings

1.56

- 1 As the majority of anchorages are close to the shore, on account of the great depth in the fjords, a perfect understanding with the Pilot is necessary as to the berth to be taken up. Being used to coasters, which sometimes attach their sterns to shore rings, the Pilot will often anchor larger vessels in small corners and secure them by the stern in the same way as the coasters. This should be avoided, if possible, under all high land on account of the heavy squalls that are liable to strike down, even in fine weather.

PILOTAGE — SWEDEN

General information

Compulsory pilotage

1.57

- 1 **Pilotage** is compulsory in Swedish coastal waters and along certain pilot leads connecting ports along the coast. The vessels subject to compulsory pilotage vary in size and type according to location. For this purpose vessels are divided into categories as given below:
- 2 Category 1. Vessels carrying, or with unclean tanks which last carried:
 - (a) Liquefied gas.
 - (b) Liquid chemicals defined in *Marpol 73* Supplement 2, Annex 2, as Category A, B or (if the vessel does not have a double-skin hull under all cargo tanks) Category C.
 - (c) Liquid chemicals which, according to IMO bulk chemical code, should be carried in Type 1 or 2 vessels.
- 3 Category 2. All other chemical tankers which are laden, or have unclean tanks, and all laden tankers.
- Category 3. All other vessels.
For details see individual station entries in *Admiralty List of Radio Signals Volume 6 (2)*.
- 4 **Ice.** Vessels entering ice-bound waters may also be required to embark an Ice Pilot if ice-breaker assistance is required. See also 1.62.

Pilotage exemption

1.58

- 1 Exemption from the need to employ a pilot may be granted by the navigation authority to the Master of a specified vessel, when navigating in specified fairways, depending on his familiarity with, and frequency of use of, those fairways and his fluency in the Swedish language.

Administration

Pilotage districts

1.59

- 1 The coast of Sweden covered by this volume is divided into pilotage districts as given in the following table.

<i>Pilot station</i>	<i>Limits of the district</i>
Marstrand	57°50'N to 58°06'N together with the fairway E of Orust to Uddevalla and W in Havstensfjord to 11°45'E
Lysekil which has a sub station at Nord-Koster.	58°06'N to the Norwegian border excluding the area given for Marstrand, above.

Classification of Pilots

1.60

- 1 Swedish Pilots are classified as follows:
 - Local Pilots. For a particular area or harbour.
 - Long distance Pilots. For service in the open sea, including the North Sea and English Channel, which connects with Swedish waters. One Pilot is normally provided with agreed rest periods. If continuous attendance on the bridge over 12 hours is required then two Pilots will attend.
 - Ice Pilots. Long distance Pilots especially trained for navigation through ice.

Pilot stations and boarding places

1.61

- 1 Pilot stations within the area covered by this volume are listed in *Admiralty List of Radio Signals Volume 6 (2)* and mentioned within the geographic text.
Each pilot station, which is equipped with VHF radio and radar, provides a continuous service except Nord-koster which operates from 0700 to 1600.
- 2 Boarding places are listed below.

Marstrand:	At Hätteberget (57°52'N 11°28'E) W of Marstrand (57°53'N 11°35'E)
Lysekil:	At Brofjordens Angöring (58°15'3N 11°11'2E).
Brofjorden:	VLCCs are boarded at 58°13'3N 11°08'7E
Nord-Koster:	58°58'2N 11°03'3E, near Nord-Hällsö. 58°54'4N 11°03'8E, in Koster Fjorden. 58°44'0N 10°59'7E S of Ramskär Light.

Requests for Pilots

1.62

- 1 **General remarks.** All requests for pilots in Swedish waters, and any subsequent amendments, are to be made either by telephone or through the Swedish Maritime Administration home page www.sjofartsverket.se. Radio contact should be established with the pilot station before arrival. For details see *Admiralty List of Radio Signals Volume 6 (2)*.
 - Long distance Pilots** and pilotage out of normal service hours should be requested 24 hours before requirement.
- 2 **Ice pilotage** should be requested 24 hours in advance through the nearest pilot station. The Icebreaker Director decides with regard to prevailing and expected ice and weather development, and the suitability of the vessel for ice navigation, whether the vessel can expect assistance from an ice breaker, and whether the vessel must then use an ice pilot. If continuous assistance is necessary on the bridge on voyages which exceed 12 hours, advanced notice must be given and two pilots will be despatched to the vessel.
For detailed information see *Admiralty List of Radio Signals Volume 6 (2)*.

Pilot vessels

1.63

- 1 Each station has a large seaworthy steel craft fitted with VHF, echo sounder and radar. Some stations also contain a light, high-speed craft.

RADIO FACILITIES

Electronic position fixing systems

1.64

- 1 **Loran C.** The Sylt Chain of the Northwest European System provides coverage over the whole of the area with a predicted accuracy of 465 m. This is not good enough for navigation near the coast.

Details are given in *Admiralty List of Radio Signals Volume 2*.

Radio navigational aids

1.65

- 1 **Satellite Navigation Systems.** The Navstar Global Positioning System (GPS) will provide world-wide position fixing but should only be utilised at the user's risk. GPS is referenced to the World Geodetic System 1984 Datum. Positions obtained by GPS must therefore be adjusted, if necessary, to agree with the datum of any chart being used; see 1.28 for information on the charts used in the area covered by this volume. The application of DGPS corrections will further refine positions obtained. For further information see *Admiralty List of Radio Signals Volume 2*.

- 2 **Racones.** There are several racons in the area to aid offshore navigation. See *Admiralty List of Radio Signals Volume 2* for details. Those aids which are pertinent to coastal and inshore navigation are included within the navigational text.

Radio navigational warnings

1.66

- 1 **NAVAREA 1 Warnings.** The area covered by this volume lies within the limits of NAVAREA 1. Warnings are broadcast through:

SafetyNET, Enhanced group Calling International SafetyNET, for full broadcast details see *Admiralty List of Radio Signals Volume 3 (1) and Volume 5*.

NAVTEX, depending upon the area affected, NAVAREA 1 Warnings may also be transmitted through NAVTEX, for full broadcast details see *Admiralty List of Radio Signals Volume 3 (1) and Volume 5*.

- 2 **Coastal Navigational Warnings** are broadcast by coast radio stations. For full broadcast details see *Admiralty List of Radio Signals Volume 1 (1)*.

Radio weather and ice reports

1.67

- 1 Ice in the Norwegian waters between Kristiansand and the international boundary with Sweden is monitored by the Norwegian Ice Service, which is administered by the Kystverket Sørøst, the Norwegian Coastal Authority for the SE coast of Norway. During the ice season, the Kystverket Sørøst receives daily reports on the ice situation from each port under its jurisdiction. This information can then be sent by radio to vessels sailing in the area; electronic ice reports are also available on the Kystverket Sørøst website, <http://www.kystverket.no>.

- 2 Radio weather and ice report broadcast details are given in *Admiralty List of Radio Signals Volume 3 (1)*.

Automatic Identification System

General information

1.68

- 1 AIS is designed to contribute to the safety of navigation, enhance protection of the marine environment and improve

the monitoring of passing traffic by coastal states. A phased implementation programme is underway (2004) on various classes of vessel and at certain establishments ashore. For further details see *The Mariner's Handbook* and *Admiralty List of Radio Signals Volumes 2 and 6 (2)*.

REGULATIONS

International regulations

Submarine cables and pipelines

1.69

- 1 The area covered by this volume is crossed by a number of submarine cables and pipelines connecting individual islands and the mainland. These are shown on the chart; however, where pipelines are close together, only one may be charted. For information on submarine cables and pipelines, and on the *International Convention for the Protection of Submarine Cables*, see *The Mariner's Handbook*.

1.70

- 1 **Caution.** Mariners are advised not to anchor or trawl in the vicinity of pipelines. Gas from a damaged oil or gas pipeline could cause an explosion, loss of a vessel's buoyancy or other serious hazard. Pipelines are not always buried and may effectively reduce the charted depth by up to 2 m. They may also span seabed undulations and cause fishing gear to become irrecoverably snagged, putting a vessel in severe danger. See Annual Notice to Mariners No 24 and *The Mariner's Handbook*.

- 2 **Caution.** It should be noted that, in Norwegian waters, some submarine cables may conduct high voltages and contact with or proximity to these poses extreme danger. Mariners should be aware that some of these cables may not be charted.

Pollution of the sea

1.71

- 1 In the area covered by this volume pollution of the sea by oil is forbidden. See *The Mariner's Handbook* for information on the *International Convention for the Prevention of Pollution from Ships 1973* (MARPOL 1973) and the 1978 Protocol to MARPOL 1973, jointly known as MARPOL 73/78.

- 2 Under Annex V of MARPOL 73/78, which covers the disposal of garbage from ships, the area described in this volume has been designated a special area.

Arrangements for the reception and discharge of oil residues from ships exist in certain ports covered in this book. Vessels requiring such facilities should give details of requirements at least 24 hours in advance.

European Community regulations

Directive 2002/59/EC

1.72

- 1 **General information.** This Directive establishes a common vessel traffic monitoring and information system throughout European Community (EC) waters. The principal provisions are described below. They apply in general to all commercial vessels over 300 grt but the rules concerning the notification of carriage of dangerous and polluting goods applies to all vessels regardless of size.

- 2 **Caution.** These extracts are for reference purposes only and are not to be regarded as a statement of the applicable law. The full text of the regulations is the sole authoritative

statement of the applicable law and it is recommended that it is consulted. The regulations to which the following refers is *Directive 2002/59/EC* or the appropriate enabling legislation drafted by individual member states.

- 3 **Ship reports.** All vessels bound for a port within the EC must report to the port authority at least 24 hours prior arrival, or, if the voyage is less than 24 hours, no later than the time of departure from the previous port. The report shall include the following information:

Name, call sign, IMO or MMSI number.

Port of destination.

ETA and ETD at port of destination.

Total number of persons on board.

- 4 Upon receipt of a ship's report, the port authority will notify the national coastguard authority by the quickest means possible. This information will then be pooled in the European-wide telematic network called SafeSeaNet.

Any amendments to the initial ship report must be notified immediately.

- 5 **Mandatory ship reporting systems.** All vessels shall report to the coastguard authority on entering an IMO-adopted mandatory ship reporting system, the report being made in the recognised format (See *Admiralty List of Radio Signals Volume 6 (2)*). The coastguard authority is to be informed of any changes to the initial report.

1.73

- 1 **VTS.** All vessels are to participate in and comply with VTS systems operated by EC member states and also those systems operated by member states in conjunction with co-operating non-member states. This includes those systems operated by member states outside their territorial waters but which are operated in accordance with IMO guide-lines.

- 2 **Routing schemes.** All vessels must comply with IMO recommended TSS and Deep Water route regulations. (See IMO publication *Ships' Routeing Guide*).

AIS and VDR. All vessels are to be equipped with AIS and VDR. The systems shall be in operation at all times.

By 2008 individual coastguard stations throughout the EC are required to be able to receive AIS information and to relay it to all other coastguard stations within the EC.

- 3 **Notification of dangerous and polluting goods.** All vessels leaving an EC port are to report dangerous and polluting goods as specified within the Directive to the harbour authority. Vessels arriving from outside EC waters must transmit a report to their first EC port or anchorage upon departure from their port of loading. If, at the time of departure, the port of destination in the EC is not known, the report must be forwarded immediately such information becomes known. Where practical, this report is to be made electronically and must include the information described in Annex 1(3) of the Directive.

- 4 When a harbour authority receives a dangerous or polluting cargo report, it shall retain the report for use in the event of an incident or accident at sea, forwarding it whenever requested by the national coastguard authority.

1.74

- 1 **Reporting of incidents and accidents.** Whenever a vessel is involved with one of the following, the coastguard authority of the EC coastal state is to be informed immediately;

(a) any incident or accident affecting the safety of the ship;

- 2 (b) any incident or accident which compromises shipping safety, such as a failure likely to affect a ship's manoeuvrability or seaworthiness;

(c) any event liable to pollute the waters or shores of the coastal state;

(d) The sighting of a slick of polluting material or drifting containers and packages.

- 3 The owner of a vessel, who has been informed by the master that one of the above has occurred, must inform the coastguard and render any assistance that may be required.

- 4 **Measures to be taken in the event of exceptionally bad weather or sea conditions.** If, on the advice of the national meteorological office, the coastguard authority deems a threat of pollution or a risk to human life exists due to impending severe weather, the coastguard authority will attempt to inform the master of every vessel about to enter or leave port as to the nature of the weather and the dangers it may cause.

- 5 Without prejudice to measures taken to give assistance to vessels in distress, the coastguard may take such measures as it considers appropriate to avoid a threat of pollution or a risk to human life. The measures may include:

(a) a recommendation or a prohibition on entry or departure from a port;

(b) a recommendation limiting, or, if necessary, prohibiting the bunkering of ships in territorial waters.

- 6 The master is to inform his owners of any measures or recommendations initiated by the coastguard. If, as a result of his professional judgement, the master decides not to act in accordance with measures taken by the coastguard, he shall inform the coastguard of his reasons for not doing so.

1.75

- 1 **Measures relating to incidents or accidents at sea.**

The coastguard authority will take measures to ensure the safety of shipping and of persons and to protect the marine and coastal environment. Measures available to EC states include:

(a) a restriction on the movement of a ship or an instruction to follow a specific course.

- 2 (b) a notification to put an end to the threat to the environment or maritime safety;

(c) send an evaluation team aboard a ship to assess the degree of risk and to help the master remedy the situation;

(d) instruct the master to put in at a place of refuge in the event of imminent peril, or, cause the ship to be piloted or towed.

- 3 The owner of the ship and the owner of the dangerous or polluting goods on board must cooperate with the coastguard authority when requested to do so.

Places of refuge. EC states are required to designate places of refuge where a vessel which has undergone an accident or is in distress can receive rapid and effective assistance to avoid environmental pollution.

Regulation (EC) No 417/2002

1.76

- 1 This regulation establishes a timetable for the phasing out of all single-hull petroleum tankers of more than 5000 dwt in European waters. Ultimately only double-hull tankers or tankers of equivalent design will be permitted to visit European ports and offshore terminals.

- 2 The timetable is based upon a vessel's date of build, its design and the type of petroleum carried. The schedule for Category 1 and 2 tankers will complete in 2007 and for Category 3 tankers in 2015. Categories are as defined in the regulation.

Norwegian regulations

Entry into territorial waters

1.77

- 1 Details of the regulations concerning the entry into and passage through Norwegian Territorial Waters (1.139) in peacetime, of foreign non-military vessels, are given in Appendix I.
- 2 Mariners should contact the appropriate Naval Operations Centre for permission to enter Norwegian waters and when passing specified reporting points in the fairway. All notifications in connection with entry and sailing in Norwegian Territorial Waters are to be routed through a Norwegian Coast Radio Station which will distribute the information to the appropriate Norwegian authorities. For further details see *Admiralty List of Radio Signals Volume 6 (2)*.

Waterway regulations in Norwegian internal waters

1.78

- 1 Waterway regulations in Norwegian internal waters. The following are extracts from waterway regulations which are in force in Norwegian internal waters (see Section 7 of Appendix I) and which differ from those in the International Regulations for Preventing Collisions at Sea (1972):
- 2 A vessel towing floating timber, oil containers, plastic hoses, etc., carries a white lantern with an additional white lantern for every 100 m of tow, or, by day, a black flag or rectangular black shape. A vessel towing dracones, herring bags, etc., which are wholly or partly submerged shall have a raft or float in tow. To mark the after end of the tow, the raft or the float shall exhibit an all-round white light or diamond shape.
- 3 Dredgers show the lights and shapes prescribed by the International Regulations except that only one shape is displayed by day. In fog the sound signal for a vessel at anchor is followed by:
At least 6 single strokes of the bell if the dredger is to be passed as if it were a red spar buoy, or;
At least 6 double strokes of the bell if the dredger is to be passed as if it were a green spar buoy.
- 4 Patrol vessels — channel closure. A vessel patrolling for the purpose of warning approaching shipping of the temporary closure or restriction of a channel will show:
By day International flag U;
By night One green light above two red lights disposed vertically.
- 5 The vessel may transmit the letter U (···-) in the Morse code by light or sound signal.
Bend in channel. A power driven vessel approaching a bend in the channel must sound a 10-second blast when 5 cables short of the bend: on hearing this signal a meeting vessel must wait.
- 6 Narrow passage. A power driven vessel approaching a passage so narrow that meeting vessels cannot pass must sound at least 5 short blasts: on hearing this signal a meeting vessel must wait.
Cable ferries or chain ferries carry a ball and three red lights, disposed in a triangle point up.

Military prohibited areas

1.79

- 1 Certain areas within the Sørlandet and Østlandet Maritime Defence Districts are prohibited to navigation.

These areas generally lie within 50 m of the shore, as defined by MSL, and are, in Sørlandet, around Hisøy (58°26'N 8°46'E), Kristiansand (58°09'N 8°00'E) and Mandal (58°02'N 7°28'E). Within Østlandet, the areas are in the N approaches to Horten (59°25'N 10°29'E), and surrounding the Bolærne Islands (59°13'N 10°33'E) and Rauer (59°14'N 10°42'E). However, details of the limits should be obtained locally.

Photography is also prohibited.

Safety zones

1.80

- 1 Safety zones established around offshore installations or other constructions must not be violated without permission.

Speed limits

1.81

- 1 Speed is limited to 5 kn when less than 100 m from the shore, boat harbours, anchored boats, etc; and within 50 m of bathing places. Public bathing places are marked by buoys (orange with an orange spherical topmark) and passing inside these is prohibited. In the District of Hurum, between Oslofjorden and Drammensfjorden, the limit applies within 150 m of the shore.

Traffic separation schemes

1.82

- 1 A traffic separation scheme is established in Oslofjorden, commencing in the S entrance (59°10'N 10°39'E) and continuing through the fjord to latitude 59°38'N as given in the *Annual Summary of Notices to Mariners* and shown on the large scale charts. A further traffic separation scheme is also established W of Nesodden (59°52'N 10°39'E) at the N end of the fjord.
- 2 These schemes are not IMO-adopted but the originating authority (Government of Norway) advises that the principles for the use of routeing systems defined in Rule 10 of the *International Regulations for Preventing Collisions at Sea (1972)* apply.
- 3 The area between these traffic separation schemes is designated a precautionary area, as defined in *The Mariner's Handbook*, in which ships should navigate with extreme caution. Recommended directions of traffic flow are established within the area, as shown on the chart.
- 4 Most recent details and a cautionary note regarding traffic separation schemes are given in the *Annual Summary of Notices to Mariners*.

Tankers

1.83

- 1 Norwegian authorities recommend that tankers of 40000 dwt and above, when navigating off the coast of Norway, should keep to seaward of a line joining the following positions:
 - (a) 187°, 13 miles from Lindesnes Light (57°59'N 7°03'E) (2.20).
 - (b) 180°, 12 miles from Ryvingen Light (57°58'N 7°30'E) (2.20).
 - (c) 180°, 15 miles from Songvår Light (58°01'N 7°48'E) (2.86).
 - (d) 146°, 15 miles from Oksøy Light (58°05'N 8°03'E) (2.83).
 - (e) 156°, 12 miles from Svenner Light (58°58'N 10°09'E) (4.17).
 - (f) 135°, 2½ miles from Færder Light (59°02'N 10°32'E) (4.17).
- 2
- 3

Reporting requirements for vessels carrying dangerous or polluting goods

1.84

- 1 Norwegian regulations require an arrival report and the completion of a check list for vessels carrying dangerous or polluting goods arriving from countries other than the EC and Iceland. All vessels departing from Norway, irrespective of destination, must make a departure report. These regulations apply to vessels of at least 300 grt and to vessels, irrespective of size, carrying dangerous or polluting goods in bulk or in packaged form, as defined by the *International Maritime Dangerous Goods Code*. The regulations do not apply to:
 - 2 Warships, and official ships used for non-commercial purposes.
Fishing vessels, pleasure vessels, and traditional vessels, provided they are less than 45 m in length.
Bunkers of less than 5000 tonnes, stores and equipment for use on board vessels.
 - 3 The regulations, forms and check lists are available from the Norwegian National Coastal Administration by email at nnca@kystverket.no, by telephone at 33034800 or by fax at 33034680. This information is also available at the National Coastal Administration's website <http://www.kystverket.no>. Users of the website require a password. Shipmasters and operators in need of a user name and password should contact the Brevik Vessel Traffic Centre on +47 35572610.

Seaplane harbours

1.85

- 1 The following information has been extracted from the regulations:
 - The alighting and taking-off of aircraft must in no way be impeded or endangered.
 - 2 No vessels shall pass within 50 m of any moored or stationary aircraft, and must pass at such reduced speed that no damage may be caused by wash. All mariners in the vicinity of alighting or taking-off areas shall keep a sharp lookout for a patrol boat and promptly obey any orders received from such boat.
 - 3 When seaplanes are operating, a black and yellow chequered flag or ball will be displayed ashore at the Administrative Buildings, and a patrol boat will be on duty. This signal indicates that the flying area is closed to shipping. During this period, mariners in vessels and small craft must not approach the patrol boat within a distance of less than 200 m, even if they are outside the operating area.
 - 4 The patrol boat is easily recognisable by its black and yellow chequered hull. It also displays a flag or ball with similar colours and may call the attention of a mariner by siren or green and red visual signals and, at night, by flares.
 - 5 Light signals shown by the patrol boat are as follows:
 - Fixed red: Stop immediately and wait.
 - Flashing red: You are in a prohibited area; proceed clear on reverse course, or in the direction indicated by visual signals.
 - Fixed green: All clear, continue on your course.
 - Flashing green: The area is clear and open to shipping.
 - 6 During the part of the year when flying operations take place, a number of notice-boards are established within the seaplane harbours, in such a position as to be easily visible to all craft under way within the limits of the operating

area. The notice-boards warn mariners to reduce speed and to follow the instructions of the patrol boat; they are inscribed:

*SJØFLYHAVNOMRÅDE
SAKTE FART. FOLG PATRULJEBÅTENS
ANVISNINGER*

- 7 The only seaplane harbour within the area covered by this volume is situated near Oslo in Lysakerfjorden (59°54'N 10°39'E) (5.188).

Quarantine

1.86

- 1 Quarantine regulations are concerned with preventing the import into Norway of plague, cholera, smallpox, and yellow fever. Declarations of health conditions are required from vessels arriving.
Vessels on foreign trade must be in possession of a deratting certificate or deratting exemption certificate. For deratting facilities see 1.170.
- 2 No vessel coming from a foreign port is allowed, except in cases of emergency, to communicate with the shore, nor may any person leave the vessel until permission has been obtained from the Quarantine Officer.
Vessels bound for a Norwegian port within the limits of this volume, and having cholera, spotted fever or plague patients onboard, shall proceed to the quarantine station at Oslo (59°54'N 10°44'E) (5.185).

Lifeboat drill

1.87

- 1 Lifeboat drill involving the lowering of boats is not permitted whilst vessels are underway in Norwegian territorial waters. Harbour drills are allowed with the permission of the local police.

Grenland approaches

1.88

- 1 Regulations on the use of the approaches to the harbour districts in Grenland are given in Appendix II. Working details are given in *Admiralty List of Radio Signals Volume 6* (2).

Swedish regulations

Territorial waters

1.89

- 1 **Display of national flag.** Merchant vessels in Swedish territorial waters (1.154), when in the company of Swedish warships in daylight, or when within 1 mile of restricted or semi-restricted areas, are required to hoist their national flag. When at anchor in the company of Swedish warships the national flag shall be hauled down.

Sea surveillance centres and traffic areas

1.90

- 1 **Naval Sea Surveillance Centres.** The main duty of such a centre is to gather and study information concerning all activities at sea; they monitor VHF Channel 16 continuously. The area covered by this volume is covered by the surveillance centre at Göteborg (57°42'N 11°55'E) (*Baltic Pilot Volume 1*).
- 2 **Sea Traffic Areas.** The Swedish Navigational Office is organised into 13 Sea Traffic Areas together with four Maritime Inspection Areas. In the area covered by this volume the sea traffic areas are Skagerrak, controlled from Marstrand; and Kattegat, controlled from Göteborg.
Göteborg is also a maritime inspection area.

- 3 **Control of shipping.** Shipping may be hailed by Swedish maritime, air or defence authorities, using signal SO or L of the *International Code of Signals*, and required to alter course or stop. They may also be boarded or instructed to enter harbour for examination. Restrictions may also be imposed on the use of the vessel's radio.

Restricted military areas

1.91

- 1 Within Swedish waters several restricted military areas have been established for the protection of defence installations, and areas of special significance to the defence of Sweden. Within the limits of this volume such an area lies outside the main channel in the approaches to Uddevalla, in the vicinity of Algön (57°55'N 11°40'E) (8.157).
- 2 Under normal circumstances, foreign persons and vessels may stay in these areas without the need for special permission. However in times of increased military tension, or at such other times as the Swedish government may decide, special regulations, details of which will be promulgated by Swedish Notices to Mariners, will apply.

Local speed restrictions

1.92

- 1 In Swedish waters vessels are to pass jetties, harbour installations and moored boats at the slowest possible speed to avoid damaging them by wash.
- 2 A speed limit of 5 kn must be observed when passing within ½ cable of light-structures which are in the process of being replenished by boats carrying gas containers; also when passing piers or jetties at which such boats are loading or discharging gas containers. These boats are distinguished by a red ball in the rigging.

Bird and seal sanctuaries

1.93

- 1 The coastline and islands of Sweden contain a large number of bird and seal sanctuaries to which entry or approach is subject to restriction or prohibition. The areas, shown on national charts and annotated with a code, are subject to change; they are also marked by boards on the shoreline. Explanation of the codes, which outline the restrictions, is given in Swedish Notice to Mariners.

Quarantine

1.94

- 1 Vessels arriving at any of the ports covered by this volume are subject to the Swedish Quarantine Ordinance (SFS 1975: 1019).
- Quarantine is enforced in accordance with International Health Regulations, 1969. Vessels entering territorial waters from abroad should hoist the appropriate signal from the *International Code of Signals* and have no communication with the shore until cleared.
- 2 An international signal code is used for sending Radio Pratique Messages, as given in *Admiralty List of Radio Signals Volume 1 (1)*, which also lists the authorities to whom the signal should be addressed. The nearest Quarantine Harbour to the area covered by this volume is Göteborg (57°42'N 11°55'E) (*Baltic Pilot Volume 1*).

- 3 In normal conditions, vessels, irrespective of flag, proceeding from one port to another in the European Community, need not request pratique.

Special regulations also apply to traffic between Sweden, Norway, Denmark and Finland.

ICEBREAKING SERVICES

General information

Ice conditions

1.95

- 1 Ice normally forms in the inner leads, fjords and several harbours within the area covered by this volume, described at 1.198. This ice can constitute a hazard to navigation. See 1.5.
- Reports of channels being closed by ice are first made when navigation in the waters of the area indicated is closed to sailing vessels.

National organizations

Norway

1.96

- 1 **Organization.** There are no government owned icebreakers in Norway. When ice conditions make it necessary the government will establish an icebreaking service in Oslofjorden and along the Norwegian coast from the Swedish border to Kristiansand, using tugs. This organization is regulated in accordance with Royal Resolution of January 18 1964; and by Crown Prince Regent resolution of January 14th, 1966, modified to suit the reorganization of the Coastal Administration. Requests for assistance should be sent as follows:

Postal address: Kystverket 1 Distrikt,
Service Box 625

Telegrams: Kystverket, Arendal

- 2 **Identification marks.** Icebreakers managed by the Norwegian Coastal Administration display the following:
- By day:* Pennant (naval ensign) and the banner of the Coastal Administration, below the signal yard.
- At night:* A blue light at the top of the mast, visible all round the horizon.

Sweden

1.97

- 1 **Organization.** The Government Icebreaking Service is managed by the National Maritime Administration:
- Postal address: Sjöfartsverkets Huvudkontoret,
Isbrytningsavdelingen,
S-601 78,
Norrköping, Sweden.
- Telegrams: Civilmarin Norrköping.
- 2 **Regional office,** established in Göteborg, is responsible for the icebreaking service within the Swedish waters covered by this volume. The head of the office is the Director of Pilot Service.

Local office, for the area covered by this volume is Marstrand-Lysekil. The head of the office is the Director of Pilot Service.

- 3 **Identification marks.** Danish–Swedish icebreakers are distinguishable as follows:

By day: Pennant (part–coloured) at the yardarm

At night: A blue light at the top of the mast, visible all round the horizon.



Swedish Icebreaker's Pennant

International operations

General information

1.98

- 1 **International co–operation.** Icebreaking services are provided under co–operative agreement between Denmark, Finland, Norway and Sweden, with the purpose, through identical regulations, of assisting the maintenance of navigation and safety at sea during the winter period.

General information on Icebreaker assistance is given in *The Mariner's Handbook*.

Promulgation of information

1.99

- 1 General ice conditions are broadcast regularly using the Baltic Sea Ice Code, as given in *Admiralty List of Radio Signals Volume 3 (1)*.

In Sweden, a telephone answering unit, as given in *Admiralty List of Radio Signals Volume 3 (1)*, is active during the winter. This unit will provide a brief account of the ice situation for the day, the operational areas of the icebreakers together with instructions for shipping.

- 2 It should be noted that transmitted ice reports are based on observations at the stations in the morning. With regard to the conditions in Oslofjorden and along the Skagerrak coast, these conditions may change very rapidly due to current and wind. In addition, low visibility and darkness may prevent observations, making it difficult to report changes as soon as would be desirable. Thus the reporting stations would welcome reports from vessels at sea.

The position of Swedish icebreakers on service is broadcast daily.

Suitability for winter navigation

1.100

- 1 The following are the minimum requirements for a ship to be considered suitable for winter navigation:

- The ship shall be classified as being of the highest class by a Classification Society approved by the state in question; or shall otherwise have demonstrated that it is of a corresponding construction and strength at an inspection of sea worthiness.
- The ship shall be equipped with propulsion machinery powerful enough for the ship to make its way through light ice or through broken channels within the belt of skerries without icebreaker assistance.
- The ship shall be at least 500 dwt.

- d) The ship shall be provided with an approved radiotelegraph or radiotelephone installation and VHF installation.

- e) The stability of the ship shall be such that, even when carrying deck cargo, a certain amount of icing can occur without risk of capsizing.

Ice–class designations

1.101

- 1 In setting requirements for ice–strengthening the Executive Board of the Swedish Icebreaking Service, in the restrictions issued for sea traffic, uses the designation of the Swedish–Finnish ice classes, established in 1987, which are as follows:

<i>Ice class</i>	<i>Conditions</i>
1A Super	For traffic in extreme ice conditions
1A	For traffic in severe ice conditions
1B	For traffic in semi–severe ice conditions
1C	For traffic in light–severe conditions
II	For traffic in very light ice conditions

Ice–class comparisons

1.102

<i>Swedish–Finnish</i>	<i>Norwegian</i>	<i>Lloyds Register of Shipping</i>
1A Super	1A1, Ice A*	100A1, Ice class 1AS
1A	1A1, Ice A	100A1, Ice class 1A
1B	1A1, Ice B	100 A1, Ice class B
1C	1A1, Ice C	100A1, Ice class C
II	1A1	100A1, Ice class 1D

Approaching ice

1.103

- 1 When approaching waters in which ice exists it is prudent to establish contact with the icebreaker as soon as possible; also to establish communications with a neighbouring coast radio station. In vessels not fitted with radio a report by visual signals should be made at the earliest opportunity.

- 2 On arriving at the edge of the ice, the Master of each vessel should keep the icebreaker constantly informed of his position until her arrival and, if possible, should await the icebreaker in open water.

Ship reports

1.104

- 1 The Icebreaking Service decides, with regard to the prevailing and expected ice conditions, when compulsory reporting for ships bound to harbours in a certain area is introduced and when such obligation ceases. Information on this will be given in the daily reports.

Ship reports, which should be made in good time before arrival in the iced area, should contain the same information as for a request for assistance (below).

Requests for assistance

1.105

- 1 **Requests** for assistance should be made directly to the icebreaker in the vicinity, in accordance with *Admiralty List of Radio Signals Volume 3 (1) and Volume 6 (2)*. These requests should be made in good time so that the service can meet its dispositions.

- 2 **Vessel at sea.** The mariner must include information concerning:

Ship details, such as name, description, port of registry, tonnage, engine power, year of construction, ice class, destination, type and tonnage of cargo.

ETA area at which icebreaker service will be required.

Whether an Ice Pilot is required, see 1.60.

- 3 Additional information concerning the vessel and her cargo must be given if requested by the Icebreaking Service.

Vessel in harbour. The Master of a vessel in harbour should apply to the local Harbour Master giving the ship's ETD. If there is no suitable Harbour Authority, requests should be made as for vessels at sea.

Icebreaking assistance

1.106

- 1 The Icebreaking Service decides whether a reported vessel can expect assistance from the icebreakers. In making this decision regard will be paid to the vessel's suitability for winter navigation (1.100) and other priorities such as:

Vessels in distress or requiring assistance owing to danger to life onboard.

Vessels to or from Scandinavian ports, with priority to passenger vessels and vessels carrying special cargoes.

Other vessels.

- 2 Having accepted a vessel as suitable for assistance, directions for the passage will be passed accordingly. These include, if necessary, the requirement for an Ice Pilot onboard.

If icebreaker assistance cannot be made available, Masters of the vessels concerned will be requested to discontinue their passage.

Conduct of icebreaking operations

1.107

- 1 **Authority.** Each ship receiving icebreaker assistance is subject to the authority of the Captain of the icebreaker and of the Coastal Administration for the duration of the assistance. This means that the Master of each ship receiving such assistance — be it requested or not — shall follow the directives. However, the Authorities accept no responsibility for delay, damage or other loss which may be incurred. Every vessel is responsible for its own safety.

- 2 **Rules.** The following rules are to be observed by the Master of any vessel while under assistance:

Careful attention should be paid to the lights and other signals from the icebreaker or other vessels in the convoy. The means of displaying or sounding such signals must be ready for immediate use. The specified VHF channel shall be monitored continuously.

- 3 The main engine must be ready for rapid manoeuvring at all times; eg full power astern may be needed to avoid hitting the icebreaker should it become ice-bound.

When several vessels follow the icebreaker there shall be no overtaking except by the express order of the icebreaker.

- 4 Distance between vessels must be carefully maintained with particular attention to own speed and that of the vessel ahead. If own speed decreases the next vessel in line must be warned by means of an attention signal.

At all times the crew of an assisted vessel must be ready to attach a towing hawser in such a way that it can be rapidly released. They must remain ready to release it instantly.

- 5 The Captain of the icebreaker determines whether or not the assisted vessel shall be towed.

The drive machinery of the vessel being towed may only be used after consultation with the Captain of the icebreaker.

- 6 Vessels should be maintained in a high state of watertight integrity and repair readiness. See *The Mariner's Handbook*.

Any damage which is of importance to the continued navigation of the vessel must be reported immediately to the Captain of the icebreaker.

- 7 Vessels which form part of a convoy and which have become fast in the ice shall keep their searchlights extinguished.

With the agreement of the Captain of the icebreaker, radio operators in the assisted vessels should, whenever possible, monitor one of the international emergency and call frequencies.

Costs

1.108

- 1 The icebreaker assistance, including any towing, is generally given free of charge in ordinary traffic routes. However, this does not apply if the service is regarded as salvage; neither does it apply to the services of an Ice-pilot, which may be compulsory in some circumstances.

Signals

1.109

- 1 **Visual** signalling is carried out using the International Icebreaker Signals which are contained in the *International Code of Signals*.

Radio. Icebreakers are fitted with VHF radio and carry mobile phones.

- 2 **Sound signals.** Icebreakers are equipped with both bass and tenor sirens. Signals made by tenor sirens apply only to the vessel nearest to the icebreaker. Signals made by bass siren apply to all vessels being assisted, and may also be made by a light synchronised with the siren; these signals should be repeated, in sequence, by all vessels.

Co-operation with aircraft

1.110

- 1 Aircraft may be used to assist the icebreaking service and, when this is the case, the following should be provided by the crew of the vessel:

Largest size national flag displayed.

Ship's name and port of registry painted on the ship's side or hatches.

Continuous watch on 2182 kHz or 500 kHz. When contact is established the channel is changed, as agreed.

If radio is not available messages may be displayed on the ice. When the emergency signal is displayed, any requirements should be included. A white rocket from the aircraft indicates that the message is understood.

- 2 Messages and emergency provisions will be dropped onto or close to the vessel. Containers should be returned to the Swedish Pilot Service.

Swedish aircraft working with the joint Icebreaking Service are distinguished by a mark consisting of three yellow crowns on a blue circular ground.

Manoeuvring signals used to direct vessels are given at 1.137

SIGNALS

International

Visual storm warning signals

1.111

- 1 The use of visual storm warning signals in the countries covered by this pilot has been discontinued; for full details of weather information available see *Admiralty List of Radio Signals Volume 3 (1)*.

International port traffic signals

1.112

- 1 The International Port Traffic Signals consist of signals recommended by the International Association of Lighthouse Authorities (IALA) and other international authorities in 1982. The system of signalling has been progressively introduced at ports as circumstances have permitted. They consist of lights only, shown continuously by day and night, and are recognisable as traffic signals as the main signals are always three lights in a vertical line. The signals may also be used for controlling movements at bridges and locks.
- 2 For a description of this system see *The Mariner's Handbook*.

Special signals by naval vessels

1.113

- 1 The *Mariners's Handbook* should be consulted concerning the characteristics and special signals shown by naval vessels.
There is also information on submarines and minelaying and mine countermeasures exercises in the *Annual Summary of Admiralty Notices to Mariners*.

Norway

Fishery protection vessels

1.114

- 1 When on duty, Norwegian fishery protection vessels exhibit a fixed blue light from the highest masthead. This light has a range of 2 miles and all-round visibility.

Patrol vessels

1.115

- 1 A vessel patrolling for the purpose of warning approaching shipping of the temporary closure or restriction of a channel will:
By day, display flag **U** of the International Code of Signals
At night, exhibit one green light above two red lights, disposed vertically.
- 2 This vessel may also send the letter **U** (· · -) in morse code by light or sound signal.

Towing

1.116

- 1 **Floating timber.** A vessel towing floating timber, oil containers, plastic hoses, etc, carries a white lantern with an additional white lantern for every 100 m of tow; or, by day, a black flag or rectangular black shape.

- 2 **Dracones.** A vessel towing dracones, herring bags, etc, which are wholly or partly submerged, carries a black diamond shape. The tow is marked by a float carrying a white lantern or black diamond shape.

Sound signals in confined waters

1.117

- 1 **Bend in channel.** A power driven vessel approaching a bend in the channel must sound a 10 second blast when 5 cables short of the bend: on hearing this signal a meeting vessel must wait.
- 2 **Narrow passage.** A power driven vessel approaching a passage so narrow that meeting vessels cannot pass must sound at least 5 short blasts: on hearing this signal a meeting vessel must wait.

Large vessels at anchor

1.118

- 1 Vessels of 92 m or more in length, when at anchor in Norwegian territorial waters (Appendix I) shall exhibit, in addition to the normal anchor lights:
One white light, screened to show from right ahead to right astern, on both sides of the vessel, midway between the forward and after anchor lights, at such a height that all three lights are in a straight line, decreasing in height towards the stern.

Diving signals

1.119

- 1 In Norwegian waters the *International Code of Signals* is used to indicate diving operations are in progress; this flag is floodlit at night. A vessel displaying this flag must be passed with special care, the passing vessel stopping engines if possible.

Dredger signals

1.120

- 1 Dredgers show the lights and shapes prescribed by the International Regulations except that only one shape is displayed by day. In fog, the sound signal for a vessel at anchor is followed by:
At least 6 single strokes of the bell if the dredger is to be passed as if it were a red spar buoy.
At least 6 double strokes of the bell if the dredger is to be passed as if it were a green spar buoy.

Ferries

1.121

- 1 **Cable ferries or chain ferries** carry a ball and three red lights, disposed in a triangle point up.

Seaplane operations

1.122

- 1 Signals used in seaplane operations are given at 1.85.

Ice signals

1.123

- 1 Signals used in icebreaking operations are given at 1.109.

Sweden

Mine clearance signals

1.124

- 1 In addition to the signals described in the *Annual Summary of Admiralty Notices to Mariners* for the current year, the following flags or lights may also be shown:
- 2 Vessels towing minesweeping apparatus, but not engaged in minesweeping, display at the foremasthead:

By day: international code flag D.

At night: three lights, disposed vertically, the upper red, centre white, lower green; visible all round the horizon.

When the above signals are shown, vessels must not approach within $\frac{3}{4}$ cable.

- 3 When engaged in acoustic minesweeping, morse code "U" flashed to a vessel approaching, indicates that the vessel must not approach closer than $1\frac{1}{2}$ miles.

- 4 When engaged in firing practices, rendering mines safe, destroying mines or towing mines, the following signals will be displayed at the foremasthead:

By day: a red flag.

At night: a red light visible all round the horizon.

Vessels should keep well clear of the vicinity.

Explosives or dangerous goods

1.125

- 1 In Swedish inner waters, vessels carrying, loading, or discharging explosives, inflammable or dangerous cargoes (including radio-active materials), must display:

By day: Flag B of the *International Code of Signals*.

At night: Two red lights disposed horizontally about the centre line and at least 2 m apart.

- 2 These signals need not be shown by vessels carrying only a small quantity of dangerous cargo, below the limits prescribed in Swedish regulations.

Dredger signals

1.126

- 1 The following signals are made by dredgers at work:

By day:

A black double cone on that side of the dredger which vessels may pass.

A red ball on that side of the dredger which vessels may not pass.

- 2 At night:

A white light above a green light on that side of the dredger which vessels may pass.

A white light above a red light on that side of the dredger which vessels may not pass.

- 3 In thick weather or fog:

Double strokes on the bell every minute indicates that vessels should pass N or E of the dredger.

Treble strokes on the bell every minute indicates that vessels should pass S or W of the dredger.

Customs vessels

1.127

- 1 The following signals are used by customs vessels to stop a vessel;

By day:

(1) Flag K of the *International Code of Signals*.

(2) Morse code "K" by lamp

(3) Explosive signal (not to be confused with distress).

- 2 At night:

(1) Alternating blue and yellow light.

(2) Morse code "K" by light.

(3) Explosive signal.

DISTRESS AND RESCUE

International

General information

1.128

- 1 The radio watch on international distress frequencies which certain classes of vessels are required to keep when at sea is one of the most important factors in the arrangements for the rescue of people in distress at sea.
- 2 For general information concerning distress and rescue at sea, including helicopter assistance, see *Annual Summary of Admiralty Notices to Mariners* and *The Mariner's Handbook*.

Ship reporting systems

Global Maritime Distress and Safety System

1.129

- 1 The Global Maritime Distress and Safety System (GMDSS) enables Search and Rescue Authorities on shore, in addition to shipping in the immediate vicinity of a vessel in distress, to be rapidly alerted to an incident so that assistance can be provided with the minimum of delay.
- 2 The sea area included within this volume is covered by both MF and VHF channels, for full details see *Admiralty List of Radio Signals Volume 5*.

Norway

Rescue organization

1.130

- 1 In Norway the rescue services, by sea, air and land, are co-ordinated administratively by the Ministry of Justice and Police. At the operational level the search and rescue service is managed by two Joint Rescue Co-ordination Centres (JRCC), 28 Rescue Sub-centres, local search and rescue units and 16 local air Search and Rescue Sub-centres (FRS). The JRCC for the area covered by this volume is located at Stavanger.
- 2 The sea rescue service combines a number of public and private institutions co-ordinated through the police who have general responsibility and authority for the saving of life. Among these institutions are included:
 - The Norwegian Sea Rescue with 30 rescue boats of various sizes.
 - The Sea Rescue Society (NSSR) (1.131).
 - The Norwegian Navy and Coastguard.
 - The Norwegian Coastal Directorate which includes pilotage, light and harbour authorities.
 - Civil defence and fishery organizations.
 - The Norwegian Air Force with 10 major rescue helicopters.
- 3
- 4 Details of communications and areas of responsibility are given in *Admiralty List of Radio Signals Volume 5*.

The Sea Rescue Society

1.131

- 1 The Sea Rescue Society (NSSR), a private institution with State support, operates life-saving cruisers (lifeboats) at a number of stations along the coast, as listed below. These vessels vary in size from 36 to 92 feet in length with a radius of action between 600 and 4000 miles. They are fitted with modern search and communications equipment and can be contacted through the nearest coast radio station. Of these, Tjøme (59°05'N 10°25'E) and Farsund (58°04'N 6°45'E) keep watch on the distress frequency,

2182 kHz, as given in *Admiralty List of Radio Signals Volume 1 (1)*.

2 Lifeboats are situated at:

Mandal	58°02'N 7°28'E
Arendal	58°28'N 8°46'E
Risør	58°43'N 9°15'E
Kragerø	58°52'N 9°25'E
Stavern	59°00'N 10°03'E
Skjærhalden	59°02'N 11°02'E
Drøbak	59°40'N 10°38'E

Sweden

Rescue organization

1.132

- 1 Swedish sea rescue operates through the cooperation of nine organizations. These organizations are the Swedish Maritime Administration, the Coast Guard Service which has local units known as coast stations, the communications authority, the navy, air force, police, civil aviation authority, the Sea Rescue Association and finally Local Authority Rescue Teams.
- 2 The Sea Rescue Association has 37 sea rescue stations around the coasts of Sweden, and operates more than 80 rescue units, most of which are sea-going rescue craft. In addition, other craft suitable for rescue operations are available at all the main maritime centres along the Swedish coast.
- 3 The Swedish Maritime Administration is responsible for the planning and conduct of the life-saving part of the Sea Rescue Service in Sweden. This includes the movement of sick and injured crew members.
- 4 The Reporting Centre for Sea Rescue (Sjöfartsveherets Rapport Central) is established within the Maritime Office in Norrköping. All rescue operations carried out by the local MRCC are reported to this centre.

Rescue centres

1.133

- 1 The Maritime Rescue Co-ordination Centre (MRCC) for the whole of Sweden is at Göteborg; a Maritime Rescue Sub-Centre is established at Stockholm. The waters within the area covered by this volume come under the responsibility of Göteborg (57°42'N 11°55'E) (*Baltic Pilot Volume 1*). This centre is located together with:
- 2 The Air Rescue Centre (for the whole of Sweden).
Coastal Control Command Centre — Region West.
The Command Centre for Naval Command West.
- 3 The Reporting Centre for Sea Rescue (Sjöfartveherets Rapport Central) is established within the Maritime Office in Norrköping. All rescues carried out by the MRCC and local MRSC are reported to this centre.
- 4 When alerted the centre will notify the appropriate rescue station, patrolling motor lifeboat, or pilot cutter best able to render assistance. In serious cases the Navy, Air Force and other organizations will be alerted.

Rescue stations

1.134

- 1 Within the area covered by this volume the following Coastal Rescue Stations and other rescue facilities are operational:

Nord-Koster	58°54'N 11°00'E	Pilot boat under the Maritime Authority.
Strömstad	58°56'N 11°10'E	Coastal Rescue Station and craft
Fjällbacka	58°36'N 11°17'E	Rescue craft of the Sea Rescue Society
Kungshamn	58°22'N 11°15'E	Coastal Rescue Station and Communications Centre
Lysekil	58°16'N 11°26'E	Coastal Rescue Station and craft
Käringön	58°06'N 11°22'E	Rescue craft of the Sea Rescue Society
Skärhamn	57°59'N 11°33'E	Coastal Rescue Station and craft
Marstrand	57°53'N 11°35'E	Coastal Rescue Station and craft

Other facilities

1.135

- 1 Pilot stations and many of the lighthouses which are suitably situated are equipped with VHF for life-saving purposes and a number of these stations are also fitted with radar. The patrolling motor lifeboats are fitted with radar and on request can assist with position fixing.

Action by vessels at sea

1.136

- 1 Mariners are advised that in case of any emergency, early contact should be made with the MRCC either directly or through a coast radio station. Delay in notification may cause severe difficulties for the rescue services.
- 2 In cases where the Master judges that the vessel itself can deal with the situation, MRCC should be contacted for follow-up and any increase in preparedness. The MRCC also wish to be informed of other hazards such as severe weather conditions and icing.
- 3 All such reports should contain details of position, course and speed, number onboard, any dangerous cargo and other details of importance.

For details see *Admiralty List of Radio Signals Volume 5*.

Visual signals by Swedish aircraft

1.137

- 1 When a Swedish aircraft performs the following manoeuvres in sequence, it indicates that the aircraft wishes to direct a vessel to an aircraft, vessel or person in distress:
 - Flying at least once round a vessel.
 - Flying low close ahead and across a vessel's course, and opening and closing the throttle.
 - Flying in the direction in which the vessel is to be directed.
- 2 Flying low across the wake of a vessel, and opening and closing the throttle, indicates that assistance is no longer required.

COUNTRIES AND PORTS

NORWAY

General description

1.138

- 1 Norway, the national name of which is Norge, is situated in the W and N parts of the Scandinavian peninsula in NW Europe. It is bounded on the E by Sweden, Finland, and Russia; to the N by the Barents Sea, to the W by the Norwegian sea, and to the S by the Skagerrak. The country occupies a total area of 125 001 square miles (323 752 square km).

National limits

Territorial Sea

1.139

- 1 Norway claims a limit of 4 miles for its Territorial Seas, measured from a straight baseline system.

Economic Exploitation Zone

1.140

- 1 By Act No 91 of 17th December 1976, and Royal Decree of 17th December 1976, the Norwegian authorities established an Exclusive Economic Zone (EEZ). Extracts from this act are as follows:

The outer limits of the zone are set at a distance of 200 nautical miles from the appropriate baselines, but not beyond the Continental Shelf Boundaries of other states.

- 2 The establishment of the zone does not affect the rights of navigation through, or flights over, the waters in question.

Except as provided in agreements with other states and in regulations concerning fisheries, aliens may not engage in fishing or hunting within the zone.

- 3 Regulations concerning the protection of the environment; scientific research; artificial installations and port facilities etc; cables and pipelines; and the exploitation of the zone for any purpose; may be issued.

Details of all EEZ limits are given in the *Annual Summary of Admiralty Notices to Mariners*.

History

1.141

- 1 Norway was founded in 872 but after 1000 was frequently united and disunited with Sweden and Denmark. By the treaty of 1814, the country was united with Sweden and then came under the rule of the Swedish monarchy. During the reign of Oscar II, from 1872 to 1905, Norway chafed increasingly under the enforced union; and the movement towards independence gained strength. In 1905, the Norwegian Government declared the union dissolved; the crown was accepted by Prince Carl of Denmark who became the new King of Norway and took the name Haakon VII.

- 2 Norway remained neutral during the First World War and on the outbreak of the Second World War, but was invaded and occupied by Germany in 1940. Neutrality was abandoned when Norway joined NATO in 1949.

In a referendum in 1972, and a further ballot in 1994, the electorate voted against joining the European Union.

Government

1.142

- 1 **Constitution.** The constitution of Norway, called the *Grundlov*, is dated 17 May 1814, with several modifications passed at various times. The resultant form of government is a constitutional and hereditary monarchy.

- 2 **Legislative power** of the realm is vested by the constitution in the *Storting*, the representative of the sovereign people. The *Storting* (Parliament) itself elects a quarter of its members to constitute the Upper Chamber (*Lagting*), the other three-quarters forming the Lower Chamber (*Odelsting*). Legislative questions alone are dealt with by both chambers at separate sittings.

- 3 **The Executive** is represented by the King, who exercises his authority through a Cabinet called a Council of State (*Statsråd*) composed of a Prime Minister or Minister of State (*Statsminister*) and 18 Ministers (*Statsråder*).

- 4 **Sittings and elections.** The *Storting* assembles every year and can sit for as long as it may find necessary. Every 4 years the people choose their representatives, the total number being 165. The country is divided into 19 districts comprising 18 *fylker* or counties and the city of Oslo, each electing from 4 to 15 representatives. Every Norwegian citizen, male and female, of 20 years of age or older (provided that such citizen resides and has resided for 5 years in the country and has not been specially disqualified) is entitled to vote.

Population

Number and distribution

1.143

- 1 The total population of Norway was estimated in 2001 to be 4.5 million of which the Lapps and Finns formed little more than one percent of the whole.

- 2 The population density of Norway is the smallest in Europe averaging 14 per sq km. The distribution of the inhabitants is very unequal; for instance, the relative population of the county of Vestfold, at the SE end of Norway, is 82.3 per sq km; while in Finnmark, at the N end, there are only 1.6 persons per sq km.

- 3 Two thirds of the population live near the coast and one-seventh on the islands. Nearly three-quarters live in urban areas with the most populous being Oslo, Bergen, Trondheim, Stavanger, Kristiansand and Drammen, all of which lie on or near the coast. Oslo, the capital, was estimated to have ½ million inhabitants in 1998.

- 4 The estimated population (2000) of the *fylke* or counties included in this volume are as follows:

Vest-Agder	155 700
Aust-Agder	102 200
Telemark	165 000
Vestfold	212 800
Akershus	467 100
Østfold	248 200

- 5 The inhabitants of different parts of Norway differ widely in habits, customs and general mode of living. Of those inhabiting the coastal region, it may be said that they look to the sea as the main source of their subsistence, while the bulk of the inland population is engaged in manufacturing and agricultural pursuits.

Language and orthography

Language

1.144

- 1 The language commonly spoken in Norway, called *Bokmål*, was originally Danish but now has a distinct pronunciation and a somewhat different orthography. *Nynorsk*, constructed from modern dialects of old Norwegian, is also officially recognised.

Orthography

1.145

- 1 The differing origins in the language create many inconsistencies in the spelling of proper names and geographical terms in Norwegian publications and charts. Spelling of names in this edition complies with that in the modern Norwegian Sailing Directions and charts.

Physical features

Topography

1.146

- 1 The W portion of the Scandinavian peninsula consists of extensive tablelands, which dip somewhat abruptly into the sea, and are separated by deep rents or fissures. These inlets, through which the ocean penetrates far into the country, in some parts to the very spurs of the mountains, are known as fjords. Certain tracts in the vicinity of Trondheim, and the coasts of Jæren and Lista, are the only localities which can be designated plains. The great fjords of the N and W, and the short, narrow valleys, shut in by steep walls of rock, are succeeded in the SE parts of Norway by wider and longer valleys with less precipitous sides; while the rivers and streams frequently expand into lakes.
- 2 Norway, although justly accounted a mountainous country, is so rather in respect of its general elevation, which is estimated at about 500 m, rather than from the prominence of its isolated summits. The ragged outline of the coast, the depth and extent of its inlets or fjords, the boldness of its headlands, and the multitude of its islands, often almost indistinguishable from the mainland, are facts now familiarly known.
- 3 Considered as a whole, Norway is essentially a great broad group of mountains, with level, far-reaching plains and plateaux. The mountains, as a rule, form a homogenous and uniform group, high or low, and heights above or depressions below are exceptions. The S half of the country is the higher, the N half being considerably lower, but the characteristic appearance is the same in both the N and S parts.

Fjords

1.147

- 1 The fjords are arms of the sea, or inlets, with which the whole coast of Norway is more or less indented. Most of the fjords on the W coast have several branches and tributary streams, where salmon will generally be found. The tidal streams do not proceed far up the fjords of the W coast and towards their inner recesses the water is nearly fresh, due to the influx of large rivers. The smaller branches usually freeze in winter while the main arteries remain open or only partially covered with ice. Power vessels ply all the year round with assistance in winter from icebreakers.
- 2 In many of the larger inlets the mountains descend almost vertically to a considerable depth. In places where

the rocks descend abruptly to the water's edge there is generally deep water close up to them. Conversely, off a sand or pebble beach the water will generally be found to shoal gradually. Most of the fjords have a much greater depth than the open sea in the vicinity.

- 3 The only large fjord within the limits of this volume is Oslofjorden, which, extending N from the NE end of the Skagerrak, differs from the great fjords on the W coast, in that its shores are neither so high nor so precipitous; and it is shallower and contains numerous small islands.

Rivers

1.148

- 1 Norway is traversed by a large number of rivers which, however, due to the formation of the country and the situation of the watershed, are not very long. The longest rivers flow through the SE part of the country and through Finnmark. The rivers in the W part of the country, due to a steeper fall and heavier average rainfall, carry a greater volume of water.
- 2 In the SE part of Norway there are long valleys through which medium-sized rivers flow on roughly parallel courses, in some cases uniting as they approach the sea. Glåma (6.121) flows S, parallel to the Swedish frontier, for 350 miles to the Skagerrak, and is the largest river in the Scandinavian peninsula. Drammenselva, another large river, flows into Drammensfjorden at Drammen Havn (5.250). There are many other rivers along the S coast of Norway but only Glåma and Drammenselva are navigable.
- 3 Banks of alluvial deposit, on which coasters and small vessels can find good anchorage, frequently extend some distance from the mouths of the larger rivers.

Flora and Fauna

Flora

1.149

- 1 The flora of Norway displays a greater richness and variety than those of any other quarter of the globe within the same parallels of latitude. Due to the continuous daylight in summer vegetable growth goes on with great rapidity. Barley ripens in latitude 70°N and, in Hammerfest, at the N end of the country, hay is made one month after the snow leaves the ground.
- 2 The SE part of Norway consists of great undulating mountain wastes, intersected by fairly wide fruitful valleys. Conversely, the W part is a rugged fjord-region, where the mountains rise in wild peaks; and where the sides of the deep fjords consist of precipitous slopes with very little soil, which extend down to the water. At the mouths of the fjords and on the great belt of islands, the mountains are not so high but have even less vegetation. The climate, due to the relatively warm North Atlantic Current, is quite insular and the flora has an altogether different character to that of the E part of Norway. However, at the upper end of the fjords, the sea has little influence and the flora resembles that of the E part of the country: with the same boreal deciduous trees growing on the warm slopes.
- 3 The great belt of islands around the coast appear barren and bare, when seen from seaward; but places that are sheltered from the direct influence of the sea breeze have quite a rich vegetation. In the crannies of the rocks, thickets of oak and birch, aspen and rowan trees grow; even a pine may be found in particularly sheltered spots. The extreme coast region is devoid of forest; and is also without a number of continental plants that are found inland.

Fauna

1.150

1 **The animal kingdom** comprise most of the domestic and other animals common in Great Britain besides many which are now extinct there. The elk, which is found in most of the forest tracts of the E part of Norway, is found only near the W fjords in S Norway in the Trondheim district. The roe deer has spread N from Sweden and is now prevalent in the SE part of Norway. The red deer is most numerous near the fjords in the neighbourhood of Bergen and Romsdal; also on Hitra Island and the adjacent mainland.

2 Big game is now very rare, the bear is almost extinct as is the lynx. Wolves are found only in the area extending N from Røros into the mountain regions. The badger is found in the SE part of the country; whilst the beaver, which was almost extinct, is now found in large numbers in the valleys of the S part, between Mandal (58°02'N 7°28'E) and Skien, 100 miles NE.

3 **Game birds** are fairly abundant in most districts; the most important in the S part being the capercaillie, black grouse, hazel hen and partridge. The eider duck is strictly preserved all the year round, for the sake of the down, and a fine is imposed for shooting them. The down taken from the dead birds has less elasticity and reduced value.

4 **Marine fauna** of Norway, more especially those forms of animal life which occur at great depths, is characterised by rich variety; of these, the common seal is numerous.

The principal varieties of fresh water fish in the S part of Norway are char, salmon and trout; grayling, carp, perch, pike, minnow and burbot are also found.

Industry and trade

Industry

1.151

1 **Natural resources.** Norway is mostly barren and mountainous. Arable soil is found in narrow strips in deep valleys and around fjords and lakes. Of the total area, 80% is unproductive, 18% is productive forest, and only 2% is cultivated.

2 The principal sources of natural wealth are forestry, fisheries, minerals; and offshore oil and gas. The most important sea fisheries are cod, mackerel, coal-fish (saithe), deep-water prawn, haddock, herring and dogfish. The principal mineral products are iron ore, titanium, copper, lead and zinc.

3 **Industry** is based mainly on crude petroleum and natural gas production; and on the raw materials produced within the country (wood, fish, oil, etc); aided by great resources of hydro-electric power. The most important manufactures are food canning, transport equipment, pulp and paper, machinery and equipment, wood, metal products, petroleum (crude and refined), printing and publishing.

Trade

1.152

1 **Principal imports** are vehicles, machinery (electrical and mechanical), transport equipment, base metals and manufactures thereof, textiles and chemicals.

2 **Principal exports** are crude oil and its products, fish, non-ferrous metals, machinery and transport equipment, base metals and manufactures thereof (ships), pulp and paper, plastics and edible animal products.

3 **Principal countries** trading with Norway are Sweden, United Kingdom, Germany, United States of America, Denmark, and the Netherlands.

SWEDEN

General description

1.153

1 Sweden, the national name of which is Sverige, occupies the E part of the Scandinavian peninsula in NW Europe. The country, which has a total land area of 449 964 sq km, is bounded W and NW by Norway, E by Finland and the Gulf of Bothnia, SE by the Baltic Sea and SW by the Kattegat.

National limits

1.154

1 Sweden claims a limit of 12 miles for its Territorial Seas and 200 miles for its Exclusive Economic Zone.

For further details see *Annual Summary of Admiralty Notices to Mariners* and *The Mariner's Handbook*.

History

1.155

1 The history of Sweden from Roman times until the 11th century is largely one of independent tribes of whom the Swedes, inhabiting Uppland, were the most powerful.

2 In 800 AD the first Swedish kingdom was achieved. In succeeding centuries Swedish Vikings – originally, like their Norwegian counterparts, farmers and traders – penetrated deeply into Russia, founding Kiev and reaching Caspian Sea and Black Sea.

3 During the 16th and 17th centuries the union of Denmark and Sweden gradually disintegrated being finally shattered by the Stockholm blood bath which was followed by a foreign policy conducted “in a spirit of hazard and aggression”. The Swedes gained control of both sides of the Gulf of Finland, shutting Russia out of the Baltic Sea which became virtually a Swedish lake.

4 Sweden's fortunes were reversed during the 18th and 19th centuries when, in bitter disputes with her neighbours, her Baltic empire gradually diminished. Nevertheless she retained the rich provinces of Skåne, Halland and Bleckinge which had been surrendered by Denmark whose realm was then limited to W of The Sound (56°10'N 12°30'E).

5 Since 1814 Sweden has followed a policy of non-alignment in peace and neutrality in war. Sweden applied for European Union membership in July 1991 and joined on January 1st 1995.

Government

1.156

1 **Constitution.** The present constitution of Sweden came into force in 1975 and replaced the constitution of 1809. The country is a representative and parliamentary democracy, with the Riksdag (Parliament), as the central organ of government. The King is Head of State, though he does not take part in the government of the country. The executive power of the country is vested in the Government, which is responsible to Parliament.

2 **Parliament** has one chamber with 349 members who are proportionately elected for a period of four years. There are 29 constituencies from which 310 members are elected; the remaining 39 seats comprise a nation-wide pool which is intended to give absolute proportionality to parties that receive at least 4% of the votes.

3 **Local government.** For the purposes of local government the country is divided into 24 län (counties), with central government being represented by an administrative board headed by a governor.

The Lapps, of whom there were some 17 000 in 1997, have their own Sameting (Parliament).

- 4 **Justice.** There is an independent judiciary headed by an Attorney-General, appointed by the government, and three judicial Commissioners appointed by Parliament. Authority is exercised through a Supreme Court, 6 intermediate courts of appeal and 97 district courts.

Population

1.157

- 1 In 2001 the population of the country was estimated to be 8 875 000, population density 20 per sq km; with 80 to 85% living in densely populated areas.

Language

1.158

- 1 The official language is Swedish which is closely allied to the other Scandinavian languages, Norwegian, Danish and Icelandic; German and English are also widely spoken.

Physical features

1.159

- 1 The S part of Sweden consists, in the main, of a plateau, about 250 m high, which includes more cultivated land than the remainder of the country. This consists of wide cultivated plains stretching from a number of lakes in the interior with beech woods, extensive heaths and areas of drifting sands.
- 2 The rivers in the SW part of Sweden are short. The most important of these is Göta Älv, which discharges the waters of Lake Vänern, the largest of the lakes, into the Kattegat at Göteborg.

Industry and trade

1.160

- 1 The country's prosperity is based on an abundance of natural resources in the form of forests, hydro-electric power and mineral deposits. Sweden is one of the leading exporters of iron ore, and aluminium, lead and copper are also produced.
- 2 Although at the beginning of the 19th century most of the population lived by agriculture, with the coming of steam power, the Swedish iron industry began to expand dramatically. The capital accumulation from her iron exports led to Sweden's modern engineering industry. This was much enriched by local technological entrepreneurs, making original contributions in such fields as turbines, electrical machinery, gas accumulators, ball bearings, core drills and pumping equipment. The de Laval nozzle (Gustav de Laval 1845–1913) for example, first used in steam turbines, is still in use today in space-age rocket engines.
- 3 The most important manufacturing sector is the mobile telephone industry, followed by the production of metals, metal products, machinery and transport equipment. Production of high quality steel is an old Swedish speciality, though there is now a decline in the production of ordinary steel.
- 4 Forestry forms the basis for an important manufacturing sector which includes saw-mills, plywood factories, furniture industries, pulp and paper-mills and wallboard factories.
- The establishment of a petrochemical industry has led to a rapid expansion in the output of chemicals and plastics. In 1999, Germany was Sweden's leading trading partner.

PRINCIPAL PORTS, HARBOURS AND ANCHORAGES

Norway

Chart 1402

South-east coast

1.161

<i>Place and position</i>	<i>Remarks</i>
Mandal (2.38) (58°02'N 7°28'E)	Deep water commercial port
Kristiansand (2.103) (58°09'N 8°00'E)	Major commercial port, railhead and ferry port; naval base.
Lillesand (3.30) (58°15'N 8°23'E)	Small commercial port
Grimstad (3.40) (58°20'N 8°36'E)	Small port with boat building
Arendal (3.52) (58°28'N 8°46'E)	Medium size commercial port with safe anchorage
Eydehavn (3.88) (58°30'N 8°52'E)	Industrial berths
Tvedestrand (3.102) (58°37'N 8°57'E)	Medium size industrial port and fishing harbour
Lyngør Havn (3.110) (58°38'N 9°08'E)	Restricted minor port. Good landlocked harbour for coasters
Risør Havn (3.125) (58°43'N 9°15'E)	Medium size industrial port with shipbuilding
Kragerø (3.133) (58°52'N 9°25'E)	Medium size industrial port and fishing harbour. Well sheltered anchorage

Langesundsfjorden and Grenland Harbour

1.162

<i>Place and position</i>	<i>Remarks</i>
Langesund (3.174) (59°00'N 9°45'E)	Medium size commercial and industrial port with ship repair yards
Asvall (3.180) (59°02'N 9°44'E)	Fuelling berth
Brevik (3.185) (59°03'N 9°42'E)	Medium size commercial port with shipbuilding facilities
Porsgrunn (3.213) (59°08'N 9°38'E)	Medium size commercial port in Skienselva. Major industrial area
Herøya (3.213) (59°07'N 9°38'E)	Major industrial deep-water berths. Outer port of Porsgrunn
Asdalstangen (3.210) (59°05'N 9°38'E)	Petro-chemical berths
Rafnes (3.211) (59°06'N 9°36'E)	Petro-chemical industrial berths
Skien (3.239) (59°12'N 9°37'E)	Medium size commercial port at the head of Skienselva
Skien Harbour Terminal (3.212) (59°07'N 9°34'E)	Major deep-water berths. Outer berths for Skien

South-west approach to Oslofjorden

1.163

<i>Place and position</i>	<i>Remarks</i>
Larvik Havn (4.24) (59°03'N 10°02'E)	Major ferry, commercial and industrial port
Stavern (4.55) (59°00'N 10°03'E)	Fishing port and holiday resort

<i>Place and position</i>	<i>Remarks</i>
Sandefjord Havn (4.62) (59°07'N 10°14'E)	Major ferry, commercial and industrial port. Ship and oil rig construction. Well sheltered anchorage
Vrengen (4.108) (59°10'N 10°24'E)	Moorings and berths in well sheltered harbour. Used for laying-up vessels
Valløy (4.131) (59°15'N 10°30'E)	Oiling berths and refinery
Tønsberg Havn (4.146) (59°16'N 10°24'E)	Major commercial and industrial harbour containing major shipyards

Oslofjorden**1.164**

<i>Place and position</i>	<i>Remarks</i>
Slagentangen (5.37) (59°19'N 10°31'E)	Major oil refinery and terminal for tankers up to 250 000 tonnes
Horten (5.65) (59°25'N 10°29'E)	Major naval base and medium size commercial port
Moss (5.95) (59°26'N 10°40'E)	Medium size commercial and industrial port comprising two harbours joined by Moss Canal
Halvorshavn (5.151) (59°35'N 10°37'E)	Oil depot
Drøbak (5.153) (59°40'N 10°38'E)	Small commercial port
Engene (5.154) (59°41'N 10°32'E)	Explosives factory
Granerudstøa (5.156) (59°47'N 10°36'E)	Repair yard
Slemmestad (5.157) (59°47'N 10°30'E)	Small commercial port
Bjørkåsholmen (5.158) (59°48'N 10°30'E)	Small commercial port
Oslo Havn (5.165) (59°54'N 10°44'E)	Major commercial and industrial port in the principal harbour in Norway
Lysaker (5.209) (59°55'N 10°39'E)	Oil depot and small commercial port
Holmestrand (5.223) (59°29'N 10°19'E)	Small commercial port with sheltered anchorage
Svelvik (5.245) (59°37'N 10°25'E)	Small commercial and industrial port
Drammen Havn (5.250) (59°44'N 10°14'E)	Large commercial port at the head of Drammensfjorden

Oslofjorden southern part — east side**1.165**

<i>Place and position</i>	<i>Remarks</i>
Vikerhavn (6.74) (59°02'N 10°57'E)	Fishing port
Skipstadhavn (6.75) (59°04'N 10°58'E)	Former ferry port
Korshavn (6.76) (59°04'N 11°00'E)	Former ferry port
Utgårdskilen (6.77) (59°05'N 10°52'E)	Fishing port

<i>Place and position</i>	<i>Remarks</i>
Fredrikstad (6.78) (59°12'N 10°57'E)	Large commercial port and oil terminal. Part of Borg Harbour
Sarpsborg (6.107) (59°16'N 11°06'E)	Medium size commercial port. Part of Borg Harbour
Halden (6.147) (59°07'N 11°23'E)	Medium size commercial port, close to the border with Sweden

Sweden**West coast****1.166**

<i>Place and position</i>	<i>Remarks</i>
Strömstad (7.61) (58°56'N 11°10'E)	Small commercial harbour and fishing port
Grebbestad (7.98) (58°41'N 11°15'E)	Small commercial port
Fjällbacka (7.102) (58°36'N 11°17'E)	Small commercial port
Kungshamn (8.17) (58°22'N 11°15'E)	Large fishing harbour which includes Gravarne
Brofjorden (8.26) (58°21'N 11°25'E)	A major tanker port for ULCC and VLCC which serves a large refinery.
Lysekil (8.75) (58°16'N 11°26'E)	Medium size commercial and fishing port
Käringön (8.107) (58°07'N 11°22'E)	A large fishing harbour
Skärhamn (8.113) (57°59'N 11°33'E)	Small commercial harbour and oil port
Ängöholmen (8.123) (57°57'N 11°34'E)	Small industrial harbour
Ellös (8.146) (58°11'N 11°28'E)	An industrial harbour
Marstrand (8.170) (57°53'N 11°35'E)	Small commercial harbour and fishing port
Wallhamn (8.179) (58°01'N 11°42'E)	The principal vehicle-handling port in Sweden
Stenungsund (8.201) (58°05'N 11°49'E)	Major petro-chemical port
Uddevalla (8.236) (58°21'N 11°55'E)	A major harbour which contains several major ports.

PORT SERVICES — SUMMARY**Docking facilities****1.167**

- The summary below lists ports with docking or slipping facilities; dimensions, where given, relate to the largest vessel that can be accommodated. Further details of the facilities are given at the reference quoted for each port.
- Norway:**
 - Mandal: two patent slips; 600 tonnes displacement (2.72).
 - Kristiansand: two dry docks and three patent slips; 40 000 tonnes displacement (2.151).
 - Grimstad: floating dock; 4500 tonnes displacement (3.49).
 - Langesund. Patent slip (3.181).
 - Brevik: patent slip; 15 000 tonnes displacement (3.201).
 - Porsgrunn: dry dock and two patent slips; 15 000 tonnes displacement (3.236).

Tønsberg. Dry dock and one patent slip (4.173).
 Horten: two dry docks; 60 000 dwt (5.91).
 Drammen: two floating docks, two patent slips;
 24 000 dwt (5.273).

3 **Sweden:**

Gravarne: two patent slips; 400 dwt (8.23).
 Wallhamn: two patent slips at Djupvik; 300 dwt
 (8.198).

Other facilities

Salvage services

1.168

1 Salvage services within Norway are maintained by the Norwegian Salvage Company, with headquarters in Bergen. The only salvage vessels within the area covered by this volume are stationed at as follows:

Kristiansand (2.152).
 Halden (6.176).

Compass adjustment

1.169

1 **Norway:**

Mandal (2.73).
 Kristiansand (2.152).
 Porsgrunn (3.237).
 Horten (5.92).
 Oslo Havn (5.203).
 Fredrikstad (6.105).

2 **Sweden:**

In the area covered by this volume there are no authorized compass adjusters. The nearest facilities are available at Göteborg (57°42'N 11°55'E).

Deratting

1.170

Norway

Deratting; deratting and exemption certificates:
 Oslo Havn (5.203).
 Drammen (5.274).

Exemption certificates only:

Kristiansand (2.152).
 Grimstad (3.49).
 Arendal (3.86).
 Porsgrunn (3.237).
 Tønsberg (4.174).
 Moss (5.120).
 Fredrikstad (6.105).
 Sarpsborg (6.126).
 Halden (6.176).

Sweden.

Deratting; deratting and exemption certificates:
 Brofjorden (8.60).
 Lysekil (8.81).
 Wallhamn (8.199).
 Stenungsund (8.222).
 Uddevalla (8.259).

Measured distances

1.171

Norway:

Kristiansand (2.123).
 Songvårfjorden (2.123).
 Oslofjorden (Horten) (5.82).
 Singlefjorden (6.132).

NATURAL CONDITIONS

MARITIME TOPOGRAPHY

Geology

1.172

- 1 Norway and Lapland are chiefly composed of primitive and transition rocks. Granite is rare, the prevailing rock being gneiss, which sometimes alternates with granite. Mica-slate also abounds and is associated with the gneiss. In beds subordinate to both are limestone quartz and hornblende.
- 2 The plateaux of the mountains are often covered with blocks of conglomerate rocks, in which pebbles of quartz and felspar are embedded, and which, being smooth and rounded, have evidently been, during a remote but lengthened period, subject to violent friction.

Sea bed

1.173

- 1 The nature of the seabed in the area covered by this volume shows strongly the influence of glaciation. During the Quaternary Ice Age, the ice sheets transported and deposited much material, ranging from clay to large erratic boulders, and on the seabed most of this material remains in a poorly sorted state.
- 2 Only in the deeper offshore zone does the nature of the bottom show much consistency; in most areas outside the 200 m depth contour, all the records are of mud or ooze which have accumulated in the deep, partially-enclosed, trench occupying the N part of the Skagerrak and having a maximum depth of at least 787 m. As the edge of the continental shelf is crossed, a proportion of samples of coarser material becomes apparent; this proportion increases as depths diminish, so that, inside the 100 m depth contour, fairly numerous samples of sand, gravel, shingle, and stones are found in addition to mud.
- 3 However, much of the seabed on the shelf, and in some deeper areas also, consists of boulder clay, a typical glacial deposit; the clay is often quite hard in itself and includes numerous boulders, either scattered singly or occurring in groups, some of the boulders being very large. Individual large boulders may easily escape detection, especially in the course of older surveys, and therefore the least depths, as well as the nature of the bottom, may be in doubt. Such erratic boulders may occur almost anywhere in a glaciated area such as this. Furthermore, the underlying solid rock emerges through the glacial deposits in many places to form groups of islands, islets and rocky shoals, often steep-to and of small extent; the underwater features being a submerged version of those visible above water. Thus the seabed of the shelf is very irregular, both in shape and in constituents, and conditions can be expected to vary considerably even over short distances.

1.174

- 1 The shelf is generally about 4 miles wide on the Norwegian side of the Skagerrak, narrowing to vanishing point in places; but on the Swedish side its width increases to about 20 miles. Several fjords, especially Oslofjorden, have depths of more than 200 m in their central parts. Some of these deeps are extensions of the main deep-water area of the Skagerrak whereas others are separated from it by irregular sills. Most of these deeps are probably floored with the mud and ooze characteristic of such enclosed or semi-enclosed basins, although clay is present in some of

them. In some places the underwater slopes on the flanks of these deeps are very abrupt; and on such slopes hard bedrock is probably either exposed or covered only by a thin layer of superficial deposits. Throughout the area, in fact, the thickness, as well as the distribution, of the seabed deposits must be expected to be very irregular.

Seismic and volcanic activity

1.175

- 1 **Earthquakes.** The S part of Norway has frequently experienced earthquakes. Evidence also exists in various parts of the country that it has been upheaved by volcanic action.
- 2 **Land levels.** At the present time, the N parts of the Scandinavian peninsula are rising out of the sea at the average rate of about 1 m in a century whilst the S parts are subsiding. This fact is established by reference to ancient HW and LW marks and by grooves specially cut in the rocks along the coast.

CURRENTS, TIDAL STREAMS AND FLOW

General information

Water movement

1.176

- 1 The information given in this volume refers only to the water movement which affects the navigation of surface vessels. In this respect it is significant that, especially in the fjords, the sub-surface flow may be quite different from that described for the surface.
- 2 It is also worthy of note that the Norwegian Sailing Directions, which are the principal source of the information given, do not usually distinguish between tidal stream, current and flow. The tidal stream (*tidevannsstrøm*) is very occasionally referred to, but otherwise all horizontal movements of the water are called *strøm*, which word has been translated as "flow" unless it is clear from the context that tidal stream or current is intended.

Currents

General remarks

1.177

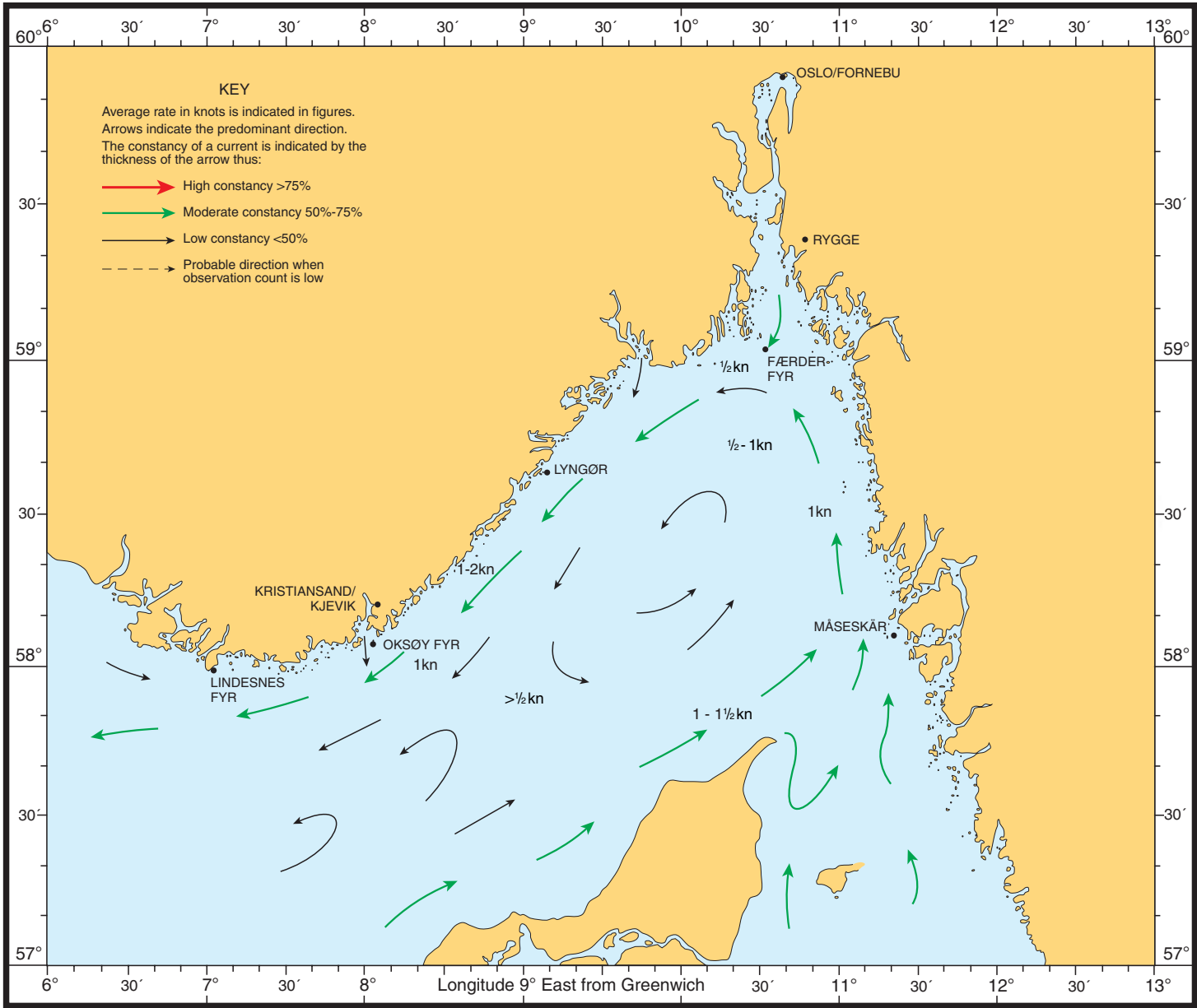
- 1 In general tidal influences predominate in the North Sea and currents, under normal conditions, are for the most part insignificant. In contrast, in the Skagerrak and Kattegat the reverse is true with the currents predominating. This is due to a net outflow of water, with low salinity, from the Baltic Sea through the Kattegat to the North Sea in the near surface layers but at greater depth there is a flow of water, of higher salinity, in the opposite direction. Under average conditions, the depth of the transitional layer between the two opposing flows is about 10 to 25 m in the Kattegat but increases to around 100 m in the Skagerrak.

Currents diagram

1.178

- 1 In the current diagram 1.178, the arrows indicate predominant direction, average rate and constancy which are defined as follows:

Predominant direction. The mean direction within a continuous 90° sector containing the highest proportion of observations from all sectors.



Predominant current direction under light wind conditions (1.178)

- 2 **Average rate.** This rate is the average of the highest 50% in the predominate sectors with persistent light winds and is indicated by the figures in the diagram. It is emphasised that rates above and below those shown may be experienced.

Constancy is a measure of its persistence, e.g. low constancy implies marked variability in rate and, particularly, direction.

Currents in the Skagerrak

1.179

- 1 Under normal conditions, there is a net outflow of low salinity water from the Baltic Sea via the Kattegat, which then mixes with water of higher salinity setting NE off NW Jutland; as is evident from the increase in salinity on passing from the Kattegat into the Skagerrak. The outflow of low salinity water is normally enhanced by further outflows of fresh water from rivers and fjords along the S coast of Norway.
- 2 The N-going flow is mainly confined to the Swedish side of the Skagerrak where it follows the general lie of the coast before turning W near the entrance to Oslofjorden, then SW towards Kristiansand. The centre of this anticlockwise circulation lies approximately midway between the coasts of Norway and Jutland.
- 3 The average rate of the NE flow off NW Jutland is between 1 and 1½ kn decreasing to around 1 kn, about 4 to 5 miles off the Swedish coast, as it sets towards the N. The flow then sets W at about ½ kn, then SW with the average rate increasing to around 1 to 2 kn some 4 to 8 miles off the SE coast of Norway. About 20 to 30 miles offshore the flow is weak and variable.

Wind driven currents

1.180

- 1 After prolonged periods of strong winds from a constant direction, a wind-drift current may be generated where the rate varies according to the speed of the wind and its duration. These wind drift currents may strengthen, weaken or reverse the surface current and cause major irregularities in the set of the current across the region.
- 2 When there is high pressure over Scandinavia and low pressure over central and W Europe, the current direction in the N part of the Kattegat remains N but the average rate may increase to 2 kn or more off the Swedish coast. During persistent SW gales the average rate of the N to NE set, between Skagen (57°45'N 11°40'E) and the Swedish coast, may increase to around 3 to 4 kn. With persistent strong W winds over the region, the N outflow of low salinity water through the Kattegat, from the Baltic Sea, is often halted and replaced by a S flow through the Kattegat, from the North Sea, and to a great depth. Winds from the E may increase the W set, off the S coast of Norway, from the normal rate of 1 to 2 kn to 3 to 4 kn, and persistent gales from between N and E may reverse the normal NE set off the NW coast of Jutland.
- 3 Outside the entrance to Oslofjorden, the current normally sets to the W with an average rate of less than 1 kn but higher rates are likely with E gales; whereas W gales are liable to reverse the normal current flow and set a vessel towards the E shore of the entrance where Kosteröarna (58°20'N 11°13'E) may constitute a hazard.

Flow in fjords

1.181

- 1 Within Oslofjorden and its associated inlets, there is normally no appreciable flow except in certain narrow channels. Such general flow as there is, is usually outgoing,

particularly when the river is in flood. Strong N winds generally give rise to an increased outflow and strong S winds can reverse the outflow into an inflow. However, as the inflow creates a back pressure, the current on the surface may be balanced by a counter current, either sub-surface or setting along the sides of the fjord. When the force which created the original current decreases or ceases, the original current will reverse and join the counter current.

- 2 Similarly in other fjords, onshore winds may lead to significant in-going currents and offshore winds may result in enhanced outflow. The rate of these transient currents can be considerable in narrow fjords but in-going currents may be less than expected, or even reversed, in the shallower layers where there is a large outflow of fresh water.

Rivers in flood

1.182

- 1 During and after periods of heavy rain, and when ice and snow are melting, the very large amounts of fresh water run-off can cause floods in the rivers and fjords. The outflow is generally highest in narrow long fjords and where the land area drained is greatest.
- 2 The outgoing flow in a fjord due to fresh water run-off from the land, especially in spring when the ice is melting, is frequently strong enough to reverse any near surface inflow. This surface outflow normally extends to a depth of about 4 to 6 m but, on occasions, may be as little as 1 m or as great as 18 m depending on conditions.

Tidal streams

General information

1.183

- 1 Off the coast and in most of the fjords covered by this volume the tidal streams are generally imperceptible. In Oslofjorden, where perceptible streams set in the narrow channels, no details are available.
- 2 Known streams off the coast are referred to by the direction towards which they set. In the fjords they are described as in-going and out-going; where fjords intersect, and in other cases as considered necessary, the direction in which they set is also given.
- 3 Series of observations sufficient for the computation of tables of tidal streams appear not to have been obtained at any position off the Norwegian or Swedish coasts, nor within the fjords, covered by the volume.
- 4 Local authorities refer tidal streams, very approximately to local HW and LW. This information is mentioned at 1.185 and at 1.186 and is given, where known, in *Admiralty Tide Tables Volume 2*. However, all the references both to local HW and LW are approximations and must be used with caution.

SEA LEVEL AND TIDES

Tides

General information

1.184

- 1 In the Skagerrak and Kattegat the tidal influence is greatly reduced from that in the North Sea such that meteorological conditions account for the major changes in water levels. This text will first review the tidal rise and fall which can then be compared to the overall rise and fall in the sea level.

Norway**1.185**

- 1 **General remarks.** Two tidal waves which meet SW of Egersund (58°25'N 6°00'E) interact in such a way that the combined effect is very small, creating an amphidromic point in the area. The tidal variation along the Norwegian coast included in this volume is therefore slight and often subordinate to the meteorological effects, as given at 1.187.

- 2 **Height variation.** At the following places the average of the differences between HW and LW at Mean Spring Tides is:

20 cm at Tregde (58°01'N 7°34'E) (2.99).
 21 cm at Nevlunghavn (58°58'N 9°52'E) (4.23).
 24 cm at Horten (59°25'N 10°29'E) (5.65).
 30 cm at Oslo (59°55'N 10°45'E) (5.165).
 Estimated as 23 cm in Hvaler (59°06'N 10°53'E) (6.5).

- 3 **Timing.** Along that part of the Norwegian coast included in this volume, spring tides occurs 1½ to 2 days after the new/full moon. The mean HW interval (by which HW lags the passage of the moon) is as follows:

Tregde. 3 hours 28 minutes.

Oslo. 4 hours 40 minutes.

- 4 The increase in the HW interval with distance W from Tregde must be attributed to the amphidromic point mentioned above.

For further details see *Admiralty Tide Tables Volume 2*.

Sweden**1.186**

- 1 Tidal movement along that part of the Swedish coast included in this volume is similar to that along the Norwegian coast, above, with spring tides occurring 2 days after the new/full moon and achieving a rise of about 30 cm. One HW is achieved 4 hours after the moon's passage over the Greenwich Meridian and the next occurs 12 hours and 25 minutes later.

Sea level**General information****1.187**

- 1 Winds which create an in-going current in a fjord also raise the sea level, for if the quantity of water increases the sea level must rise. Similarly, winds which create an out-going current decrease the height of the sea level. This change in level will continue until there is a balance between the back pressure of the water and the force creating the current; or when an equal and opposite counter current is created. Removal of the external force allows restoration of normal levels.

Norway**1.188**

- 1 As mentioned previously, meteorological influence on water levels can often be considerable and lead to large deviations from the astronomical tides. The highest and lowest observed water levels, given above and below MSL, are as follows:

Tregde +112 cm and -73 cm.

Nevlunghavn +127 cm and -86 cm.

Oslo +189 cm and -105 cm.

See 1.9 for details of vertical clearances for overhead obstructions.

Sweden**1.189**

- 1 **Wind.** Along the W coast of Sweden the sea level generally rises with W winds and falls with E winds. With storms from the W a so-called Storm Flood can occur, whereby the sea level can rise quickly by more than a metre. However, because of the variation in depths and the irregular shape of the coast, the sea level can vary greatly from one place to another.

Pressure. Air pressure also affects the sea level; with high pressure it falls and with low pressure it rises.

- 2 **Sea levels.** The following characteristic sea levels occur along the coastal stretch from Hällö (58°20'N 11°13'E) to Hätteberget (57°52'N 11°28'E), 30 miles SSE, given above and below mean water:

Highest high water +150 cm.

Mean high water +95 cm.

Mean low water -70 cm.

Lowest low water -117 cm.

- 3 **Seasonal variations.** In addition to the temporary variations give above a seasonal variation occurs which involves lower sea levels during the Spring and higher sea levels during the late Summer and Autumn. However, considerable variations can occur in different years.

SEA AND SWELL**General remarks****1.190**

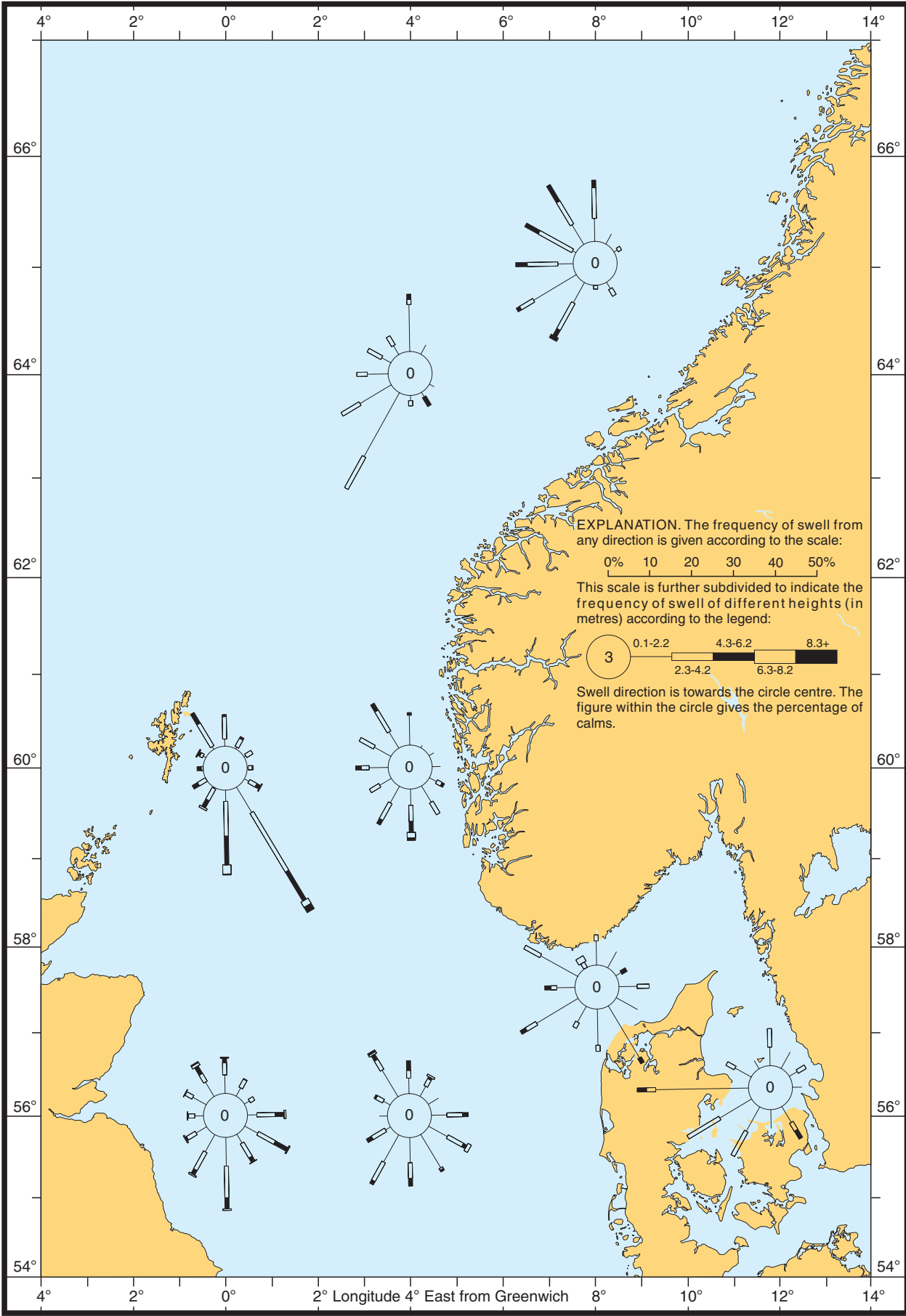
- 1 For general information on sea and swell, see *The Mariner's Handbook*.

Sea conditions**1.191**

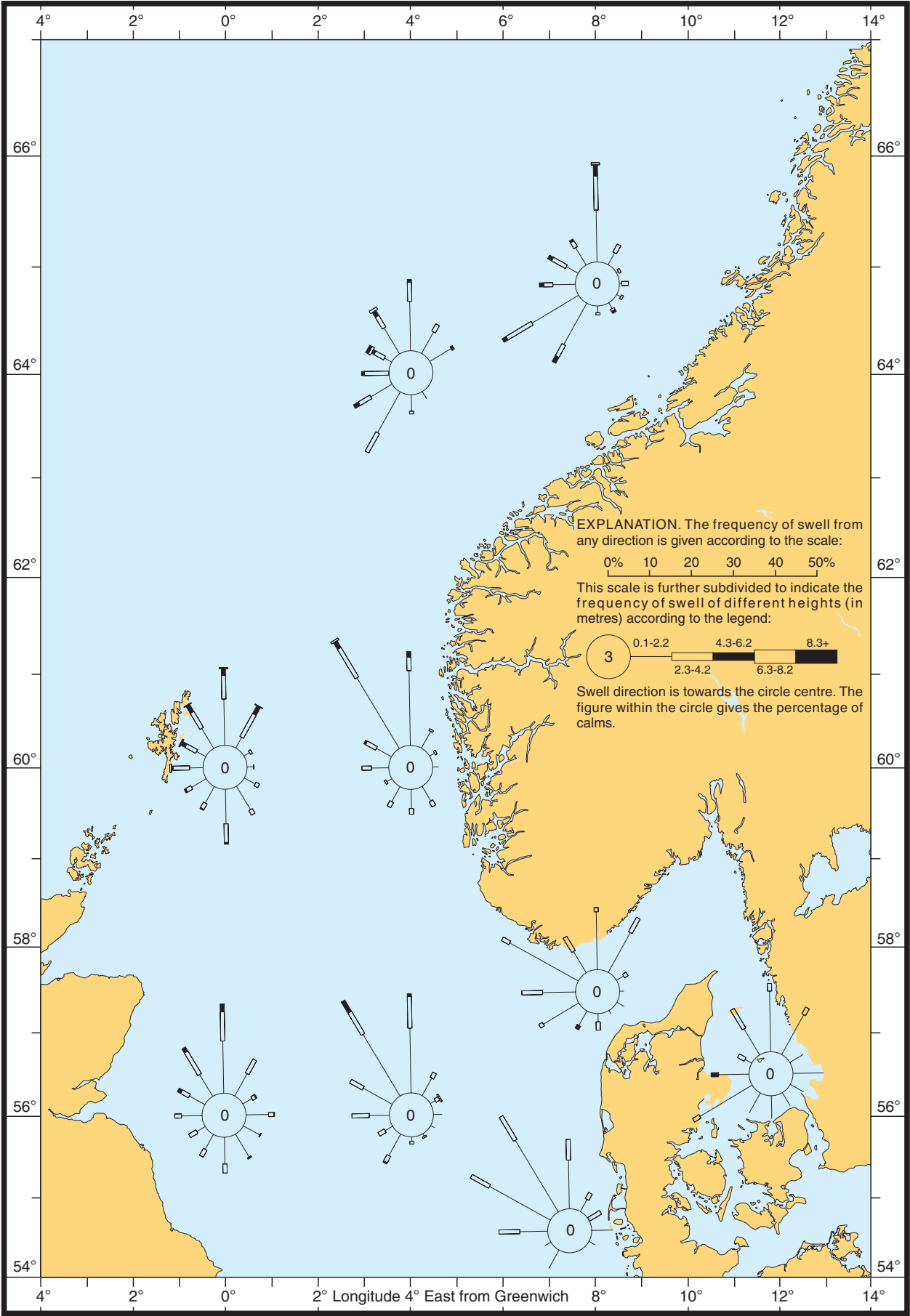
- 1 Sea waves are generated locally by the wind and can be very variable in direction. Some of the roughest seas are experienced when a vigorous secondary depression develops in the Skagerrak or in the W of the area, with strong to gale force winds from between SW and NW. In the many inlets and fjords the seas are generally less than over open water although where there is a funnelling of the wind the seas may be higher than expected.

Dangerous waves**1.192**

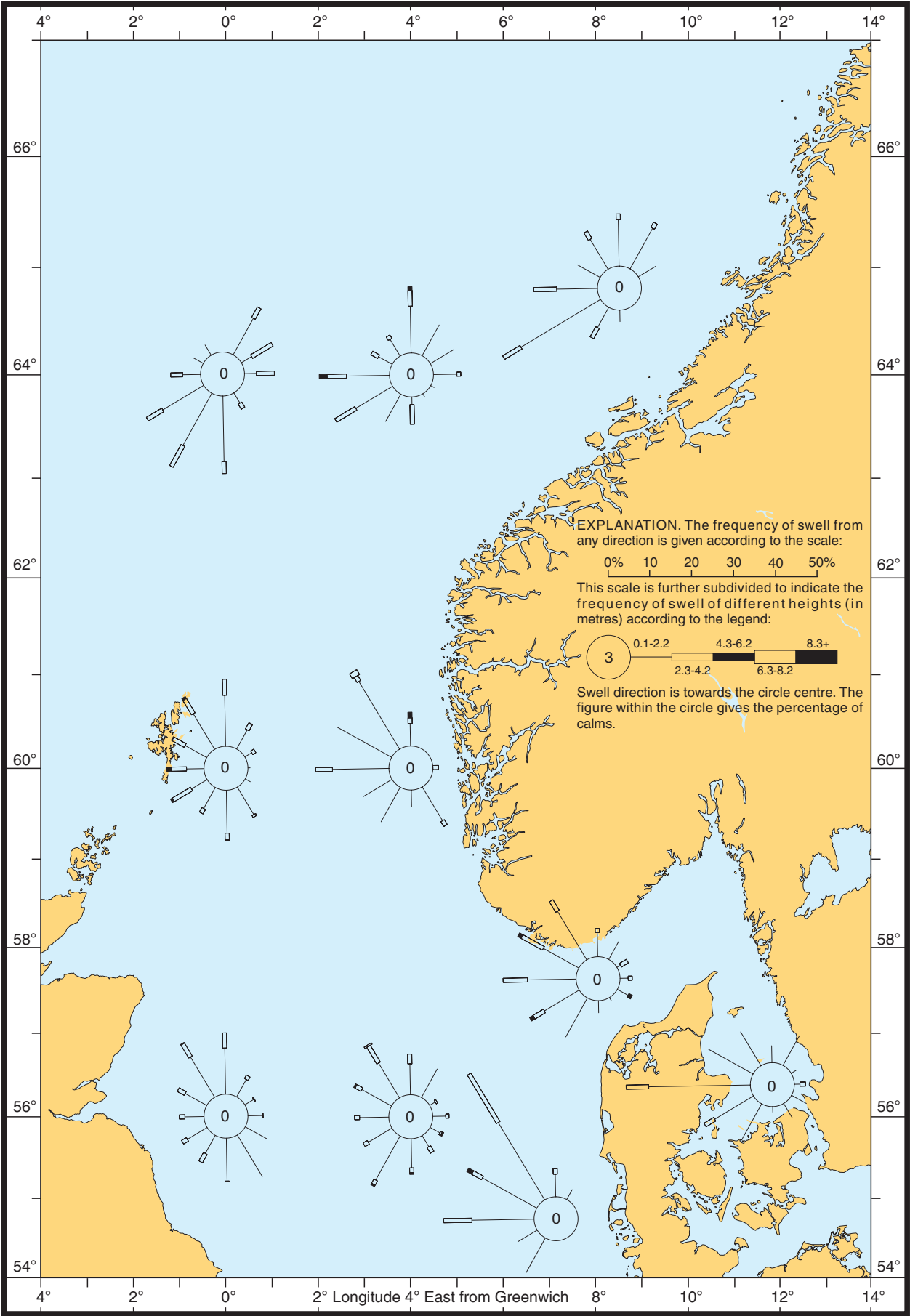
- 1 Dangerous waves may be encountered in the following areas:
- (a) In the vicinity of Ryvingen Light (57°58'N 7°30'E) where the current normally sets W with almost no tidal stream. Interaction between the current and moderate or higher waves from between SW and W frequently gives rise to heavy breakers.
 - 2 (b) Between Tvistein (58°56'N 9°56'E) and Færder (59°01'N 10°31'E), 19 miles ENE, in depths from 50 to 100 m, where the current, largely independent of the tide, has a rate of 1 to 1½ kn.
 - 3 In the W part of the area it is reported that winds from W and SW generate the biggest seas. Rough seas and large waves occur from NW and SW; and the sea condition is characterised by large, short swells which can break as tumbling breakers.
 - 4 In the E part, it is reported that winds from SE to SW give the roughest seas with tumbling breakers. The sea is described as rough and recoiling from all directions.
 - 5 (c) In the vicinity of 57°37'N 7°18'E, as shown on the chart.



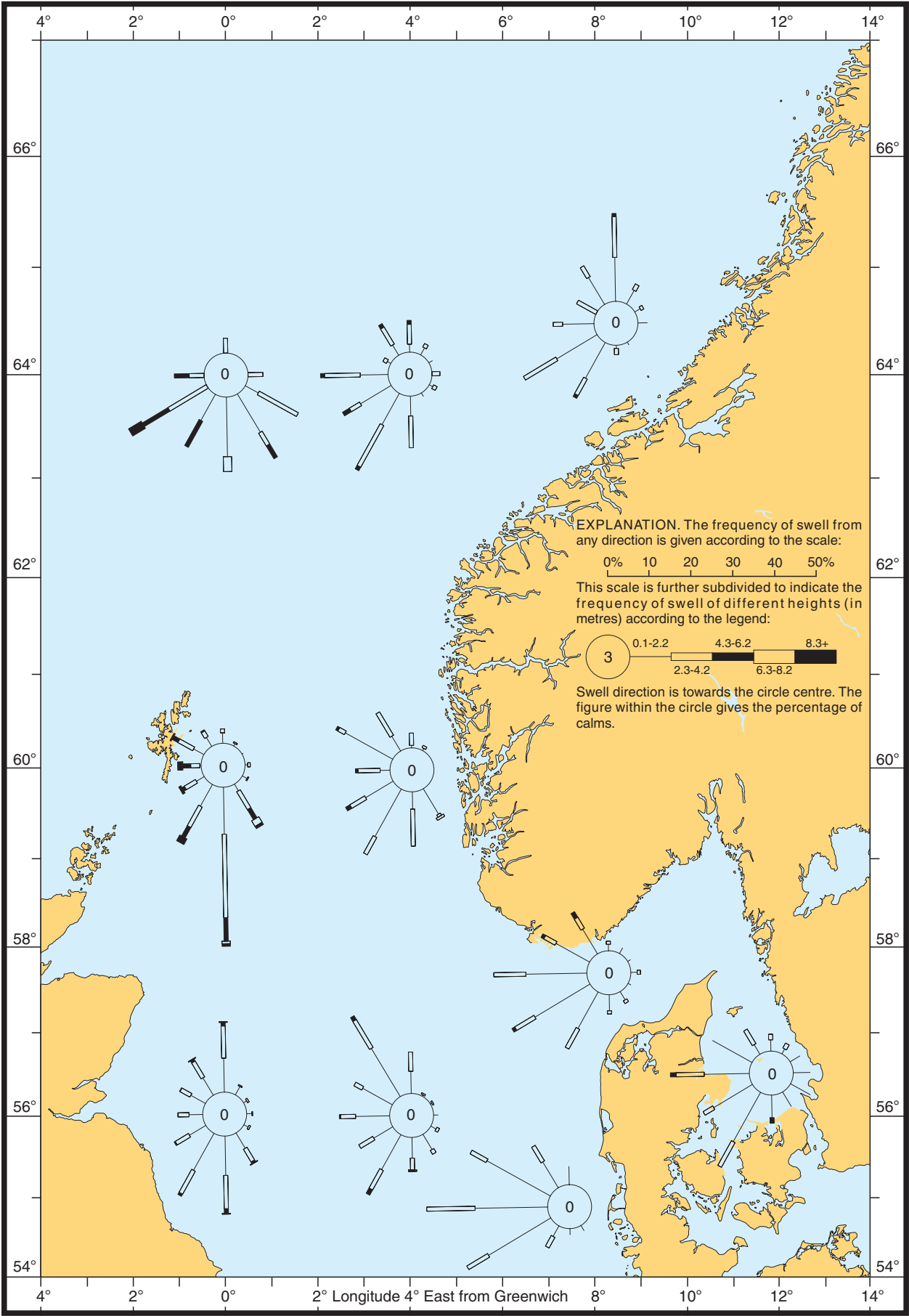
Swell distribution JANUARY (1.193.1)



Swell distribution APRIL (1.193.2)



Swell distribution JULY (1.193.3)



Swell distribution OCTOBER (1.193.4)

Swell conditions**1.193**

- 1 Diagrams 1.193.1 to 1.193.4 give swell roses for January, April, July and October. Moderate to heavy swells frequently develop in the Skagerrak after a period of persistent strong W to SW winds over the North Sea, and with swells of 4 m and over occurring on about 6% to 8% of occasions in winter and less than 1% in summer.

SEA WATER CHARACTERISTICS**Salinity****1.194**

- 1 For an explanation of salinity as applied to sea water, see *The Mariner's Handbook*.

The salinity values for the coastal area of Norway and Sweden and the sea areas covered by this volume vary across the area and according to the season. In winter the values range from 32.00‰ in the E of the area to 30.00‰ in the W; and in summer they range from 30.00‰ in the E to 25.00‰ in the W of the area.

- 2 Lower than average values of salinity will be encountered close inshore and in ports and approaches, particularly in spring and summer, due to ice melt run off from rivers. Values as low as 16.70‰ for June have been recorded in Oslofjorden and 00.20‰ in April for the Uddevalla Approaches.

Density**1.195**

- 1 For an explanation of density as applied to sea water, see *The Mariner's Handbook*.

The density values for the coastal area of Norway and Sweden covered by this volume vary across the area and according to the season. In spring the values range from 1.02200 gm/cm³ in the E of the area down to 1.01800 gm/cm³ in the W. In winter they are up to 1.02500 gm/cm³ in the E and 1.02000 gm/cm³ in the W of the area.

- 2 Because of lower salinity values, lower than average values of density occur close inshore and in ports and approaches in the area covered by this volume. For June in Oslofjorden values of 1.01200 gm/cm³ and for the Uddevalla Approaches in April values of 1.00000 gm/cm³ have been recorded.

Sea surface temperatures**1.196**

- 1 Diagrams 1.196.1 and 1.196.2 show the mean sea surface temperature for February and August. Sea surface temperatures are normally at their lowest in February and highest in August. In February the mean sea surface temperature increases from around 1.5°C in the entrance to Oslofjorden to about 4.5°C in the W of the area covered by this volume, and in August is around 15.5°C in the west and 17.5°C in the E.
- 2 In winter, the mean sea surface temperature is about 1°C higher than the mean air temperature in the E of the area and around 2°C higher in the W. By August the mean sea surface temperature and mean air temperature are usually within 1°C of each other.

Variability**1.197**

- 1 Sea surface temperatures can vary from one occasion to another, especially in the SW of the area in summer. The

average variation is about 2 to 3°C above or below the average for the time of the year, and can be even greater in shallow waters or where there is a major fresh water outflow.

SEA ICE**Norway****1.198**

- 1 Along the S coast of Norway freezing starts earlier and with greater severity with increasing longitude such that, in January and February, ice normally forms in the inner leads, fjords and several harbours along the coastal stretch from Kristiansand (58°09'N 8°00'E) to the Swedish border (59°00'N 11°05'E). This creates regular problems for the fishing fleet and smaller vessels; and some harbours to the E of Jomfruland (58°52'N 9°36'E), including Oslofjorden, are dependent on the local icebreaker service (1.95) to maintain navigational conditions.

- 2 Harbours in the vicinity of Lindesnes (57°59'N 7°30'E) are seldom ice-bound and, except during severe winters, most of the harbours W of Jomfruland are ice-free.

In some winters the shipping route along Norway's S coast is troubled by drift ice as given at 1.200.

Sweden**1.199**

- 1 **Conditions.** Ice formation along the W coast of Sweden is unpredictable and treacherous due to the greater salinity of the Skagerrak compared with the low salinity of the water in-flowing from the Baltic Sea and local rivers, for reasons given in *The Mariner's Handbook*. The most critical months for ice formation are February and March as the sea is then at its coldest. Its formation is favoured by winds from the NE or E; and its break-up and dispersal is caused by winds from the S or SW.

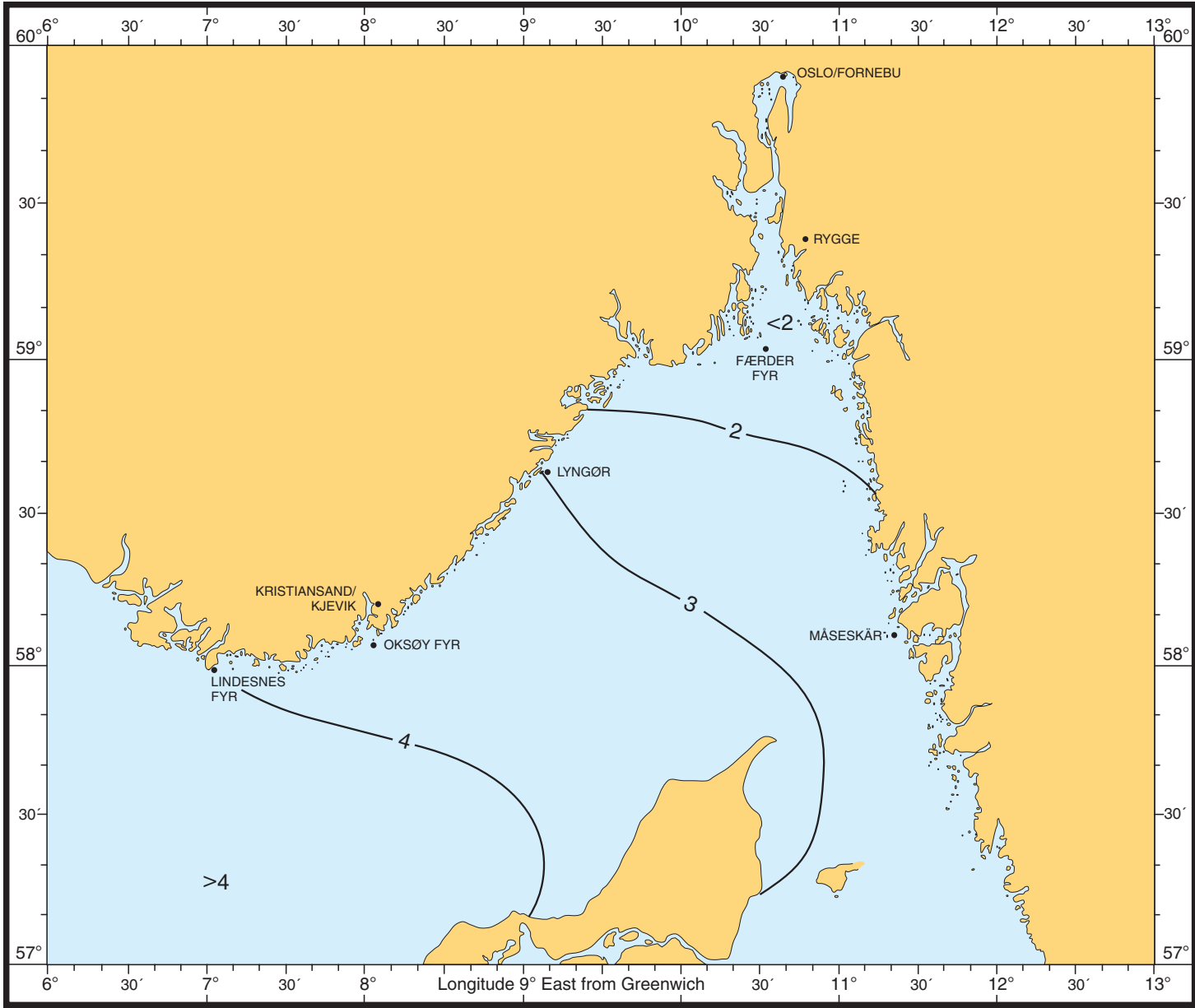
- 2 **Timing.** During normal and mild winters the W coast of Sweden does not become iced-up; however, some ice will normally form in late January and persist until about mid-March. During severe winters ice may develop in late January and persist into late April. In the worst case the Kattegat and the E end of the Skagerrak may be frozen and all waters along the W coast of Sweden filled by ice.

Drift ice**1.200**

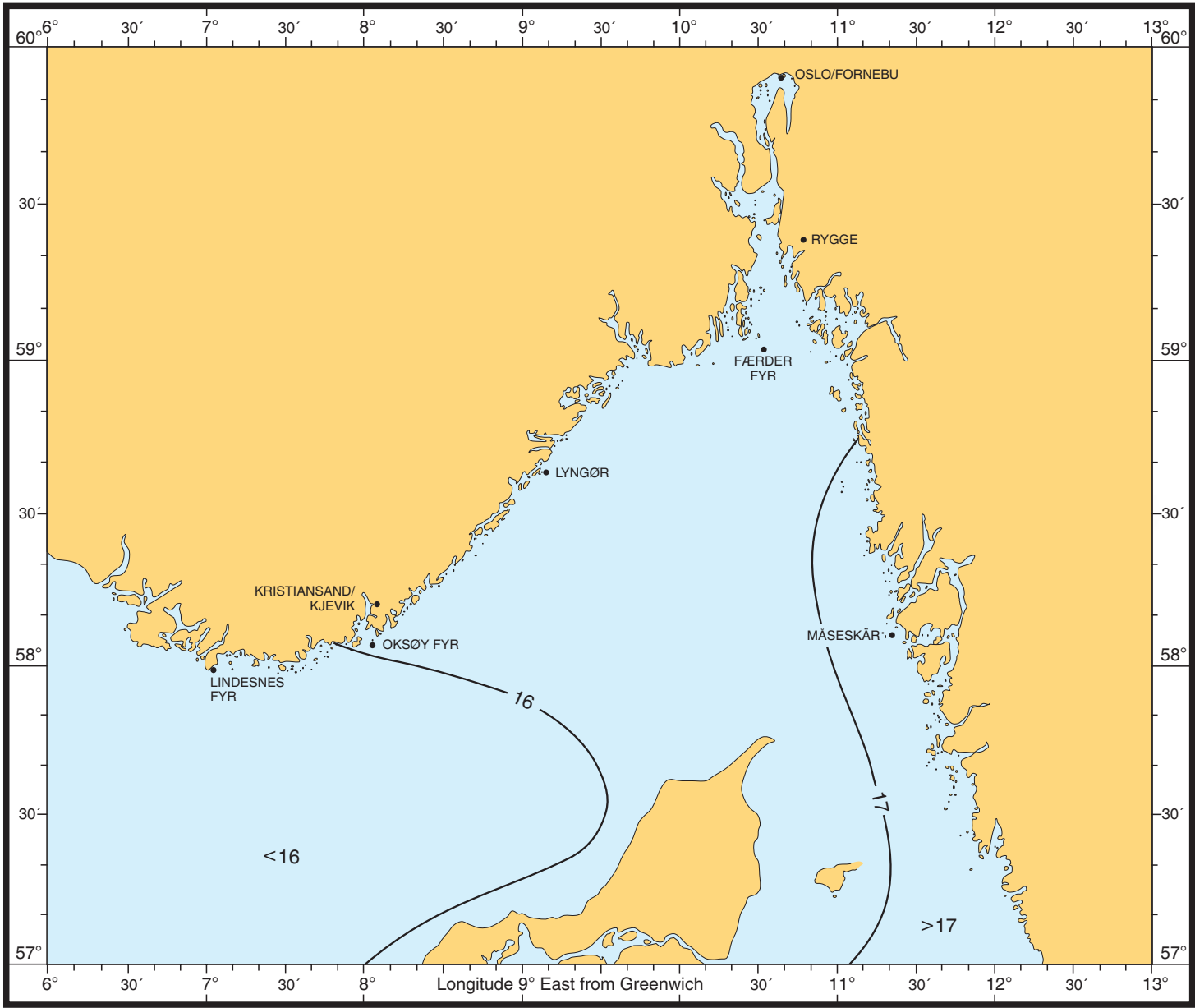
- 1 Ice from the Kattegat drifts N with the current and adds to the problems of ice off the coasts of both Sweden and Norway. Such drift ice, which generally appears near the beginning of the year and seldom before Christmas, may be encountered in the entrance to Oslofjorden as late as April and is common in March. These dates are difficult to predict as they depend on the state of ice in the Baltic; however, this ice is seldom a hindrance to navigation after February.

Ice dates**1.201**

- 1 The inner channel to Uddevalla (58°21'N 11°55'E) is normally iced-up during February and March.
- 2 The earliest, average and latest times of the onset and break-up of ice in the harbours given below are compiled from 30 years' data (1931–1960).



Mean sea surface temperature (°C) FEBRUARY (1.196.1)



Mean sea surface temperature (°C) AUGUST (1.196.2)

TABLE OF ICE DATES AT SPECIFIED HARBOURS

Station		Onset of ice			Break-up of ice		
		Earliest	Mean	Latest	Earliest	Mean	Latest
Norway	Kristiansandsfjorden	29/1	10/2	23/2	7/2	3/3	17/3
	Grimstad	16/12	13/2	12/3	16/12	18/3	24/3
	Galtesundet	2/1	8/2	16/3	7/2	22/3	19/4
	Brevikfjorden	14/12	25/1	26/2	16/12	21/3	19/4
	Larviksfjorden	1/12	26/1	21/3	4/1	12/3	20/4
	Oslo	16/12	27/1	3/3	16/12	27/2	12/4
	Halden	2/12	12/1	24/2	1/2	13/3	20/4
Sweden	Strömstad	3/1	13/2	17/3	10/1	21/3	22/4
	Lysekil	20/1	7/2	21/2	20/2	17/3	12/4
	Marstrand	7/1	8/2	28/2	28/2	14/3	9/4

(With acknowledgements to Deutsches Hydrographisches Institut, Hamburg).

CLIMATE AND WEATHER

General information

1.202

- The following information on climate and weather should be read in conjunction with the information contained in *The Mariner's Handbook* which explains in more detail many aspects of meteorology and climatology of importance to the mariner.
- Weather reports, ice reports and forecasts, that cover the area, are regularly broadcast in a number of different languages; for details see *Admiralty List of Radio Signals Volume 3 (1)*.

General conditions

1.203

- The region covered by this volume is relatively mild in the S and W of the area although frequently below freezing in the winter months in the N. The weather in this region can be very variable with periods of strong winds and rough seas. Gales can occur in any month but are most frequent in the autumn and winter with winds reaching storm force on some occasions. When an anticyclone becomes established over Southern Scandinavia, settled conditions prevail and may occasionally last for several weeks.
- Rainfall is not high and is fairly evenly spread throughout the year, although early spring to early summer tends to be the driest period with mid-summer to autumn the wettest. The winter months are generally more cloudy with an average of 5 to 6 oktas compared with 4 to 5 oktas in summer.
- Fog is infrequent in summer but is most common in winter and spring, particularly in the E of the area. Visibility is often good and, on occasions, exceptional visibility occurs with N or NW winds.

Pressure

Average distribution

1.204

- In summer the average monthly pressure is around 1012 hPa (mb) across the area and in mid-winter decreases to about 1008 hPa in the N. Climatic tables at the end of this chapter give the average monthly pressure values at a number of reporting stations in the area.

Variability

1.205

- It is stressed that the actual pressure pattern can be significantly different from the mean for long periods, due to the numerous mobile depressions that can affect the area, or move NE off the W coast of Norway, and with central pressures as low as 950 hPa. On occasions, especially in winter, when a high pressure cell, up to 1050 hPa, becomes established over Scandinavia, the pressure pattern is reversed with high pressure in the N of the area and relatively low pressure to the S.

Diurnal variation

1.206

- The diurnal variation is small, about 0.2 to 0.6 hPa amplitude, but is nearly always masked by larger irregular changes in the weather pattern.

Anticyclones

The Azores anticyclone

1.207

- This anticyclone is centred about 35°N in summer and around 30°N in winter. In summer, a ridge of high pressure often extends NE from the anticyclone towards central Europe, and frequently brings settled weather to the area, while forcing E-moving mobile depressions further N.

The Asiatic anticyclone

1.208

- The Asiatic anticyclone develops in winter over Siberia and it is not uncommon for a ridge of high pressure to extend W to North-west Europe with, on occasions, a separate high pressure cell forming over Southern Scandinavia. When this occurs, cold dry E to NE winds can affect the area and may, on occasions, last for several weeks. At the same time E-moving mobile depressions are prevented from approaching until the ridge collapses.

Depressions

Atlantic depressions

1.209

- Most of the more vigorous depressions, that affect the area in autumn and winter, move NE between 57° and 59°N but an almost equal number move between SE and ESE across the region from Iceland. A third group of depressions move between N and NE along or near the W

coast of Norway. The “Skagerrak depression” is a particular, often short lived, secondary depression that develops in the Skagerrak following the arrival of fronts associated with a primary depression usually moving NE near Trondheim in Norway. Like most other depressions crossing the area, these depressions generally move away to the NE. The intervals between depressions can be as short as 24 hours and may give rise to gale or, on some occasions, storm force winds, especially in winter.

- 2 In summer, there is generally an increase in the frequency of E-moving mobile depressions crossing the area, although the number of intense depressions (central pressure less than 980 hPa) is very low compared with the average for autumn and winter.

Fronts

Warm and cold fronts

1.210

- 1 Warm and cold fronts are frequently occluded by the time they reach the area, particularly to the N of 58°N, but are responsible for much of the bad weather in the region (see *The Mariner's Handbook* for a full description of warm and cold fronts and occlusions). Occlusions can, on occasions, become slow moving and weaken as they near the coast of SW Sweden.

Winds

Average distribution

1.211

- 1 Wind roses showing the frequency of winds of various directions and speeds for January, April, July and October are given in diagrams 1.211.1 to 1.211.4.

Variability

1.212

- 1 Due to the frequent mobile depressions that affect the area, there are often marked variations in both the speed and direction of the wind during any set period of time. However, if a high pressure cell becomes established over Southern Scandinavia, especially in winter and spring, then E to NE winds over the whole of the area are common and may persist for several weeks.

Open sea

1.213

- 1 In winter the winds are very variable but with SW and NNE winds being most frequent in the N of the area, and winds between W and SW being marginally more frequent in the S. By early summer the winds become less variable and, by July, there is a high frequency of W winds in the S of the area and SW winds in the N.

Coastal waters

1.214

- 1 Winds tend to blow parallel to the coast of S and SE Norway but with frequent variations in the fjords. Winds from between NNE and NE tend to be most frequent along the coast between Oksøy and Færder in spring and autumn, and from between S and SW in summer. At Oslo, S winds are most frequent between spring and autumn and reach a maximum frequency in July.
- 2 Local topography can cause major modifications to both the strength and direction of the wind. In steep narrow fjords the wind may be channelled in the direction of the

fjord and its strength increased due to funnelling; as may also occur around headlands.

- 3 In settled summer conditions there is a tendency for the wind direction to follow the course of the sun, and this effect is known locally as *Solgangsver*, or *Solgangsvind*. A *Solgangsver*, or *Solgangsvind*, may occur during settled summer conditions along the coast between Oslofjorden and Lindesnes. Initially a light E wind starts to blow soon after sunrise then slowly veers and increases in strength to become, at about 1700, moderate SW. The wind frequently falls calm during the evening but near midnight the wind may become light N.

Land and sea breezes

1.215

- 1 Land and sea breezes may develop in summer during settled spells, particularly in the E of the area where the hinterland is relatively flat. The land breeze, although generally weaker than the sea breeze, tends to reach its maximum strength around dawn whilst the sea breeze is often strongest between 1600 and 1800. Both land and sea breezes may either reduce or enhance the prevailing wind.

Squalls

1.216

- 1 In winter, katabatic winds (see *The Mariner's Handbook* for a full description) along the S and SE coast of Norway may produce sudden squalls in fjords and coastal waters with a sudden drop in the air temperature of around 15°C, and are known locally as *Sno* or *Elvegust*. *Sno* squalls moving offshore in winter are likely to reduce visibility to near fog limits.

Gales

1.217

- 1 The percentage frequency of winds of force 7 and over, in autumn and winter, is around 22% of all observations in the extreme W of the area, about 19% in the N and 14% in the SE. In summer, the percentage frequency decreases to around 7% to 8% in the extreme W of the area and to between 3% and 5% in the E. Gale force winds are possible from almost any direction in autumn and winter but, in summer, are most frequent from between NW and SW in the S of the area and from the SW in the N of the area.

Cloud

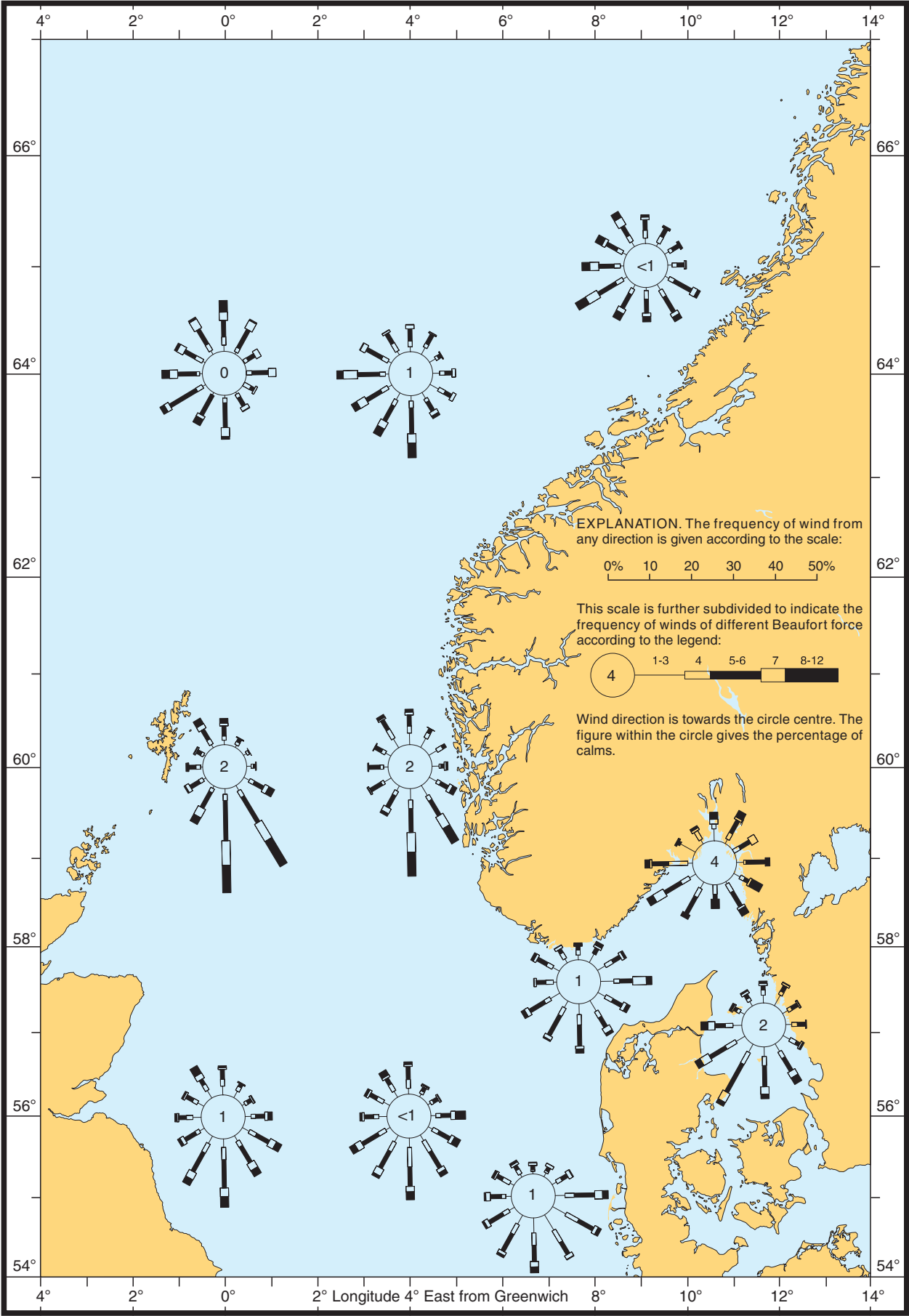
1.218

- 1 The average cloud cover, in winter, is around 5 to 6 oktas in the N of the area and around 6 oktas in the S of the area, and in summer the average cloud cover is about 4 to 5 oktas across most of the area. However, on any particular day the actual cloud cover may be very different from the mean. Cloud cover is generally less over the SE coast of Norway than in the S of the area, with winds from between W and N.

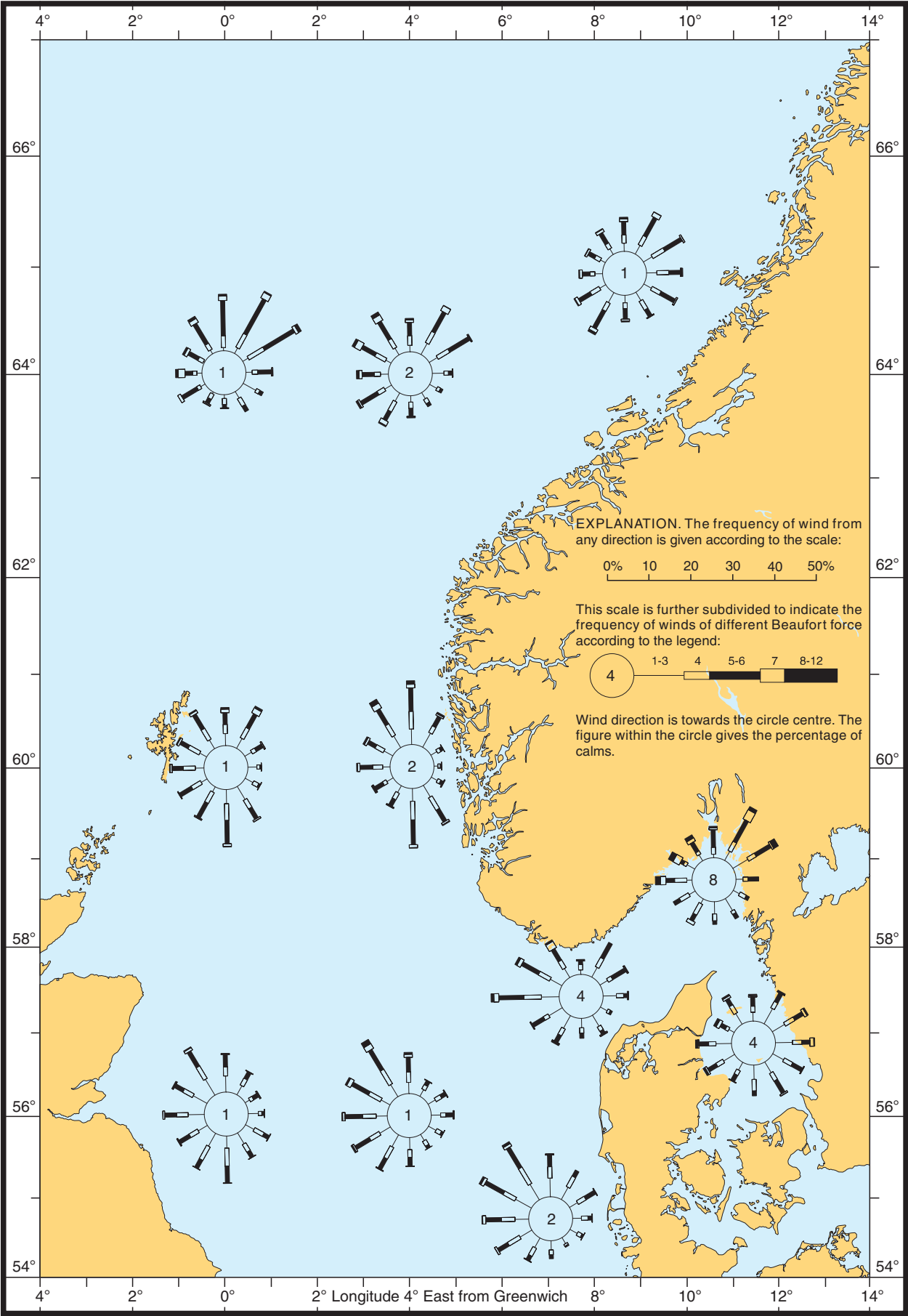
Precipitation

1.219

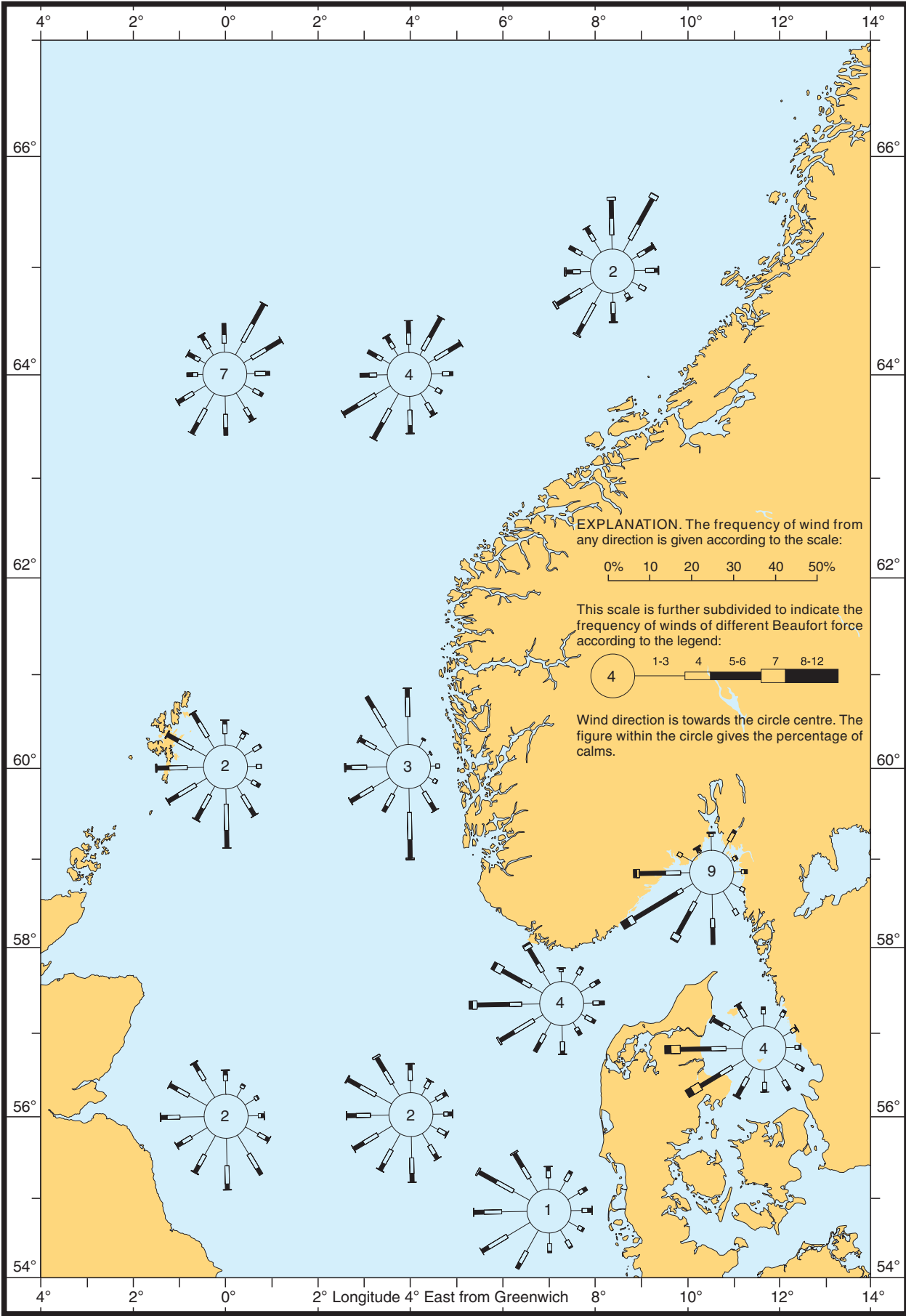
- 1 The climatic tables at the end of this chapter give the average amounts of precipitation for each month at several coastal stations in the area and the mean number of days each month when significant precipitation was recorded. However, the quantity and duration can vary significantly from one day to another and from one year to another.



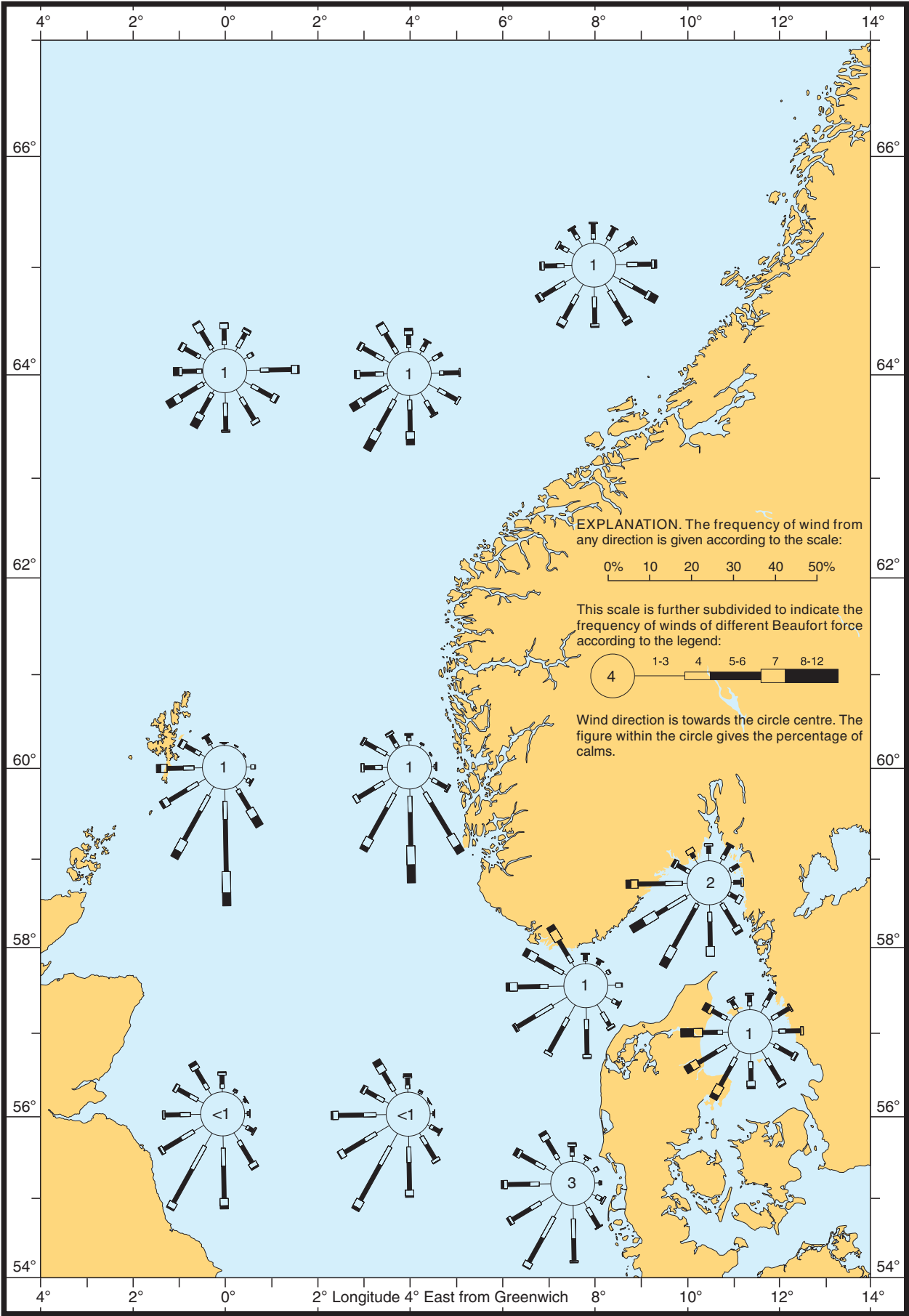
Wind distribution JANUARY (1.211.1)



Wind distribution APRIL (1.211.2)



Wind distribution JULY (1.211.3)



Wind distribution OCTOBER (1.211.4)

Rain**1.220**

- 1 The average amount of rain, and its equivalent in melted snow, is considerably less on the SE coast of Norway than on the more exposed W facing coasts. It also tends to be greater inland away from the coast, particularly in the W of the area. For example, at Kristiansand the average yearly rainfall is around 1400 mm compared with about 730 mm at Oslo.
- 2 The driest months tend to be from March to June and the wettest period from mid-summer to autumn, although the distinction between the two is less marked near Oslo than in the W of the area.

Thunderstorms**1.221**

- 1 Thunderstorms, occasionally accompanied by hail, are relatively rare from late autumn to early spring and most common during the summer months. The average number of thunderstorms per month in summer over Oslofjorden is around 4 to 5, and between 1 and 3 per month elsewhere.

Snow**1.222**

- 1 The majority of snow falls between November and March, although snowfalls can occur as early as October or as late as May. At Oksøy, snow may fall on around 7 days per month between January and March while Oslo has on average 10 days of snow per month between December and March. Snow lies for an average of 78 days per year at Kristiansand and 54 days at Grimstad, however, in extreme winters, snow has been known to lie for considerably longer. The mean depth of snow in February is around 190 mm at Kristiansand, 230 mm at Grimstad and 170 mm at Oslo.

Fog and visibility**1.223**

- 1 Fog is most frequent over open waters in winter and spring where it occurs on about 4% of occasions in the W and between 6% and 7% in the E; and in July and August the frequency is less than 2%. The climatic tables give the average number of days with fog for each month at a number of coastal stations.
- 2 A form of fog which occurs, on occasions in winter, in fjords is *frost smoke*, and is the result of very cold air draining from surrounding high ground and condensing over the relatively warm waters in the fjords. Sea fog (see *The Mariner's Handbook* for a full explanation on this and other types of fog) occurs most frequently over the Skagerrak in late spring and early summer with mild S winds. An increase in the sea breeze may cause the coastline and other landmarks to become obscured.
- 3 Good visibility may occur in any month and with any wind direction but is more common with N or NW winds and can, on occasions, be exceptional. Mirages are not uncommon in summer.

Air temperature**General information****1.224**

- 1 In general the coldest time of the year is January and February and the warmest July and August. Because of the frontal depressions that affect the area, with frequent changes in airstream, the temperature can be extremely

variable from one day to the next, especially in winter. High pressure over N Europe can give rise to exceptionally cold spells in winter and warm spells in summer.

Summer**1.225**

- 1 In summer the average air temperature over the open sea in the W of the area is between 15° and 16°C; and about 17°C in the E of the area. In July, the average daily maximum temperature along coasts is between 17° and 19°C and around 21° to 22°C near Oslo. However, it can reach 26° to 28°C on occasions, particularly inland towards Oslo. Daily minimum temperatures are around 13°C in July as shown in the Climatic Tables.

Winter**1.226**

- 1 In winter the average air temperature over the open sea falls to around 3°C in the SW of the area, 1.5°C in the SE and near freezing in the N of the area. In February, the average daily maximum temperature along the coast is between 1° and 3°C and near freezing near Oslo but can fall to around -15°C, on occasions, in winter near Oslo and -6° to -8°C in the S of the area.
- 2 At Oslo, the first frost usually occurs in mid-October and the last in late April, and at Færder the dates are around mid-November and late March.
In winter the mean air temperature is about 1°C lower than the mean sea surface temperature in the E of the area and around 2°C lower in the W of the area. By August the mean air temperature and the mean sea surface temperature are usually within 1°C of each other.

Humidity**General information****1.227**

- 1 Humidity is closely related to temperature and generally decreases as the air temperature increases. During the early morning, around dawn, the humidity normally reaches a maximum and then slowly decreases to a minimum during the early part of the afternoon.

Sea and coastal areas**1.228**

- 1 The relative humidity in the S and SE of the area is usually at its highest during the winter with an average value of around 85% and, elsewhere in both summer and winter, it averages between 79% and 82%. However, on any particular day the actual humidity may differ greatly from the mean.
- 2 In coastal areas and fjords, there are often relatively large fluctuations in humidity depending on the exposure of the locality to the prevailing wind and its distance from the open sea. In winter, relatively dry winds from between NW and NE can give rise to significant falls in humidity, particularly in the NE of the area.

Climatic tables**1.229**

- 1 The climatic tables which follow give data for several coastal stations which regularly undertake weather observations. Some of these stations have been re-sited and so the position given is the latest available, while others are new stations for which only a limited period of data is available.

2 It is emphasised that these data are average conditions and refer to the specific location of the observing station and therefore may not be representative of the conditions to be expected over the open sea or in approaches to ports in their vicinity. The following comments briefly list some of the differences to be expected between conditions over the open sea and at reporting stations, as given in *The Mariner's Handbook*.

3 Wind speeds tend to be higher at sea with more frequent gales than on land, although funnelling in

narrow inlets and fjords can result in an increase in wind strength.

Precipitation along mountainous wind-facing coasts can be considerable higher than at sea to windward. Similarly, precipitation in the lee of high ground is generally less.

4 Air temperature over the sea is less variable than over the land and in the lee of high ground.

Topography has a marked effect on local conditions.





Location of climatic stations 1.229

1.230

WMO No 01436

LINDESNES FYR (57° 59' N 07° 03' E) Height above MSL – 13 m

Climatic table compiled from observations 1984 to 2005

Month	Average pressure at MSL	Temperatures				Average humidity		Average cloud cover		Precipitation		Wind distribution – Percentage of observations from																Mean wind speed		Number of days with				
		Mean daily max.	Mean daily min.	Mean highest in each month	Mean lowest in each month	0700	1300	0700	1300	Average fall	No. of days with 0.1 mm or more	0700																0700		Gale or above	Fog	Thunder		
												N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W						NW	Calm
January	hPa 1007	°C 4	°C 1	°C 8	°C −5	% 83	% 0	Oktas 6 0		mm 123	21	3	15	14	8	6	14	21	17	2										Knots 15		3	1	0
February	1014	4	1	7	−5	83	0	5	0	102	17	3	21	11	5	5	14	23	17	1										14		1	2	0
March	1013	4	1	8	−3	79	0	5	0	96	17	1	19	25	7	4	10	14	19	1										14		1	3	0
April	1013	7	4	13	−1	78	0	5	0	67	14	3	24	33	10	4	4	12	9	1										12		1	4	0
May	1013	12	8	17	4	76	0	5	0	50	12	1	12	22	12	4	11	25	12	1										12		0	3	0
June	1012	15	11	19	7	79	0	5	0	81	13	1	8	18	14	4	9	31	15	0										12		0	2	1
July	1012	17	13	21	9	79	0	5	0	72	12	1	5	22	10	6	8	34	12	2										11		0	1	1
August	1012	18	14	21	11	77	0	5	0	102	14	2	9	25	10	5	6	30	11	2										11		0	0	0
September	1009	15	11	18	7	81	0	6	0	110	15	2	12	30	4	6	10	17	19	0										14		1	0	0
October	1013	11	8	14	3	82	0	6	0	143	19	2	16	22	8	8	11	20	13	0										16		2	1	0
November	1010	7	5	11	−1	85	0	6	0	122	18	4	21	21	13	11	7	10	12	1										16		1	0	0
December	1011	5	2	9	−5	82	0	6	0	119	18	6	24	18	7	5	10	14	16	0										14		2	0	0
Means	1013	10	7	22*	−7§	80	0	5	0	–	–	2	16	22	9	6	9	21	14	1										14		–	–	–
Totals	–	–	–	–	–	–	–	–	–	1187	190	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12	17	3
Extreme values	–	–	–	25†	−12‡	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
No. of years observations	22	22				22		22		21		22																22		22	22	22		

* Mean of highest each year

§ Mean of lowest each year

† Highest recorded temperature

‡ Lowest recorded temperature

1.231

WMO No 01448

OKSØY FYR (58° 04' N 08° 03' E) Height above MSL – 8 m

Climatic table compiled from observations 1984 to 2005

Month	Average pressure at MSL	Temperatures				Average humidity		Average cloud cover		Precipitation		Wind distribution – Percentage of observations from																		Mean wind speed		Number of days with		
		Mean daily max.	Mean daily min.	Mean highest in each month	Mean lowest in each month	0700	1300	0700	1300	Average fall	No. of days with 0.1 mm or more	0700										1300								0700	1300	Gale or above	Fog	Thunder
												N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm					
January	hPa	°C	°C	°C	°C	%	%	Oktas		mm																								
February	1011	3	1	8	−7	86	83	6	6	111	18	21	15	6	4	8	13	24	7	2	15	17	5	5	8	14	27	7	2	15	15	3	2	0
March	1012	3	0	8	−7	84	80	6	6	80	15	19	17	5	4	6	13	26	8	2	6	18	13	4	6	17	26	8	2	14	15	2	2	0
April	1013	4	1	9	−4	82	78	6	6	92	15	14	21	12	4	6	13	21	7	2	3	19	18	4	9	20	18	8	1	14	15	1	5	0
May	1013	8	3	14	−1	77	75	5	5	68	12	9	30	20	4	6	13	10	5	3	4	21	22	5	9	22	8	7	2	13	15	1	5	0
June	1015	13	8	18	4	74	73	4	4	59	10	3	21	26	5	8	19	11	5	2	2	13	24	5	8	30	13	4	1	13	15	1	3	0
July	1012	16	11	21	7	76	74	5	5	63	10	4	10	26	5	9	25	16	4	1	1	7	16	6	11	35	20	3	1	12	15	0	2	1
August	1012	18	13	23	9	76	74	5	4	73	10	5	10	20	5	8	22	20	7	3	1	5	16	5	10	37	21	4	1	12	15	0	1	1
September	1012	19	14	22	10	77	74	5	5	111	12	7	16	18	4	6	16	22	6	5	2	8	18	6	9	32	19	4	2	12	14	0	1	1
October	1013	15	11	19	6	79	74	5	5	105	13	15	21	12	5	6	8	23	8	2	4	14	18	5	10	21	22	5	1	14	15	1	1	1
November	1011	11	8	15	2	84	78	6	6	144	17	16	15	11	8	8	11	20	9	2	4	13	17	8	10	17	24	5	2	14	15	2	1	1
December	1012	7	4	11	−2	85	81	6	6	127	17	24	16	8	8	7	8	20	8	1	14	19	11	9	8	11	20	6	2	14	15	2	1	0
Means	1011	4	1	9	−6	85	83	6	6	110	16	25	16	5	5	6	10	24	8	1	20	18	6	4	7	8	27	8	2	14	14	2	1	0
Totals	1012	10	6	23*	−9§	80	77	5	5	—	—	14	17	14	5	7	14	20	7	2	6	14	15	6	9	22	20	6	2	13	15	—	—	—
Extreme values	—	—	—	—	—	—	—	—	—	1143	165	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	24	5
No. of years observations	22	22				22		22		21		22										22								22	22	22		

* Mean of highest each year

§ Mean of lowest each year

† Highest recorded temperature

‡ Lowest recorded temperature

1.232

WMO No 01452

KRISTIANSAND/KJEVIK (58° 12' N 08° 05' E) Height above MSL – 17 m

Climatic table compiled from observations 1984 to 2005

Month	Average pressure at MSL	Temperatures				Average humidity		Average cloud cover		Precipitation		Wind distribution – Percentage of observations from																				Mean wind speed		Number of days with				
		Mean daily max.	Mean daily min.	Mean highest in each month	Mean lowest in each month	0700	1300	0700	1300	Average fall	No. of days with 0.1mm or more	0700										1300										0700	0700	Gale or above	Fog	Thunder		
												N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm									
January	hPa	°C	°C	°C	°C	%	%	Oktas		mm																												
February	1011	3	–2	9	–12	81	76	6	6	135	17	5	37	10	3	9	16	11	5	4	6	30	8	3	9	20	12	7	5	8	7	1	2	0				
March	1013	5	–1	11	–8	74	66	6	5	95	14	3	34	11	3	9	15	13	8	4	1	17	17	4	20	16	15	9	1	8	10	1	3	0				
April	1013	9	2	17	–5	65	60	5	5	64	12	4	29	18	2	17	10	11	7	2	2	16	22	5	24	13	9	9	0	8	10	0	2	0				
May	1015	15	6	23	0	58	55	5	4	65	10	1	18	22	4	24	14	10	7	0	1	8	24	4	31	15	10	7	0	9	10	1	2	0				
June	1012	18	9	25	4	63	59	5	5	74	11	2	12	19	5	25	15	14	7	1	1	5	16	5	34	17	16	6	0	8	10	0	1	1				
July	1012	21	11	26	7	62	58	5	4	84	11	2	8	17	4	25	20	16	8	0	1	5	13	4	36	18	18	5	0	7	10	0	1	1				
August	1012	20	11	25	6	66	62	5	5	122	12	3	18	13	4	17	18	17	9	1	1	5	19	4	33	18	16	4	0	7	9	0	2	1				
September	1012	16	8	22	2	73	65	5	5	126	13	3	30	11	3	9	12	15	13	4	2	14	18	4	18	18	18	7	1	7	9	0	3	1				
October	1011	11	5	16	–3	81	72	6	6	164	18	4	32	13	5	8	14	10	8	6	5	17	15	5	17	18	15	6	2	7	8	1	3	0				
November	1012	6	1	11	–7	84	77	6	6	145	17	7	42	13	5	5	10	8	6	4	8	33	11	5	6	14	11	6	6	7	7	1	2	0				
December	1011	3	–2	10	–11	83	79	6	6	120	15	6	45	10	2	7	11	10	4	5	7	42	8	3	7	14	10	5	4	7	7	1	2	0				
Means	1012	11	4	26*	–15§	72	66	5	5	–	–	4	28	14	4	14	14	12	7	3	3	18	15	4	20	17	14	7	2	8	9	–	–	–				
Totals	–	–	–	–	–	–	–	–	–	1289	164	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	24	5				
Extreme values	–	–	–	30†	–20‡	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				
No. of years observations	22	22				22		22		21		22										22										22		22	22	22		

* Mean of highest each year

§ Mean of lowest each year

† Highest recorded temperature

‡ Lowest recorded temperature

1.233

WMO No 01467

LYNGØR FYR (58° 38' N 09° 09' E) Height above MSL – 5 m

Climatic table compiled from observations 1984 to 2005

Month	Average pressure at MSL	Temperatures				Average humidity		Average cloud cover		Precipitation		Wind distribution – Percentage of observations from																		Mean wind speed		Number of days with			
		Mean daily max.	Mean daily min.	Mean highest in each month	Mean lowest in each month	0700	1300	0700	1300	Average fall	No. of days with 0.1 mm or more	0700										1300								0700	1300	Gale or above	Fog	Thunder	
												N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm						
	hPa	°C	°C	°C	°C	%	%	Oktas		mm																				Knots					
January	1010	3	–1	8	–8	82	79	6	5	81	15	20	11	5	2	9	23	14	12	4	16	17	4	3	9	27	13	7	4	10	10	1	2	0	
February	1011	3	–1	9	–8	77	71	5	5	51	11	21	17	4	1	7	20	18	8	4	8	20	8	3	10	26	17	6	2	10	12	1	2	0	
March	1012	4	0	11	–5	72	66	5	5	59	13	13	21	10	4	7	25	10	8	2	7	13	13	5	16	22	12	10	2	11	12	1	4	0	
April	1013	8	3	15	–1	75	73	5	5	54	11	9	29	18	8	13	9	7	5	2	7	23	14	6	17	20	5	5	3	10	11	0	4	0	
May	1014	13	8	20	4	71	67	5	4	58	10	3	26	21	9	17	13	5	4	2	3	13	13	7	29	23	6	3	3	10	11	0	2	0	
June	1011	17	12	22	9	70	70	5	5	63	10	6	12	19	8	19	20	9	6	1	1	7	11	6	26	33	10	4	2	9	11	0	1	1	
July	1012	19	14	23	10	71	70	4	4	73	10	6	14	21	8	24	15	7	4	1	2	7	9	6	35	31	5	4	1	8	11	0	1	1	
August	1012	19	14	23	11	70	69	4	4	102	12	7	22	25	6	12	12	9	5	2	3	7	19	10	25	25	6	4	1	9	10	0	0	1	
September	1012	15	11	21	6	75	72	5	5	99	13	14	24	15	6	11	14	7	6	3	5	17	17	9	18	21	9	3	1	11	12	1	1	0	
October	1011	11	7	15	2	79	73	6	6	118	16	18	14	8	5	7	21	15	11	1	7	15	13	5	16	22	12	8	2	11	12	1	1	0	
November	1012	6	3	12	–3	81	78	6	6	100	15	24	19	5	5	8	15	10	11	3	19	19	9	6	9	15	14	6	3	11	11	1	1	0	
December	1011	3	0	9	–7	80	78	6	6	72	14	26	13	3	2	7	17	13	16	3	24	16	3	2	8	21	15	7	4	10	10	1	1	0	
Means	1012	10	6	24*	–10§	75	72	5	5	–	–	14	19	13	5	12	17	10	8	2	9	14	11	6	18	24	10	6	2	10	11	–	–	–	
Totals	–	–	–	–	–	–	–	–	–	930	150	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7	18	4	
Extreme values	–	–	–	29†	–15‡	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
No. of years observations	22	22				22		22		21		22										22								22		22	22	22	

* Mean of highest each year

§ Mean of lowest each year

† Highest recorded temperature

‡ Lowest recorded temperature

1.234

WMO No 01482

FÆRDER FYR (59° 02' N 10° 32' E) Height above MSL – 8 m

Climatic table compiled from observations 1984 to 2005

Month	Average pressure at MSL	Temperatures				Average humidity		Average cloud cover		Precipitation		Wind distribution – Percentage of observations from																		Mean wind speed		Number of days with					
		Mean daily max.	Mean daily min.	Mean highest in each month	Mean lowest in each month	0700	1300	0700	1300	Average fall	No. of days with 0.1 mm or more	0700										1300								0700	1300	Gale or above	Fog	Thunder			
												N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm								
	hPa	°C	°C	°C	°C	%	%	Oktas		mm																											
January	1010	2	0	6	−7	86	84	6	6	56	12	23	13	6	4	12	20	16	5	1	22	12	5	5	13	22	15	5	1	16	16	4	5	0			
February	1011	2	−1	6	−7	84	80	6	5	37	10	21	15	4	5	11	21	17	5	1	20	12	6	6	13	27	11	4	1	15	15	3	4	0			
March	1012	3	1	7	−4	82	77	5	5	44	9	20	13	9	6	15	18	13	5	1	21	10	6	6	19	23	10	4	1	14	14	2	6	0			
April	1013	7	4	13	−1	81	75	5	5	41	10	33	15	9	5	16	13	7	2	0	28	10	5	5	17	24	7	3	1	12	12	1	5	0			
May	1015	13	9	19	5	76	70	5	4	38	9	32	14	8	8	12	19	5	1	1	18	8	5	3	21	30	10	4	1	12	12	0	2	0			
June	1011	17	13	22	10	76	71	5	4	48	10	26	12	8	7	17	21	7	1	1	12	6	5	4	23	37	10	3	0	11	12	1	1	0			
July	1011	19	15	24	11	77	73	5	4	52	9	24	11	7	7	16	24	8	2	1	10	4	3	3	23	43	11	3	0	11	13	1	1	1			
August	1012	19	16	22	12	79	74	5	5	74	12	23	13	11	6	14	20	8	4	1	12	7	5	4	24	37	8	2	1	12	13	1	0	1			
September	1012	15	12	18	8	80	74	5	5	60	10	24	16	8	8	9	16	14	5	0	19	8	8	6	17	31	7	3	1	14	14	2	1	0			
October	1011	10	8	14	3	83	79	6	6	81	13	16	15	9	8	12	17	16	6	1	15	14	7	6	18	24	11	4	1	15	15	3	3	0			
November	1012	6	4	10	−2	85	82	6	6	68	12	22	17	8	9	12	14	11	6	1	21	18	8	8	12	14	13	6	0	15	15	3	1	0			
December	1011	3	1	9	−6	84	84	6	6	52	11	25	15	5	5	10	18	15	7	0	23	15	6	5	11	18	16	5	1	15	15	4	4	0			
Means	1012	10	7	24*	−10§	81	77	5	5	—	—	24	14	8	7	13	18	11	4	1	18	10	6	5	18	27	11	4	1	14	14	—	—	—			
Totals	—	—	—	—	—	—	—	—	—	651	127	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	31	3			
Extreme values	—	—	—	28†	−18‡	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
No. of years observations	22	22				22		22		21		22										22								22		22	22	22			

* Mean of highest each year

§ Mean of lowest each year

† Highest recorded temperature

‡ Lowest recorded temperature

1.235

WMO No 01488

OSLO/FORNEBU (59° 54' N 10° 38' E) Height above MSL – 17 m

Climatic table compiled from observations 1974 to 1998

Month	Average pressure at MSL	Temperatures				Average humidity		Average cloud cover		Precipitation		Wind distribution – Percentage of observations from																		Mean wind speed		Number of days with					
		Mean daily max.	Mean daily min.	Mean highest in each month	Mean lowest in each month	0700	1300	0700	1300	Average fall	No. of days with 0.1 mm or more	0700									1300									0700	1300	Gale or above	Fog	Thunder			
												N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm								
	hPa	°C	°C	°C	°C	%	%	Oktas		mm																											
January	1010	–1	–5	7	–15	81	77	6	6	46	12	19	13	5	4	9	7	13	11	19	14	11	7	4	11	11	14	9	19	4	4	0	4	0			
February	1014	1	–6	8	–15	81	70	6	5	37	10	13	14	8	3	11	9	13	6	23	10	14	9	5	19	9	8	5	21	4	4	0	5	0			
March	1012	5	–2	12	–11	76	62	5	5	40	10	12	13	12	6	17	8	7	5	20	12	14	9	5	28	11	9	4	8	4	6	0	4	0			
April	1013	10	1	19	–5	66	52	5	5	37	10	13	16	12	9	22	8	7	6	7	14	12	9	7	31	10	11	4	2	5	7	0	2	0			
May	1015	17	7	25	0	58	48	5	5	37	8	10	13	14	14	28	7	8	4	2	9	9	9	8	44	10	7	3	1	6	8	0	0	1			
June	1011	20	11	27	5	60	51	5	5	63	12	10	11	14	12	32	6	9	5	1	9	7	8	9	44	10	8	5	0	6	8	0	0	2			
July	1011	22	13	28	8	61	52	5	5	75	12	9	9	13	10	32	9	11	5	2	6	6	6	7	52	11	6	5	1	5	8	0	0	3			
August	1012	21	12	26	6	65	54	5	5	104	14	9	12	15	12	26	6	9	7	4	7	8	6	7	48	11	8	4	1	5	7	0	0	2			
September	1011	16	8	22	1	71	58	5	5	72	12	12	13	15	8	21	11	8	5	7	10	10	8	7	34	11	13	5	2	5	7	0	1	1			
October	1012	10	4	16	–4	80	68	6	6	75	12	16	18	10	6	15	6	8	6	15	12	14	8	7	25	8	10	6	10	4	6	0	3	0			
November	1010	3	–1	11	–9	83	77	6	6	61	14	22	13	7	4	10	5	12	10	17	15	13	8	4	14	8	10	12	16	4	4	0	4	0			
December	1009	0	–5	9	–14	82	80	6	6	44	12	23	13	5	3	8	7	13	10	18	21	12	6	3	9	9	10	12	18	3	4	0	5	0			
Means	1012	10	3	29*	–18§	72	62	5	5	–	–	14	13	11	8	19	7	10	7	11	12	11	8	6	30	10	9	6	8	5	6	–	–	–			
Totals	–	–	–	–	–	–	–	–	–	691	138	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	28	8			
Extreme values	–	–	–	35†	–25‡	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–			
No. of years observations	25	25				25		25		15		25									25									25		25	25	25			

* Mean of highest each year

§ Mean of lowest each year

† Highest recorded temperature

‡ Lowest recorded temperature

1.236

WMO No 01494

RYGGE (59° 23' N 10° 47' E) Height above MSL – 53 m

Climatic table compiled from observations 1984 to 2005

Month	Average pressure at MSL	Temperatures				Average humidity		Average cloud cover		Precipitation		Wind distribution – Percentage of observations from																		Mean wind speed		Number of days with																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		Mean daily max.	Mean daily min.	Mean highest in each month	Mean lowest in each month	0700	1300	0700	1300	Average fall	No. of days with 0.1 mm or more	0700									1300									0700	1300	Gale or above	Fog	Thunder																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
												N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	hPa	°C	°C	°C	°C	%	%	Oktas		mm																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

* Mean of highest each year

§ Mean of lowest each year

† Highest recorded temperature

‡ Lowest recorded temperature

1.237

WMO No 02508

MÅSESKÄR (58° 06' N, 11° 21' E) Height above MSL – 14 m

Climatic table compiled from observations 1983 to 1996

Month	Average pressure at MSL	Temperatures				Average humidity		Average cloud cover		Precipitation		Wind distribution – Percentage of observations from																		Mean wind speed		Number of days with		
		Mean daily max.	Mean daily min.	Mean highest in each month	Mean lowest in each month	0700	1300	0700	1300	Average fall	No. of days with 0.1 mm or more	0700										1300								0700	1300	Gale	Fog	Thunder
												N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm					
		°C	°C	°C	°C	%	%	Oktas				7	9	13	8	19	19	17	6	2	7	11	11	6	20	18	21	5	1	20	21	7	3	⊕
January		2	0	6	–6	87	87	5	6			7	9	13	8	19	19	17	6	2	7	11	11	6	20	18	21	5	1	20	21	7	3	⊕
February		1	–1	5	–7	87	83	5	6			9	15	18	10	18	16	9	4	1	10	12	17	8	19	16	14	5	⊕	16	17	3	3	⊕
March		4	1	7	–4	86	81	6	1			7	9	18	12	20	16	13	5	1	6	7	12	11	23	13	20	6	1	17	17	4	5	0
April		7	4	14	–1	83	74	5	5			10	13	24	10	15	10	12	5	1	8	12	13	7	19	11	16	13	1	14	14	1	4	⊕
May		14	9	20	4	79	69	4	4			9	11	20	15	13	14	13	4	1	8	8	9	4	18	16	22	14	1	13	13	1	2	1
June		17	13	23	9	81	72	5	5			10	6	13	10	14	17	21	6	2	7	3	5	3	16	22	29	15	1	13	13	1	1	1
July		19	15	24	12	82	73	5	5			13	5	10	10	16	22	18	5	2	7	2	3	2	18	28	25	14	1	13	13	2	1	2
August		19	15	23	11	86	76	5	5			7	9	13	11	17	19	19	4	2	6	3	6	4	23	20	25	13	⊕	14	14	1	⊕	1
September		15	12	19	7	85	76	5	5			10	11	15	13	12	13	20	4	2	12	6	11	8	18	16	21	8	1	16	16	3	⊕	1
October		11	9	14	3	85	80	6	6			6	9	17	8	18	15	20	7	⊕	8	6	12	11	23	14	19	6	1	17	17	4	2	⊕
November		6	4	10	–2	86	83	5	6			12	11	17	13	16	14	13	5	1	11	10	16	9	19	14	15	3	1	17	17	4	2	⊕
December		4	2	8	–4	86	85	5	6			10	10	11	10	17	17	17	7	2	9	9	13	8	19	14	23	5	⊕	19	19	6	2	⊕
Means		10	7	25*	–9§	84	78	5	5			9	10	16	11	16	16	16	5	1	8	7	10	7	20	17	21	9	1	16	16	–	–	–
Totals		–	–	–	–	–	–	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	37	25	6
Extreme values		–	–	28†	–21‡	–	–	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
No. of years observations		13				13		13				13										13								13		13	13	

* Mean of highest each year

§ Mean of lowest each year

† Highest recorded temperature

‡ Lowest recorded temperature

⊕ Rare

METEOROLOGICAL CONVERSION TABLE AND SCALES

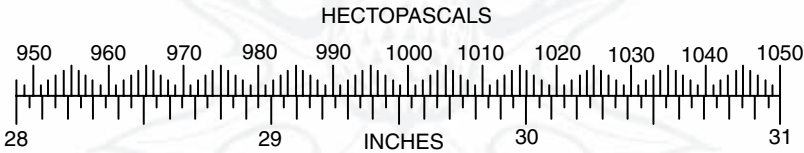
Fahrenheit to Celsius
°Fahrenheit

	0	1	2	3	4	5	6	7	8	9
°F				Degrees Celsius						
-100	-73.3	-73.9	-74.4	-75.0	-75.6	-76.1	-76.7	-77.2	-77.8	-78.3
-90	-67.8	-68.3	-68.9	-69.4	-70.0	-70.6	-71.1	-71.7	-72.2	-72.8
-80	-62.2	-62.8	-63.3	-63.9	-64.4	-65.0	-65.6	-66.1	-66.7	-67.2
-70	-56.7	-57.2	-57.8	-58.3	-58.9	-59.4	-60.0	-60.6	-61.1	-61.7
-60	-51.1	-51.7	-52.2	-52.8	-53.3	-53.9	-54.4	-55.0	-55.6	-56.1
-50	-45.6	-46.1	-46.7	-47.2	-47.8	-48.3	-48.9	-49.4	-50.0	-50.6
-40	-40.0	-40.6	-41.1	-41.7	-42.2	-42.8	-43.3	-43.9	-44.4	-45.0
-30	-34.4	-35.0	-35.6	-36.1	-36.7	-37.2	-37.8	-38.3	-38.9	-39.4
-20	-28.9	-29.4	-30.0	-30.6	-31.1	-31.7	-32.2	-32.8	-33.3	-33.9
-10	-23.3	-23.9	-24.4	-25.0	-25.6	-26.1	-26.7	-27.2	-27.8	-28.3
-0	-17.8	-18.3	-18.9	-19.4	-20.0	-20.6	-21.1	-21.7	-22.2	-22.8
+0	-17.8	-17.2	-16.7	-16.1	-15.6	-15.0	-14.4	-13.9	-13.3	-12.8
10	-12.2	-11.7	-11.1	-10.6	-10.0	-9.4	-8.9	-8.3	-7.8	-7.2
20	-6.7	-6.1	-5.6	-5.0	-4.4	-3.9	-3.3	-2.8	-2.2	-1.7
30	-1.1	-0.6	0	+0.6	+1.1	+1.7	+2.2	+2.8	+3.3	+3.9
40	+4.4	+5.0	+5.6	6.1	6.7	7.2	7.8	8.3	8.9	9.4
50	10.0	10.6	11.1	11.7	12.2	12.8	13.3	13.9	14.4	15.0
60	15.6	16.1	16.7	17.2	17.8	18.3	18.9	19.4	20.0	20.6
70	21.1	21.7	22.2	22.8	23.3	23.9	24.4	25.0	25.6	26.1
80	26.7	27.2	27.8	28.3	28.9	29.4	30.0	30.6	31.1	31.7
90	32.2	32.8	33.3	33.9	34.4	35.0	35.6	36.1	36.7	37.2
100	37.8	38.3	38.9	39.4	40.0	40.6	41.1	41.7	42.2	42.8
110	43.3	43.9	44.4	45.0	45.6	46.1	46.7	47.2	47.8	48.3
120	48.9	49.4	50.0	50.6	51.1	51.7	52.2	52.8	53.3	53.9

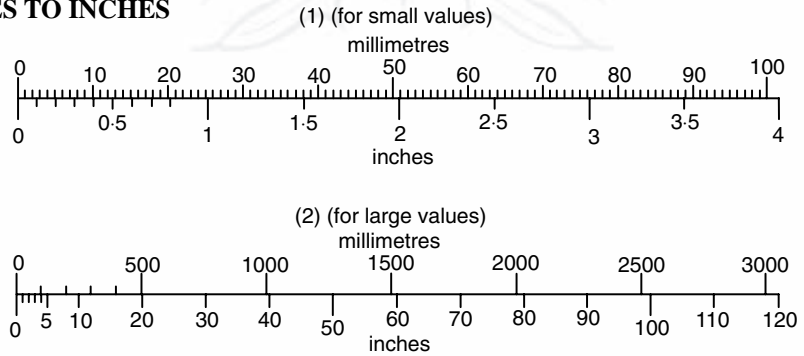
Celsius to Fahrenheit
°Celsius

	0	1	2	3	4	5	6	7	8	9
°C				Degrees Fahrenheit						
-70	-94.0	-95.8	-97.6	-99.4	-101.2	-103.0	-104.8	-106.6	-108.4	-110.2
-60	-76.0	-77.8	-79.6	-81.4	-83.2	-85.0	-86.8	-88.6	-90.4	-92.2
-50	-58.0	-59.8	-61.6	-63.4	-65.2	-67.0	-68.8	-70.6	-72.4	-74.2
-40	-40.0	-41.8	-43.6	-45.4	-47.2	-49.0	-50.8	-52.6	-54.4	-56.2
-30	-22.0	-23.8	-25.6	-27.4	-29.2	-31.0	-32.8	-34.6	-36.4	-38.2
-20	-4.0	-5.8	-7.6	-9.4	-11.2	-13.0	-14.8	-16.6	-18.4	-20.2
-10	+14.0	+12.2	+10.4	+8.6	+6.8	+5.0	+3.2	+1.4	-0.4	-2.2
-0	32.0	30.2	28.4	26.6	24.8	23.0	21.2	19.4	+17.6	+15.8
+0	32.0	33.8	35.6	37.4	39.2	41.0	42.8	44.6	46.4	48.2
10	50.0	51.8	53.6	55.4	57.2	59.0	60.8	62.6	64.4	66.2
20	68.0	69.8	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2
30	86.0	87.8	89.6	91.4	93.2	95.0	96.8	98.6	100.4	102.2
40	104.0	105.8	107.6	109.4	111.2	113.0	114.8	116.6	118.4	120.2
50	122.0	123.8	125.6	127.4	129.2	131.0	132.8	134.6	136.4	138.2

HECTOPASCALS TO INCHES



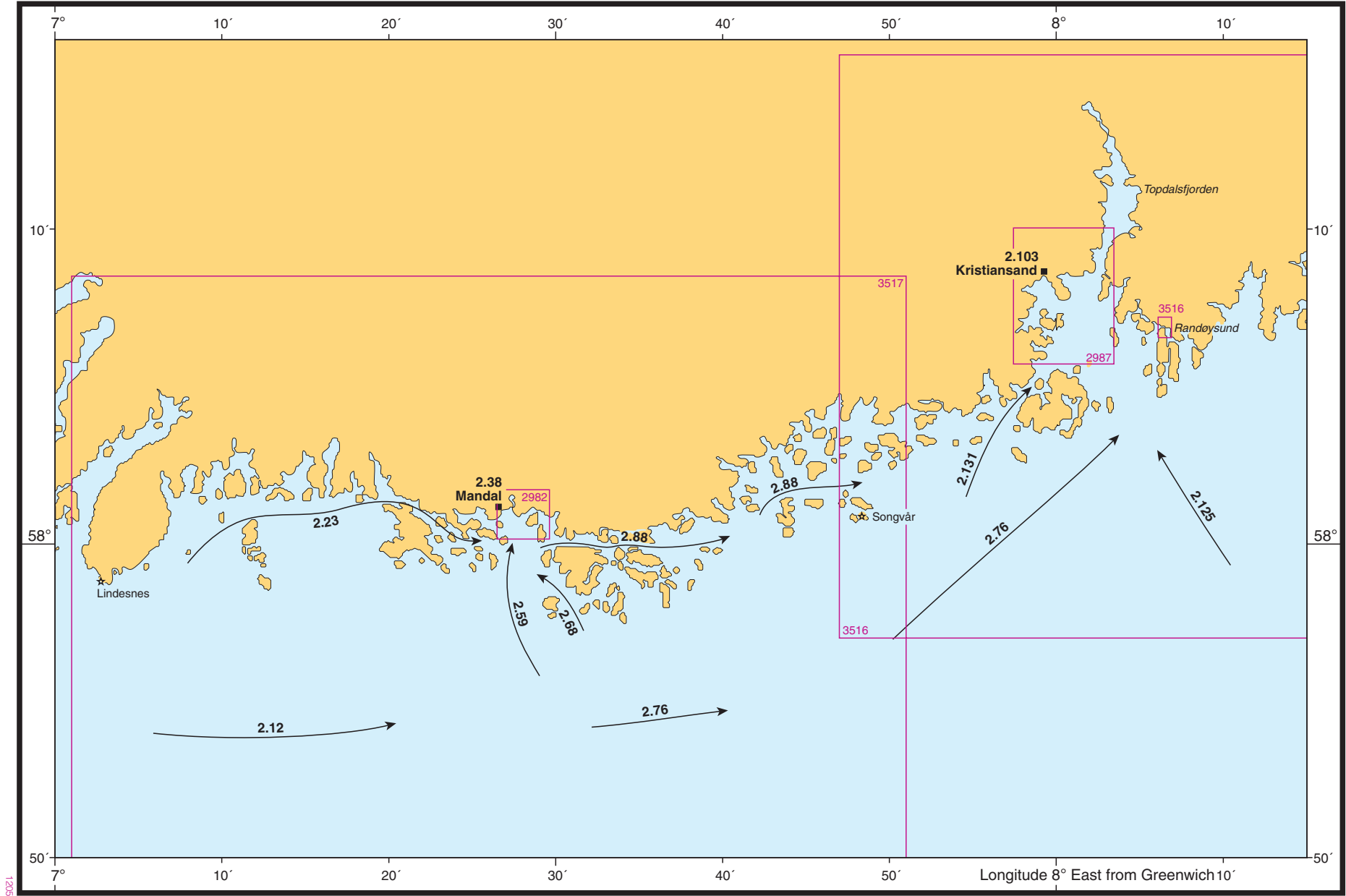
MILLIMETRES TO INCHES



NOTES



Chapter 2 - Lindesnes to Kristiansand



CHAPTER 2

LINDESNES TO KRISTIANSAND

GENERAL INFORMATION

*Chart 1402***Scope of the chapter****2.1**

- 1 This chapter covers the coastal waters from Lindesnes (57°59'N 7°03'E) to Kristiansand (58°09'N 8°00'E), 30 miles ENE. It also includes the approaches and entry into Mannefjorden (58°00'N 7°28'E) (2.40) and Kristiansandfjorden (58°07'N 8°02'E) (2.105). The chapter is arranged as follows:
- 2 Lindesnes to Mandal and the port of Mandal (2.11).
Mandal to Kristiansand and the port of Kristiansand (2.75).

Routes**2.2**

- 1 **Coastal route.** This route, which passes outside the 200 m depth contour, leads E, then ENE, clear of dangers, as given at 2.12 and 2.76.
Tanker route. Laden tankers of 40 000 dwt and greater are advised to start the coastal route at least 13 miles offshore and maintain this distance to a position 15 miles SSE of Oksøy (58°05'N 8°03'E). See 1.83 for details.
- 2 **Inner passage.** An inner passage, used mainly by coasters and small craft, passes in more sheltered waters between the mainland and the coastal archipelago which lies off most of the coast covered by this chapter except around Lindesnes where there is no protection at all.

Topography**2.3**

- 1 The coast between Lindesnes and Kristiansand is highly indented with mountains, which generally extend to the coast, forming a succession of peninsulas and promontories.
Inland, Kristiansands Høye Land (58°20'N 7°46'E) is visible from far out to sea as a ridge sloping gently towards the E and falling steeply towards the W.
- 2 Offshore, the coast is fronted by an archipelago of islands, islets and skerries, known as the Skjærgården (1.3), the islands of which are generally low, bare and grey or dark grey; some of which have patches of lighter colour.

Navigation**2.4**

- 1 This part of the coast is considered to be one of the most exposed and navigationally hazardous sections of the Norwegian seaboard. Although the coast is high and bold, with the exception of Lindesnes (2.20) it is difficult to pick out natural landmarks when some distance off the coast, as several of those given in this chapter are only conspicuous from a particular direction and distance. These will be difficult for strangers to identify if the position of observation is not reasonably well fixed. With the exception of Udvåre (57°59'N 7°13'E) (2.22), the islands of Skjærgården tend to blend with the background.
- 2 Navigation will not, however, present too much difficulty in good visibility as the coastline is well marked by lights and beacons.

Depths**2.5**

- 1 The 200 m depth contour, which lies parallel with the coast about 4 miles offshore, marks the change from the deep and relatively even seabed of the Skagerrak to the highly irregular depths which surround and extend seaward from the islands and skerries, within which isolated shoal patches have been found to exist.

Hazards**2.6**

- 1 **Fishing.** General information on fishing is given at 1.19. Fishing for salmon and mackerel takes place within the coastal waters and for sprats within the fjords.
During the period of drift-net fishing for mackerel, from May to July, mariners, other than those in tankers (2.2), are requested to keep within 4 miles of the land to the E of Lindesnes (57°59'N 7°03'E), as the main fishing ground is to seaward of this limit.
- 2 **Dangerous waves,** the general conditions for which are described at 1.192, may be encountered over a large area off this part of the coast. The main area, which extends over a wide band NE from 57°00'N 6°00'E to 58°00'N 8°00'E, contains three of the basic conditions:
- 3 Depths are mainly less than 100 m, with the exception of Norskerenna (Norwegian Trench) (57°40'N 7°00'E), a glacial trough which follows the S coast of Norway at the W end of the area covered by this volume.
The W-going coastal current dominates the current pattern.
A steep seabed exists some 5 miles offshore where Norskerenna rises to the coastal bank.
- 4 With waves from SW several refraction centres are created off the coast, over Norskerenna, and, in addition, reflections are caused by the steep seabed near the coast. Interaction between waves and current can lead to breaking waves which may cause extreme conditions during the more vigorous "Skagerrak depressions".
- 5 An area in the vicinity of Ryvingen (57°58'N 7°30'E) is vulnerable to heavy breakers when waves from SW to W meet the W-setting current.

Traffic regulations**2.7**

- 1 General traffic regulations are given at 1.69 and for tankers at 1.83.
Kristiansand (58°09'N 8°00'E) is covered by special regulations as given at 2.119.

Currents**2.8**

- 1 The SW current on the Skagerrak coast takes a more W direction off Kristiansand and trends NW when W of Lindesnes. The set is irregular close inshore and in the Inner Passage (2.2). In these areas W and N sets are more common, especially in spring and summer, but with persistent N and E winds the set may be E or S. However,

when navigating near the coast mariners must always be prepared for an onshore set.

Ice

2.9

- 1 The outer harbours along this coastal stretch are usually ice-free.

LINDESNES TO MANDAL AND THE PORT OF MANDAL

GENERAL INFORMATION

Charts 3517, 3516

Area covered

2.11

- 1 This section describes the coastal waters from Lindesnes (57°59'N 7°03'E) to Ryvingen (57°58'N 7°30'E), about 14 miles E, along with its harbours and anchorages. It is arranged as follows:
Lindesnes to Mandal (2.12).
Mandal (2.38).

LINDESNES TO MANDAL

General information

Chart 3517

Routes

2.12

- 1 **Coastal route.** From a position 4 miles S of Lindesnes (57°59'N 7°03'E) the coastal route leads E for about 15 miles, in deep water outside the 200 m depth contour and inside the main fishing area (2.6), to a position S of Mandal (58°02'N 7°28'E).
Tanker route is given at 2.2.
- 2 **Inner Passage** (2.23), used mainly by coasters and small craft, links Lindesnes with Mandal and a number of small harbours, passing through inner channels which are sheltered by Skjærgården (1.3) except in the vicinity of Lindesnes peninsula.

Topography

2.13

- 1 A general description of the coast is given at 2.3. Lindesnes (57°59'N 7°03'E) (2.20) is the S extremity of mainland Norway, around which the land falls steeply into the sea. Skipmannsheia (58°01'N 7°04'E), 153 m high, and Presthusveden (58°03'N 7°08'E), 185 m high, two prominent hills on the high land behind Lindesnes, can be seen from a distance of 30 to 40 miles in good visibility. Hoveheia (58°05'N 7°17'E) and Skjeggstadheia, 1½ miles SSE, are also reported to be landmarks, but see caution at 2.4.
- 2 There are two main groups of islands off the coast, the Våre and Udvåre group (58°00'N 7°12'E) (2.22) and, 5 miles farther E, the Hille group which is separated from the mainland by Hillesundet. These islands form a broken and exposed section of the Skjærgården (1.3).

Depths

2.14

- 1 Depths are given at 2.5.

Coast radio

2.10

- 1 A coast radio station is established at Farsund (58°04'N 6°45'E); for details see *Admiralty List of Radio Signals Volume 1 (1)*.

Hazards

2.15

- 1 **Fishing.** See 2.6.
Dangerous waves. See 2.6.

Local knowledge

2.16

- 1 Local knowledge is required for navigation through the Inner Passage, into the small ports and anchorages entered from the Inner Passage and amongst the islands.

Harbour district limits

2.17

- 1 Vessels using the Inner Passage will transit through the Lindesnes Harbour District Limit as shown on the chart.

Rescue

2.18

- 1 An offshore life-boat is stationed at Mandal (58°02'N 7°28'E). For details of the search and rescue organization see 1.128.

Natural conditions

2.19

- 1 **Currents** are given at 2.8.
Ice is given at 2.9.
Local weather. Severe squalls may be experienced under high ground in the fjords under certain conditions as given at 1.216.
- 2 **Climatic table.** See 1.229 and 1.230.

Directions

(continued from Norway Pilot Volume IIA)

Principal marks

2.20

1 Landmarks:

- 1 Lindesnes (57°59'N 7°03'E) a distinctive reddish-brown headland 40 m high which, being the S extremity of Norway, is an important landfall on the S coast. Lindesnes Light (lighthouse with tower, 16 m in height) stands on the point.
- 2 Ryvingen Lighthouse (red metal tower, white band, 22 m in height) (57°58'N 7°30'E) which stands on the SW peak of Ryvingen, a prominent island on the E side of the entrance to Mannefjorden. A beacon (white cone) stands on the island 1½ cables ENE of the light.

3 Major lights:

- Lindesnes Light — as above.
- Ryvingen Light — as above.

Other aid to navigation

2.21

1 Racon:

- Ryvingen Light (57°58'N 7°30'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Lindesnes to Ryvingen

2.22

- 1 From the vicinity of 57°55'N 7°03'E the coastal route leads E for about 14 miles, passing (with positions relative to Udvåre Light (57°59'N 7°13'E)):

S of Neskletten (5 miles WSW) a shoal with a least depth of 22 m over it, on which the sea sometimes breaks, lying up to 1¼ miles S of Lindesnes (2.20), thence:

- 2 S of Ytre Kletten (1¾ miles S) which is the S of a chain of shoals extending broadly S from Udvåre, a grey, bare and extremely rugged island on the S end of which stands Udvåre Light (white lantern). Udvåre lies at the S end of the group, of which Våre, 1½ miles NNW, is nearly as high as the neighbouring land and resembles a lofty promontory from the offing. An iron perch marks the W of Gjesslingan, two above-water rocks, 8 cables N of Ytre Kletten. Thence:

- 3 S of Tvisteinen (3 miles E), a reef which is partly above water. During winds from S or SW, the sea sometimes breaks in depths from 18 to 22 m near the outer edge of this reef. Thence:

S of Steinsboan (6½ miles E) (2.61).

- 4 **Clearing marks:**

The alignment (298°) of Lindesnes Light (2.20) with the summit of Markøy, an island 2¼ miles WNW; or with Markøy visible N of the light, clears SSW of Kletten.

(Directions continue for Mandal at 2.59, and for the coastal route towards Kristiansand at 2.83)

Inner Passage

Principal marks

2.23

Landmarks:

Lindesnes (57°59'N 7°03'E) (2.20).

Ryvingen Lighthouse (57°58'N 7°30'E) (2.20).

Major lights:

Lindesnes Light (57°59'N 7°03'E) (2.20).

Ryvingen Light (57°58'N 7°30'E) (2.20).

Other aid to navigation

2.24

- 1 **Racon:**

Ryvingen Light (57°58'N 7°30'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Route

2.25

- 1 **Description.** The Inner Passage between Lindesnes and Mandal, which is described below, gives access to a large number of ports and anchorages. It is reported to be suitable for coasters throughout its length and, in certain parts, for larger vessels. It is well marked with lights, beacons and buoys.

- 2 **Track.** From the vicinity of 57°57'N 7°08'E a recommended route leads:

NNE for about 4½ miles, within a white sector (017½°–025½°) of Imsa Light (white lantern) (58°02'N 7°11'E), standing on the SE end of the island, passing between Agneskjer, 1 mile SW of the light, and Våre, 8 cables ESE (2.22), thence:

- 3 E for about 2 miles passing between Våre and the coastal islets, 7 cables N, thence:

Along the alignment (081°) of Gjallaråsholmen Leading Lights (white lanterns) (front light 58°01'5N 7°20'3E and rear light 4 cables E) for about 3 miles keeping clear of Føllet (58°01'4N 7°18'3E), thence:

- 4 ESE for about 2¼ miles through Hillesundet (58°01'N 7°22'E), between Hille and the mainland, the fairway of which is narrow and intricate but well marked, passing Kvistholmen Light (white lantern) (58°00'6N 7°23'3E), thence:

- 5 SE through Bau fjorden, within a white sector (126¼°–133½°) of Indre Mannevær West Point Light (white lantern, 4 m in height) (58°00'N 7°25'E), thence:

N of Indre Mannevær West Point Light and into a SW approach route to Mandal (2.42).

Useful marks:

- 6 Svarte Hillegarn Light (post) (57°59'5N 7°06'0E) which stands on a rock 2½ cables offshore.

Five windmills (red lights) (58°00'5N 7°05'2E) standing 8 cables N of Lillehavn.

Lille Kråga Beacon (black truncated cone, white band, 2.5 m in height) (58°01'3N 7°19'2E), which stands on an above-water rock.

Harbours and anchorages off the Inner Passage

Vågehavn

2.26

- 1 Vågehavn (57°59'3N 7°04'1E) is a good harbour, with depths from 2 to 3 m sand and mud, but it is subject to swell during onshore winds. The alignment (348°) of leading marks (white masts with a cross) leads NNW through a fairway, marked by iron perches, towards the harbour.

Lillehavn

2.27

- 1 **Description.** Lillehavn (57°59'6N 7°05'3E), situated on the E coast of Lindesnes (2.20), is a fishing harbour, with depths from 2.5 to 6.0 m, and a fish processing port.

Approach is made from the SSW on the alignment (022½°) of Lillehavn Leading Lights:

Front light (post) (57°59'5N 7°05'3E).

Rear light (lantern on post) (201 m NNE of the front light).

- 2 **Useful marks:**

Svarte Hillegarn Light (57°59'5N 7°06'0E) (2.25).

Drabskjer Beacon (black), 2 cables NNW of the light.

Five windmills (58°00'5N 7°05'2E) (2.25).

Berths. The largest berth is Visitor's Quay with a length of 34 m and depths from 3.5 to 1.6 m alongside.

Ramslandsvågen

2.28

- 1 **Description.** Ramslandsvågen (58°02'N 7°07'E), a large bay on the E side of Lindesnes peninsula, contains a chemical factory and a disused canning factory.

Entry. This bay, which is protected by a natural breakwater across its entrance, can be entered along the alignment (352°) of leading lights (lanterns on posts) situated on the E side of the bay.

- 2 **Anchorage,** in depths of 15 m, 5 cables within the bay, is sheltered from the S but subject to squalls during winds from the NW.

Berths. The largest berth, with a length of 51 m and depths from 3.5 to 3.3 m alongside, is reported to be in poor condition. There are three other berths and a small slipway.

Båly 2.29

- 1 **Description.** Båly (58°02'4N 7°09'2E), situated near the head of Njervefjorden, services a stone quarry and population of 500 (1992) at Spangereid.

Anchoring in the cove off Båly is impracticable owing to a submarine pipeline.

- 2 **Berths.** The largest berth, with a length of 100 m and depths from 5.5 to 7.9 m alongside, is situated close outside the harbour mole. Berths for small craft are available inside the mole.

Udvåre 2.30

- 1 Udvåre (57°59'N 7°13'E) (2.22), a bird reserve, has a harbour on its E side, which provides anchorage in depths from 4 to 5 m, over a bottom of sand.

Våre 2.31

- 1 Våre (58°00'N 7°12'E) (2.22) has harbours on its E and W sides, which provide anchorage in depths from 3 to 4 m, over a bottom of sand; these harbours have mooring rings. To the SW of the S end of the island, anchorage which is particularly well sheltered, with mooring rings, can be found between Våre and the islands close offshore.

Remesfjorden 2.32

- 1 **Description.** Remesfjorden (58°03'N 7°11'E), which is reported as being the first good harbour E of Lindesnes, affords anchorage for larger craft to the W of Svennevik (58°03'N 7°12'E), clear of pipelines and cables as shown on the chart. This anchorage, in 35 m mud, is clear of Buanskjeran, above-water rocks 3½ cables SSW of Svennevik, and of two rocks awash, 2 cables WNW of the same point.
- 2 **Olasviga**, on the W side of the fjord, is a good harbour with mooring rings and depths of 16 m, over a bottom of sand and mud.

Svinøyhamn 2.33

- 1 **Description.** Svinøyhamn (58°02'0N 7°13'5E) affords anchorage with stern mooring rings N of the island of Svinør and alongside berths at Åvik on the N side of the sound. Svinør is a popular holiday resort and Åvik, a former fishing port, is the starting point of the coastal convoy (1.11).
- 2 **Directions from south-west.** From the first leg of the directions given at 2.25, in the vicinity of 58°00'N 7°10'E, a white sector (037°–042°) of Åvigen Light (white lantern on concrete column, 10 m in height) (58°02'0N 7°13'1E) leads NE towards and into Svinøyhamn.
- 3 **Berths.** The longest berth has a length of 28 m with depths from 2.4 to 9.4 m alongside; the deepest berth has a length of 14 m with depths from 7.3 to 10.7 m alongside. Anchorage and alongside berths for small vessels are available at Svinør and there is a boat building yard, with lay-up facilities, at Åvik.

Syrdalsfjorden 2.34

- 1 **Description.** Syrdalsfjorden (58°02'N 7°15'E), for which local knowledge is required as it is somewhat foul, affords good anchorage for coasters in depths from 29 to 38 m, mud. Small coasters can also find restricted anchorage to the W of Furuholmen, near the head of the fjord, in a depth of 29 m. However, a good deal of swell may be experienced during strong onshore winds.

- 2 **Berths.** A berth with a length of 31 m and depths from 2.7 to 4.6 m alongside is available at Mørkesdal (58°02'8N 7°15'6E); and another, with a length of 41 m and depths from 2.2 to 3.0 m alongside, on the W side of Furuholmen, a small peninsula W of Mørkesdal.

Useful marks:

- 3 Grønningen SW Point Light (white lantern) (58°01'5N 7°15'0E).
Nordbåen Light (post) (58°02'0N 7°13'7E).

Tjømsfjorden 2.35

- 1 Tjømsfjorden (58°02'N 7°18'E) affords good anchorage in an idyllic area, in 6 m, mud. The W entrance, S of Store Kallholmen, has a depth of 8 m in the channel. There are several harbours for small craft in the inner part of the fjord.

Kåfjorden 2.36

- 1 **Description.** Kåfjorden (58°02'N 7°20'E) affords anchorage for coasters throughout the fjord on good holding ground except in the vicinity of Fjordboen, 2 cables N of Lindholmen (58°01'6N 7°19'7E), where the bottom is rocky. Marine farms (1.21) are moored within the fjord.
- 2 **Entry.** This fjord can be entered either side of Lindholmen, from the third leg of the approach line given at 2.25.

Hillesundet 2.37

- 1 A bay on the N side of Hille, in position 58°01'N 7°21'E, affords good anchorage in depths from 20 to 34 m. Mooring bolts are available.

MANDAL

General information

Charts 3517, 2982 plan of Mandal

Position 2.38

- 1 Mandal Havn (58°02'N 7°28'E) is situated in the mouth of the Mandalselva, a river which flows into the head of Mannefjorden. Mandal, Norway's S-most town, stands on the W bank of the river with Malmøya on the E bank.
- 2 The deep water commercial port, lies between Kleven and Gismerøya, about 7 cables E of Mandal; and the deep water fuelling berth is in the S part of Søvteviga (58°00'N 7°30'E).

Function 2.39

- 1 The town of Mandal, which had a population of about 10 100 in 2004, has a wide range of manufacturing industries, from the manufacture of steel wire rope to engineering and timber processing. The port handles general and container cargoes and there are several ship building yards in the area. Mandal is a customs port of entry.

Mannefjorden

2.40

- 1 Mannefjorden (58°00'N 7°28'E) is an arm of the sea, about 3½ miles in length by 1 mile wide, and is deep as far as a line joining Hattholmen (58°00'N 7°27'E) to Gismerøya, 1 mile NE; depths are highly irregular with pinnacles rising from deep water. This fjord leads between numerous islands to a tree-covered rocky mainland coast.

Topography

2.41

- 1 At the head of the fjord, in the NE corner, Kua (Kuveden) (122 m high) (58°01'3N 7°29'2E) and Kalven, 1½ cables N, which resemble hayrick-shaped mountain peaks, rise close E of Kleven. In the centre of the fjord, at its head, Sjøsandén, a beach of yellow sand extending 800 m WSW from Mandalselva, is very prominent and can be seen from a great distance.
- 2 The town of Mandal consists mainly of old and well preserved wooden houses with a blend of narrow passages and open streets; whilst Gismerøya contains a large and distinctive ship construction shed.

Approach and entry

2.42

- 1 **Main approach.** There are three approach routes to Mandal Havn from seaward of which the main approach is through Mannefjorden (58°00'N 7°28'E), from within which routes can be chosen:
 - To approach Mandal itself by passing close E of Hattholmen (58°00'N 7°27'E), thence N towards the harbour; with entry through a dredged channel.
- 2 For the deep water approach to the fuelling berth and deep water commercial port (2.38) by passing between Ferøy (57°59'7N 7°29'4E) and Stussøy, 3 cables N; thence N in the fairway between Stussøy and the mainland and finally NE between Gismerøya and the mainland, direct into the port area.
- 3 **Approach from south-west** which, from the vicinity of 57°58'N 7°22'E leads NE passing close SE of Tuneskjær (57°59'2N 7°23'5E); then NW of Indre Mannevær, 1 mile NE; then E into Mannefjorden. This route is suitable for small vessels only and local knowledge is required. Directions are not given in this text.
- 4 **Inner approach from south-south-east** which, from the vicinity of 57°57'N 7°32'E, leads generally NNW through a channel between Ryvingen (57°58'N 7°30'E) (2.20) and Skjernøy, 5 cables NE; continues N inside the coastal shoals to pass through Ferøysundet (57°59'7N 7°29'7E), thence as given above for the deep water approach to the deep water commercial port. This route is suitable for small vessels only and local knowledge is required.

Traffic

2.43

- 1 In 2004 the port was used by 55 vessels with a total of 135 969 dwt.

Port Authority

2.44

- 1 Mandal Havnevesen, Ballastbrygga, PO Box 57, N-4501 Mandal, Norway; authority is vested in the Harbour Master.

Limiting conditions

Controlling depth

2.45

- 1 **Mandal.** The dredged channel leading from the fjord into Mandalselva has a width of 20 m, with a depth of 4.5 m.
Gismerøya commercial port can be used by vessels with a draught of 10 m.
- 2 **Inner approach from south-south-east** has least depths as follows:
 - 11 m (57°58'8N 7°30'3E) in the section S of Ferøysundet.
 - 13 m (57°59'2N 7°29'5E) in the SW approach to Ferøysundet from Mannefjorden.

Vertical clearances

2.46

- 1 A bridge, which spans Mandalselva about 6 cables above the entrance, has a vertical clearance (1.9) of 2.9 m.
 The bridge connecting Gismerøya with Kleven has a vertical clearance of 4.7 m.

Deepest and longest berths

2.47

- 1 **Mandal.** The deepest berth is Båtservice Verft and the longest berth is Kommunebrygga as given at 2.71.
Gismerøya as given at 2.71.
Fuelling berth as given at 2.71.

Tidal levels

2.48

- 1 The tidal range is negligible in the harbour but meteorological conditions can create large changes in the water level. At Tregde (58°00'N 7°34'E), about 4 miles ESE of Mandal, mean spring range is about 0.2 m and mean neap range is about 0.1 m. For further information see *Admiralty Tide Tables Volume 2*.

Density of water

2.49

- 1 The density of water is 1.025 g/cm³ at berths away from the river.

Maximum size of vessel handled

2.50

- 1 Oil carriers up to 50 000 tonnes are accepted at the fuelling berth.
 Vessels of 20 000 grt, 150 m loa and draught of 9 m are accepted in the deep water commercial port at Gismerøya.

Local weather

2.51

- 1 Mandalselva may be impossible to enter in strong SE winds.
 The deep water commercial port is well sheltered and can be entered under all conditions.

Arrival information

Port radio

2.52

- 1 The harbour office, which stands on Ballastkaien (58°01'4N 7°27'4E) is also the port radio station.

Notice of ETA

2.53

- 1 Notice of 24 hours is required when booking a pilot.

Pilotage and tugs

2.54

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours.

For categories of vessels for which pilotage is compulsory and for other details see *Admiralty List of Radio Signals Volume 6* (2).

- 2 There are no pilot stations between Lindesnes and Mandal. Mariners making for Mandal usually embark harbour pilots SW of Sogndalsstranda (58°18'N 6°14'E) (Chart 1402) when approaching from the W, and SE of Oksøy (58°03'N 8°07'E) (Chart 3516) when approaching from the E.

- 3 Pilots can be obtained from Kristiansand for departure.

Tug assistance is available on application to the Harbour Office.

Regulations concerning entry

2.55

- 1 **Speed.** Within the harbour district, the limits of which follow that of the county border, speed shall not exceed 7 kn. Under no circumstances must the speed be great enough to create wash which may cause damage or danger to other vessels or the harbour installations.

- 2 **Speed limits** are 5 kn inside Mandalselva and 7 kn inside a line drawn from the river mouth 6 cables SW to Aspholmen, thence 4 cables W across Bankefjorden to Hobdeodden (58°00'·7N 7°25'·6E).

Restricted area. Landing and unauthorised approach within 50 m are prohibited around the military restricted area of Homsvika (58°00'·4N 7°30'·0E).

Quarantine

2.56

- 1 Mariners should contact their agents for pratique.

Harbour

General layout

2.57

- 1 The overall harbour complex consists of three port areas: Mandal itself (2.71), along both banks of Mandalselva, which is restricted in depth.
- 2 The deep water commercial port (2.71) between Gismerøya, 7 cables SE of Mandal, and Kleven, which are connected by a bridge. The deep water fuelling berth (2.71) is situated in the approach to this port.
- 3 Risøbank, 9 cables SW of Mandal, a channel which, with depth and width restrictions, serves the largest of the ship construction yards.

Approach channels are given at 2.42.

Natural conditions

2.58

- 1 **Currents.** There is almost no current in the harbour or its approaches.

Within Mandalselva the flow can reach a rate of several knots, leading to an outflow from the river which may be noticeable as far S as Hattholmen (2.61). In these conditions there is an eddy along the foreshore W of the river entrance.

- 2 **Ice.** Traffic in the harbour is seldom hindered by ice.

Directions for entering harbour

(continued from 2.22)

Principal marks:

2.59

- 1 **Landmarks:**

Ryvingen Lighthouse (57°58'N 7°30'E) and beacon tower (2.20).

Major light:

Ryvingen Light — as above.

Other aid to navigation

2.60

Racon:

Ryvingen Light (57°58'N 7°30'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Mannefjorden southern part

2.61

- 1 **Track.** From the vicinity of 57°55'N 7°30'E the track leads NNW for about 5 miles in the white sector (335°–356°) of Hattholmen Light (lighthouse) (58°00'N 7°27'E), which stands on the NE side of Østre Hattholmen, passing (with positions relative to Hattholmen Light):

- 2 WSW of Makrelboen (3 miles SSE), drying rocks which extend 3 cables SSE from Slettingen, an islet lying close S of Ryvingen (2.20), thence: Over or clear of Klevehausen (2 miles S) a rocky pinnacle which lies in the white sector, thence: ENE of Steinsboan (2 miles SSW), detached rocks marked by a spar buoy (port hand), thence:
- 3 ENE of Springen (1¼ miles S), rocks awash marked by an iron perch, thence: WSW of Fjordboen (1 mile SE) an isolated rocky pinnacle, thence: ENE of Storøyskjeran which extends 2 cables ESE from Storøy (8 cables SSW).

2.62

- 1 **Useful marks:**

- 1 Østre Tuneskjer Cairn (black truncated cone with white stripe and band, 3 m in height) (2 miles WSW) which stands on a rock with an elevation of 2·5 m.
 - 2 Disken Cairn (black with white diagonal stripe, 2 m in height) (1½ miles WSW) which stands on an above-water rock.
- Two small islets Hjelmén (2 miles SE) and Eigelandsskjeran (2¼ miles SE) are made conspicuous by their dark brown colour.
- (Directions continue for the approach to the deep water commercial port at 2.65)

Approach to Mandal

2.63

- 1 When Hattholmen Light is distant 5 cables, a white sector (352°–355°) of Sjøsandén Light (white lantern on base) (58°01'·2N 7°26'·9E) standing near the middle of Sjøsandén (2.41) leads N for about 1½ miles, passing (with positions relative to the light):
- 2 Between Hattholmboen (1½ miles SSE) which is marked by a spar buoy (isolated danger) and Gulholmen, an islet 6 cables W of Hattholmboen, thence: W of Bjørnboen (1 mile SSE) an isolated rock marked by a spar buoy (starboard hand), thence: E of Østre Hattholmen (1 mile S) (2.61), thence:
- 3 W of Bjørneskjer (1 mile SSE), a small rock on which stands a cairn (black with diagonal white stripe, 2 m in height), thence: W of Buskeboen (5¾ cables SSE), a shoal marked by a spar buoy (isolated danger) on its SE side.

Entry to Mandal Harbour

2.64

- 1 When Sjøsandén Light is distant 2¼ cables the alignment (043°) of Nedre Malmøy Leading Lights (posts) (58°01'·4N 7°27'·6E) leads NE through the dredged channel

(2.45) into Mandalselva, passing (with positions relative to the front light):

- 2 NW of Nua (3½ cables SW), two above-water rocks, thence:
SE of Pirhodet Pier (2¼ cables E) from the head of which a light (post) is exhibited.

Approach to the deep water commercial port from Mannefjorden

(continued from 2.62)

2.65

- 1 From position 57°59'·5N 7°27'·5E an approach to the berths at Kleven and Gismerøya leads ENE in deep water for about 1½ miles, passing (with positions relative to Kalkskjer Light (58°00'·2N 7°29'·5E)):
 - NNW of Fjordboen (1 mile SW) (2.61), thence:
SSE of Hattholmboen (1 mile WSW) (2.63), thence:
- 2 NNW of Nordre Ferøyboen (3 cables SSW) a detached rock which is unmarked and lies 1 cable off the NW side of Ferøy, thence:
SSE of Kalkskjer, a small islet on which stands Kalkskjer Light (post) and a beacon (black truncated cone, white band, 2 m in height).

2.66

- 1 When clear of Kalkskjer the track leads N for about 4 cables through the channel between Stussøy and the mainland, passing (with positions from Kalkskjer Light):
 - W of a shoal, with a depth of 6·5 m over it (2 cables E), marked by a buoy (W cardinal), thence:
- 2 E of the rocky bank extending 1 cable E from Stussøy (1½ cables NW), and:
W of Nordre Havnholmen (3 cables NE), the N of two islets between Skjernøy and the mainland, on which stands Nordre Havnholmen Light (lantern on post), thence:
W of the oil installation (3½ cables NE) (2.71).

Entering the deep water commercial port

2.67

- 1 From a position 4 cables NNE of Kalkskjer Light the alignment (323°) of Kleven Leading Lights (posts) (58°01'·4N 7°28'·6E), which stand at the head of Kleven Harbour, lead NW through the fairway for about 8 cables into the deep water port, passing (with positions relative to the front light):
- 2 NE of the foul ground extending ½ cable NE from Østre Brattholmen (8½ cables SSE), thence:
SW of Ellingstønnene (6¾ cables SE) a group of rocks, on the S end of which stands a beacon (black with a white band), and:
- 3 NE of the bank extending ½ cable NE from Moldskjera (6½ cables SSE) which are above-water rocks on the foul ground extending ESE from Gismerøya, thence:
SW of Kubåen (3¾ cables SE) which lies in mid-channel ½ cable ENE of the deep water berth on Gismerøya (2.71).

Inner approach route from south-south-east

2.68

- 1 From the vicinity of 57°57'N 7°32'E a white sector (337°–341°) of Maddoden Light (white lantern on tripod)

(57°59'·5N 7°29'·8E) leads NNW through the confined channel between Ryvingen and Skjernøy for about 2½ miles, passing (with positions relative to the light):

- 2 WSW of Timannsskjer (2¼ miles SE) a small islet on a reef, thence:
ENE of Vestre Kråga (2 miles S) a small islet, thence:
ENE of Saltboen, rocks (1¼ miles SSE), marked by an iron perch, thence:
- 3 Close WSW of Troneboen (1½ miles SSE), a shoal marked by a spar buoy (isolated danger), thence:
WSW of Båtvikboen (1¼ miles SSE), a reef which extends 2 cables from Skjernøy and is marked on its W side by a spar buoy (port hand), thence:
- 4 Between Skjernøy and a 6 m patch (9 cables SSE) which extends 2 cables NE from Eigelandsskjeran (2.62), thence:
Over a rock (8 cables SSE) which is the least depth in the fairway (2.45), thence:
- 5 Between Skjernøy and Hjelmenskjera, (6 cables S), a group of above-water and submerged rocks over which the sea breaks in strong gales from the SW. Part of this shoal, with charted depths of less than 10 m, lies within the white sector and only the E edge of the sector is clear.

2.69

- 1 When Madodden Light is distant 2 cables the track is altered to the W for 2 cables, to avoid shoal water extending 1 cable S of the light. Then, when Ferøysundet is fully open, the track leads generally N for about 6 cables through Ferøysundet (57°59'·7N 7°29'·7E) keeping on the E side of the channel in the N part of the sound to avoid a rock awash off the NE end of Ferøy.

(Directions continue for the deep water commercial port at 2.66)

Anchorage and berths

Anchorage

2.70

- 1 **Orlogsreden** (58°00'·5N 7°27'·0E) affords anchorage suitable for coasters in a depth of 10 m with good holding ground clear of Buskeboen (58°00'·7N 7°27'·2E) (2.63).
- 2 **Risøbank** (58°00'·8N 7°25'·7E). A roomy anchorage in Bankefjorden, in a depth of 12 m, with good holding ground and mooring rings on Landehobde, 1 cable SW of the anchorage.
- 3 **Kleven** (58°01'·3N 7°28'·9E), in a depth of 31 m, clay, with land ties to mooring rings.

Alongside berths

2.71

- 1 **Fuelling berth.** An oil installation (58°00'·4N 7°30'·0E) at the S end of Søviga contains a berth for tankers with a length of 72 m and depths from 13·0 to 19·2 m alongside. This berth also provides bunkers and water for larger vessels.
- 2 **Deep water commercial port.** The largest berth, which is on the NE side of Gismerøya (58°01'N 7°29'E), has a length of 97 m with depths from 10·4 to 15·9 m alongside. There are two other berths and Ro-Ro facilities are available for small vessels.
- 3 **Mandal.** The longest berth, which is on the SW part of Kommunebrygga (58°01'·6N 7°27'·2E), has a length of 204 m with depths from 4·5 to 2·7 m alongside. The deepest berth is the E quay of Båtservice Verft (58°01'·4N

7°27'·6E) which has a length of 62 m and depths from 3·8 to 5·4 m alongside. There are 19 other berths.

Port services

Repairs

2.72

- 1 All types of deck, engine and electrical repairs can be carried out, however there is no dry dock. The dimensions of the largest slip are: length 50 m, beam 10·3 m, draught 2 m, capacity 600 dwt. There is a further slip and two outfitting berths.

Other facilities

2.73

- 1 Compass adjustment can be carried out; hospital and several doctors are available; reception facilities exist for small quantities of oily waste but not for tank cleaning.

Supplies

2.74

- 1 Fuel obtained alongside at Søviga (2.71) for all vessels and diesel for smaller vessels alongside at several other berths; fresh water at all alongside berths; provisions and ship's stores can be obtained in the town.

MANDAL TO KRISTIANSAND AND THE PORT OF KRISTIANSAND

GENERAL INFORMATION

Charts 3517, 3516

Area covered

2.75

- 1 This section describes the coastal waters from Ryvingen (57°58'N 7°30'E) to Kristiansandfjorden, about 20 miles ENE, along with its harbours and anchorages. It is arranged as follows:
Mandal to Kristiansand (2.76).
Kristiansand (2.103).

- 3 Islands and islets to the W of Songvår (58°01'N 7°49'E) are dark grey, bare and very rugged. Those to the SE of Mandal (58°02'N 7°28'E) are comparatively high, while those to the S of Kristiansand are low. Songvår itself is lighter in colour with patches of brown.

Topography in the vicinity of Kristiansand is described at 2.105.

Depths

2.78

- 1 Depths are given at 2.5.

Hazards

2.79

- 1 **Fishing.** See 2.6.
Dangerous waves. See 2.6.

Local knowledge

2.80

- 1 Local knowledge or the largest scale Norwegian chart is required for navigation through parts of the Inner Passage, into the small ports and anchorages entered from the Inner Passage and amongst the islands.

Rescue

2.81

- 1 An offshore life-boat is stationed at Mandal (58°02'N 7°28'E). See 1.128 for details of the Search and Rescue organization.

Natural conditions

2.82

- 1 **Currents** are given at 2.8.
Ice is given at 2.9.
Local weather. Severe squalls may be experienced close to high ground in the fjords as described at 1.216.
- 2 **Climatic table.** See 1.229 and 1.231.

Directions

(continued from 2.22)

Principal marks

2.83

- 1 **Landmark:**
Oksøy Lighthouse (white metal tower, red bands, 36 m in height) (58°04'N 8°03'E) which stands on the S end of Oksøy.

MANDAL TO KRISTIANSAND

General information

Charts 3517, 3516

Routes

2.76

- 1 **Coastal route.** From a position 3 miles S of Ryvingen Light (57°58'N 7°30'E) the coastal route continues E for about 6 miles then ENE for about 16 miles, in deep water outside the 200 m depth contour and inside the main fishing area (2.6), to a position SSE of Kristiansand (58°09'N 8°00'E).
Tanker route is given at 2.2.
- 2 **Inner Passage** (2.88), used mainly by coasters and small craft, links Mandal with Kristiansand and a number of small harbours, passing through inner channels which are sheltered by Skjærgården (1.3).

Topography

2.77

- 1 A general description of the coast is given at 2.3.
The coast between Harkmarkfjorden (58°02'N 7°38'E) and the port of Høllen, 7 miles NE (2.100), is particularly indented and fronted by innumerable islets and rocks.
- 2 Near the coast, the peak of Eidsveden (58°02'N 7°40'E) can be identified; and some 13 miles NE stands Den Omvendte Båt, a prominent hill which resembles an upturned boat. Other natural landmarks are difficult to identify as they tend to merge with the mountainous coastline.



Approaches to Kristiansand – Oskøy Light (2.83)

(Original dated 2005)

(Photograph – HMS Echo)

Major lights:

Ryvingen Light (57°58'N 7°30'E) (2.20).

Oksøy Light — as above.

Other aids to navigation**2.84****Racons:**

Ryvingen Light (57°58'N 7°30'E).

Oksøy Light (58°04'N 8°03'E).

For details see *Admiralty List of Radio Signals Volume 2*.**Ryvingen to Oksøy****2.85**

- 1 From the vicinity of 57°55'N 7°30'E the coastal route leads E for about 6 miles, passing (with positions relative to Ballastskjer Light (57°58'·5N 7°41'·0E)):
- 2 S of Oddhausen (3½ miles WSW) a rock which lies on the edge of a reef extending 2 cables SE from Ytre Odd, the islet on which stands Oddknuppen Light (lantern on post). This islet lies close SE of Indre Odd, an islet with an elevation of 12 m on which stands a beacon (black truncated cone, 3 m in height). Thence:
- 3 S of Ytsteskjær (2¼ miles WSW) an above-water rock near the S end of a reef extending 5 cables SSE from Årsholmane, an islet at the S end of a chain of offshore islands, thence:
S of Gåseskjeran (1¼ miles WSW) an isolated group of above-water and submerged rocks, thence:
- 4 S of Ballerskjerene, a group of above-water and submerged rocks which extend 1 mile NE from the small black rock on which stands Ballerskjer Light (white lantern, 16 m in height).

2.86

- 1 From the vicinity of 57°55'N 7°41'E, about 3½ miles S of Ballerskjer Light, the track leads ENE for about 16 miles, passing (with positions relative to Songvår Light (58°01'N 7°49'E)):
- 2 SSE of Seiboen (¾ miles WSW), the least depth over an under-water ridge extending 7 cables ENE, thence:
SSE of Vester Viboen (1¼ miles SW), the seaward end of foul ground extending SW from Hellersøya, near the SE end of which stands Songvår Light (white wooden house), thence:
- 3 SSE of Hanegalsboen (¾ miles ENE), marked by a spar buoy (isolated danger), thence:
SSE of Sandgrunnane (6½ miles ENE), which lies near the S extremity of the foul bank extending 1¼ miles SSE from Blåstholmen; a light (white lantern on tripod) is exhibited from the S side of on the S side of Blåstholmen. Thence:
- 4 SSE of the foul bank and shallow ground extending 1 mile S from Oksøy (58°04'N 8°03'E).

2.87**Useful marks:**

- 1 Savonmaa monument at Kneblingen (black pyramid surmounted by a cross) (57°58'·7N 7°37'·9E).
Two beacon towers (white conical), standing close together on Helgøya (58°03'N 7°51'E), which are prominent from seaward.
- 2 Mågeskjer Beacon (black truncated cone, white band, 3 m in height) (58°02'·6N 7°53'·6E), standing on a reddish rock with an elevation of 6 m.

(Directions continue for the approach to Kristiansand at 2.125 and for the coastal passage NE at 3.13)

Inner Passage

Routes

2.88

- 1 **Description.** The Inner Passage between Mandal and Kristiansand, which leads to a large number of ports and anchorages, is reported to be available for coasters and small craft throughout its length and for larger vessels in certain parts. This passage, which is well marked with lights, beacons and buoys, follows a number of diverse routes all of which pass through position 58°00'·0N 7°36'·1E where there is a least charted depth of 9 m in the fairway. Individual routes have the following limitations:
- 2 **Route north of Skjernøy.** From Mannefjorden, in position 58°00'N 7°29'E to position 58°00'·2N 7°34'·1E, passing N of Skjernøy (57°59'N 7°31'E), the route as given at 2.89 has a least depth of 6·7 m, width of 20 m and vertical clearance (1·9) of 19 m in Skjernøysund.
- 3 **Route south of Skjernøy.** From Mannefjorden in position 57°58'·5N 7°29'·0E to position 58°00'·2N 7°34'·1E, as above, passing S of Skjernøy, the route as given at 2.90 has a least depth of 18 m and width of 50 m.
- 4 **Combined route east.** From position 58°00'·2N 7°34'·1E to Kristiansand, passing through Songvårfjorden (58°02'N 7°48'E) and S of Skarvøya (58°02'·6N 7°50'·3E), the route as given at 2.92 has the least charted depth in the fairway as previously given for all routes.
- 5 **Route through Ny-Hellesund.** From position 58°02'·5N 7°47'·6E to Kristiansand, passing through Ny-Hellesund (58°03'·2N 7°50'·5E), as given at 2.97, has a least depth of 7·5 m and vertical clearance of 29 m, see 1.9. Local knowledge is required for this channel which has a speed limit of 5 kn and is often ice-bound in winter.

Directions

2.89

- 1 **Route north of Skjernøy.** This route passes through Skjernøysund (58°00'·3N 7°31'·0E) under a bridge at its W end (see 2.88 for limitations), which leads:
E and ESE for about 1½ miles through the sound, thence:
- 2 NNE through Buøysundet (58°00'·0N 7°33'·5E) along the alignment (025½°) of Tregde Leading Lights (lanterns on posts) (58°00'·5N 7°33'·9E), with a least depth of 9 m and width of 30 m, thence:
ESE to position 58°00'·2N 7°34'·1E where it joins the combined route east.

(Directions continue for combined route east at 2.92)

2.90

- 1 **Route south of Skjernøy.** From the S end of Mannefjorden, in position 57°58'·5N 7°29'·0E, the track leads:
E for about 1¾ miles passing N of Ryvingen (2.20), then S of Skjernøy to a position S of Ellingholmen Light (lantern on post) (57°58'·5N 7°32'·0E) which stands on a small islet close off the SE point of Skjernøy, thence:
- 2 NE for about 5 cables between Skjernøy and Huseboan, close SE, which is marked by a spar buoy (starboard hand) and of the foul ground extending W from Hellersøy (57°58'·7N 7°33'·4E) which is marked by a spar buoy (starboard hand); thence:
ENE for about 7 cables, passing SSE of Vedeskjer Light (lantern on post) (57°59'·0N 7°33'·7E).

2.91

- 1 From a position close E of Vedeskjer Light the track leads generally N for about ¼ miles through a channel between the islands, which has a least depth and width as given at 2.88 for the route S of Skjernøy. This occurs in Kreppa (57°59'·7N 7°34'·1E), the narrows between Hårsøy and Landøy. The recommended route passes, (with positions relative to Kreppa):
- 2 E of Kattholmbåen Light (lantern on post) (3 cables S) which stands on a submerged rock near the S end of the channel, thence:
Through Kreppa, in which the flow is strong and which has high land on both sides, causing squalls during winds from E and W, thence:
- 3 W of a 6 m patch (1½ cables N), thence:
E of a submerged rock (3½ cables NNW) which is marked by an iron perch, thence:
Between Saltbåen Light (lantern on post) (4¼ cables N) and an iron perch, 1 cable NW of the light, which marks the end of a reef.

2.92

- 1 **Combined route east** (continued from 2.89 and 2.91). From position 58°00'·2N 7°34'·1E, close N of Saltbåen Light, the combined route leads generally E for about 1 mile, passing (with positions relative to Skogsøyboen Light (58°00'N 7°36'E)):
- N of Langøyskær (1 mile W) a reef, partly awash, which lies on the S side of the fairway and is marked by an iron perch on its S side, thence:
- 2 S of a reef which dries (8 cables W) off a cove on the S side of Buøy, an island on the N side of the channel, close to the mainland, thence:
N of the shallow bank (7 cables W), close N of Langøy Light (white lantern), which is marked by a spar buoy (starboard hand), thence:
- 3 S of Skogsøy (5 cables WNW). A white sector (266°–274°), astern, of Langøy Light leads E through the fairway passing between Skogsøyboen Light (white lantern on column, 10 m in height), which stands on a rock, and Hellaren (1½ cables S) a reef awash and marked by an iron perch. A 9·0 m rock lies within the white sector, midway between the reef and the light. Deeper water can be found S of Hellaren.

2.93

- 1 **Combined route east–north–east.** From a position ENE of Skogsøyboen Light, a white sector (254°–257°), astern, of the light leads ENE for about 2 miles, passing (with positions relative to the light):
- 2 NNW of Lindholmen (4 cables E) on the centre islet of which stands a beacon (black truncated cone with white diagonal stripe, 2½ m in height), thence:
SSE of Ladderøyskjeran (1½ miles ENE), rocks awash on foul ground, and:
- 3 NNW of a rock with a depth of 1·3 m over it, marked by an iron perch (1½ miles E), lying ¼ cables NE of Leiholmen, an islet, thence:
Over or clear of Tomasboen (1¾ miles ENE), a rock which lies in the white sector, thence:
- 4 NNW of Stolsboen (2 miles E), rocks marked by an iron perch, with a 5 m patch close NW, thence:
Close NNW of Gjeideryggen (2 miles E) which lies 2½ cables S of Tånes, and:
SSE of Tånes (2¼ miles ENE) on which stands a beacon (black truncated cone, 3 m in height, with an elevation of 8 m).

- 5 **Clearing sector.** A white sector (070°–074½°) of Tåneskjer Light (white lantern on tripod) (58°01'N 7°40'E), which stands on a rock close S of Tånes, clears between the S side of Ladderøyskjeran (above) and the N side of Tomasboen.

2.94

- 1 From a position 5 cables ENE of Tånes, a white sector (252°–255°), astern, of Tåneskjer Light (above) leads ENE for about 1 mile in deep water, passing (with positions relative to the light):
 NNW of Knuppeboen (6 cables ESE) which is marked by an iron perch, thence:
 2 SSE of Svarteskjeret (7½ cables ENE), an above-water rock, thence:
 NNW of Stangholmbøen (1¼ miles ENE), marked by a spar buoy (starboard hand). This rock lies 1½ cables NE of Stangholmen, on which stands a radio mast.
 3 After passing Stangholmen the track alters to the NNE for about 7 cables, passing (with positions relative to Vassøy Light (58°01'8N 7°42'0E)):
 Clear of Uvårboen (6 cables SE), and:
 WNW of the islets extending 4 cables N from Uvår (1 mile ESE).

2.95

- 1 **Combined route east through Songvårfjorden, western part.** When Vassøy Light (white lantern) bears 267°, a white sector (266°–267¼°) astern, of this light leads E through Songvårfjorden for about 4½ miles, passing (with positions relative to Varholmen Light (58°02'4N 7°47'2E)):
 2 N of Bøddelen (2 miles WSW), a rock with an elevation of 5 m on which stands a beacon (black truncated cone, 3 m in height), and:
 Close S of Uvårflakket (1¾ miles WSW), a reef marked by an iron perch. After passing Uvårflakket clearer water lies on the N side of the sector. Thence:
 3 N of Seiboen (1½ miles SW) a shoal marked by a spar buoy (isolated danger), thence:
 S of Vester Fiske (1 mile WSW), thence:
 S of Knuden (8 cables SW) marked by a spar buoy (port hand), thence:
 N of Store Gjeve (1¼ miles SSW), thence:
 4 Close N of Vester Grønningboen (7 cables SSW), a shoal marked by a spar buoy (starboard hand), which lies at the W end of a chain of rocks and islets extending 7 cables E to Auster Grønningen. The middle section of the chain, at its N end, lies very close to the white sector. And:
 5 S of Varholmen at the S end of which stands Varholmen Light (white lantern).
(Directions continue for the route through Ny–Hellesund at 2.97)

2.96

- 1 **Route east through Songvårfjorden, eastern part.** From position 58°02'0N 7°47'3E, 5 cables S of Varholmen Light, a white sector (266°–267¼°) astern, of Vassøy Light (2.95) continues E through Songvårfjorden for about 2½ miles, passing (with positions relative to Varholmen Light (58°02'4N 7°47'2E)):
 S of Hunsøya (7 cables E), thence:
 2 N of shallow patches which extend up to 1½ cables N and NE from Kniven (1¼ miles ESE), an above-water rock on a reef. A 14 m patch lies 3 cables NE of the rock. And:

- 3 S of Skarvøyboen (1¼ miles E) which is marked by a spar buoy (port hand), thence:
 S of Skarvøya (1½ miles E), thence:
 S of Helleboen (2 miles E), a rock awash marked by an iron perch.
 4 Thence from the vicinity of 58°02'N 7°52'E the track leads ENE for about 2 miles into Vestergapet (2.107), passing (with positions relative to Mågeskjer Beacon (58°02'6N 7°53'6E)):
 SSE of Lille Svartskjer (6 cables W), a skerry at the S end of a chain of rocks extending 8 cables S from Ydder Hellersøya, thence:
 5 SSE of Mågeskjer (2.87), thence:
 NNW of Hanegalsboen (1 mile ESE) (2.86).
(Directions continue for the approach to Kristiansand through Vestergapet at 2.131)

2.97

- 1 **Route through Ny–Hellesund** (continued from 2.95). From a position 2 cables NE of Varholmen Light (58°02'4N 7°47'2E) a white sector (235°–240°), astern, of the light leads generally NE towards Ny–Hellesund (58°03'N 7°51'E), a narrow and tortuous channel between Monsøya, to the NW, and Kapelløya and Helgøya, to the SE; local knowledge is required.
 2 From a position 6 cables ENE of Monsøya the route leads E for about 2½ miles into Vestergapet (58°04'N 7°57'E) (2.107), passing (with positions relative to the light on Nordre Hellersøy (58°03'5N 7°51'6E)):
 In mid-channel between Inner Hellersøy and Herøya (3 cables NE). A light (white lantern on tripod) is exhibited from the S end of Herøya. Thence:
 3 S of Tjamsøya (2 miles ENE) having kept clear of Leieboen (7 cables ENE), marked by a spar buoy (starboard hand), Ikkjevetta (8½ cables E), Paradisboen (1½ miles ENE), marked by an iron perch, and other unmarked shoals, with a least charted depth of 5 m.

Small ports and anchorages along the Inner Passage

Chart 3517

Outer anchorages

2.98

- 1 **Sandøyhavn** (57°58'1N 7°33'3E) affords anchorage, with a depth of 17 m, sand, off a snug harbour on the W side of Sandøy, which has two jetties.
Ødøyfjorden (57°59'4N 7°35'0E), affords anchorage in a maximum depth of 25 m, mud and clay, with mooring rings on Landøy, clear of submarine cables laid across the fjord.

Tregde

2.99

- 1 **Description.** Tregde (58°00'5N 7°34'0E) is a sheltered harbour with alongside berths and a good but restricted anchorage in depths from 15 to 30 m, clay.
Directions. From a position SSW of the harbour, the alignment (025½°) of Tregde Leading Lights (posts) leads to the harbour area.
 2 **Berths.** The largest berth, which lies 7 cables W of Tregde, close NW of Ramsøya, has a length of 35 m with depths from 2.1 to 2.3 m alongside.
 This location also contains a marina with berths, fuel, provisions and water.

Chart 3516

Høllen**2.100**

- 1 **Description.** Høllen (58°05'N 7°49'E), a summer resort along the entrance to the river Søgneelva at the head of Høllefjorden, contains a plastics factory, boat-building yard and an engineering workshop. The harbour, which is dredged to 4 m and kept ice-free, is well sheltered and provides specialist facilities for fishing vessels.

Speed is limited to 5 kn within the area.

- 2 **Anchorage** can be obtained throughout the outer harbour, with good holding in sand, and with mooring rings on the shore. The fjord, which also affords snug anchorage, clear of a submarine pipeline (1.69), as shown on the chart; has many mooring rings and is much used to provide lay-up anchor berths for larger vessels.

- 3 **Berths.** The largest berth within the harbour, which lies along the W wall of the basin, has a length 151 m and depths from 5.4 to 1.8 m alongside. There is one other berth.

An outer berth at Amfeneset (58°04'.3N 7°47'.8E), used for loading shell-sand, has a length of 59 m and depths from 5.8 to 8.6 m alongside.

- 4 **Repairs** to deck and engines can be carried out at Amfeneset.

Supplies: fuel; water; provisions; medical stores.

Ny-Hellesund**2.101**

- 1 **Description.** Ny-Hellesund (58°03'N 7°51'E), a small harbour on the S side of Monsøya, well sheltered by surrounding islands, contains a shipbuilding yard and an engineering workshop. The harbour is crossed by a submarine cable, a submarine water pipeline, and an overhead cable with a vertical clearance as given at 2.88.

Anchorage, which lies on the SW side of the island, has depths from 18 to 19 m, sand.

- 2 **Berths.** The largest commercial berth has a length of 17 m with depths from 3.8 to 1.9 m alongside.

Repairs. A shipyard on the S side of the harbour contains a berth with a length of 33 m and depths from 1.9 to 7.8 m alongside; there is also a slipway with a length of 30.5 m, width of 6.7 m and depth of 4 m.

Nodenaset**2.102**

- 1 Nodenaset (58°04'.3N 7°52'.0E), a fishing port on the mainland close N of Herøya, contains a berth with a length of 62 m and depths from 3.3 to 5.9 m alongside. The channel separating Herøya from the mainland is crossed by an overhead cable with a vertical clearance (1.9) of 11 m.

KRISTIANSAND**General information**

Charts 3516, 2987

Position**2.103**

- 1 Kristiansand (58°09'N 8°00'E) stands on a sandy plain by the river Otra at the head of Kristiansandsfjorden, about 5 miles from the open sea.

Function**2.104**

- 1 Kristiansand Havn is one of the best harbours in Norway, capable of accommodating large numbers of

vessels. The harbour, which is easy to enter and well sheltered in all weather, is suitable for laying up large vessels.

- 2 The inner harbour, which contains one of the principal ports on the S coast of Norway, is a terminal for rail/car ferry and shipping routes to Scandinavia, Europe and America, handling Ro-Ro, container, dry bulk, fish and general cargoes. Fast ferries operate on a route to Denmark. There are also several shipyards.

- 3 The town of Kristiansand, which had a population of about 75 000 in 2003, is the commercial, administrative and military centre for the area. Main industries include manufacturing, commerce, shipbuilding and coastal services.

- 4 A naval base is situated at Marvika, 1 mile E of the town.

Topography**2.105**

- 1 Kristiansandfjorden is a deep-water arm of the sea, with a length of 4½ miles and width of 1¼ miles, which leads N into Topdalsfjorden (58°11'N 8°04'E) which then continues N for about 6 miles to its head.

The rocky coastline is light-grey in colour, backed by gentle, wooded ridges.

- 2 Close offshore, Flekkerøya (58°04'N 8°00'E), in the entrance to the fjord, and the many islets with innumerable rocks which extend up to 1½ miles off its S and SE coasts, are all low, bare and grey. Three miles ENE, a similar group is formed by Østre Randøya (58°06'N 8°07'E) and Vestre Randøya, close W, which are low and level in comparison with the mainland.

Port limits**2.106**

- 1 Kristiansand Harbour District includes the waters NW of a line joining a position 1¼ miles SW of Bergenesodden Light (58°03'.6N 7°58'.5E) and Furegrunnen, 9 miles ENE.

Approach and entry**2.107**

- 1 **Main approach** is from the S with entry to the fjord through Østergapet (58°05'N 8°05'E) which has a width of 8 cables between Oksøy and Grønningen, 1¼ miles ENE. This approach follows the specified route for navigation through Norwegian internal waters, as given in Appendix I.

- 2 **Secondary approach**, which is not suitable for large vessels, is from SW passing through Vestergapet (58°04'N 7°57'E), thence between Flekkerøya and the mainland, close NW, through a channel with a least width of 2 cables in position 58°04'.8N 7°57'.9E, into Kristiansandfjorden.

- 3 **Entry.** The commercial harbour is entered 1½ cables SE of Odderøya (58°08'N 8°00'E).

Traffic**2.108**

- 1 In 2004 the port was used by 1517 vessels with a total of 6 175 939 dwt. In addition, over a million passengers passed through the port.

Port Authority**2.109**

- 1 **Address.** Kristiansand Euro-Port Norway, Gravane 4, PO Box 114, N-4662 Kristiansand, Norway.

Website. www.kristiansand-europort.no.

Email. post@kristiansand-europort.no.

Limiting conditions

Depths

2.110

- 1 **Approach** to the commercial port through Østergapet can be made in deep water. Within the commercial port depth limitations are those of the berth (2.146).

River Otra (2.121) has a least navigable depth over the bar of 3.7 m in position 58°08'6N 8°01'0E, which leads to the deepest channel on the E side of the river.

Vertical clearance

2.111

- 1 Two suspension bridges, close together, at Varodden (58°09'7N 8°03'2E), with a vertical clearance (see 1.9) of 27 m, span the channel leading to Ålefjær (2.149).

Deepest and longest berth

2.112

- 1 Odderøykaien (58°08'3N 7°59'9E) (2.146).

Tidal levels

2.113

- 1 The tidal range is negligible in the harbour but meteorological conditions can create large changes in the water level.

Density of water

2.114

- 1 The density of water is 1.025 g/cm³ at berths away from the river.

Maximum size of vessel handled

2.115

- 1 Maximum size of vessel accepted alongside is 25 000 dwt. There are no limits for vessels at anchor, including oil rigs.

Arrival information

Port radio

2.116

- 1 The harbour office is equipped with VHF radio. See *Admiralty List of Radio Signals Volume 6 (2)* for details.

VHF facilities for the coast radio service are located in Kristiansand, for further information see *Admiralty List of Radio Signals Volume 1 (1)*.

Notice of ETA

2.117

- 1 Minimum notice of 2 hours is required when booking a Pilot.

Pilotage and tugs

2.118

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and for other details see *Admiralty List of Radio Signals Volume 6 (2)*.

- 2 Pilots board 1½ miles SE of Oksøy, in position 58°03'3N 8°05'6E, from a boat marked "LOS" on each bow.

- 3 **Tugs** are available on request.

Regulations concerning entry

2.119

- 1 **Remarks.** General traffic regulations are given at 1.69 and for tankers at 1.83.

The whole of Kristiansand and its approaches lie within Norwegian internal waters as given in Appendix I. This appendix contains the relevant traffic regulations.

- 2 **Passage** in the approach to Kristiansand, as given in the directions (2.125), follows the specified leads or navigation routes given in Appendix I.

Military prohibited area. Anchoring is prohibited at Marvika (58°09'N 8°02'E) due to the presence of a naval base within the bay. See Appendix I for further information.

- 3 **Speed limits.** Vessels must proceed at reduced speed, as follows:

Not exceeding 5 kn in the middle part of Vesterhavn (58°08'N 7°59'E).

Not exceeding 3 kn in the inner parts of Fiskåbukta, close S of Vesterhavn, and within the bays at its SW end. Also within the inner parts of Vesterhavn, Austerhavn, close NE, and Berteskukta (58°08'7N 8°01'7E).

- 4 Not exceeding 6 kn in River Otra N of Tangen (58°08'7N 8°00'8E).

Quarantine

2.120

- 1 Vesterhavn is used as the quarantine anchorage; see 2.140.

Harbour

General layout of harbour

2.121

- 1 Kristiansand Havn is divided into two harbours by the island of Odderøya. Vesterhavn, the W harbour, contains the main commercial port at its N end with a fishing harbour in its NE corner (58°08'5N 7°59'8E). Austerhavn, to the E, is mostly filled by a shallow bank and is used mainly by small craft. River Otra, leading generally NW from Austerhavn, has a number of specialised berths along its banks.

- 2 South of the commercial port, shipyards, engineering and chemical works line the mainland coast of Vesterhavn and of Fiskåbukta, an extension SW from it.

Local knowledge

2.122

- 1 Local knowledge is required to navigate within Topdalsfjorden above the bridge due to shifting sandbanks off the mouth of Topdalselva (58°12'N 8°04'E).

Measured distances

2.123

- 1 **Kristiansandfjorden** contains a measured distance of 1852 m with a running track of 150°/330°, marked as follows:

SSE limit, the alignment (060°) of two beacons on Dvergsøya (58°06'7N 8°03'4E).

NNW limit, the alignment (060°) of two beacons on Revholmane (58°07'6N 8°02'5E).

- 2 **Songvårfjorden** contains a measured distance of 1852 m with a running track of 086°/266°, marked as follows:

E limit, the alignment (356°) of two beacons on Skarvøya (58°02'6N 7°50'4E).

W limit, the alignment (356°) of two beacons on Hunsøya (58°02'4N 7°48'5E).

Natural conditions

2.124

- 1 **Flow.** The predominant flow is out of the fjord due to the outflow of the rivers. This flow tends to set S and may influence the course of a vessel whilst entering the fjord

across the set. The flow is more marked in the spring or after severe storms as meteorological conditions are the dominant factor; tidal effects are small.

- 2 **Ice.** Within Kristiansandfjorden both Vesterhavn and Austerhavn are kept ice-free and open to traffic in the hardest of winters. Ice can form in some parts of Kristiansandsfjorden during the winter but rarely in quantities that could significantly hinder navigation. The large ferries that sail from Kristiansand to Hirtshals, Göteborg and Newcastle help keep the channels open.

Topdalsfjorden is usually iced-up in winter above the bridges at Varodden (58°10'N 8°03'E).

- 3 **Local weather.** Austerhavn, the E harbour, is exposed to gales from SE and S which send in a heavy swell.

Climatic table. See 1.229 and 1.232.

Directions for entering harbour through Østergapet (continued from 2.87)

Principal marks

2.125

- 1 **Landmarks in the approach:**

Oksøy Lighthouse (58°04'N 8°03'E) (2.83).

Grønningen Lighthouse (lighthouse with tower, 14 m in height) 1¼ miles ENE of Oksøy, standing on the N extremity of Grønningen (2.127).

- 2 Dolsveten (58°08'N 8°08'E) and Sotåsen, 7 cables S, two wooded knolls which are prominent from the SW and easy to identify.

Major light in the approach:

Oksøy Light (58°04'N 8°03'E) (2.83).

- 3 **Landmarks within Kristiansand** (with positions relative to the cathedral spire (58°08'·8N 7°59'·7E)):

Cathedral spire, situated in the middle of the town.

White grain elevator (5 cables S).

White building (4 cables SSW) which could be mistaken for the grain elevator.

- 4 Radio mast with satellite dishes (7½ cables SSE) standing near the middle of Odderøya (2.127).

Chimney of a smelting works (1¼ miles SW). Smoke from this chimney is often seen first.



Approaches to
Kristiansand – Grønningen Lighthouse (2.125)

(Original dated prior to 2005)

(Photograph – Norwegian Hydrographic Service)

Other aid to navigation

2.126

- 1 **Racon:**

Oksøy Lighthouse (58°04'N 8°03'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Approach and entry to Kristiansandfjorden from south

2.127

- 1 From the vicinity of 58°00'N 8°10'E, a white sector (321°–328½°) of Odderøya Light (lighthouse) (58°08'N 8°00'E), which stands on the foreshore on the SW side of Odderøya, a well-wooded island 90 m high, leads NW for about 7½ miles, passing (with positions relative to Kinn Light (58°06'N 8°02'E)):

- 2 Close by the pilot boarding station (¾ miles SE) (2.118), and:

NE of the bank, with depths from less than 10 m over it, which extends up to 1 mile S and SE from Oksøy (1½ miles SSE) on which stands Oksøy Light (2.83), thence:

- 3 SW of a reef, awash at its outer end, which extends 1¼ cables S from Grønningen (2 miles ESE), a small islet on the N end of which stands Grønningen Light (2.125), thence:

NE of Skipbåen (1½ miles SSE), a drying rock which lies 1½ cables E of Oksøy and is marked by a spar buoy (port hand). A 13 m patch lies 1 cable NE of the buoy. Thence:

- 4 Over or clear of Langgrunnen (1½ miles SE), an isolated patch over which the sea seldom breaks, thence:

SW of Kjerkeboen (1½ miles ESE), an isolated patch which is marked at its SW end by a spar buoy (starboard hand), thence:

- 5 Close NE of a spit, with a least depth of 2·4 m over it, which extends 3 cables NNE from the N extremity of Oksøy to a position 1 mile SE of Kinn Light, thence:

Very close NE of a 7·5 m patch (8 cables SE), and:

- 6 SW of Dvergsøyhusen (1¼ miles E), thence:

NE of Kinn, on the N extremity of which stands Kinn Light (white lantern), thence:

SW of Dvergsøyboen (7½ cables NE) which has a least depth of 1·7 m over it. It is marked on its SW side by a spar buoy (starboard hand) and lies 1½ cables SW of the S end of Dvergsøya.

2.128

- 1 **Clearing marks:**

The alignment (030°) of Grønningen Light with Sotåsen, 3 miles NNE (2.125), clears ESE of all dangers lying off the SE side of Flekkerøya. However, this line passes inside shoals with a least depth of 30 m, 1¼ miles SSW of the light.

- 2 The alignment (270°) of Oksøy Lighthouse with Høyfjellet (1¼ miles W) clears S of all rocks extending S from Svertingen (58°04'·8N 8°06'·0E) and Vestre Skogrunn, 1 mile E.

Useful mark:

- 3 Beacon (black and white stripes) (58°06'·7N 8°05'·4E) standing on the S point of Herøya.

Approach to Vesterhavn from south-east

2.129

- 1 From position 58°06'·2N 8°02'·5E the track continues NW in the same white sector for about 2 miles, passing (with positions relative to Kinn Light):

NE of Skede ($7\frac{1}{2}$ cables WNW) an islet on the W side of the fjord which is fringed by a reef, marked by an iron perch at its NW end, which dries, thence:

- 2 NE of Gjeiteva ($1\frac{3}{4}$ miles NNW), a rocky shoal lying 1 cable ESE of Ragnhildsholmen an islet close off the E end of Langøya, thence:

NE of Dybingen (2 miles NNW) an islet in the entrance to Vesterhavn, on the NE side of which stands Dybingen Light (post, 2 m in height).

- 3 **Useful marks:**

Pairs of beacons marking the limits of a measured distance, as given at 2.123.

(Directions for Topdalsfjorden continue at 2.137)

Entering Vesterhavn

2.130

- 1 When clear NE of Dybingen, the track leads WNW into Vesterhavn, passing (with positions relative to Odderøya Light):

SSW of Hidebåen ($1\frac{1}{2}$ cables WNW) a group of rocks lying up to $1\frac{1}{2}$ cables off the SW side of Odderøya, and:

NNE of Kjerkebåen ($4\frac{1}{2}$ cables WSW) a rock marked by a buoy (starboard hand).

Thence as required for berthing.

Directions for entering harbour through Vestergapet

(continued from 2.96)

Principal mark

2.131

- 1 **Major light:**

Oksøy Lighthouse ($58^{\circ}04'N$ $8^{\circ}03'E$) (2.83).

Other aid to navigation

2.132

- 1 **Racon:**

Oksøy Lighthouse ($58^{\circ}04'N$ $8^{\circ}03'E$).

For details see *Admiralty List of Radio Signals Volume 2*.

Vestergapet

2.133

- 1 From the vicinity of $58^{\circ}01'N$ $7^{\circ}56'E$, a white sector ($008\frac{1}{2}^{\circ}$ – 018°) of Flekkerøygapet Light (white lantern on base) ($58^{\circ}04'.7N$ $7^{\circ}57'.4E$) leads NNE for about $3\frac{1}{2}$ miles, passing (with positions relative to the light):

ESE of Hanegalsboen ($2\frac{3}{4}$ miles SSW) (2.86), thence:

WNW of Blåstholmbåen ($2\frac{1}{4}$ miles S), and:

ESE of Midgrunnen ($2\frac{1}{4}$ miles SSW), thence:

- 2 Over or WNW of a 16 m shoal which extends into the white sector $1\frac{1}{2}$ cables W from Krumhalsen ($1\frac{1}{2}$ miles S) a 7 m shoal which lies on the E side of the fairway, 2 cables W of Københavnskjer, and: ESE of Lyngholmsboen (2 miles SSW) a rock marked by a spar buoy (port hand), thence:

- 3 Over or WNW of isolated rocky peaks with charted depths of 13 m ($1\frac{1}{4}$ miles SSW) and 17 m (1 mile SSW), thence:

WNW of Ankerholmen (1 mile S) an islet which lies at the N end of the foul ground along the E side of the fairway, thence:

ESE of Store Ryvingen ($6\frac{1}{2}$ cables SSW).

2.134

- 1 **Useful marks:**

Bergenesodden Light (lantern on framework structure) ($58^{\circ}03'.6N$ $7^{\circ}58'.3E$) exhibited from the SW extremity of Flekkerøya.

Fredriksholmen ($58^{\circ}05'.8N$ $7^{\circ}59'.0E$) a small islet which can be identified by a large white patch on the S side of the stone walls of a ruined fort which, from the offing, resembles a white house.

Passage north–west of Flekkerøya

2.135

- 1 When Flekkerøygapet Light is distant 4 cables, a white sector (048° – 053°) of Jøngeholmskjæret Light (white lantern) ($58^{\circ}05'.5N$ $7^{\circ}59'.6E$) leads NE for about 1 mile, passing (with positions relative to the light):

SE of the foul ground extending $3\frac{1}{2}$ cables SW from Flekkerøygapet Light ($1\frac{1}{2}$ miles WSW) marked at its SW end by an iron perch, thence:

- 2 NW of Småvardeboen ($1\frac{1}{2}$ miles SW) a shoal, with a depth of 5.5 m over it, which is marked by a spar buoy (starboard hand), thence:

NW of the foul ground extending $\frac{1}{2}$ cable NW from Gammeløya (5 cables SW) which itself lies at the NW end of foul ground extending from Flekkerøya.

- 3 **Useful mark:**

Two radio masts, 1 cable E of Jøngeholmskjæret Light, which have an elevation of 49 m and exhibit red obstruction lights (not charted).

2.136

- 1 When clear of Gammeløya (above) the track leads NNE in mid channel for about 1 mile into Kristiansandfjorden passing ESE of Kastellbåen, 3 cables NW of Jøngeholmskjæret Light, a 3.5 m shoal marked by a spar buoy (port hand) which lies 1 cable ESE of Fredriksholmen (2.134).

Directions for Topdalsfjorden

Kristiansandfjorden to Varodden

(continued from 2.129)

2.137

- 1 From a position 8 cables SE of Dybingen ($58^{\circ}07'.6N$ $8^{\circ}00'.1E$) the track leads $1\frac{1}{2}$ miles NNE in the white sector (015° – $022\frac{1}{4}^{\circ}$) of Gleodden Light (white lantern) ($58^{\circ}08'.8N$ $8^{\circ}02'.3E$), passing (with positions relative to the light):

ESE of Odderøya ($1\frac{1}{4}$ miles SW) (2.127), and:

WNW of Revholmane ($1\frac{1}{4}$ miles S), on which stand two beacons marking the N limit of a measured distance (2.123), thence:

- 2 WNW of Kjerkebåen ($4\frac{1}{2}$ cables S), a shoal marked by a spar buoy (starboard hand), thence:

ESE of the marina at Kuholmen (3 cables WSW) and the shoal extending 1 cable seaward, marked at its SE end by an iron perch.

- 3 Thence the route leads $1\frac{1}{4}$ miles NE, passing SW of Gleodden Lighthouse, and, with its white sector ($213\frac{1}{2}^{\circ}$ – 215°), astern, passes SW of Vikebåen ($7\frac{1}{2}$ cables NNE), a shoal marked by two iron perches.

Varodden Bridges, crossing the fjord between Varodden and Hånesodden, have a vertical clearance (1.9) of 27 m. A fixed green light on each side of the bridges marks the centre of the navigable channel.

Varodden to Ålefjær

2.138

- 1 From the channel under Varodden Bridges the track leads 5 miles farther N and NNW to the head of the fjord,

passing (with positions relative to Varodden Bridge Light (58°09'·7N 8°03'·5E)):

- Clear, depending on draught, of a shoal depth of 11 m 1 cable NNE of the bridge and within the navigable channel, thence:
- 2 E of Justnesøya (2 miles N), an island from which shoal ground, and three islets, extend 1¾ cables W, and:
- W of Topdalselva (2 miles NNE), and the sandbanks at its entrance; see 2.122. Thence:
- 3 E of Storeskjerane (4 miles N), a shoal patch on which there are islets and rocks awash, 3 cables S of Ålefjær.

Anchorages

General information

2.139

- 1 A large number of sheltered anchorages are charted in the fjord; however, due to lack of swinging room it may be necessary to moor larger vessels.

Vesterhavn

2.140

- 1 Vesterhavn, contains three anchorages on the W side of the harbour, clear of Binesbåen (58°08'·2N 7°58'·9E).
Vessels not allocated a berth must be anchored so that they do not swing NE of a line drawn from the W point of Dybingen (58°07'·6N 8°00'·1E) 8 cables NW to Nordodden.
Vessels under quarantine anchor in the same area.

Fiskåbukta

2.141

- 1 Fiskåbukta (58°07'·5N 7°59'·0E), an extension SW from Vesterhavn, affords anchorage as required in depths from 15 to 33 m, with good holding ground, as shown on the plan. Mariners should note two shoals, only one of which, Timlingbåen, is marked by a buoy (port hand). There are mooring rings around the shore.
- 2 A submarine pipeline extends E from the coast 2 cables SSW of Myrodden (58°07'·8N 7°58'·9E) with its direction indicated by leading beacons on the shore; anchoring is prohibited in the vicinity of the alignment. Another pipeline is laid E then NE from the shore at Auglandsbukta, close NW of the charted anchorage.

Indre Kongshavn

2.142

- 1 Indre Kongshavn (58°06'·7N 7°59'·3E), which has depths of over 10 m in the entrance and from 10 to 17 m in the harbour, affords snug anchorage which is sometimes used as a lay up berth for larger vessels.

Topdalsfjorden

2.143

- 1 The bay N of Gleodden (58°08'·8N 8°02'·3E) contains mooring buoys and is also used as a lay-up harbour. Submarine pipelines cross the N part of Topdalsfjorden about 1½ cables S of Varodden Bridge.

Alongside berths

Flekkerøya

2.144

- 1 Skålevik (58°04'·7N 8°01'·0E) is a fishing port which contains a berth with a length of 72 m and depths from 5·6 to 6·7 m alongside. There are 15 other berths.

Mæbø (58°04'·4N 8°00'·5E) contains a berth with a length of 38 m and depths from 4·6 to 5·6 m alongside. There are four other berths and two small slipways.

Randøysund

2.145

- 1 **Vråneshukta** (58°07'·1N 8°06'·5E) contains a berth with a length of 37 m and depths from 3·5 to 4·6 m alongside. There are three other berths.
There is a speed limit of 6 kn within Randøysundsleden.

Vesterhavnen

2.146

- 1 **Odderøykaien**. On the W side of Odderøya the largest berth is Odderøykaien (58°08'·3N 7°59'·9E) which has a length of 317 m and depths from 7·0 to 14·0 m alongside. There are grain and cement silos and an overseas terminal at this quay.
- 2 **Odderøya West Quay**, 2 cables S of Odderøykaien, which is the fuelling berth with a length of 60 m and depths from 11·9 to 18·2 m alongside, can accommodate vessels of 20 000 dwt. There are two other berths in the vicinity.
- 3 **At Lagmannsholmen**, the deepest berth is Caledonian Container Terminal (58°08'·5N 7°59'·6E), with a length of 184 m and a depth of 9·0 m alongside. This quay has a Ro-Ro ramp, with a width of 20 m, at its SE end. The longest berth is Lagmannskaien, close S, with a length of 268 m and a depth of 9·0 m alongside; and a Ro-Ro ramp with a width of 26 m. There are eight other berths.
- 4 **New jetty**. Near the head of the bay a new jetty, which extends from the NW shore, has a length of 147 m with depths from 8 to 17 m alongside. It is used by ferries and passenger, container and Ro-Ro vessels.
At Nordodden (58°08'·3N 7°58'·6E), the largest berth has a length of 232 m with depths from 9·4 to 18·6 m alongside. There is one other berth.

Fiskåbukta

2.147

- 1 The largest berth, which is situated on Kjeholmen (58°07'·6N 7°58'·5E), has a length of 275 m with depths from 8·9 to 13·3 m alongside. There is one other berth.

Outer berths

2.148

- 1 **At Valsvik** (58°08'·0N 8°04'·2E) the Harbour Authority has a berth with a length of 67 m and depths from 8·6 to 13·2 m alongside.
Vige (58°09'·9N 8°02'·8E), situated close N of the bridges at Varodden (2.111), contains a berth with a length of 100 m and depths from 5·5 to 6·9 m alongside. There is one other berth.

Topdalsfjorden

2.149

- 1 **Ålefjær** (58°14'·N 8°02'·E), at the head of Ålefjærfjorden, an extension N from Topdalsfjorden, contains a berth with a length of 35 m and depths from 3·9 to 4·4 m alongside. This berth is used for the shipment of timber. There is one other berth. In 1998 the port was used by two vessels totalling 3350 dwt.

Vestergapet

2.150

- 1 **Kjærskilen** (58°04'·7N 7°59'·3E) has a berth with a length of 100 m and depths from 3 to 8 m alongside. There are two other berths.

Lindebøkilen, close NE of Kjærskilen, has a berth with a length of 100 m and a depth of 7 m alongside.

- 2 **Kroodden** (58°05'·7N 7°58'·6E) contains a bunkering quay with a length of 12 m and depths from 6·3 to 8·5 m alongside which can accommodate vessels of 400 tonnes; larger vessels can be moored by the stern. There are two other berths.

Port services

Repairs

2.151

- 1 All types of repair can be undertaken. The dimensions of the largest dry dock, which can accommodate vessels of up to 40 000 dwt, are: length 210 m, beam 28 m, depth 7·6 m. There are two other docks and three slipways.

Other facilities

2.152

- 1 Compass adjustment; de-ratting exemption certificates issued; hospitals and extensive medical facilities; reception

and disposal of oily waste by barrel and by barge; salvage equipment and services are stationed in the port.

Supplies

2.153

- 1 **Fuel** of all types from alongside the fuelling berth at Odderøya (2.146); notice of 48 hours is advisable. Fuel can also be supplied by lighter.

Fresh water is laid on at the berths or available from lighters.

Provisions of all kinds can be obtained in the town.

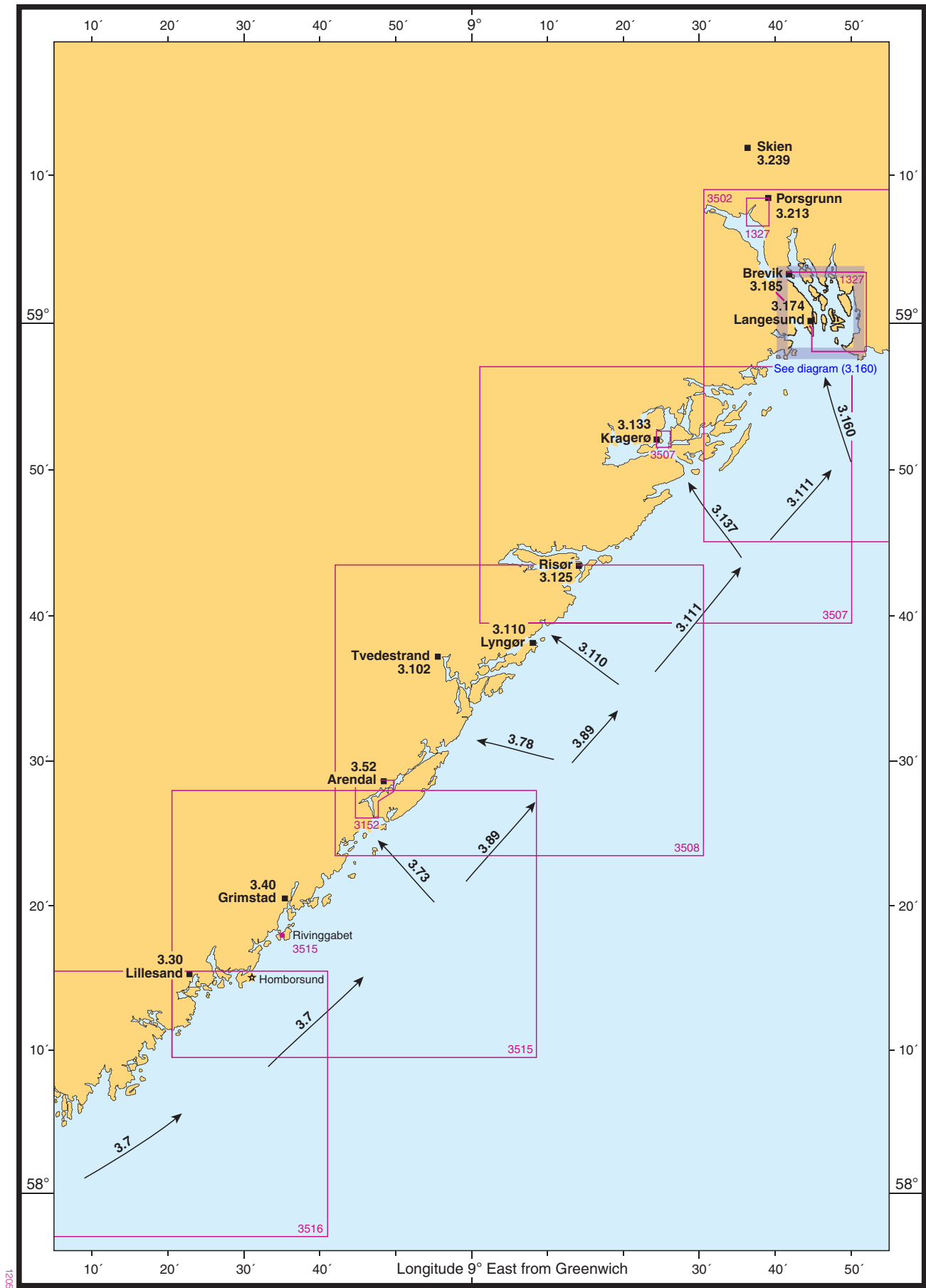
Ship's stores, including charts, are available.

Communications

2.154

- 1 The airport is close to the city, and has international connections. Frequent ferry services connect with Hirtshals in Denmark; other ferries serve Sweden and UK.

Chapter 3 - Kristiansand to Langesundsfjorden



CHAPTER 3

KRISTIANSAND TO LANGESUNDSFJORDEN

GENERAL INFORMATION

*Charts 1402***Scope of the chapter****3.1**

- 1 This chapter covers the coastal route and the inner passage along the S coast of Norway from Kristiansandfjorden (58°07'N 8°02'E) to Langesundsfjorden (59°00'N 9°48'E), about 75 miles NE. It also includes the approach and entry into the following major harbours:

Arendal (58°28'N 8°46'E) (3.52).

Brevik (59°03'N 9°42'E) (3.185).

Porsgrunn (59°08'N 9°39'E) (3.213).

Skien (59°12'N 9°37'E) (3.239).

- 2 In addition, the area contains the medium-sized ports of Tvedestrand (58°37'N 8°57'E) (3.102), Risør Havn (58°43'N 9°15'E) (3.125) and Kragerø (58°52'N 9°25'E) (3.133). The chapter is arranged as follows:

Kristiansand to Langesundsbukta (3.6).

Langesundsbukta and Langesundsfjorden (3.142).

Routes**3.2**

- 1 **Coastal route.** This route passes outside the 200 m depth contour, leading ENE, then NE, clear of dangers, as given at 3.7 and 3.89.

Tanker route. Laden tankers of 40 000 dwt and greater are advised to start the coastal route at least 15 miles offshore and maintain this distance to a position 15 miles SE of Tvistein (58°56'5N 9°56'0E). See 1.83 for details.

- 2 **Inner passage.** An inner passage, used mainly by coasters and small craft, passes through more sheltered waters between the mainland and the coastal archipelago which lies off much of the coast covered by this chapter, except between Lyngør (58°38'N 9°09'E) (3.111) and the

entrance to Langesundsfjorden, 25 miles NE (3.142), which is exposed.

Topography**3.3**

- 1 The main feature of the coast between Kristiansandfjorden and Lyngør, 47 miles NE, continues to be the many islands, islets and rocks of the Skjærgården (1.3), which are generally grey in colour, low and bare. The land behind the islands is wooded with even contours and mostly indented by short fjords. Farther NE the coast is exposed with few offshore islands.

- 2 Landmarks are difficult to identify, particularly in poor visibility.

Depths**3.4**

- 1 The 200 m depth contour, which lies parallel with the coast about 4 miles offshore, marks the change from the deep and relatively even seabed of the Skagerrak to the highly irregular depths which surround and extend seaward from the islands and skerries, within which isolated shoal patches have been found to exist.

- 2 To the NE of Jomfruland (58°52'N 9°36'E), a shallow shelf extends up to 4 miles from the shore with depths of less than 10 m along its outer edge. The 200 m depth contour lies about 4 miles off this shelf.

Fishing**3.5**

- 1 General information on fishing is given at 1.19. Salmon fishing by drift net takes place in an area from the coast to a distance of 4 or 5 miles offshore. The area for mackerel fishing lies between 7 or 8 miles offshore and 25 to 30 miles offshore.

KRISTIANSAND TO LANGESUNDSBUKTA

GENERAL INFORMATION

*Chart 1402***Area covered****3.6**

- 1 This section describes the coastal waters from Kristiansandfjorden (58°07'N 8°02'E) to Langesundsbukta (58°58'N 9°46'E), 75 miles NE, along with its harbours and anchorages. It is arranged as follows:

Kristiansand to Arendal (3.7).

Arendal (3.52).

Arendal to Lyngør (3.89).

Lyngør to Langesundsbukta (3.111).

KRISTIANSAND TO ARENDAL

General information*Charts 1402, 3516, 3515***Routes****3.7**

- 1 **Coastal route.** From a position 5 miles SSE of Oksøy Light (58°04'N 8°03'E), off the entrance to Kristiansandfjorden, the coastal route continues ENE for about 10 miles, then NE for 23 miles, in deep water outside the 200 m depth contour, to a position 4 miles ESE of Torungen Light (58°23'9N 8°47'6E).

Tanker route is given at 3.2.

- 2 **Inner passage.** This passage, used mainly by coasters and small craft, links Kristiansand with Arendal and a

number of small harbours; its inner channels are sheltered in parts by the Skjærgården (1.3).

Topography

3.8

- 1 The coast, which is rugged with many short fjords and inlets, is generally light grey between Kristiansandfjorden and Homborsund ($58^{\circ}15'N$ $8^{\circ}31'E$), 15 miles NE. It is then generally dark grey towards the NE, except for that part extending 5 miles NE from Grimstad ($58^{\circ}20'N$ $8^{\circ}36'E$) which has an easily identifiable red-brown colour.
- 2 Behind the coast stands Grimstadsadlen ($58^{\circ}21'N$ $8^{\circ}31'E$), a wooded hill with a deep and distinctive cleft which is best seen from SE when within 10 miles of the coast. Farther inland, Homborsunds Fall ($58^{\circ}28'N$ $8^{\circ}31'E$), a plateau with a steep cliff at its E end, is prominent when viewed from S.
- 3 The Skjærgården lies between 2 and 5 miles off the coast in a long archipelago of islets which are bare and light grey in colour. Homborøya ($58^{\circ}15'N$ $8^{\circ}30'E$), which is somewhat lower than the neighbouring coast, is easily identified as an island.
- 4 Natural fixing marks are difficult to identify at some distance from the coast as the islets and skerries blend with the gentle wooded hills with few distinctive marks. However, there are many good navigation marks which allow easy fixing in good visibility.

Depths

3.9

- 1 Depth over the coastal bank, which extends up to $2\frac{1}{2}$ miles offshore, is extremely irregular and has, in places, shoals and breakers which extend more than a mile seaward of the outer skerries. As the outer dangers on this bank are generally steep-to, mariners are advised to keep well clear in poor visibility.

Hazards

3.10

- 1 **Fishing.** See 3.5.
Cables. Submarine power cables are laid from the shores of Kvåsefjorden ($58^{\circ}07'N$ $8^{\circ}11'E$) in a generally SSE direction across the Skagerrak to Denmark, as charted.
Visibility and flow. There is often poor visibility during onshore winds, when a strong set towards the land occurs off Arendal ($58^{\circ}28'N$ $8^{\circ}46'E$).

Rescue

3.11

- 1 Life-boats are stationed at Arendal ($58^{\circ}28'N$ $8^{\circ}46'E$), Risør ($58^{\circ}43'N$ $9^{\circ}15'E$) and Kragerø ($58^{\circ}52'N$ $9^{\circ}25'E$). See 1.128 for further information.

Natural conditions

3.12

- 1 **Local magnetic anomaly.** Local deflection of the compass, with a decrease of about 3° in variation, is reported to occur about 1 mile WNW of Gåsa ($58^{\circ}13'N$ $8^{\circ}28'E$).
Currents, which are reported to be of little note, flow generally SW off this coast. A strong W-going set may be wind-driven at times.
- 2 **Ice.** General information on ice is given at 1.198. The outer coastal harbours are generally free of ice, except in very hard winters.

Directions (continued from 2.87)

Principal marks

3.13

Landmarks:

- 1 Homborsund Lighthouse (white tower on white stone house, 20 m in height) ($58^{\circ}15'N$ $8^{\circ}32'E$) which stands on the S point of Store Grønningen, an islet close off Homborøya.
- 2 Drottningborg ($58^{\circ}20'8N$ $8^{\circ}38'5E$), with its dominating building and isolated position, is a mark which can be seen from far out to sea between SW and NE.
- 3 Lauvåsen ($58^{\circ}22'6N$ $8^{\circ}40'1E$), a wooded ridge situated close N of Fevik.
- 4 Torungen Lighthouse (white tower, red stripe, 34 m in height) ($58^{\circ}23'9N$ $8^{\circ}47'4E$), standing on Store Torungen, off the S entrance to Arendal.
- Disused lighthouse (white stone tower, 29 m in height) ($58^{\circ}24'7N$ $8^{\circ}47'5E$), standing in the middle of Lille Torungen, 8 cables N of Torungen Light. Lille Torungen Light (3.75) is exhibited from a position 1 cable SE of the tower.



Homborsund Lighthouse from SE (3.13)

(Original dated prior to 2005)

(Photograph – Norwegian Hydrographic Service)

3.14

Major lights:

- 1 Torungen Light — as above.
 Oksøy Light ($58^{\circ}04'N$ $8^{\circ}03'E$) (2.83).



Torungen Lighthouse from S (3.13)

(Original dated prior to 2005)

(Photograph – Norwegian Hydrographic Service)

Other aids to navigation**3.15****1 Racons:**

Oksøy Light 58°04'N 8°03'E).

Gåsa Light (58°13'N 8°28'E).

Torungen Light (58°24'N 8°47'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Kristiansandfjorden to Røynevarðsgrunnen**3.16**

- 1 Track.** From the vicinity of 58°00'N 8°10'E, about 5 miles SSE of Kristiansandfjorden, the coastal route continues ENE for about 10 miles, passing (with positions relative to Oksøy Light (58°04'N 8°03'E)):

SSE of Ytre Hausane (4¼ miles E), a group of shoals marked 1 cable S by a light-buoy (S cardinal), thence:

- 2** SSE of Blekgrunnen (6½ miles E), a rocky peak over which the sea seldom breaks, thence:

SSE of Røynevarðsgrunnen (9½ miles ENE), a shoal over which the sea seldom breaks.

3.17**1 Clearing marks:**

To the S of Ytre Hausane are given at 2.128.

Useful mark:

Tronderøyholmen Beacon (black cairn, 3 m in height) (58°09'N 8°19'E), standing on an islet 6 m high.

Røynevarðsgrunnen to Arendal**3.18**

- 1** From the vicinity of 58°03'N 8°26'E the coastal route leads NE for about 23 miles to a position ESE of Torungen Light (58°24'N 8°48'E), passing (with positions relative to Hesnesbregen Light (58°18'N 8°40'E)):

SE of the extensive reef on the W side of Bregen (10 miles SW) (3.34), thence:

- 2** SE of rocks extending up to 4 cables E and SE from Gåsa (8 miles SW), a small islet on which stands Gåsa Light (lantern on post, 11 m in height), thence:

SE of Knatten, two shoals with a least depth of 13 m over them, which lie 9 cables ESE of Homborsund Light (5 miles SW) (3.13), thence:

- 3** SE of Grunnsetta (2½ miles SW), a shoal, thence: SE of Hesnesbregen, shoals which lie within 1 mile of Hesnesbregen Light (lantern on tripod, 14 m in height), thence:

- 4** SE of Sandoddryggene (3 miles NE), a shoal which lies near the S limit of Losserevet. Losserevet consists of shoals which extend 1¼ miles NNE to Lossene (3¾ miles NE), a group of small islets fronted by further shoals. Thence:

- 5** SE of the shoal which extends up to 4 cables from Fiskeskjæra (5 miles NE), which consists of two low black skerries, thence:

SE of Torungen Light (7 miles NE) (3.13).

Clearing marks and light sectors**3.19**

- 1** The alignment (232°) of Hesnesbregen Light with Homborsund Light, 5 miles SW, clears SE of all the shoals NE of Hesnesbregen Light.
- 2** The white sectors (242°–037°) of Gåsa Light, and (232°–036°) of Hesnesbregen Light, respectively, cover water clear of all shoals, with the exception of those within 5 cables of Gåsa Light.

Useful marks**3.20**

- 1** Langbåen Cairn (black with two white bands, 2.5 m in height) (58°12'N 8°25'E), standing on the W side of Bregen (3.34).

Håbåskjær Cairn (black stone, 3 m in height) (58°17'N 8°35'E), standing on a low rock.

- 2** Hesnes Beacon (red wooden structure with a white top) (58°20'·2N 8°40'·8E), standing on Valøykallen, a group of islands to the E of Hesnesøya.

Kattopsa (58°22'·1N 8°40'·1E), a steep rock wall with several fissures and light-coloured foot on the W side of Fevigkilen.

(Directions continue, for Arendal at 3.73 and for the coastal route towards Lyngør at 3.93)

(Directions for the approach to Arendal through Tromøysundet are given at 3.78)

Inner Passage

Charts 3516, 3515

General information**3.21**

- 1** Between Kristiansandfjorden and Homborsund (58°15'N 8°30'E) the inner channels are mostly exposed or only partly protected by shoals and breakers which, in some places, lie over 1 mile off the outermost rocks. The waters are fairly foul and, in many places, the channel is narrow and intricate requiring local knowledge in addition to the local chart.

- 2** From Homborøya to Lille Torungen (58°25'N 8°47'E), off the entrance to Arendal, the inner passage is tolerably free from dangers, though still rather exposed.

The passage is described in the following text but directions are not given.

Chart 3516

Kristiansandfjorden to Lillesand**3.22**

- 1** From the E side of Kristiansandfjorden (2.105) the Inner Passage is entered through Vrengen (58°07'·0N 8°06'·5E), to the N of Stokken, a narrow and tortuous channel which leads into Randøysundet (58°06'·5N 8°07'·1E), which lies to the N of Østre Randøya and of Torsøya, and in which there is a speed limit of 5 kn and a vertical clearance (see 1.9) of 29 m.

- 2** After passing Torsøya Light (white lantern on tripod) (58°06'N 8°09'E) the passage continues E through open waters across the entrance to Kvåsefjorden, passing S of Toveboen, 5 cables ENE, and N of Leidegrunnen, 1 mile E of the light, thence S of the foul ground extending SW from Ytre Ulvøya (58°07'N 8°13'E).

- 3** Having cleared the shoal extending 3 cables SE from Ytre Ulvøya the passage leads NE through a narrow channel which separates Høye Nibe (58°07'N 8°15'E) and Ramsøya, close N, from the mainland. Thence the track continues NE through the sound between Spaknesskjæran (58°07'·9N 8°15'·6E), a rock in mid-channel from which a light (white lantern, stone base) is exhibited, and Nattviktangen (3.23), close NW. A beacon tower (truncated pyramid, black over white, 2 m in height) stands ½ cable S of Nattviktangen.

3.23

- 1** Having cleared the sound the wider and deeper route passes S and E of Kvalsholmen (58°08'·6N 8°17'·0E), thence continues NE between Svertingen, 6 cables ENE, and Tronderøyjentane, 6 cables NE of the light on Kvalsholmen. Having cleared these shoals the alignment

(234½°), astern, of Kvalsholmen Light (white lantern) with Nattviktangen Light (white lantern), 1 mile SW, leads NE for 3½ miles across open water.

- 2 From a position 5 cables SE of Reierskjer Light (white lantern on tripod) (58°11'7N 8°23'3E), a white sector (359°–003°) of Saltholmen Light (58°13'9N 8°24'3E) (3.34) leads N towards Lillesand (3.30) and the next leg of the Inner Passage.

Lillesand to Grimstad

3.24

- 1 **Homborsundsleia Leading Lights:**

Front light (white lantern, elevation 5 m) (58°15'7N 8°29'5E).

Rear light (white lantern on framework structure, elevation 29 m) (4 cables farther NE). The rear light structure is difficult to distinguish in summer due to dense bushes.

- 2 From a position 9 cables NNE of Reierskjer Light the alignment (041°) of these lights leads along the route of the Inner Passage for about 4 miles, across open water for most of its length, into Homborsund.
- 3 When the front leading light is 2½ cables distant, the white sector (078°–079½°) of Sundholmen Light (white lantern) (58°15'6N 8°30'6E) leads ENE through the fairway to within 1 cable of the light. Thence, having passed the light the track leads SE in mid-channel through Dybesundet, the narrow channel NE of Sundholmen, on the N point of which stands Sundholmen Light. This channel is free from dangers.

3.25

- 1 When clear of Dybesundet (58°15'5N 8°30'8E) the passage leads NE through Homborside, which lies close to the mainland; and across open water for about 1½ miles.
- 2 From the vicinity of 58°16'3N 8°32'8E the track follows the directions given for the SW approach to Grimstad at 3.45 to a position N of Galten Light (white lantern on cairn) (58°18'8N 8°35'8E), whence the track leads NE in mid-channel through Leiholmsundet, 4 cables NE of the light, which is well marked by beacons and lights, but is suitable for small vessels only; local knowledge is required.

Grimstad to Arendal

3.26

- 1 When clear of Leiholmsundet the Inner Passage continues NE passing NW of Gråholmen (58°19'6N 8°38'0E) thence through Hesnessund, 7 cables NNE of the islet, which has two narrows, N and S. When clear of the sound the track leads ENE for about 6 cables, along the N coast of Kvaløya (58°20'5N 8°39'4E), to achieve the alignment (226°), astern, of Hesnes Leading Lights:
- 2 Front light (white lantern with an elevation of 4 m) on a small islet off the NE end of Kvaløya.
Rear light (white lantern at an elevation of 14 m) on Kvaløya, 1½ cables SW of the front light.

3.27

- 1 **Alternative route.** An alternative and clearer route to that through Hesnessund lies through Gamlegabet (58°20'4N 8°40'0E), the channel between Hesnesøya and Tønneholmen, on which stands a beacon (black, barrel-shaped masonry with a white band, 3 m in height). A white sector (008°–012½°) of Hesnes Front Leading Light leads through the channel to within 5 cables of the light.

3.28

- 1 **Combined route.** The alignment (above) of Hesnes Leading Lights, astern, leads NE for about 2½ miles; passing close SE of Vestre Midtgrunnen, marked by an iron perch (5 cables NE of the front light) and Østre Midtgrunnen, 4 cables farther NE, marked by a buoy (port hand), thence over a least depth of 8 m (58°21'8N 8°42'2E) and into a white sector (045°–046°) of Spærrholmene Light (white lantern) (58°23'N 8°45'E).

- 2 **Useful mark:**

Hellene Beacon (white tower with a black stripe on its E and W sides) (58°21'N 8°40'E).

3.29

- 1 **Continuation.** When Spærrholmene Light is distant about 7 cables, the track is adjusted to pass close NW of the light, and then lead NE in a white sector (047°–048¾°) of Lille Torungen Light (58°24'6N 8°47'6E) (3.75), which continues in mid-channel for about 2¼ miles.
- 2 When Lille Torungen Light is distant 5 cables the route leads N towards Arendal, along the line of bearing, 357°, of Sandvigodden Light (58°26'N 8°47'E) (3.77).

Useful mark:

Svartskjæra Beacon (black truncated cone, white band, 3 m in height), standing 3 cables N of Spærrholmene Light.

Lillesand

General information

3.30

- 1 **Position and function.** Lillesand Havn (58°15'N 8°23'E) is situated on the NW shore of a fjord sheltered by islands in the entrance. The port, which handles dry bulk and general cargoes, supports local industries which include glass fibre, timber and mineral processing.
- 2 The town of Lillesand, which had a population of 6100 in 2004, is the county town and a summer holiday resort.
Port limits. Lillesand Harbour District Limit includes the waters NW of a line joining Furegrunnen, 6 cables SSE of Ytre Ulvøya (58°07'N 8°13'E), and Gåsa Light.
- 3 **Approach and entry.** The widest and best approach to Lillesand Havn is from SE, with entrance through Sandsgapet (58°14'2N 8°23'9E), W of Langøya.
Traffic. In 2004 the port was used by 72 vessels with a total of 130 838 dwt.
Port Authority:
Address. Lillesand Havn KF, PO Box 23, N-4791 Lillesand, Norway.
Web site. home.no/lillesand.havn.
E-mail. erland.drystad@lillesand.kommune.no
- 4

Limiting conditions

3.31

- 1 **Controlling depth.** Least depth in the entrance is 55 m, thus controlling depth is that of the berth.
Deepest and longest berth. Kokkeneskaia (3.38).
Mean tidal levels. The tidal range is small but meteorological conditions can lead to large changes in water level.
- 2 **Density of water.** 1.025 g/cm³.
Maximum size of vessel handled was 17 000 dwt.
Ice. The harbour is usually free of ice during the winter.

Arrival information

3.32

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory

and for other details see *Admiralty List of Radio Signals Volume 6* (2).

The pilot boards off Oksøy (58°04'N 8°03'E) (2.118) or Torungen (58°24'N 8°48'E) (3.66).

- 2 **Tugs** are available from Kristiansand.

Speed limit, from 15th June to 15th August, is 5 kn within 50 m of the shore.

Quarantine anchorage is given at 3.37.

Harbour

3.33

- 1 **Berths.** The main berthing area lies around a cove on the NW shore of the fjord.

Magnetic anomaly. See 3.12 for information on a reported anomaly in the approaches to Lillesand.

Flow is not particularly noticeable in the harbour.

Directions

3.34

- 1 **Principal mark:**

Lillesand Church (58°15'N 8°23'E), yellow with a dark grey roof and spire, is prominent from seaward.



Saltholmen Light (3.34)

(Original dated 2005)

(Photograph – Norwegian Hydrographic Service)

- 2 **Approach from south-east.** From position 58°10'0N 8°30'5E, a white sector (310°–330°) of Saltholmen Light (aluminium lantern on tripod, orange top, 5 m in height) (58°13'9N 8°24'3E), leads NW for about 4½ miles to a position 2½ cables off the light, passing (with positions relative to the light):

SW of Gåsa shoals (2 miles ESE) (3.18), thence:

- 3 NE of Bregen (2 miles SSE), a drying rock marked by an iron perch which lies on the E side of an extensive reef in the S approach to Lillesand. Nordbåen, on the N part of the reef, are marked by an iron perch (1½ miles SSE) where they are awash, by a spar buoy (port hand) on the NE edge and by a spar buoy (starboard hand) off the N side. Thence:

SW of Ytre Malmgrunnen (1 mile ESE) an 11 m patch, thence:

SW of Indre Malmgrunnen (7 cables SE) which has a least depth of 2.5 m over its S end and is marked by a spar buoy (S cardinal), and:

- 5 NE of Nebbgrunnen (8½ cables S) an unmarked rock, thence:

SW of Store Malmen (5 cables ESE), the S of a group of islets, and of the reef, partly above-water, which extends 1½ cables NW from the islet.

3.35

- 1 **Useful marks** (positioned from Saltholmen Light):

Langbåen Cairn (2 miles S) (3.20).

Mebø Beacon (tower) (1¼ miles SW) which stands on Justøya at an elevation of 49 m.

Havsteinen Beacon (tower with black and white stripes) (1 mile ENE).

Bergkyrkja Beacon (black tower with white band, ball topmark) (1½ miles ENE).

3.36

- 1 **Entering harbour.** When Saltholmen Light is distant 2½ cables the route passes NE of the light and continues NW into harbour on the alignment (318°) of Lillesand Havn Leading Lights:

Front light (lantern on post, elevation 6 m) (58°14'9N 8°22'7E).

Rear light (lantern on tripod, elevation 26 m) (3 cables NW of the front light).

- 2 This track passes (with positions relative to Saltholmen Light):

Close NE of Saltholmen, which is steep-to, thence: SW of Langøybåen (1½ cables N) which is marked by an iron perch, thence:

Through Sandsgapet (5 cables NNW) keeping clear of a 8 m rock on its SW side.

Anchorage and berths

3.37

- 1 **Anchorage** is available, with good holding ground, mostly clay with some sand, anywhere in the fjord between Lillesand and Tingsaker, 4 cables NE. The depths are 20 to 30 m, clear of a shallow patch at the N end of the harbour and anchorage should be clear of submarine pipelines and cables (1.69) as shown on the local chart. Mooring bolts are established around the entire fjord.

The quarantine anchorage is in the NE part of the same anchorage.

- 2 **Skallefjorden** (58°14'N 8°22'E), about 1 mile SW of Lillesand, is a large and sheltered anchorage, with depths from 30 to 40 m, mud, in the main part of the fjord and 5 to 10 m, mud, off Skalle, on the NW shore.

3.38

- 1 **Alongside berths.** Kokkeneskaia, on the E side of the inlet, is the largest berth in the main port with a length of 80 m, and depths of 9.5 m alongside. Langbrygga, on the W side, is 50 m in length and has a depth of 7.5 m. There are 12 other berths.

- 2 At Fossebekk, 4 cables SW of the port, the largest berth has a length of 50 m with a depth of 8.0 m alongside; there is one other berth.

Port services

3.39

- 1 **Medical facilities:** doctors are available locally; hospitals at Kristiansand (2.152) and Arendal (3.86).

Supplies: fuel from barge or road tanker; water at all berths; provisions and ship's stores, including charts, available in town.

Grimstad

Chart 3515

General information

3.40

- 1 **Position and function.** Grimstad Havn (58°20'N 8°36'E) is situated in a cove on the W side of Goosefjorden (Grosfjorden). The port handles general and container cargoes but it is reported that there is little foreign trade. Local industries include boat building, canning, plastics and a refrigerator factory.

The town of Grimstad, with a population of about 15 050 in 2004, stands around the port area. It is also a summer holiday resort.

- 2 **Port limits.** Grimstad Harbour District Limit includes the entire fjord and approaches NW of a line joining Gåsa Light (3.18) and Torungen Light.

- 3 **Approach and entry.** Several narrow channels give access to Goosefjorden between numerous islets and rocks. The most important of these, recommended for larger vessels, is through the W entrance to Rivingdybet (58°18'3N 8°34'9E), at the S end of the fjord, which is approached from S, passing E of Bjørøya (58°17'4N 8°33'0E).

- 4 **Traffic.** In 2004 the port was used by 65 vessels with a total of 215 783 dwt.

Port Authority. Grimstad Havnevesen, Storgt. 2A, 4876 Grimstad. The Harbour Office is on Torskeholmen in the centre of the port.

Limiting conditions

3.41

- 1 **Controlling depth.** The least depth in the SW approach is 14 m and vessels with a draught of 9.2 m can be taken into the harbour.

Deepest and longest berth is at Torskeholmen (3.48).

Mean tidal levels. The tidal range is small but meteorological conditions can lead to large changes in water level.

- 2 **Ice.** In particularly severe winters the harbour may freeze for short periods but a channel will then be kept open.

Density of water. 1.025 g/cm³.

Maximum size of vessel handled was 60 000 dwt with a draught of 9.2 m.

Arrival information

3.42

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and for other details see *Admiralty List of Radio Signals Volume 6 (2)*.

The pilot boards off Torungen (58°24'N 8°48'E) (3.66).

- 2 **Tugs** can be arranged from Kristiansand on request to the Harbour Master at Grimstad.

Quarantine anchorage is given at 3.48.

Harbour

3.43

- 1 The harbour, which occupies the N part of Goosefjorden, is well sheltered and encloses the port area which is approached through the fjord.

Directions

3.44

- 1 **Principal mark:**

Grimstad Church (58°20'6N 8°35'7E), yellow with a dark green roof and grey spire.

- 2 **Outer approach from south.** From the vicinity of 58°10'N 8°37'E, the alignment (344°) of the SW extremity of Bjørøya (58°17'4N 8°33'0E) with Tjoresteinen, a hill 81 m high 2 miles NNW, leads towards the S entrance for 6½ miles, passing (with positions relative to Bjørøya Light (white lantern) on the NE end of the island):

- 3 ENE of Knatten (2½ miles S) which consists of two shoals, thence:

ENE of Ytre Prestholmgrunnen (1¼ miles S) which has a least depth of 10 m over it, thence:

WSW of Yderstgrunnen (1½ miles S) which has a least depth of 17 m over it.

- 4 **At night,** the line of bearing, 353°, of the dividing line between the white and green sectors of Bjørøya Light can be used instead of the track given above. This track passes close E of Yderstgrunnen.

- 5 **Useful marks:**

Mast with white barrel topmark standing on the E end of Homborøya (2½ miles SSW) (3.8).

Prestholmen Beacon (black tower with white band) (1¼ miles SSW).

3.45

- 1 **Inner approach from south-west.** When Prestholmen Beacon is abeam the track is altered NNE for 1½ miles, along the alignment (023°) of Østre Tvillingholmen and Vessøyhauet Leading Lights:

Front light (white lantern) (58°19'N 8°35'E).

Rear light (white lantern on base, 21 m in height), 1 mile NNE.

- 2 This track leads into the entrance, passing (with positions relative to Bjørøya Light):

WNW of Steinene (7 cables SSE), three shoals, the N and W of which are marked by spar buoys (lateral), and:

ESE of Helleskjær (5½ cables SSW), a small islet with a fringing reef, thence:

- 3 ESE of Lakesgrunnen, a 4 m shoal which lies 1 cable off the SE side of Bjørøya. Bjørøya Light stands on the NE part of Bjørøya. Thence:

ESE of Nibbehausen (2 cables NNE) which is marked by a spar buoy (port hand), and:

- 4 WNW of Vikletten (4½ cables ENE) which is marked by a spar buoy (starboard hand), thence:

WNW of Jeppegrunden (7 cables NE), a shoal, marked by a spar buoy (starboard hand), which lies on the NW extremity of foul ground extending 2 cables S and 3 cables E.

- 5 **Useful marks:**

Stangholmen Light (white lantern) (58°17'8N 8°35'4E).

Håbåskjær Beacon (black, 3 m in height), which stands on a low skerry 7 cables SSW of Stangholmen Light.

3.46

- 1 **Entry through Rivingdybet.** When Håøya Beacon (white wooden structure with a black top) (58°18'N 8°36'E) bears 087° the track is altered to the E for 4½ cables, with the beacon ahead, passing (with positions relative to the beacon):

- 2 S of Risholmen (6 cables W) on which stands a beacon (black wooden structure with a white band, 4 m in height), thence:
N of Lille Mågholmen, off the E side of which stands Rivingdybet Light (lantern on tripod), thence:
- 3 S of Rivingen (4 cables W) on the S end of which stands Rivingen Light (white lantern on framework structure). A beacon (black tower) stands 1½ cables N of the islet.

3.47

- 1 **Route through Groosefjorden.** After passing Rivingen the track is altered N for about 6 cables along a line of bearing, 350°, of Østre Tvillingholmen Light (58°19'0N 8°34'9E) (3.45), passing close W of Fladerivingen, 2 cables SSE of the light.
- 2 When clear of Fladerivingen, the line of bearing, 018°, of Vessøyhauet Light (58°19'9N 8°35'6E) (3.45) leads through the fairway for about 8 cables to a position close W of Bøddelbåen Perch, 3½ cables S of the light, passing close WNW of Fjordbåen Perch.

Thence continue in mid-channel to Grimstad Havn.

Anchorage and berths

3.48

- 1 **Anchorage.** The main anchorage for vessels not allocated a berth, and for those in quarantine, is in Vigkilen, the fjord extending NNE from Grimstad. Depths from 30 to 40 m are available in the S part of the anchorage and 10 to 15 m in the N part, mud, clear of the rocks extending up to 1 cable from the W shore and the submarine cables and pipelines (1.69) shown on the local chart.
- 2 **Berths.** The largest berth, which is on the NE side of Torskeholmbrygga, situated in the centre of the harbour, has a length 90 m and depths from 6.0 to 15.9 m alongside. The largest Harbour Authority berth, for use by visitors, is at Odden, on the SW side of the harbour, which has a length of 74 m and depths from 4.7 to 6.7 m alongside. There are 21 other berths which include Ro-Ro and container handling.

Port services

3.49

- 1 **Repairs.** Hull and machinery repairs can be carried out at the head of Vigkilen where there is a repair yard containing a quay with a length of 90 m and depths from 8.3 to 11.9 m alongside. This yard also has a floating dock which can accommodate a vessel with a length of 120 m, beam of 19.5 m, draught of 5.8 m, and displacement of 4500 tonnes.
- 2 **Other facilities:** De-ratting exemption certificates issued; medical facilities are available.
- Supplies:** fuel from barge on request; water at all berths; provisions and ship's stores, including charts, available in town.

Other small ports and anchorages on the Inner Passage

Chart 3516

Ulvøysund

3.50

- 1 **Description.** Ulvøysund (58°06'8N 8°12'8E) which passes between Indre Ulvøya and Ytre Ulvøya, contains a small port with a least depth of 5.2 m and reception facilities for fish.

Approach and entry is from E or W but the W entrance is very intricate and contains two shoals with a depth of 4 m over them.

- 2 **Directions for approach from south and entry from east.** From position 58°04'2N 8°11'0E, the alignment (032°) of Svervikodden Light (white lantern) (58°07'8N 8°15'1E) with Nattviktangen Light, 2½ cables NNE (3.23), leads NNE for about 3 miles, passing (with positions relative to Torsøya Light (58°06'N 8°09'E)):

- 3 ESE of Ytre Hausane (1¾ miles SE) (3.16) and the shoals extending 1 mile NNE to Meholmen (1¾ miles E) the positions of which are best seen on the chart, thence:
WNW of Furegrunnen (2¼ miles E) which, with a depth of 2 m or less over it, is marked by a spar buoy (starboard hand), thence:
- 4 Close ESE of Kårehausen 2½ miles ENE) which is marked by a buoy (port hand), thence:
Between Kåregrunnen, close NE of Kårehausen, which is marked by a spar buoy (port hand) and Måkegrunnen which is marked by a spar buoy (starboard hand).

- 5 When Ulvøysund is well open it can be entered in mid-channel, clear of a reef extending NE from Ertholmen (58°06'8N 8°13'4E).

Rough weather approach. In rough weather the recommended track passes E of Måkegrunnen on the alignment (018°) of the steep N side of Høya Nibe (58°07'N 8°15'E) with Dyngge, 6½ cables NNE.

- 6 **Useful mark:**

A beacon (mast with barrel and white cross) (58°07'N 8°13'E) which stands on the S part of Ytre Ulvøya.

Berths. The largest berth has a length of 41 m and depths from 2.7 to 3.9 m alongside. There are four other berths.

- 7 **Supplies.** Fuel and fresh water available.

Risholmfløa

3.51

- 1 Risholmfløa, W of Risholmen (58°08'6N 8°16'3E) (3.46) and the area, 4 cables W, between Helløya and Lyngholmene, affords anchorage for coasters over a bottom clay and sand, exposed to swell during S winds. Mooring rings are available. Mariners should note several marine farms established in the vicinity.

ARENDAL

General information

Charts 3508, 3152

Position and function

3.52

- 1 Arendal Havn (58°28'N 8°46'E) lies on the NW shore of Tromøysundet (3.53), about 3 miles from the open sea. The harbour, which is safe in all weathers, is a port of call for medium-sized vessels. The port, which handles wood pulp, mineral ore and general cargo, is a Customs Port of Entry.
- 2 The town of Arendal, with a population in 2004 of about 33 000, is an industrial and commercial centre. There are a number of summer holiday resorts in the surrounding area.

Topography

3.53

- 1 Tromøysundet (58°30'N 8°54'E), a deep and well sheltered sound with a length of about 8 miles and average

width of 2 cables, lies between Tromøy, the largest island along this coast, and the mainland. The terrain is tree-covered with a rocky shore.

Harbour limits

3.54

- 1 The harbour area includes the whole of Tromøysundet and Galtesund (3.55) and their approaches from Torungen Light (3.13) and Bonden Light (58°31'N 8°59'E) respectively, as shown on the chart.

Approach and entry

3.55

- 1 The main approach to Arendal is from a position SE of Torungen Light (58°23'·9N 8°47'·4E) with entry through Galtesund (58°26'·5N 8°47'·0E), the channel separating Hisøy from the W side of Tromøy, which is free from dangers in the fairway. This channel should be preferred during difficult weather conditions.
- 2 A secondary approach is from a position ENE of Gitmartangen Leading Lights (58°30'·7N 8°56'·9E), with entry through Tromøysundet (3.53), as given at 3.78.

Traffic

3.56

- 1 In 2004 the port was used by 134 vessels with a total of 309 088 dwt.

Port Authority

3.57

- 1 **Address.** Arendal Havnevesen, PO Box 33, N 4801 Arendal.
Website. www.arendalhavn.no.
Email. jurgen.sievers@arendal.kommune.no.

Limiting conditions

Vertical clearance

3.58

- 1 Tromøybrua, a suspension bridge which spans Tromøysundet at Broneset (58°28'N 8°49'E), has a vertical clearance (see 1.9) of 34 m over a width of 100 m in the middle of the fairway, marked in the centre by two green lights disposed vertically. None of the bridge pillars are in the water.

Deepest and longest berth

3.59

- 1 Barbukaiaen (58°27'·6N 8°46'·4E) (3.84).

Mean tidal levels

3.60

- 1 The tidal range is very small but meteorological conditions can lead to large changes in water level. Mean spring range is about 0·2 m and mean neap range about 0·1 m. For further information see *Admiralty Tide Tables Volume 2*.

Density of water

3.61

- 1 1·025 g/cm³.

Maximum size of vessel handled

3.62

- 1 The maximum size handled is 50 000 tonnes.

Arrival information

Port radio

3.63

- 1 A radio telephone is manned in the Harbour Office. For details see *Admiralty List of Radio Signals Volume 6 (2)*.

Notice of ETA

3.64

- 1 Notice of ETA required is at least 24 hours.

Outer anchorages

3.65

- 1 **Revesand.** The bay to the S of Revesand (58°26'·3N 8°48'·2E) affords good anchorage for vessels up to 10 000 dwt, anywhere in the bay clear of a submarine pipeline and a submarine cable (1.69) as shown on the chart. The holding ground is good, on sand and clay, and mooring rings are available around the shore.
- 2 **Buøya** (58°30'·6N 8°53'·8E) affords anchorage in a bay off its E side, in a depth of 34 m with good holding on clay. The swinging room is limited by a shoal, Stølene and a submarine pipeline laid across the fjord close NE, as shown on the chart, and vessels may need to be moored. This anchorage is used for vessels waiting to berth at Eydehavn (58°29'·8N 8°52'·7E) (3.88).

Pilotage and tugs

3.66

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and for other details see *Admiralty List of Radio Signals Volume 6 (2)*.
- 2 The pilot boards about 7 cables SE of Torungen Light in position 58°23'·5N 8°48'·6E, from the Arendal lifeboat, which is used as the pilot boat.
- 3 **Tugs** are available.

Regulations concerning entry

3.67

- 1 **Military prohibited area.** Certain areas, generally within 50 m of the shore, are prohibited to navigation around Hisøy (58°26'N 8°46'E). See 1.79 for further information.
- 2 **Speed caution.** Powered vessels shall, within the harbour district, not exceed speeds required for good seamanship and the vessel's manoeuvrability. Under no circumstances must speed be so great as to create wash which may cause damage or danger to other vessels or installations in the harbour.
- 3 **Speed limits** are 6 kn for deep-sea vessels and 12 kn for pleasure craft in Galtesund from a point N of Sandvigodden Light (3.77) and in Tromøysundet as far ENE as Tromøybrua (3.58).
Within the inner harbour (3.69), W of Tromøy and N of Hisøy, the operational limit is 6 kn for all vessels and craft.
- 4 The speed limit is 4 kn in three main coves on the NW shore of Tromøysundet, namely, Kittelsbukta (58°27'·4N 8°45'·7E), Pollen, 2½ cables ENE, and Songekilen (58°28'·2N 8°48'·0E).
- 5 **Seaplanes.** The above regulations do not apply to seaplanes when landing or taking off. Where possible, landings shall be reported before hand to the Harbour Master.

Quarantine

3.68

- 1 The quarantine anchorage is N of Store Skotholmen in position 58°27'·2N 8°46'·9E. Rings are available on the shore for stern mooring.

Harbour

General layout of harbour

3.69

- 1 The inner harbour of Arendal Havn lies within a line joining Tangen (58°27'·3N 8°46'·2E) to Skilsøpynten, 4 cables NE, and thence to Flyndra (58°27'·8N 8°47'·0E), and extends 9 cables SW from Tangen to the head of Skarvedalsbukta.
- 2 The main berths (3.84) are situated on the NW shore of the inner harbour along the waterfront at Arendal. The main anchorages (3.83) are close ENE and WSW of the town.

Seaplane area

3.70

- 1 Tromøysundet is used by seaplanes for landing and take off.

Hazards

3.71

- 1 A number of ferry routes cross the harbour and its approaches.

Natural conditions

3.72

- 1 **Wind.** The prevailing wind blows from the SW.
Flow. Nidelva, a river which enters the sound WSW of Arendal, causes a permanent ENE flow through the harbour which is strongest during the melting of snow in spring and after heavy rainfall. The rate, which is fairly strong NW of Hisøy, decreases ENE and is not particularly troublesome to the E of Pussnespynten (58°27'·6N 8°47'·3E).
- 2 **Ice.** The harbour and the channels of Galtesundet and Tromøysundet easily freeze in the winter. The ice thickness

depends on the proximity to the shore. In mid-channel it is normally less than 10 cm but on rare occasions it can be up to 30 cm, which happened in 2003. The harbour is kept open by icebreakers if necessary.

- 3 The Harbour Inspector for Arendal reported that in the 1940s and 1960s, when ice conditions were particularly severe, it was common to have thick ice in the inner channels making it possible to travel by car over the ice up to Lyngør, 25 km NE of the port.

Directions for approaching Arendal from south-east, with entry through Galtesund (continued from 3.20)

Principal marks

3.73

Landmarks:

- 1 Disused lighthouse (58°24'·7N 8°47'·5E) on Lille Torungen (3.13).
Tromøy Church (58°27'N 8°52'E), a white building with high dark roof but no tower, which is particularly prominent from the E.

Major light:

Torungen Light (58°23'·9N 8°47'·4E) (3.13).

Other aid to navigation

3.74

Racon:

- 1 Torungen Light (58°24'N 8°47'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Charts 3515, 3152

Approach from south-east

3.75

- 1 From the vicinity of 58°22'N 8°54'E, a white sector (297°–316°) of Lille Torungen Light (white lantern on tripod, 6 m in height) (58°24'·6N 8°47'·6E), which stands near the SE end of Lille Torungen (3.13), leads NW for nearly 4 miles, passing (with positions relative to the light):
- 2 Through the pilot boarding station (1¼ miles SSE), thence:



Arendal – Approach from SE (3.73)

(Original dated 2000)

(Photograph – T.S. Plews)

NE of Skånegrunnene (8 cables SSE), over which the sea breaks only in rough weather, thence:

NE of Hågåsgrunnen (4 cables SSE).

- 3 When Lille Torungen Light is distant 4 cables, the track leads NNW, passing (with positions relative to Lille Torungen Light):

WSW of Langrumpa (3 cables SE) the W extremity of a shoal extending 4 cables WSW from Makrellbåen, marked by a spar buoy (starboard hand), thence:

ENE of the bank fringing Lille Torungen.

- 4 Thence from a position 2 cables ENE of Lille Torungen Light the track is altered to NW for 5 cables, passing (with positions relative to the light):

NE, distant 1 cable from the NE side of Lille Torungen, and:

- 5 SW of Kankene (3 cables N), a group of shoals which are marked on their SW extremity by a spar buoy (starboard hand). An iron perch marks a rock 2 cables NE of the buoy.

3.76

- 1 When clear of Kankene, a white sector (344°–001°) of Sandvigodden Light (58°26'N 8°47'E) (3.77) leads N in the fairway for about 1 mile, passing (with positions relative to the light):

- 2 E of a reef extending 1 cable E and SE from Havsåya (1 mile SSW). A rock on the SE side of the reef is marked by an iron perch. Thence:

W of Merdø (8 cables SSE) on the W extremity of which stands Merdø Light (white lantern), thence:

- 3 W of Småholmane (6 cables SSE), on the N islet of which stands a wooden beacon (black and white). A similar beacon stands on the S side of Skudeholmen (6 cables SE) which lies close ENE of Småholmane. Thence:

- 4 W of Håholmen (2½ cables SE) off the W extremity of which stands Håholmbåen Light (lantern on tripod, 12 m in height).

Entering harbour through Galtesund

3.77

- 1 From a position W of Håholmen the track leads N into Galtesund then generally NNW for about 2 miles in mid-channel through the sound, passing (with positions relative to Sandvigodden Light):

E of the bank extending ½ cable E from Sandvigodden, from which a light (white lantern on base, 17 m in height) is exhibited, thence:

- 2 WSW of Pinneholmane (7 cables N) and the many dangerous rocks which extend up to 1½ cables NW and SE from it, thence:

Between Lille Skottholmen Light (post) (8½ cables N), which stands on the SW extremity of the island, and Galten Light (post) (8½ cables NNW), which stands on a rock close NE of the islets of Galten, thence:

- 3 WSW of a 10 m patch (1 mile N) which is the least depth over an elongated and unmarked shoal extending 1 cable SSE, thence:

WSW of Skilsøybåane (1¼ miles N) a chain of submerged rocks which lie up to 1¼ cables off the coast and are marked on their W extremity by an iron perch. Two islets, Knubben and Flateskjær, lie within the chain. And:

- 4 Over or clear of Arendalsbåen (1¼ miles NNW) which lies 1 cable NE of Tangen, the W entrance

point at the N end of Galtesund. A 2.5 m patch, close E of Tangen, is marked by a spar buoy (port hand).

Passage directions for approaching Arendal from east–north–east and entering through Tromøysundet

Charts 3508, 3152

Route

3.78

- 1 The principal approach to Tromøysundet is from the ENE through Bondedybet which passes between shoals in the vicinity of Bonden Light (58°31'N 8°59'E). This channel is easy to make, is straight and has no dangers in the fairway.

- 2 Tromøysundet (3.53), which is entered NW of Gitmartangen, 1¼ miles WSW of Bonden Light, provides a secondary approach route to Arendal Havn (58°28'N 8°46'E) (3.55). This channel has a width of only 1 cable in parts of its NE end but the dangers generally lie close inshore. The direction of buoyage in Tromøysundet is from SW to NE and therefore opposes an entry from NE.

- 3 If bound for Arendal it is also necessary to pass under Tromøybrua (58°28'N 8°49'E), with limitations as given at 3.58. The SW part of Tromøysundet, above the bridge, is clear of dangers in the fairway.

Directions for the approach from east–north–east

3.79

- 1 **Gitmartangen Leading Lights:**

Front light (white lantern on tripod, 3 m in height) (58°30'.7N 8°56'.9E) exhibited from the NE extremity of the point.

- 2 Rear light (white lantern, 3 m in height) (1¼ cables from the front light). The rear light shows only from 233° to 243° and is intensified on the leading line.

From the vicinity of 58°33'N 9°04'E the alignment (237½°) of these lights leads WSW for about 3 miles, passing (with positions relative to the front light):

- 3 SSE of Kirkegrunnen (¾ miles NE), two shoals which lie off the outer edge of an extensive foul ground, thence:

NNW of the reef extending 3 cables NNE from Molen (1¼ miles ENE) marked at its N end by a spar buoy (N cardinal), and:

- 4 SSE of Kalvøybrotta (2 miles NE) an extensive reef which is awash in places, thence:

SSE of Saltbåen (1½ miles NE), which lies 2 cables NNW of Bonden and is marked by a spar buoy (port hand), thence:

- 5 NNW of Bonden Light (white lantern on tripod) (1¼ miles ENE) which lies close within the NW edge of an extensive shoal. A beacon (yellow tower) stands close to the light.

Useful marks:

- 6 Sandskjæra Beacon (black truncated pyramid with white stripe, 3 m in height) (58°33'.8N 9°02'.0E), standing on a rock with an elevation of 4 m.
- Ytre Møkkalasset Beacon (red iron tower with white band, 17 m in height) (58°32'.4N 9°00'.2E) which is a disused lighthouse.

3.80

- 1 After passing Bonden the track is adjusted to continue WSW for about 1¼ miles towards and through the E entrance to Tromøysundet, within a white sector

(068°–075°) astern, of Bonden Light, passing (with positions relative to the light):

- 2 SSE of Vestre Romlingsbåen (4½ cables W) which is awash and marked by an iron perch, thence: NNW of Østre Svartskjær (8 cables SW) an above-water reef on the W side of an extensive shoal, thence:
- 3 NNW of Almebåen (1 mile WSW) which lies near the centre of the entrance, and: SSE of the foul ground extending 3 cables E from Skinnfelltangen (1¼ miles WSW), the N entrance point of Tromøysundet on which stands Skinnfelltangen Light (white lantern, 3 m in height).

4 **Useful mark:**

Søre Måkeholmen Beacon (black tower), (7 cables W), standing on the S of a group of islets.

Directions for Tromøysundet from north-east

3.81

- 1 When Bonden Light is distant 1½ miles (astern) the line of bearing, 239°, of Frisøya Light (white lantern on base, 6 m in height) (58°29'6N 8°52'4E) which stands on the E extremity of Frisøya, leads WSW for 2¼ miles, along a dividing line between a red and white sector, passing (with positions relative to the light):
- 2 Between Kvitebergsbåen (1¼ miles ENE), which extends from the NW side of the fairway and is marked by an iron perch, and the shoals fringing the SE side of the channel in the vicinity of Kjörvigpynten Light (lantern on post, 5 m in height), thence:
- 3 Close NW of Åmdalsøyra (2 cables E), a group of rocks with less than 2 m over them which lie close off the SE shore; they are marked by an iron perch.

3.82

- 1 After passing Åmdalsøyra the track leads in mid-channel, past Frisøya Light and into a white sector (049°–053°), astern, of that light which leads SW for about 1 mile passing close NW of a 4.0 m rock, 9 cables SW of the light.
- 2 When Frisøya Light is distant 1¼ miles (astern) a white sector (219°–227½°) of Tromøysundet Light (white lantern, 3 m in height) (58°28'2N 8°49'4E), which stands on the S side of Tromøybrua (3.58) at Broneset, leads SW for about 7 cables.

When Tromøysundet Light is distant 2 cables the track can be adjusted to pass under the central section of the bridge, into the outer harbour.

Anchorage and berths

Anchorage

3.83

- 1 Anchorage is available anywhere in the harbour outside the main channel, clear of submarine pipelines and submarine cables (1.69), as shown on the chart. The holding ground is good, on clay and mud, and rings are available on the shore for stern mooring. The main anchorages for larger vessels are:
- 2 NE of Pussnespynten (58°27'6N 8°47'3E) in depths from 23 to 25 m.
NW of Nordodden (58°27'3N 8°45'9E) in a depth of 22 m.

Alongside berths

3.84

- 1 **Inner harbour.** The largest berth is Barbukaaien (58°27'6N 8°46'4E) which has a length of 230 m with depths from 9.4 to 15.7 m alongside. This berth is adjacent to the Harbour and Customs offices.

There are 26 other berths and it is reported that Ro–Ro and container berths are being developed.

- 2 **Vindholmen** (58°28'1N 8°48'3E). The largest berth, Rygene Norway, has a length of 86 m with depths from 6.7 to 8.6 m alongside.

Steinbukta. 2 cables SSW of Sandvigodden Light (58°26'N 8°47'E), contains a fuelling berth with a length of 80 m and depths from 10.9 to 12.9 m alongside.

Port services

Repairs

3.85

- 1 Repairs to both engines and hulls can be undertaken. The longest slipway, which lies on the N side of Hisøy, can accommodate vessels with a length of 40 m, width of 4.5 m, and draught of 2.5 m. The deepest slipway, which is at Tangen, can accommodate vessels with a length of 20 m, width of 5.5 m and draught of 6 m. There are four other slipways.
- 2 The shipyard at Vindholmen (3.84), which contains a berth with a length of 85 m, depth of 6.2 m alongside and a 100 tonne crane, is used in the construction of offshore components.

Other facilities

3.86

- 1 Deratting exemption certificates issued; medical facilities are good; oily waste reception facilities available by barge.

Supplies

3.87

- 1 **Fuel.** Larger vessels can obtain fuel alongside at Steinbukta (3.84). Small quantities can also be obtained from a tank installation in Østerbukta (58°28'3N 8°49'1E). A further installation at Trolleues (58°28'7N 8°49'8E) can accommodate vessels of 2000 dwt.
- 2 **Water** is available alongside at all Harbour Authority berths.

Provisions and ship's stores, including charts, can be obtained in the town.

Eydehavn

General information

3.88

- 1 The port of Eydehavn (58°29'8N 8°52'7E) is situated inside the NW shore of Tromøysundet, about 2½ miles from the E entrance. There is a smelting works which exports silicon carbide. The largest berth is Eksportkai which has a length of 176 m with depths from 5.2 to 9.5 m alongside. There are three other berths. Two vessels, totalling 7360 dwt, visited the port in 1998.

ARENDAL TO LYNØR

General information

Chart 3508

Routes

3.89

- 1 **Coastal route.** From a position 4 miles ESE of Torungen Light (58°23'9N 8°47'4E), off the entrance to

Arendal, the coastal route continues NE for about 20 miles, in deep water outside the 200 m depth contour, to a position 6 miles ESE of Lyngør Light (58°38'N 9°09'E).

Tanker route is given at 3.2.

- 2 **Inner passage.** This passage, used mainly by coasters and small craft, links Arendal with Lyngør and a number of small harbours, passing through inner channels which are sheltered by Tromøy and the Skjærgården (1.3) except off the coast of Flostaøya, in the vicinity of 58°31'N 8°58'E, where the route is more exposed and the channel is somewhat foul.

Topography 3.90

- 1 This part of the coast, which is generally low and well wooded with even, gentle contours, contains a number of hillocks. Inland, mountain peaks rise which can be seen up to 35 miles offshore.
- 2 The coastline is generally bold and rugged with short fjords and inlets which penetrate the coast up to 5½ miles. The Skjærgården, which lies between 2 and 3 miles off the coast, consists of low, grey islands which are bare and without vegetation.
- 3 Identification of good natural landmarks is difficult, as the large number of islets and skerries off the coast merge with the background. However, a number of navigation marks have been erected so that orientation should present no difficulty in good visibility.

Hazards 3.91

- 1 **Fishing** See 3.5.
Visibility and flow. Onshore winds, which influence the current (3.92), are often accompanied by fog, mist and rain. Mariners are advised against navigating near the coast in poor visibility.

Natural conditions 3.92

- 1 **Currents** generally set SW off this stretch of coast but, during onshore winds the resultant flow sets towards the land around Tromøya.
Climate. There is a meteorological station at Lyngør (58°38'N 9°08'E). For climatic table see 1.229 and 1.233.

Directions (continued from 3.20)

Principal marks 3.93

- 1 **Landmarks:**
Torungen Lighthouse (58°23'·9N 8°47'·4E) (3.13).
Disused lighthouse (58°24'·7N 8°47'·5E) on Lille Torungen (3.13).
Tromøy Church (58°27'N 8°52'E) (3.73).

Other aid to navigation 3.94

- 1 **Racon:**
Torungen Lighthouse (58°24'N 8°48'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Arendal to Bonden 3.95

- 1 From the vicinity of 58°22'N 8°54'E, about 4 miles ESE of Torungen Light, the coastal route continues NE for about 10 miles, passing (with positions relative to Bonden Light (58°31'N 8°59'E)):

- 2 SE of Markopskjæra (6¾ miles SW), a group of above-water rocks, thence:
SE of Spornesskjæra (5½ miles SW), above-water rocks on the SW end of a reef, thence:
SE of Tallaken (4¾ miles SW), which is marked on its W side by a buoy (starboard hand), thence:
3 SE of the chain of shoals, with a least depth of 3·7 m over them, which extend 7 cables SW from Brenningene (3¾ miles SW). Brenningene consists of a rock awash on which stands a beacon (black truncated cone, 1·5 m in height); it is marked on its N side by a buoy (starboard hand). Thence:
4 SE of Rossbåen (2 miles SSW) which is marked by an iron perch; it lies 3 cables E of Dybingsbåen which is marked by a spar buoy (starboard hand). Thence:
SE of Meleskjærbåen (1¼ miles SSW) which lies at the S end of a number of reefs and shoals which extend 2 miles ENE from Gitmartangen (1½ miles WSW) (3.79), thence:
SE of the shoal fringing Molen (4½ cables ESE) (3.79).

3.96

- 1 **Clearing marks:**
The alignment (242°) of the disused lighthouse (58°24'·7N 8°47'·5E) on Lille Torungen with Lauvåsen, 4½ miles WSW (3.13), clears SSE of all the shoals given above.
- 2 **Clearing line.** The line of bearing, 225°, of Torungen Lighthouse (3.13) open SE of Brenningene Beacon, clears SE of all the shoals lying NE of the beacon.
Useful marks in the vicinity of Bonden are given at 3.79.

(Directions for the approach to Arendal from ENE are given at 3.79)



Lyngør Light from S (3.97)

(Original dated prior to 2005)

(Photograph – Norwegian Hydrographic Service)

Bonden to Lyngør 3.97

- 1 From the vicinity of 58°29'N 9°06'E, about 4 miles SE of Bonden Light, the coastal route continues NE for about 10 miles, passing (with positions relative to Lyngør Light (58°38'N 9°09'E)):
- 2 SE of Torskebåen (centred 3 miles SW), a narrow shoal which lies off the coastal bank and extends 4½ miles NE from its SW end. The sea breaks over it in many places during a heavy swell. Thence:
- 3 SE of the numerous shoals, including those of Vestre Bøsse and Kvartensbåen, which lie up to 7 cables

off the SE side of Lyngør (4 cables SW); Vestre Bøsse and Kvartensbåen are marked by buoys (port hand).

The track then leads to a position about 6 miles ESE of Lyngør Light (white stone house with tower, 17 m in height), which is exhibited from the S point of Kjeholmen.

4 Clearing marks:

The alignment (224°) of Brenningene Beacon (58°28'6N 8°55'8E) (3.95) with Torungen Light (58°23'9N 8°47'6E) (3.13) clears SE of Torskebåen.

5 Useful marks:

Ytre Møkkalasset Beacon (58°32'4N 9°00'2E) (3.79).
Fiskeskjær Beacon (black cairn, with white patches on its S, E and N sides) (58°37'3N 9°08'1E).
(Directions continue for the coastal route to Langesundsfjorden at 3.115)

Inner passage

Charts 3152, 3508

Arendal to Oksefjorden

3.98

- 1 From Arendal Havn (58°28'N 8°46'E) the Inner Passage leads through Tromøysundet, reversing the directions given at 3.80, until Bonden Light (58°31'N 8°59'E) is distant 9 cables. Thence the track lies along the NE alignment, (222°) astern, of Gitmartangen Leading Lights:

Front light as given at 3.79.

- 2 Rear light (wooden hut, 3 m in height) (1¼ cables from the front light).

This alignment leads NE in the channel for 1¼ miles, passing (with positions relative to Bonden Light):

SE of Søre Måkeholmen (7 cables W) (3.80), thence:
NW of Romlingsbåene (4 cables W), two rocks awash, marked by iron perches.

- 3 Thence the track is adjusted to pass NW of the 222° alignment to avoid a rocky shoal (4½ cables NW). When clear of the shoal the alignment is regained and leads NE, passing:

Close SE of Raudsteinbåen (6 cables NNW), a shoal which is marked by a spar buoy (port hand).

3.99

- 1 From a position 7½ cables N of Bonden Light, the alignment (018°) of Tverrdalsøy Light (white lantern on tripod) (58°33'4N 9°00'1E) which stands on Holmesundsodden, with Oksefjorden Light (white lantern, 3 m in height), 3 cables NNE, leads NNE in the channel for about 1 mile, passing (with positions relative to the front light):

- 2 ESE of Renneskjær (1¼ miles SSW), an above-water rock from which a light (lantern on cairn, 10 m in height) is exhibited, thence:

WNW of Kalvøybrotta (1¼ miles S) (3.79), and:

Close ESE of Teistholmbåen (8 cables SSW) which is marked by an iron perch, thence:

ESE of Kilsund Light (4½ cables SW) (3.106).

- 3 After passing Kilsund Light the track leads generally NNE for 6 cables, passing ESE of Tverrdalsøy Light (above) to join the alignment (220°), astern, of Tverrdalsøy Light with Kilsund Light, 4½ cables SW, which leads NE for about 1 mile, across the entrance to Oksefjorden towards Havefjorden.

Chart 3508

Oksefjorden to Lyngørfjorden

3.100

- 1 From the vicinity of 58°34'2N 9°01'4E the white sector (002°-014°) of Havefjorden Light (white lantern) (58°35'N 9°02'E) leads into Hagefjorden, passing close W of an 8 m patch, 5 cables S of the light. A N track in mid-channel clears this patch, then, after passing the light, continues NNE for about 1 mile through the fjord which is clear in mid-channel and almost free from dangers.
- 2 From the N end of Hagefjorden, the dividing line (011°) of the red and green sectors of Jesøyskjær Light (white lantern) (58°36'3N 9°02'6E) leads NNE in the fairway to within 1½ cables of the light.
- 3 From a position close E of Jesøyskjær Light the track leads NE to achieve the alignment (214°), astern, of Jesøyskjær Light with Bjørka Beacon (prominent black tower with a white stripe and an elevation of 61 m), 1¼ miles SSW, which then leads NNE for 6 cables passing WNW of the reef which lies 5½ cables NNE of the light.
- 4 When clear of this reef the track leads NE for 1 mile through a narrow passage between Ruholmen (58°37'2N 9°04'2E), on which stands a light (white lantern), and the spar buoy (starboard hand) ¾ cable WSW of Østre Lyktene; into Lyngørfjorden.

Lyngørfjorden

3.101

- 1 From a position NE of Ruholmen the track through Lyngørfjorden leads close to the SE side of Engholmen, 3 cables NNE of Ruholmen, then continues in mid-channel for about 1¼ miles towards and through the narrows between Hellersøybåen (58°38'2N 9°06'5E), marked by a spar buoy (port hand), and a 10 m patch, 1 cable SSE, which lies near the NW side of Steinsøya.
- 2 From a position 2 cables ENE of Brenningsholmen Light (white lantern) (58°38'4N 9°07'2E), the alignment (252°), astern, of this light with Tøkersfjell Light (white lantern), 3½ cables WSW, leads ENE through Østregapet for about 2 miles, passing clear of an unmarked 5 m shoal, 1 mile ENE of the front light.
- 3 When Brenningsholmen Light is distant 2¼ miles the track is altered to 059° along the line of bearing, 239°, astern, of the cleft in Eikelandsheia (58°34'6N 8°57'1E) just open SE of the houses on the SE side of Steinsøya (58°38'N 9°08'E).
- 4 This track leads ENE for about 2 miles, passing between Åkvågbåen (58°39'6N 9°12'1E) and Persknatt (3.117). The track then leads out into open waters close SE of Fiebåen (58°40'N 9°14'E).

Tvedestrand and approaches

General information

3.102

- 1 **Description.** Tvedestrand (58°37'N 8°57'E) lies at the head of Oksefjorden, about 6 miles from the open sea. There are metal and textile factories in the town and timber is shipped from the port. Tvedestrand had a population of 2000 in 2004.

Harbour limits. Tvedestrand Harbour District Limit extends from 2½ miles NE of Bonden Light (58°31'N 8°59'E) to the seaward end of Østregapet, 8 miles NE.

Port Authority. Tvedestrand Havnvesen, N-4900 Tvedestrand, Norway.

Limiting conditions**3.103**

- 1 **Tidal levels.** The tidal range is small, but meteorological conditions can lead to large changes in water level.
Ice. The fjord usually freezes in the winter.

Arrival information**3.104**

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*.

Harbour**3.105**

- 1 **Flow.** The flow through Oksefjorden in summer usually sets N in the forenoon and S in the afternoon; in winter it sets constantly S except during E gales. The S-going flow is more to be depended on than the N-going flow, especially in autumn and spring.

Directions**3.106**

- 1 From the vicinity of 58°31'·7N 9°01'·7E, a white sector (316½°–321°) of Kilsund Light (white lantern) (58°33'N 8°59'E) leads NW for 1½ miles, passing (with positions relative to the light):
 NE of Håvikbåen (1 mile SSE), thence:
 NE of Steinmolen (9 cables SSE), thence:
 2 SW of Ytre Langvikbåen (8 cables SE), marked by a spar buoy (starboard hand), thence:
 NE of Ytre Møkkalasset (7 cables SSE) (3.79), thence:
 SW of Indre Langvikbåen (6 cables SE), marked by a spar buoy (starboard hand), thence:
 3 NE of Fjorbåen, a 7·0 m patch (5 cables SSE).
 When Kilsund Light is distant 2 cables the track is altered to 018° along the leading line given at 3.99 and follows the track of the Inner Passage for about 9 cables, to the entrance to Oksefjorden.
 4 From the vicinity of 58°33'·7N 9°00'·6E, the track leads NW into a white sector (156°–157°), astern, of Oksefjorden Light (3.99) which then leads NNW for about 1 mile through the narrowest part of the channel between Tverrdalsøya (58°34'·3N 8°59'·6E) and the W extremity of Borøya, 1½ cables E. Thence continue in mid-channel, as most of the dangers are close to the sides of the fjord.
 5 From a position 1¼ cable W of Saltnes (58°35'·4N 8°58'·6E) a white sector (351°–355°) of Sagesund Light (white lantern) (58°36'·3N 8°58'·0E) leads N for 4½ cables, passing (with positions relative to the light):
 6 W of an islet (7½ cables SSE) and of Knutsvikbåen, a 2 m shoal, ½ cable NNW of the islet, which is marked by a spar buoy (starboard hand), thence:
 Close E of a point at the foot of Nuen (5½ cables S) which is a steep hill, thence:
 E of Nuholmen (5 cables S) a small islet, close N of the point.

3.107

- 1 When clear of Nuholmen, the wider of two channels leads WSW for 6 cables within a white sector (247°–252°) of Furøysund Light (white lantern) (58°35'·7N 8°57'·0E) which stands on a small islet, passing (with positions relative to the light):

- 2 SSE of Furøybåen (2½ cables ENE) which lies close to the S side of Furøya and is marked by a spar buoy (starboard hand).
 3 When clear of Furøybåen the track leads WNW, for about 2½ cables, passing (with positions relative to Furøya Light):
 NNE of a reef extending from Tvibolten (1 cable NNE), an above-water rock. This reef is marked by a spar buoy (port hand), thence:
 SSW of a rock awash (1¼ cables N) which is marked by an iron perch.
 4 When clear of the rock awash, the track is altered to NNW and follows the line indicated on the chart; or, at night, in the white sector (158°–170°), astern, of Furøysund Light, which leads through the fairway for about 1 mile passing W of Furøya and of Fjerdingskjærene, 7½ cables N of the light, to a position off the entrance to Tvedestrand Havn.

Berths**3.108**

- 1 **Anchorage** can be obtained in the outer harbour in a depth of 14 m, on good holding ground, with stern moorings.
 2 **Alongside berths.** The largest berth is at Kommune kaien, on the SW side of the cove, which has a length of 73 m and depths from 7·4 to 8·6 m alongside. The SE part of this berth is used by fishing vessels. There are nine other berths in the cove with depths from 0·3 to 11·0 m alongside.

Port services**3.109**

- 1 **Facilities.** Doctors are available locally; the nearest hospital is at Arendal (3.86).
Supplies. Fuel, water, provisions and charts can be obtained.

Lyngør Havn and approaches**General information****3.110**

- 1 **Harbour.** Lyngør Havn (58°38'N 9°08'E), which is narrow and landlocked, is safe in all weathers. This harbour previously served a paper mill.
Speed limit is 5 kn within the harbour and its approaches.
 2 **Vertical clearance.** An overhead cable, with a vertical clearance of 24 m, crosses the SW part of the harbour. For further information on clearances see 1.9.
Directions. The best of four approach channels is from SE through Fiskeskjærgapet (58°37'·3N 9°08'·0E), which leads close SW of Fiskeskjær Beacon (3.97) then between Askerøya and Lyngøya.
 3 **Anchorage**, which is available on sand and clay, clear of submarine cables (1.69), should only be used with the addition of stern mooring rings, as the channel is narrow.
Berths. The largest berth has a length of 14 m with depths from 7·9 to 9·1 m alongside. There are three other berths.
Facilities. Repairs can be carried out and provisions are available.

LYNGØR TO LANGESUNDSBUKTA

General information

Charts 3508, 3507, 3502

Routes

3.111

- 1 **Coastal route.** From a position 6 miles ESE of Lyngør Light (58°38'N 9°09'E), the coastal route continues NE for about 20 miles, in deep water outside the 100 m depth contour, to the vicinity of 58°50'N 9°50'E, 7 miles SW of Tvistein Light (58°56'·2N 9°56'·4E).

Tanker route. See 3.2.

- 2 **Inner passage.** Between Lyngør and Langesundsbukta, 25 miles NE, the inner passage is less clearly defined, as the coast is exposed for considerable stretches, except in the vicinity of Jomfruland (58°51'N 9°35'E) where the island affords protection from the sea.

Topography

3.112

- 1 The coast between Lyngør and the entrance to Langesundsfjorden is generally low, indented by many fjords and covered with hillocks. The Skjærgården (1.3) is less evident along this part of the coast, as mentioned above.
- 2 Jomfruland stands out clearly from the mainland although is low and flat. This island has a grey stone slope at its SW end and the NE part is wooded. Jomfruland Light stands near the centre of the island.

Rescue

3.113

- 1 Life-boats are stationed at Risør (58°43'N 9°15'E) and Kragerø (58°52'N 9°25'E). See 1.128 for further information.

Flow

3.114

- 1 Currents set W to WSW off Langesundsfjorden and SW off the remainder of the coast, as shown at 1.178. However, between Jærnestangen (58°45'N 9°22'E) and Portør, 4 miles NE, the resultant flow often sets strongly towards the coast, especially before and during SE gales.

Directions

(continued from 3.97)

Principal marks

3.115

- 1 **Landmark:**
Jomfruland Lighthouse (tower, 31 m in height) (58°52'N 9°36'E).
- 2 **Major light:**
Jomfruland Light — above.

Other aids to navigation

3.116

- 1 **Racons:**
Knubbehausen Light (58°49'N 9°29'E).
Tvistein Light (58°56'N 9°56'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Lyngør to Knubbehausen

3.117

- 1 From the vicinity of 58°36'N 9°20'E, 6 miles ESE of Lyngør Light (3.97), the coastal route continues NE for about 11 miles, passing (with positions relative to Stangholmen Light (58°42'·6N 9°14'·6E)):

- 2 SE of Persknatt (3½ miles SSW) which, with a least depth of 14 m over it, lies 6 cables S of Store Sildskjær Beacon (black tower), thence:
SE of Steingrunnberget, a shoal which lies 1½ miles SE of Stangholmen Light (3.129). This shoal breaks only in an extremely heavy sea. Thence:
- 3 SE of Vardøybåene and Toppebåene (2¾ and 3¼ miles ENE, respectively) each of which has a least depth of 10 m over it, thence:
SE of Gjersbåene (4½ miles ENE), a group of submerged rocks which are marked by a spar buoy (port hand) on their SE side and by two spar buoys (starboard hand) on their N and W sides, thence:
- 4 SE of Taraldsbåen (6 miles NE), an underwater rock with a least depth over it of 8 m, thence:
SE of Portørhausen (7½ miles NE), a rock in the middle of a narrow bank which lies from 1 to 1¼ miles off the coast. This coast is exposed and dangerous with foul ground extending up to 6 cables offshore.
- 5 The track then leads to a position about 5 miles SSE of Knubbehausen Light (6½ miles NE) (3.137).

Useful mark:

Strømtangen Light (58°50'·2N 9°27'·9E) (3.137)
(Directions continue for the SE approach to Kragerø at 3.137)

Knubbehausen to Langesundsbukta

3.118

- 1 From the position about 5 miles SSE of Knubbehausen Light (58°49'N 9°29'E), the coastal route continues NE for about 10 miles, passing (with positions relative to Jomfruland Light (58°52'N 9°36'E)):
SE of Knubbehausen (4½ miles SW) (3.137), forming the SW part of Jomfrulandsrevet, thence:
- 2 SE of the fringing reef and shallow bank extending up to 5 cables from Jomfruland (3.112) on which stands Jomfruland Light (3.115). Djupodden Lighthouse (white lantern on base) (6½ cables SW) stands near the middle of the island and Jomfruland Beacon (black wooden structure with a white stripe on its SE and SW sides, 12 m in height) stands near the SW end of the island. Thence:
- 3 SE of Svea (1¼ miles NE) a rocky shoal which is marked at its NE end by a spar buoy (port hand), thence:
SE of Rislebåen (2¾ miles NE) which lies 7 cables ESE of Mostein, a prominent whitish rock resembling a hayrick, which lies close off the SE end of Stråholmen, a low, flat island.
- 4 The track then leads to the vicinity of 58°50'N 9°50'E, 7 miles SW of Tvistein Light (58°56'·2N 9°56'·4E).
(Directions continue, for Langesundsfjorden and Grenland Harbour at 3.164 and for the coastal route ENE at 4.17)

Inner passage

Principal marks

3.119

- 1 **Landmark:**
Jomfruland Lighthouse (58°52'N 9°36'E) (3.115).
- Major light:**
Jomfruland Light — above.

Other aids to navigation

3.120

1 Racons:

Knubbehausen Light (58°49'N 9°29'E).

Tvistein Light (58°56'N 9°56'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Lyngør to Kragerøfjorden

3.121

- 1 From the vicinity of 58°40'N 9°15'E the inner passage continues NE across exposed waters for about 11 miles, passing SE of Risør Havn (58°43'N 9°15'E) (3.125), to the vicinity of Jomfrulandsrevet Light-buoy (58°48'N 9°30'E), at the entrance to the SE channel leading to Kragerø (3.133).

Jomfrulandsrenna

3.122

- 1 **General information.** Jomfrulandsrenna (58°51'N 9°34'E), a narrow, winding channel between Jomfruland and the mass of islands extending NW from it, has a least depth of 6 m and, though it is well marked, local knowledge is required.
- 2 The flow in Jomfrulandsrenna changes with wind direction and, as a rule, sets NE with a W wind and SW with an E wind. The SW flow is usually the strongest which can achieve a rate of 3 kn, especially when E winds begin suddenly.
- 3 Anchorage within the channel is limited by many submarine cables (1.69).

3.123

- 1 **Directions for approach from south-west.** From a position 5 cables NNW of Jomfrulandsrevet Light-buoy, the Inner Passage continues generally NE, passing (with positions relative to Djupodden Light (58°51'N 9°34'9E)):
- 2 Between Knubbehausen (4 miles SW) (3.137) to the SE, and Stangbåen (4 miles SW) (3.137) to the NW, thence:
SE of Rødskjærbåen, which, with depths of less than 8 m, extends 7½ cables SSW from Vestre Naus Beacon (white truncated pyramid, black stripe) (3 miles SW), and:
- 3 NW of Måkhølmhausen (¾ miles SW), which lies at the SW end of a spit extending ¼ miles SW from Jomfruland and is marked off its SW side by a spar buoy (S cardinal), thence:
SE of Søre Hausen (3 miles SW), a shoal which is marked by a spar buoy (port hand), thence:
- 4 Over or clear of Staddebåen (2 miles SW), an unmarked shoal which lies in the middle of the fairway, thence:
SE of Pilkehellene (1¾ miles SW), which are awash and marked by an iron perch. Between these rocks and Søre Hausen there are many other dangers, the positions of which can best be seen on the chart. Thence:
- 5 SE of Håbåane (1¼ miles SW), three groups of rocks marked by iron perches and by two spar buoys (starboard hand). The buoys mark a secondary channel which passes between the groups of rocks. Thence:
ESE of Midtfjordskjær (1 mile WSW), which is awash, thence:
- 6 Through Baake (5 cables W), a narrow channel which leads ENE, passing between Hurumbåane, which extend up to 4 cables W from Jomfruland and are

marked on their NW edge by an iron perch (6 cables WSW), and Stangholmen (5 cables W), a group of rocks marked by a beacon (white), thence:

- SE of Ellevbåen (¾ cables NW), which dries and is marked by an iron perch, thence:
- 7 NW of Hagenbåen (4 cables N), which is marked by a spar buoy (starboard hand), thence:
E of Dambåen (6 cables N), which has a depth of 2.5 m over it and is marked by a spar buoy (port hand), thence:
W of Beverskjær (1 mile NNE), which are marked off their W side by a spar buoy (starboard hand), thence:
- 8 SE of Østre Midtfjordskjærbåen, with a depth of 2 m or less over it (1¼ miles N) and is marked by a spar buoy (port hand). A beacon (black tower) stands on a rock 1 cable SW of the shoal. And:
NW of Eikeskogbåen (1¼ miles ENE) a shoal marked by a spar buoy (isolated danger), thence:
- 9 Between shallow patches (2 miles NNE), with a least charted depth of 4.0 m, thence:
SE of Arøybrottet (2¼ miles NNE), which dries and is marked by two iron perches. Arøybåen 1½ cables N of the patch, has a depth of 2 m or less over it and is marked on its E side by a spar buoy (port hand).

Jomfrulandsrenna to Langesundsbukta

3.124

- 1 When clear of Arøybåen (58°53'8N 9°36'2E) the track continues NNE for about 1 mile, then NE for about 2½ miles, passing (with positions relative to Rødskjær Beacon (58°56'N 9°41'E)):
- 2 Between Askholmene (2 miles SW), a chain of islets and rocks which extend 1 mile SW from Flesa, on which stands a beacon (white tower with a black stripe), and foul ground extending 4 cables NNE from Danmark (1¾ miles SW). Danmarksbåen, with a depth of 2 m or less over it, situated 2 cables W of the S end of Danmark, is marked by a spar buoy (starboard hand). Thence:
- 3 NW of Flesbåen (1 mile SW), which dries and is marked by an iron beacon, thence:
SE of Bjørnøybåen (5 cables W), a shoal marked by a spar buoy (port hand), thence:
NW of Rødskjær, an above-water reef on which stands a beacon (black truncated cone with two white crosses), thence:
- 4 SE of the banks and foul ground extending up to 2½ cables SE and E from Rauen (5 cables N), which are two islets on the NW side of Rødskjærrenna. The SE extremity of the banks is marked by a spar buoy (port hand). And:
NW of Rødskjærbåen (4 cables NNE), which is marked by a spar buoy (starboard hand).
- 5 When clear of Rødskjærrenna, a white sector (033°–037°) of Langøytangen Light (58°59'5N 9°45'7E) (3.164), leads in the fairway towards Langesundsfjorden passing over or clear of the SE edge of Ivarhausane, 2¾ miles SW of the light.

Risør Havn

General information

3.125

- 1 **Position and function.** Risør Havn (58°43'N 9°15'E) is situated on the E end of a promontory which separates

Sandnesfjorden, to the S, from Søndeledfjorden, to the N. Despite being close to the open sea, the harbour is well sheltered by a number of small islands but is exposed to storms from the S.

- 2 The port caters for local industries which are dominated by engineering but also include shipbuilding, the manufacture of confectionery and woodpulp production. There are also fish-handling facilities. The town of Risør, which stands around the harbour, had a population of about 4500 in 2004.

- 3 **Topography.** The timber houses in the old part of the town are nearly all painted white.

Sandnesfjorden (58°42'N 9°10'E), a narrow fjord which has moderate depths and steep, wooded sides, extends 5 miles inland from the sea.

- 4 Søndeledfjorden (58°44'N 9°11'E) is a deep fjord with high wooded shores, about 5 miles in length and 1 mile in width, divided into two narrow arms, Nordfjorden and Sørfjorden, by the island of Barmen.

Port limits. Risør Harbour District extends from the seaward end of Østregapet (58°39'N 9°11'E) to Taraldsbåen, 8½ miles NE.

- 5 **Approach and entry.** Risør Havn can be approached from either the S through Stangholmgapet (58°42'·5N 9°14'·8E), which has a least width of ½ cable, or from E through Grønholmgapet (58°44'·6N 9°19'·5E), a narrow and tortuous channel for which local knowledge is required. Leading lights towards the harbour are provided only for Stangholmgapet and it is for this route that directions are given in the text.

- 6 **Port Authority.** The harbour is administered by Risør Havneskontor, N 4950, Risør, Norway.

Limiting conditions

3.126

- 1 **Water levels.** While the tide is hardly noticeable, meteorological conditions can lead to large changes in water level.

Density of water. 1.025 g/cm³.

- 2 **Maximum size of vessel handled** was 10 000 dwt with a draught of 8.5 m. The limiting draught for vessels entering through Stangholmgapet is 8 m.

Ice. The harbour is free of ice, except in very hard winters.

- 3 **Sea state.** The main channel into Risør through Stangholmgapet is unsafe during S gales, when the sea sometimes breaks right across the narrow channel.

Arrival information

3.127

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and for other details see *Admiralty List of Radio Signals Volume 6* (2). The pilots are stationed at Langesund (3.153).

- 2 **Speed limits** are 7 kn in the S and SE approaches, inside Stangholmen (58°42'·5N 9°14'·50E), and 5 kn in the inner harbour (3.128).

Quarantine. Vessels under quarantine anchor in Kranfjorden (58°43'·7N 9°13'·3E) (3.128).

Harbour

3.128

- 1 **General layout.** The complex is made-up of an inner harbour, within the small bay at the E end of the peninsula; an outer harbour, between the inner harbour and the offshore islands; and Kranfjorden, a larger bay 7½ cables

NW of the inner harbour. The port area consists of berths around the inner harbour and along the S side of Kranfjorden. The fish quay is at the head of the inner harbour.

Directions for approach and entry from south

3.129

- 1 **Approach from south.** From the vicinity of 58°40'N 9°17'E, in the approaches to Stangholmgapet (3.125), a white sector (322°–349°) of Stangholmen Light (white lantern, concrete base) (58°42'·6N 9°14'·6E), which stands on the NE point of the islet, leads NNW for 2¼ miles, passing (with positions relative to the light):

- 2 ENE of Fiebåen (2½ miles S), which is marked by a spar buoy (port hand), thence:

WSW of Steingrunnberget (1½ miles SE) (3.117), thence:

- 3 ENE of Høybåen (1¼ miles S), which is marked on its E side by a spar buoy (port hand). This shoal is the E of foul ground extending 6½ cables E from Høybåtangen (58°41'·3N 9°13'·7E), the S entrance point of Sandnesfjorden, thence:

- 4 ENE of Taraldsskjærrumpa (8 cables S), with a least depth of 10 m over it. A spar buoy (port hand), 2 cables W of the shoal, marks Fjordbåen. Thence: ENE of Taraldskjær (6 cables S), which is partly awash and marked 1½ cables WSW by a spar buoy (starboard hand).

- 5 **Useful marks:**

Risørflekken (58°43'·3N 9°14'·4E), a large white chalk patch on a rock face which can be seen from S.

Store Furuøya Light (white lantern, 3 m in height) (1 mile SW).

3.130

- 1 **Entry from south.** When Stangholmen Light is distant 5 cables, the alignment (352°) of Risør Havn Leading Lights (white lanterns on posts) (58°43'·4N 9°14'·4E), leads N for about 1 mile, passing (with positions relative to the front light):

- 2 Close W of Stangholmstein (9½ cables S), marked by a spar buoy (starboard hand), which lies at the S end of a chain of rocks, and:

E of Stangholmen, which is the preferred side of the channel, thence:

Close E of a rock, with a depth of 5 m over it (7 cables S), and:

- 3 W of the reef fringing Enga (7 cables SSE), thence: E of Flisebåen, a rock awash marked by an iron perch (5 cables SSW), and:

W of the reef fringing Skibholmen (4½ cables SSE).

Anchorage and berths

3.131

- 1 **Anchorage** is available in depths of up to 45 m, with good holding ground, in the outer harbour which is exposed to storms from the S. Anchorage should be clear of submarine cables and pipelines as shown on the chart.

- 2 **Alongside berths.** Dampskipbrygga, at the S end of the harbour, contains the largest berth which has a length 112 m and depths from 5.1 to 7.3 m alongside. There are 19 other berths around the inner harbour.

- 3 Kranfjorden contains a concrete quay on its S side, which has a length of 125 m and depths from 9.5 to 12.5 m alongside.

Port services

3.132

- 1 **Repairs.** Engine and hull repairs can be undertaken. The largest slipway is able to accommodate vessels with a length of 25 m, beam of 5 m and draught of 3.2 m. There is one other slipway.

Other facilities. There are doctors locally.

Supplies: fuel from road tanker; water alongside the main berths; provisions available in town; chart agent.

Kragerø and approaches

General information

3.133

- 1 **Position and function.** Kragerø (58°52'N 9°25'E), a well sheltered harbour on the W side of Bærøfjorden, is located about 4 miles from the open sea. In addition to fish, the port handles general cargo and timber. Local industries include mineral excavation, timber and woodpulp production.

- 2 The town of Kragerø is the centre of the Kragerø Council District; in 2004 the district had a population of about 10 500, of which half lived in the town of Kragerø.

Port limits. Kragerø Harbour District seaward limit extends from Taraldsbåen (58°46'N 9°24'E) to Ranhausen, 15 miles NE; the area includes Jomfruland and the many fjords NW of the line.

- 3 **Approach and entry.** The best and most used of several approach channels is from SE through Stanggapet (58°48'8N 9°28'8E), with entry through Kragerøfjorden (58°51'N 9°27'E), which lies between Skåtøy and the mainland.

- 4 The narrowest and shallowest part of Stanggapet can be avoided by passing E of Stangbåen, close E of Stanggapet, and approaching through Rødskjærgapet (58°49'N 9°30'E). This route contains no lights, though parts of the channel are buoyed.

- 5 **Traffic.** In 2004 the port was used by 181 vessels with a total of 610 000 dwt.

Port Authority:

Address. Board of Harbour Commissioners, PO Box 158, N-3770 Kragerø, Norway.

Email. post@kragero-havnevesen.no.

Limiting conditions

3.134

- 1 **Controlling depth.** It is reported that the least depth in the approach to the main berths at Kragerø is 12.5 m (58°52'0N 9°25'5E). It was also reported that Stanggapet was suitable for vessels with a maximum draught of 7.5 m; however, Rødskjærgapet has a least charted depth of 12 m.

- 2 **Deepest and longest berths** (3.140).

Water levels. Tidal range in the harbour is small; meteorological conditions have the greatest influence on water levels. West winds increase levels and E winds reduce them. The highest recorded storm level is 142 cm above mean water.

- 3 **Density.** 1.025 g/cm³.

Maximum size of vessel handled is 26 000 dwt, in ballast.

Ice can occur in severe winters, but the harbour is seldom blocked entirely. If necessary icebreakers keep the fairways open.

Arrival information

3.135

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and for other details see *Admiralty List of Radio Signals Volume 6* (2).

Tug assistance is available given 24 hours notice.

- 2 **Local knowledge** is required for all approaches and entry to Kragerø.

Speed limit is 5 kn in the inner harbour (58°51'9N 9°24'7E) (3.136).

Quarantine anchorage is in Vennevikbukta (58°51'4N 9°27'0E), in a depth of 15 m. Swinging room is limited but mooring rings are available. Local knowledge is required.

Harbour

3.136

- 1 **General layout.** The harbour is in two parts. The outer harbour which lies to the N of Øya (58°52'N 9°25'E) and contains the main anchorage and berthing areas. The inner harbour, which lies between the mainland and the islands of Øya and Gunnarsholmen, ½ cable WSW, caters for smaller vessels.

- 2 **Flow.** The flow generally sets out of the fjord but wind conditions can cause a shift in direction. The rate, which is often very strong in the main approach channel from the SSE, is usually strongest when Strømtangen Light (58°50'2N 9°27'9E) (3.137) is abeam.

River water creates a strong E flow in Kilsfjorden, to the N of Tatøy (58°51'N 9°24'E). To the S of Tatøy the E flow is much weaker and meteorological conditions can create a W flow.



Strømtangen Light from SE (3.137)

(Original dated prior to 2005)

(Photograph – Norwegian Hydrographic Service)

Directions

(continued from 3.117)

3.137

- 1 **Major light:**

Jomfruland Light (58°52'N 9°36'E) (3.115).

Other aid to navigation:

Racon transmitted from Knubbehausen Light (58°49'N 9°29'E). For details see *Admiralty List of Radio Signals Volume 2*.

- 2 **Approach from south-east.** Kragerøfjorden Leading Lights:

Front. Strømtangen Light (white wooden hut, 9 m in height) (58°50'2N 9°27'9E).

Rear. Stavseng Light (white tower on white wooden house, 17 m in height) (9 cables NNW).

- 3 From the vicinity of 58°44'N 9°32'E, 5 miles SSE of Knubbehausen Light (58°49'N 9°29'E), the alignment (340°) of the leading lights leads NNW for 5¼ miles, passing (with positions relative to the front light):

WSW of Knubbehausen (2 miles SSE) which is marked by a buoy (S cardinal) 4 cables SSW of the shoal and by a spar buoy (starboard hand) on both its N side and NW extremity, which consists of a 7 m patch. Knubbehausen forms the SW part of Jomfrulandsrevet. Thence:

- 4 Through the narrows of Stanggapet (3.133) which are bordered to the W, by Storbrottet (1½ miles SSE), a reef partly awash which is marked on its E side by Knubbehausen Light (white lantern, 14 m in height), and to the E, by Stangbåen, ½ cable E of Knubbehausen Light, which is marked on its S side by a spar buoy (starboard hand). There is a 7 m patch close to the W edge of this shoal and, when nearing Knubbehausen Light, the alignment should be kept open to the WSW by a small amount to clear this patch.

3.138

- 1 **Entering Kragerøfjorden.** When clear of Stanggapet a white sector (169°–181°) of Knubbehausen Light, astern, leads generally N in the fairway for about 1 mile, passing (with positions relative to the light):

- 2 E of Stangskjær (4 cables NNW), a reef partly awash which is marked on its NE side by a spar buoy (port hand). A beacon (black truncated cone with a mast and black triangular topmark, 3 m in height) stands on the W side of the reef. And:

W of Fjordbåen (4 cables N), a reef partly awash, marked by a spar buoy (starboard hand). A beacon (black truncated cone) stands near the middle of this reef. Thence:

- 3 W of the foul ground and bank extending from Rødskjær (8 cables NNE), thence:

E of the foul ground (1¼ miles NNW) which extends up to a cable offshore to the SSE of Strømtangen.

Useful mark:

Vestre Naus Beacon (1¼ miles NE) (3.123).

3.139

- 1 **Kragerøfjorden.** When Knubbehausen Light is distant 1¼ miles, a white sector (311½°–318°) of Buttebåen Light (white lantern on tripod) (58°51'5N 9°25'7E) leads NW in the fairway for about 2 miles, clear of all dangers which lie within 1 cable of the shore.

- 2 When Buttebåen Light is distant 3½ cables, a white sector (110°–118½°), astern, of Stavseng Light, leads WNW for 5 cables, passing between Buttebåen Light and Hamnebåen, a shoal 3 cables WSW of the light, which is marked by a spar buoy (isolated danger).

- 3 **Approach to Outer Harbour.** From a position E of Buttebåen Light, a white sector (353°–029°) of Galeiodden or Kragerø Light (white lantern on tripod) (58°52'0N 9°25'4E) which stands on the E extremity of Øya, leads N towards Bærøfjorden and the main berthing areas, passing W of Barbaraskjæret, an islet marked on its W side by a buoy (starboard hand). The track leads close E of the E end of Øya, SW of Galeioddbåene, a rocky patch marked by three buoys (cardinal), thence W to the berths, or NNW to Stillnestangen.

- 4 **Approach to Inner Harbour.** From a position E of Buttebåen Light, the track leads NW towards the W end of Øya, passing NE of Kragerøbåen, an unmarked shoal, 4 cables WNW of Buttebåen Light.

Anchorage and berths

3.140

- 1 **Anchorage** is available in Havnefjorden, 9 cables WSW of Kragerø Light, in a depth of 30 m, with good holding on stones and clay, clear of submarine cables (1.69).

- 2 **Alongside berths.** The longest berth, which is at Stillnestangen (58°52'5N 9°25'2E) at the N end of the harbour, has a length 129 m and depths from 3.7 to 10 m alongside. The deepest berth, which is at Jernbanekaaien, 4 cables SSW of Stillnestangen, has a length of 101 m and depths from 6.7 to 11.6 m alongside. There are 18 other berths for coasters and fishing vessels.

- 3 Ro–Ro facilities are reported to be available at the car ferry berth on Danskekaaien which has a length of 45 m and depths from 3 to 7 m alongside.

- 4 A berth at Malmhella, 7½ cables NNW of Kragerø Light, which has a length of 61 m and depths from 8.6 to 16.1 m alongside, is used for the export of hyperite.

Port services

3.141

- 1 **Repairs.** Engine and hull repairs can be undertaken. The largest slip has a length of 263 m, with a width of 28 m.

Other facilities: hospital; several doctors.

- 2 **Supplies.** Fuel can be obtained at Øya bridge and alongside other berths from road tankers, given 24 hours notice. Water is available at Jernbanekaaien; and provisions can be obtained in Kragerø where there is also a chart agent.

LANGESUNDSBUKTA AND LANGESUNDSFJORDEN

GENERAL INFORMATION

Introduction

Charts 3502, 1327

Area covered

3.142

- 1 This section covers the general area of Langesundsfjorden, a complex of fjords and channels which lie within 3 miles E and 10 miles NW of the town of Langesund (59°00'N 9°45'E), the whole of which is controlled as Grenland Harbour. Each of the inner fjords are named separately, as shown on the chart, however, the fjord charted as Langesundsfjorden (1996) in position 59°02'N 9°44'E is actually Brevikfjorden. These fjords

form the approach channels to the harbours and berths established within Grenland Harbour.

- 2 Langesundsbukta (58°58'N 9°46'E), which is the bay forming the approach to Langesundsfjorden, is also included in this section. The section is arranged as follows:

Approach and entry to Langesundsfjorden (3.160).

Brevik (3.185).

Brevik to Porsgrunn and Skein (3.204).

Porsgrunn (3.213).

Skein (3.239).

Harbours and berths

3.143

- 1 **Major harbours** (given in order from the entrance inwards):

Brevik (59°03'N 9°42'E) (3.185) situated near the head of Brevikfjorden, at the junction of three fjords.

Porsgrunn (59°08'N 9°39'E) (3.213) situated at the mouth of Skienselva.

Skien (59°12'N 9°37'E) (3.239) situated at the head of Skienselva.

- 2 **Major berths** (given in order from the entrance inwards):

Langesund (59°00'N 9°45'E) (3.174).

Asvall (59°01'7N 9°43'9E) (3.180), a fuelling berth.

Asdalstangen (59°05'0N 9°37'4E) (3.210), at a petrochemical plant.

Rafnes (59°06'N 9°36'E) (3.211) at a petrochemical industrial area.

Skien Harbour Terminal (59°07'3N 9°33'8E) (3.212).

Topography

3.144

- 1 Langesundsfjorden has an irregular shape, with an axis that is generally SE/NW. It is approximately 12 miles long and between 5 cables and 2½ miles wide. The entrance is divided by three large islands, Langøya, Geitrøya and Arøya, into four separate channels for navigation, one of which, Gamle Langesund, is almost blocked by shoals.

- 2 Tree covered hills rise above the rocky shore which surrounds the fjord.

Harbour limits

3.145

- 1 The seaward limit of Grenland Harbour (3.142) is a line drawn 3½ miles E from the N point of Sâstein (58°58'3N 9°42'5E) to the N point of Mølen.

Approach and entry

3.146

- 1 Langesundsfjorden is approached from the SSE and entered through Langesundsbukta (58°58'N 9°46'E). Within Grenland Harbour a local Traffic Separation Scheme has been established between Langesundsbukta and Brevik with two separate marked channels:

Dypingen Channel (59°00'N 9°47'E).

Kalven Channel (59°02'N 9°46'E).

- 2 Beyond Brevik, a narrow channel, Brevikstrømmen (59°03'N 9°42'E), leads into Frierfjorden (59°06'N 9°37'E) which gives access to Asdalstangen, Rafnes, Skein Harbour Terminal, Porsgrunn and thence Skien.

Port Authority

3.147

- 1 **Address.** Grenland Port Authority, Strømtagen, PO Box 20, N-3951, Brevik, Norway.

Website. www.port.of.grenland.com.

Email. ghv@grenland-havn.no.

Maximum size of vessel handled

3.148

- 1 The maximum size of vessels accepted for passage through the channels within Grenland Harbour are as follows:

Dypingen Channel: length 198.1 m; width 30.5 m; draught 10.4 m. The maximum width for vessels carrying a hazardous cargo is 27.4 m.

Kalven Channel: length 274.3 m; width 45.7 m; draught 14.2 m.

- 2 Brevikstrømmen: length 198.1 m; width 30.5 m; draught 9.9 m. The maximum width for vessels carrying a hazardous cargo is 27.4 m. Under

special circumstances, in daylight, the acceptable length may be extended to 213.4 m, width to 33.5 m and draught to 11.0 m for vessels which do not carry a hazardous cargo.

Vertical clearances

3.149

- 1 The vertical clearance under Brevik Bridge (59°03'0N 9°41'7E) is 45 m over a width of 100 m. Under E18 Grenland Bridge, 6 cables WNW of Brevik Bridge, the vertical clearance is also 45 m, with a similar clearance under the overhead cable close W of it. See also 1.9.

Port operations

3.150

- 1 Port operations are controlled by Grenland Traffic Centre at Brevik; for details see *Admiralty List of Radio Signals Volume 6* (2).

Vessel traffic service

3.151

- 1 A mandatory vessel traffic service (VTS) is in operation within Grenland Harbour for all vessels of 50 grt and over, for which clearance is required from the Grenland Traffic Centre for movement within the harbour. This system, which also involves monitoring a common VHF frequency and making position reports, is fully described in *Admiralty List of Radio Signals Volume 6* (2).

Notice of ETA

3.152

- 1 Notice of 24 hours is required for vessels carrying hazardous cargoes and specified tankers, as given in *Admiralty List of Radio Signals Volume 6* (2).

Clearance should be obtained for all vessels subject to VTS control at least 1 hour in advance of entry or departure.

Pilotage

3.153

- 1 Pilotage is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and for other details see *Admiralty List of Radio Signals Volume 6* (2).

The pilot boards in the vicinity of 58°56'6N 9°47'6E, 4½ miles W of Tvistein Light, from a fast sea cutter painted orange.

Tugs

3.154

- 1 Tugs are available at all times and must be used as given in the regulations for Grenland Harbour at Appendix II.

Regulations

3.155

- 1 **General traffic regulations** are given at 1.72 and for tankers at 1.83. As Langesundsfjorden lies wholly within Norwegian Territorial Waters the regulations given in Appendix I also apply.

- 2 **Grenland regulations.** In addition to the general traffic regulations (above), special Regulations for Navigating and Approaching the Maritime District of Grenland, as given in Appendix II, are in force.

Routes through Langesundsfjorden and in the approaches to ports within the area, as given in the appropriate directions, follow the specified lead or marked navigation routes given in the appendices.

Natural conditions

Flow

3.156

- 1 **General information** on flow, including use of the term “flow” in Norwegian publications, is given at 1.176. Detailed information on the flow in fjords is given at 1.181.

Within Langesundsfjorden generally, the flow varies with the amount of fresh water entering the fjord, the tides and the weather conditions at sea, with the fresh water input as the strongest influence.

- 2 **Depths and rate.** In the S part of Frierfjorden, 2 miles NW of Brevik, the predominant current is an outgoing surface layer, 2 to 3 m deep, of brackish water. Nearer the sea this layer is normally 1 to 2 m deep and there is usually an in-going weak flow beneath the brackish layer.

- 3 At flood times (1.182) there can be an outgoing flow of 3 to 4 kn at Brevikstrømmen (59°03'N 9°40'E), the narrow passage between Brevik and Stathelle. This consists of a surface layer 4 m deep that is worthy of particular attention. Off Langesund the corresponding flow reduces to 1 kn but can still be troublesome in the narrower sounds.

- 4 **Direction.** From the mouth of Skienselva (59°07'N 9°37'E) the outflow sets S towards Ringsholmane, 2 miles S, causing a back eddy along the NE shore of Frierfjorden. From Brevikstrømmen the flow sets towards Sandøya, 1 mile E, where it divides. One arm forms a large back-eddy in Eidangerfjorden (59°04'N 9°43'E), flowing N on the E shore and S on the W shore. The other arm sets SE along the axis of Brevikfjorden, towards Langøya and Geiterøya at its entrance, causing a back eddy which sets NW along the SW shore of the fjord.

Ice

3.157

- 1 The first ice in winter is formed where the current is least, in the waters E and NE of Brevik (59°03'N 9°42'E). In hard winters ice forms all the way out to Langesund and Fugløya (58°59'N 9°48'E); but usually it causes no difficulties in Langesund.

- 2 The heavy traffic to and from the ports of Langesund, Brevik, Porsgrunn and Skien is normally enough to keep the fairways open.

Dangerous waves

3.158

- 1 See 4.13 for the likelihood of dangerous waves in the approaches to Langesundsfjorden.

Local weather

3.159

- 1 If visibility is less than 1 mile the Traffic Centre will restrict the movement of vessels carrying hazardous cargoes.

APPROACH AND ENTRY TO LANGESUNDSFJORDEN

Chart 3520

Routes

3.160

- 1 **Approach.** From the vicinity of 58°50'N 9°50'E, 7 miles SW of Tvistein Light (58°56'2N 9°56'4E) the approach route leads generally NNW to the vicinity of 58°59'3N 9°47'5E, 6 cables SSW of Arøy Light.

Entry. On entering Grenland Harbour the route then divides to follow one of the two main channels, Dypingen

or Kalven. Both of these channels connect Langesundsbukta with Brevik (59°03'N 9°42'E).

- 2 Dypingen Channel (3.169) leads N through Dypingen (59°00'N 9°47'E), thence NNW through Kjørtingen Channel (59°00'5N 9°46'5E) into Brevikfjorden (59°02'N 9°44'E) which leads NW to Brevik.

- 3 Kalven Channel (3.170) leads E through Helgerofjorden (58°59'5N 9°49'0E) thence NW through Håøyfjorden (59°01'N 9°48'E) and Kalven, 1½ miles NNW (3.172), thence W through Kalvsundet (59°02'6N 9°44'5E) into Brevikfjorden.

Mean tidal levels

3.161

- 1 At Helgeroa (58°59'7N 9°51'5E) the mean spring range is about 0.3 m and the mean neap range about 0.1 m. For further information see *Admiralty Tide Tables Volume 2*.

Speed regulations

3.162

- 1 Within Brevikfjorden, between Figgeskjær Light (59°01'N 9°45'E) and Gjermundsholmen Light, 2¼ miles NNW, a limit of 8 kn is in force.

Through Brevikstrømmen, between Gjermundsholmen Light (59°02'8N 9°42'5E) and Flauodden Light, 1½ miles WNW, a limit of 5 kn is in force.

Prohibited area

3.163

- 1 Unauthorised approach is prohibited within 50 m of the coast in an area around Langøytangen (58°59'5N 9°45'7E).

Directions for the approach to Langesundsfjorden

(continued from 3.118)

Principal mark

3.164

- 1 **Landmark:**

Langøytangen Lighthouse (white tower, red top, 14 m in height) (58°59'5N 9°45'7E), situated on the S end of Langøy, is prominent in the entrance to Langesund which is also very distinctive.



Langøytangen Light from E (3.164)

(Original dated prior to 2005)

(Photograph – Norwegian Hydrographic Service)

Outer approach

3.165

- 1 From the vicinity of 58°50'N 9°50'E, 7 miles SW of Tvistein Light (58°56'2N 9°56'4E), a white sector

(339°–009°) of Langøytangen Light leads NNW for about 8 miles, passing (with positions relative to the light):

- ENE of Steinhausen (4 miles SW), a shoal at the E end of Steingrunden, which is marked by a pillar light–buoy (E cardinal), thence;
- 2 ENE of Ranhausen (3½ miles SSW) shoals, with a depth of 2 m or less over them which are marked on their N side by a spar buoy (starboard hand). Another shoal, with a depth of 9 m over it, lies 4 cables NE of Ranhausen and is marked on its N side by a spar buoy (starboard hand); this shoal lies near the NE extremity of Steingrunden which extends 1½ miles NE from Stråholmsteinen, a low islet on which stands a mast with a wooden daymark. And;
- 3 WSW of the pilot boarding station (3 miles SSE), thence;
- WSW of Sandværhausen (3 miles SE), thence;
- ENE of Såsteinsbåen (2½ miles SSW), which lies in the vicinity of the outer anchorage (3.182), and;
- WSW of Finsbåane (2½ miles SE), a group of rocks, some of which are awash, marked at their N and S ends by an iron perch.

3.166

- 1 **Clearing line.** The line of bearing, 322°, of the hill Esa Varde (3¼ miles WNW) well open NE of Mejulen (2¾ miles SW), a greyish islet which is easily identified by a white marble stripe between its summit and the waters edge on its W side, clears NE of Steingrunden.

- 2 **Clearing marks:**

The alignment (343°) of the W extremities of Fugløy and Arøy (1¼ miles ENE) clears WSW of Finsbåane.

(Directions for Langesund are given at 3.178)

Inner approach to main channels

3.167

- 1 When Langøytangen is distant 2 miles, a white sector (356°–021°) of Arøy Light (white lantern) (58°59′.9N 9°47′.6E), which stands near the E extremity of Arøya, leads NNE for about 2 miles, passing (with positions relative to the light):

Across the seaward limit of Grenland Harbour and through a way point of the Grenland VTS, thence:

- 2 WNW of Fugløya (1 mile SSE), an island that is steep–to on its seaward face and on the W side of which stands a radar scanner. Fugløyskjær Light (concrete column, 10 m in height) stands on a small islet close NNW of Fugløy.
- 3 The track then leads to the vicinity of 58°59′.3N 9°47′.5E, 6 cables SSW of Arøy Light.

(Directions continue, for Dypingen Channel at 3.168 and for Kalven Channel at 3.170)

Directions for the main channels leading to Brevik

Principal mark

3.168

- 1 **Landmark:**

Langøytangen Lighthouse (58°59′.5N 9°45′.7E) (3.164).

Dypingen Channel

3.169

- 1 **Dypingen.** From the vicinity of 58°59′.3N 9°47′.5E, a white sector (337¼°–340½°) of Kjørtingen SE Light (lantern on column, 19 m in height) (59°00′.5N 9°46′.6E) leads NNW along the W side of Dypingen for just over 1 mile.

- 2 **Kjørtingen Channel.** When Kjørtingen SE Light is distant ½ cable the track is altered to the NW through the narrow channel SW of Kjørtingen, a small islet surrounded by foul ground. This channel, which passes between Kjørtingen and Geitrøya, 1 cable SW, is marked on each of four corners by a light (lanterns on columns).

- 3 **Brevikfjorden.** When clear of Kjørtingen Channel, a white sector (134½°–137¾°), astern, of Kjørtingen NW Light leads NW for about 1½ miles, passing close SW of Råholmbåen, 6 cables NNW, which is marked by a light (lantern on column). It should be noted that the flow sets strongly towards Bjørkøya, 1¼ miles NNW.

- 4 When Kjørtingen NW Light is distant 1½ miles (astern), a white sector (153°–156¾°), astern, of Figgeskjær Light (white lantern on tripod) (59°01′N 9°45′E), which stands on a rock close off the W shore, leads NNW through the fairway for about 1¼ miles passing WSW of Bjørkøybåen, 1½ miles NNW, marked on its SW side by a spar buoy (starboard hand) and near its centre by a light (lantern on column, 16 m in height). The flow sets towards this rock.

(Directions continue for Brevik, Porsgrunn and Skien at 3.198)

Kalven Channel

(continued from 3.167)

3.170

- 1 **Helgerofjorden.** From the vicinity of 58°59′.3N 9°47′.5E, a white sector (078°–088°) of Åmlirogna Light (lantern on column) (58°59′.5N 9°50′.4E) leads E for about 1¼ miles, through Helgerofjorden, passing (with positions relative to the light):

- 2 S of Vestrebåen (1¼ miles W), a narrow spit marked by a spar buoy (S cardinal) 1 cable NNW of its extremity, thence:

N of Fugløyskadden (1 mile WSW), marked by a spar buoy (starboard hand), which lies ¾ cable NNW of Fugløyskjær Light (3.167), thence:

- 3 Over or clear of Klovsteinbåen, comprising of shoal patches with a least charted depth of 13 m (9 cables W) which lie in the fairway, and:

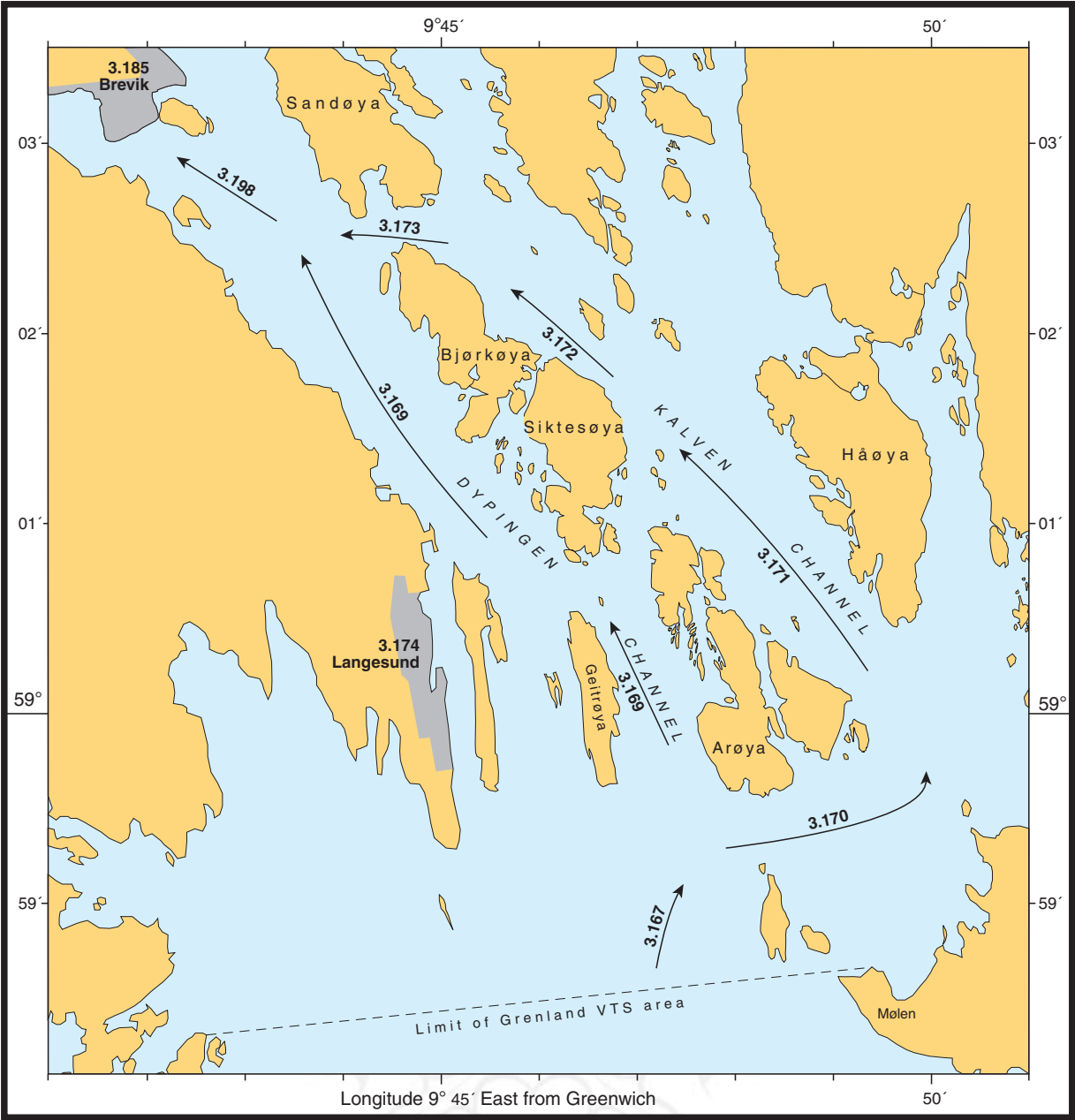
N of Kuongbåen (9 cables WSW) which dries and is marked on its N side by a spar buoy (starboard hand). A depth of 13 m is charted to the N of this buoy.

- 4 When Åmlirogna Light is distant 2 cables, the track leads about 2 cables NE, to a white sector (311°–342¾°) of Håøytangen Light (lantern on column) (59°00′.5N 9°49′.5E) which then leads NNW for about 7 cables, passing (with positions relative to the light):

ENE of Midtbåen (7½ cables SE). A white sector (149°–153°), astern, of Åmlirogna Light also passes ENE of this shoal. And:

- 5 ENE of Lammøyskjera (6 cables S), above–water rocks on a bank which extends SSW for 1½ cables to Lammøybåen, from which a light (lantern on column) is exhibited, thence:

ENE of Selskjerbåen (3 cables S) awash and marked by a light (lantern on column).



Grenland Harbour - main channels (3.160)

3.171

- 1 **Håøyfjorden.** When Håøytangen Light is distant 2½ cables, a line of bearing, 318°, of Vestre Brattholmen Light (lantern on column) (59°02'·0N 9°46'·6E) leads NW for 1½ miles within a white sector (311°–319¼°) of the light, passing (with positions relative to the light):

- 2 SW of Håøytangbåen (2¼ miles SE), which is awash and marked by an iron perch. A spar buoy (starboard hand) is moored ½ cable W of the rock. Thence:

NE of Dynabåen (1¾ miles SE), which lies 1 cable N of Dyna and is marked by an iron perch, thence:
Close SW of Narrholmbåen (1½ miles SE) which lies in the fairway.

3.172

- 1 **Kalven.** When Vestre Brattholmen Light is distant 8 cables, a white sector (307½°–311°) of Rødden Light (lantern on column) (59°02'·7N 9°44'·7E) leads NW through Kalven for about 1¾ miles, passing (with positions relative to the light):

- 2 Close SW of Halveisholmbåen (1¾ miles SE), and: NE of Francobåen (1¾ miles SE), a drying rock which lies at the N end of a chain of islets and is marked by an iron perch, thence:

NE of the bank fringing Siktesøya (1½ miles SE), and:

- 3 SW of a group of rocks, with a least depth of 5·4 m over them (1½ miles SE), thence:

- 3 SW of Vestre Brattholmen (1 mile SE) an island on the S extremity of which stands Vestre Brattholmen Light, thence:

Clear of Risesundoddbåen (1 mile SE) which lies in the fairway, thence:

SW of Kisteholmen (6½ cables ESE); a light (lantern on column) is exhibited from a rock close SW of this islet. Thence:

- 4 SW of Orebuktbåen (2¼ cables ESE), which is marked off its W side by a spar buoy (starboard hand).

3.173

- 1 **Kalvsundet.** When Rødden Light is distant 1½ cables the track is altered to the W for about 7 cables, passing (with positions relative to the light):

- 2 N of the bank which extends up to 1 cable NW from the NW extremity of Bjørkøya (2 cables SW), which is marked by Tangengrunnen Light–buoy (port hand) and on which stands Bjørkøya Light (lantern on column), thence:

- 3 N of Bjørkøybåen (5 cables WSW) (3.169).

Clearing sector. A white sector (065°–070½°), astern, of Rødden Light leads through the W entrance to Kalvsundet clear NNW of Bjørkøybåen.

(Directions continue for Brevik, Porsgrunn and Skien at 3.198)

Langesund

Charts 3502, 1327

General information**3.174**

- 1 **Position and function.** Langesund (59°00'N 9°45'E) stands on the W shore of Langesund Channel, at the SW entrance to Langesundsfjorden.

- 2 The town, with a population of about 4000 in 2005, contains a prawn factory, fish processing plant, engineering works for computer systems, and ship repair yards. The port handles container traffic, general cargo, petroleum and

other liquids in bulk. There is a passenger ferry service to Helgeroa (3.184), 3½ miles ESE.

- 3 **Topography.** The harbour of Langesund, about 1½ miles in length and with an average width of only 1¼ cables, lies between the island of Langøya, which is low and tree covered, and the mainland to the W. The town, with many old-style timber buildings fronted by the wharves of the port, lines the W shore of the sound.

- 4 **Approach and entry.** The direct approach is from the S through Langesundbukta with entry between Langøytangen (58°59'·5N 9°45'·7E) and the S point of Langesundstangen, 2¾ cables SW.

Approach can also be made through Dypingen Channel (59°00'N 9°47'E) (3.168) with entry between Figgeskjær (59°01'N 9°45'E) and the N extremity of Langøya, 1 cable SSE.

- 5 **Traffic.** In 2004 the port was used by eight vessels with a total of 34 904 dwt.

Limiting conditions**3.175**

- 1 **General remarks.** Limiting conditions for Langesundsfjorden, which are given at 3.148, generally apply to Langesund.

Longest berth is at the Norwegian Contractors Shipyard (59°00'·2N 9°45'·0E) (3.180).

Deepest berth is at the Harbour Terminal (3.180).

- 2 **Maximum size of vessel handled.** Vessels with draughts up to 9·1 m have been handled.

Ice is not usually a problem within the harbour area.

Arrival information**3.176**

- 1 **Pilotage.** See 3.153.

Tugs, which can be booked through the Harbour Office or through Brevik, are compulsory for some vessels as given in the regulations at Appendix II.

- 2 **Regulation concerning entry.** Within Langesund, between Langøytangen (58°59'·5N 9°45'·7E) and Figgeskjær Light, 1½ miles NNW, vessels must travel at reduced speed, not exceeding 5 kn.

- 3 **Quarantine.** Vessels under quarantine should be anchored to the N of Langesund Shipyard (59°00'·2N 9°45'·0E) with good holding in depths of 18 m and mooring rings available onshore.

Harbour**3.177**

- 1 **General layout.** Harbour facilities extend along the W side of the narrow channel between Langøya and the town of Langesund, with the exception of the fuelling wharf, which is at Asvall, 1 mile NNW of the harbour. There is direct access into the S entrance of the harbour from Langesundsbukta, and into the N entrance from Langesundsfjorden.

- 2 **Flow.** General description of the flow within Langesundsfjorden is given at 3.156.

Within Langesund the flow is usually outgoing.

Directions for entering harbour**3.178**

- 1 **Approach from south.** From a position N of the pilot boarding station (58°56'·6N 9°47'·6E) (3.153) the line of bearing, 334°, of Langesund Church (59°00'·1N 9°44'·9E), a white building with a slate roof and low slate spire, open SW of Langøytangen Light (3.164), 6½ cables SSE, leads NNW for about 3 miles, passing (with positions relative to the light):

- 2 Across the seaward limit of Grenland Harbour (3.145) and WSW of a way point of the Grenland VTS Area (1¼ miles SE) (3.151), thence:
ENE of the bank extending 1 cable ENE from Skjeregga (6 cables SSW), a small islet, thence:
- 3 WSW of Langøyskaten (2 cables SSE) which is marked by a spar buoy (starboard hand), thence:
In mid-channel between Langesundstangen (2½ cables SSW) and Langøytangen into the harbour. In addition to Langøytangen Light, a light is exhibited from an islet on the E shore of Langesundtangen.

3.179

- 1 **Approach from north.** Leading lights:
Front light (white lantern) exhibited from Kuskjeret (59°00'·6N 9°45'·0E).
Rear light (white lantern on column) (1½ cables SSW of front light).
- 2 From the vicinity of 59°01'·1N 9°45'·2E the alignment (194°) of these lights leads SSW into Langesund, passing between Figgeskjær Light (59°01'N 9°45'E) (3.169) and Langøyabben which, with a depth of 2 m or less over it, lies on the 10 m bank off the N point of Langøya and is marked by a spar buoy (starboard hand).

Anchorage and berths

3.180

- 1 **Anchorage.** Anchoring is permissible in the quarantine area (3.176) for vessels which have not been allocated an anchorage or mooring berth.
Alongside berths at Langesund. The longest berth, which is at Norwegian Contractors Shipyard (59°00'·2N 9°45'·0E), has a length of 163 m with depths from 3·9 to 6·4 m alongside.
- 2 The deepest berth, which is the N berth at the Harbour Terminal, 2 cables N of the shipyard, has a length of 80 m with depths from 6·4 to 7·3 m alongside. This berth has a cargo ramp for Ro-Ro installations.
There are 19 other berths in the port.
- 3 **Alongside berth at Asvall.** Asvall oil fuel berth (59°01'·7N 9°44'·0E), which has a length of 68 m with depths from 10·6 to 13·2 m alongside, supplies diesel and fresh water.

Port services

3.181

- 1 **Repairs.** Engine and hull repairs can be undertaken. The largest slip is at the shipyard (3.180), which is able to accommodate vessels up to 25 m in length with a width of 6·0 m and draught of 1·8 m.
- 2 **Other facilities:** local doctors; limited oily waste reception facilities.
Supplies: fuel alongside selected berths; fresh water at all berths; provisions and charts in the town.

Anchorage and minor harbours

Outer anchorage

3.182

- 1 Vessels may be anchored on Såsteinsflakket in the vicinity of 58°57'N 9°44'E, using the clearing line at 3.166. Approval should first be sought from Grenland Traffic Centre; the anchorage is reported to be exposed to wind and swell from the SW.

Helgerofjorden and Eidangerfjorden

3.183

- 1 **General remarks.** Within Grenland Harbour vessels may only be anchored when it is necessary and permission should first be obtained from Grenland Traffic Centre. For safety reasons the Traffic Centre may direct mariners to one of the following designated anchorages:
- 2 **Helgerofjorden:**
A. With Åmliroga Light (58°59'·5N 9°50'·3E) bearing 062°, 6 cables.
B. With Åmliroga Light bearing 046°, 4 cables.
Eidangerfjorden:
C. North of a line extending E/W from the S point of Ørviktangen (59°03'·8N 9°42'·1E).
- 3 Vessels may only be anchored outside these anchorages in order to avoid danger, informing the VTS. It should be noted that numerous cables and pipelines cross the fjords, the positions of which are best seen on the chart.

Helgeroa

3.184

- 1 **Description.** Helgeroa (58°59'·5N 9°52'·0E) is a summer resort, with a population of about 900 (1997), situated on the E side of the entrance to Langesundsfjorden. The harbour, protected by moles, has an entrance 30 m wide, with dredged depths from 2·5 to 3·0 m inside the entrance.
Anchorage can be obtained close W and 3 cables SW of the harbour.
- 2 **Berths.** The largest berth has a length 43 m with depths from 1·4 to 2·9 m alongside. There are a number of other quays and jetties for small craft in the harbour.
The ferry from Langesund berths on the S wall.

BREVIK

General information

Charts 3502, 1327

Position and function

3.185

- 1 Brevik (59°03'N 9°42'E), situated about 4½ miles from the open sea, lies partly on the island of Sylterøya and partly on the mainland, at the junction of Brevikfjorden with Eidangerfjorden.
- 2 The port, which includes facilities at Dalsbukta, 5 cables NNW, handles dry bulk and general cargoes. Local industries include the manufacture of cement, ice cream and tinware, as well as shipbuilding.
- 3 The population is about 2700 (1997); and the main organization of Grenland Harbour Board (3.151) is located in the town. A ferry service operates from the port.

Topography

3.186

- 1 General topography for Langesundsfjorden is given at 3.144.
Eidangerfjorden (59°05'N 9°43'E) is clear and comparatively wide. The E side of the fjord, which appears quite steep, is mainly clad with conifer trees interspersed with cabins.

Approach and entry

3.187

- 1 The port is approached through Langesundsfjorden by one of the main channels given at 3.160 and entered as given at 3.198.

Traffic**3.188**

- 1 In 2004 the port was used by 275 vessels with a total of 1 901 817 dwt.

Port Authority**3.189**

- 1 See 3.147.

Limiting conditions**Controlling size****3.190**

- 1 Controlling size in the approach through Langesundsfjorden is given at 3.148. Brevik is accessible to vessels with a length of 167 m and draught of 9.7 m, and to tankers with a length of 182 m and draught of 9.0 m.

Deepest and longest berths**3.191**

- 1 **Brevik.** The largest berth is alongside the Public Quay (59°03'·1N 9°41'·9E) (3.200).

Dalsbukta. The largest berth is alongside Bulk Quay (59°03'·8N 9°42'·1E) (3.200).

Tidal levels**3.192**

- 1 Tidal levels are given at 3.161.

Density of water**3.193**

- 1 The density of water, which is brackish, varies from 1.012 to 1.023 g/cm³.

Maximum size of vessel handled**3.194**

- 1 The largest vessel handled was 100 000 dwt in size.

Ice**3.195**

- 1 Ice conditions are generally good, apart from drift ice which flows through Brevikstrømmen. Ice breakers keep a channel open when necessary.

Arrival information**3.196**

- 1 See 3.150 to 3.155 for arrival information within Langesundsfjorden.

Harbour**General layout****3.197**

- 1 The port area extends along the SE shore of the peninsula containing Brevik. There are three main berthing areas in the harbour, as follows (with positions relative to Sylterøya Church (59°03'·1N 9°42'·3E)):

Dalsbukta (7 cables NNW).

Brevik public and commercial wharves (2 cables W).

Trosvika (5 cables WNW).

Each area can be accessed from deep water.

Directions

(continued from 3.169 and 3.173)

3.198

- 1 From the vicinity of 59°02'·5N 9°43'·5E, at the NW end of Brevikfjorden, a white sector (153°–156¾°), astern, of

Figgeskjær Light (59°01'N 9°45'E) leads NNW in deep water, passing (with positions relative to Gjermundsholmen (Gjermesholmen on Chart 3502) Light (59°02'·7N 9°42'·5E)):

WSW of Smakkebåen (6½ cables E), which are awash and marked by a light (lantern on post), thence:

- 2 ENE of the bank which, with charted depths of less than 10 m over it, extends over 2 cables SE from Gjermundsholmen Light (white lantern on tripod) which stands on the NE extremity of Croftholmen.
- 3 Thence as required for berthing at Brevik or Dalsbukta, keeping clear of Blokkhusbåen (2½ cables NNE) which lies off the SE end of Sylterøya.

(Directions continue for Porsgrunn and Skien at 3.207)

Anchorage and berths**Anchorage and mooring****3.199**

- 1 Mariners arriving at the harbour without an allocated anchorage or mooring can anchor in Brevikstrømmen clear of the channel and of submarine cables and a pipeline (1.69).

- 2 Small vessels can be anchored in Trosvika (59°03'·2N 9°41'·4E), to the SW of a mooring buoy established in the anchorage, as shown on the chart. Mooring rings, which have been set into the shore, can be used to limit the swinging circle.

Alongside berths**3.200**

- 1 **Brevik.** The largest berth is at the Public Quay (59°03'·1N 9°41'·9E) which has a length of 116 m with depths from 7.1 to 10.6 m alongside. There are 17 other berths, one of which, the ferry berth, close E of the Public Quay, has Ro–Ro facilities.

- 2 **Dalsbukta.** The largest berth is at the Bulk Quay (59°03'·8N 9°42'·1E), on the W side of Eidangerfjorden, which has a length 227 m with depths from 10.3 to 17.7 m alongside. There are six other berths in the vicinity, the N of which, at Orviktangen, has a Ro–Ro ramp with a width of 30 m and depths from 9.0 to 14.2 m.

- 3 **Trosvika:** The longest berth has a length of 100 m with depths from 4.6 to 5.6 m alongside. The deepest berth has a length of 31 m with depths from 7.6 to 17.6 m alongside.

Port services**Repairs****3.201**

- 1 All types of repairs can be carried out, including new buildings and alterations. The largest repair facility is at Trosvika, 3 cables NW of Brevik bridge, where there is a building slipway which can accommodate vessels with a length of 140 m and displacement of 15 000 tonnes.

Other facilities**3.202**

- 1 Medical facilities are available in Brevik, with a hospital in Porsgrunn, 5 miles NNW.

Supplies**3.203**

- 1 Fuel and fresh water at Dalsbukta; provisions, ship's stores and charts in Brevik.

BREVIK TO PORSGRUNN AND SKEIN

General information

Chart 3502

Route

3.204

- 1 From a position about 4 cables E of Gjermundsholmen Light (Gjermesholmen on Chart 3502) (59°02'·7N 9°42'·5E) the route from Brevik to Porsgrunn and Skein leads initially WNW for 2 miles through Brevikstrømmen and thence generally NNW, for a further 4 miles, through Frierfjorden to a position 4 cables SW of Torsberg Light (59°07'·4N 9°36'·4E).

Depths

3.205

- 1 Depths vary greatly in Brevikstrømmen and in the S approach to Frierfjorden with unmarked depths in the channel of 11 m in position 59°03'·4N 9°39'·3E and 1½ cables E. These depths may limit the draught of vessels in the approach to Porsgrunn and Skein.

Vertical clearances

3.206

- 1 See 3.149.

Directions

(continued from 3.198)

Brevikstrømmen

3.207

- 1 From the vicinity of 59°02'·8N 9°43'·3E, the track towards Porsgrunn leads WNW for about 1 mile towards and under Brevik Bridge where the centre of the 100 m wide navigable channel is marked by a green light on the bridge and the edges by red lights on both sides. This track passes (with positions relative to the centre of the bridge):
SSW of Blokkhusbåen (4½ cables E) (3.198), and:
NNE of the bank extending 1 cable N from Gjermundsholmen Light (4½ cables ESE) (3.198).
- 2 After passing the bridge and when clear, a green sector (284¼°–293¼°) of Flauodden Light (white lantern) (59°03'·4N 9°40'·0E) leads WNW for about 4 cables passing close NNE of Krabberødbåen, 6½ cables E of the light, which is awash and marked by a spar buoy (port hand). Krabberødbåen Light (concrete column) stands on a rock at the N end of the danger.
- 3 When Flauodden Light is distant 4 cables, a white sector (274½°–276°) of Midtfjordskjer Light (lantern on column) (59°03'·3N 9°39'·4E) leads W for about 4 cables, passing (with positions relative to the light):
- 4 N of Steinholmgrunnen Light–buoy (port hand) (6½ cables E), which marks the N extremity of a shoal extending 1 cable N from Steinholmen, thence:
Under E18 Grenland Bridge (6 cables E).
- 5 When Midtfjordskjer Light is distant 3 cables the track leads NW for about 5 cables, passing (with positions relative to the light):
SW of a rock awash (3 cables ENE) which lies close SW of Flauodden Light and is marked by an iron perch, and:
- 6 NE of the reef surrounding Midtfjordskjer (1½ cables SSE) and Midtfjordskjer Light, thence:
Over or clear of the limiting depths given at 3.205, which lie 1½ cables NNE and 1½ cables NNW of the light.

Frierfjorden

3.208

- 1 When clear, a white sector (159½°–165°), astern, of Midtfjordskjer Light leads NNW in the fairway for about 2 miles, passing (with positions relative to the light):
ENE of a 9 m patch (8½ cables NNW) which is marked by a spar buoy (port hand), thence:
WSW of Saltbuodden Light (white lantern on base) (1¾ miles NNW), thence:
- 2 WSW of Nautelandsbåen (2¼ miles N) which is marked on its N side by a spar buoy (starboard hand), thence:
ENE of the shoal surrounding Øvre Ringsholmen (2½ miles NNW). A light (concrete column) is exhibited from the N end of the islet.
- 3 After passing Øvre Ringsholmen, a white sector (335°–341°) of Torsberg Light (white lantern on base) (59°07'·4N 9°36'·4E) leads NNW for about 1½ miles, in clear water, until 5 cables from the light. From this position the track is altered to the W for about 4 cables to cross a red sector (341°–011°) of the light, into the adjoining white sector bearing more than 011°.
- 4 The track then leads 4 cables SW of Torsberg Light (59°07'·4N 9°36'·4E).

Useful mark:

Prominent chimney (59°05'·8N 9°35'·3E) which is topped by a flare.

(Directions continue for Porsgrunn at 3.233 and for Skien Harbour Terminal at 3.212)

Anchorages and harbours

Anchorages

3.209

- 1 **General remarks.** Vessels may only be anchored when it is necessary and permission should first be obtained from Grenland Traffic Centre. For safety reasons the Traffic Centre may direct mariners to one of the following designated anchorages:
- 2 **Frierflaket:**
 - D. With Øvre Ringsholmen Light (59°05'·5N 9°37'·4E) bearing 192°, 1.1 miles.
 - E. With Øvre Ringsholmen Light bearing 207°, 1.1 miles.
 - F. With Øvre Ringsholmen Light bearing 202°, 9 cables.
 - G. With Øvre Ringsholmen Light bearing 212°, 9 cables.
- 3
 - H. With Øvre Ringsholmen Light bearing 219°, 7 cables.
 - I. With Øvre Ringsholmen Light bearing 226°, 9 cables.
- Herrebukta:**
 - J. With Rafnes Quay No 3 (59°06'·2N 9°35'·4E) bearing 125°, 7 cables.
 - K. With Rafnes Quay No 3 bearing 125°, 4 cables.
- 4 Vessels may only be anchored outside these anchorages in order to avoid danger, informing the VTS. It should be noted that numerous cables and pipelines cross the fjords, the positions of which are best seen on the chart.

Asdalstangen

3.210

- 1 Berthing facilities have been constructed at Asdalstangen (59°05'·0N 9°37'·7E), on the SW shore of Frierfjorden, to serve a large petrochemical plant. Entry is restricted as given at 3.228.

- 2 The largest berth has a length of 83 m, extended by a mooring dolphin 30 m NW, with depths from 6.9 to 8.9 m alongside. A Ro-Ro ramp at the SE end of the berth has depths from 7.8 to 8.5 m alongside.

Rafnes

3.211

- 1 Berthing facilities at Rafnes (59°06'N 9°36'E), on the SW shore of Frierfjorden, serve a large petrochemical industrial area. Entry is restricted as given at 3.228 and outlet pipes are marked by spar light-buoys (special) in positions 4½ cables ESE and 5 cables NNE of the prominent chimney (3.208).
- 2 The largest berth, which has a length of 64 m, extended by mooring dolphins at both ends, with depths from 11.8 to 12.3 m alongside, is used for gas tankers. There are three other berths serving the same industrial area.

Skien Harbour Terminal

3.212

- 1 **Description.** Skien Harbour Terminal (59°07'·3N 9°33'·8E) is situated at Slevik on the N shore of the entrance to Volls fjorden.

The maximum size of vessel handled was 40 000 dwt with an LOA of 182 m, beam 25.9 m and draught of 9.9 m.

Vertical clearance. An overhead cable with a vertical clearance (see 1.9) of 37 m spans the entrance to Volls fjorden in the vicinity of Kjeøya (59°07'·2N 9°34'·0E).

- 2 **Directions** (*continued from 3.208*). From position 59°05'·7N 9°37'·8E the alignment (309°) of Lauvøyane Leading Lights (posts) (59°07'·3N 9°33'·8E), with the rear light 60 m NW of the front light, leads NW for 2½ miles towards the terminal berths in Volls fjorden, passing (with positions relative to the front light):

- 3 SW of Lagmannsbåen (7 cables SE) which is marked on its W side by a spar buoy (starboard hand). This rock lies ½ cable SW of Lagmannsskjeret, an above-water rock. Thence:

NE of the shoal extending 2 cables E from Flesketangbåen (5 cables SSE), a rock which is marked by a spar buoy (isolated danger), thence:

- 4 NE of Halvsundbåen (2¼ cables SE), a rock which is marked on its NW side by a spar buoy (port hand), and:

Close SW of Kjeøya (2 cables ESE) on which stands Kjeøya Light (lantern on post).

- 5 **Berths.** The largest of two quays has a length of 126 m and depths from 8.5 to 15.5 m alongside. A Ro-Ro ramp, with a width of 30 m and depths from 13.0 to 15.5 m, lies between the quays.

PORSGRUNN

General information

Charts 3502, 1327

Position and function

3.213

- 1 Porsgrunn (59°08'N 9°39'E), extends along the banks of Skienselva, at its lower end, for about 2½ miles. Herøya, 1 mile SW of Porsgrunn, stands on the NE shore of Frierfjorden.
- 2 The port, which includes Herøya, handles dry bulk, petroleum, other liquid bulk and general cargo. Local industries include engineering works, the manufacture of fertilisers, magnesium, electro-metals, plastics, ceramic

goods and porcelain. Porsgrunn with Herøya forms Norway's largest industrial complex.

- 3 The town of Porsgrunn, which a population of about 35 906, is the administrative centre for the large municipality of the same name.

Topography

3.214

- 1 General topography for Langesundsfjorden is given at 3.144. Frierfjorden (59°06'N 9°37'E), which has a length of about 5 miles, a width of between 5 cables and 1½ miles, and depths of less than 94 m, is surrounded by wooded hills.

- 2 Porsgrunn is generally low except for an area of tall industrial structures on Herøya which is built on flat land within the mouth of Skienselva. Topography along Skienselva is given at 3.240.

Port limits

3.215

- 1 The boundary between Porsgrunn and Skien is given at 3.241.

Approach and entry

3.216

- 1 The port is approached through Langesundsfjorden by one of the main channels given at 3.160. The route then continues through Brevikstrømmen (59°03'N 9°41'E) into Frierfjorden which leads to Herøya at its N end and to the mouth of Skienselva, for Porsgrunn.

Traffic

3.217

- 1 In 2004 the port was used by 1358 vessels with a total of 8 520 528 dwt.

Port Authority

3.218

- 1 See 3.147.

Limiting conditions

General remarks

3.219

- 1 Controlling size in the approach through Langesundsfjorden is given at 3.148.

Controlling depths

3.220

- 1 Controlling depths for Porsgrunn are as follows:
Torsbergrenna, the entrance channel to Skienselva, which extends from Torsberg (59°07'·4N 9°36'·4E) to Dypvannskaien, 4½ cables NE, is dredged to 10.5 m.
Above this point the river is dredged to 9.1 m as far as Kolatangsundet, 6 cables NE.

Vertical clearances

3.221

- 1 **Overhead cables.** There is a vertical clearance of 45 m under overhead cables which cross Skienselva at its lower end.

Klaffebru (59°08'·1N 9°37'·9E) is a bascule bridge crossing Skienselva 1 mile above its S entrance, with a vertical clearance of 13 m when closed.

- 2 **Porsgrunnsbrua** (59°08'·4N 9°38'·6E), the bascule bridge linking E and W Porsgrunn, has a navigable channel of 40 m and a vertical clearance of 6.5 m when closed. Bridge Control is fitted with radar and VHF radio as given at 3.228.

Density of water**3.222**

- 1 1.002 g/cm³.

Deepest and longest berths**3.223**

- 1 Herøya: Hovedkaien (Main Quay) (59°07'·0N 9°37'·7E) (3.234).
Porsgrunn: Dypvannskaien (Deep Water Quay) (59°07'·6N 9°37'·1E) (3.235).

Maximum size of vessel handled**3.224**

- 1 Largest vessel at Herøya was *Star Evviva* which is a bulk carrier of 49 000 dwt with a draught of 10.2 m.

Ice**3.225**

- 1 Frierfjorden is kept open by icebreakers in winter.

Arrival information**Port operations****3.226**

- 1 See 3.150 to 3.155 for arrival information within Langesundsfjorden.
Porsgrunn and Herøya Harbour Control both man port radio frequencies as given in *Admiralty List of Radio Signals Volume 6* (2).

Outer anchorages**3.227**

- 1 Mariners arriving at the harbour without an allocated anchorage or mooring place shall anchor without hindering other traffic until a place is allocated by the Harbour Authority. A roomy anchorage, with good holding ground, can be found on Frierflaket (59°07'N 9°38'E), but see 3.209 for designated anchorages.

Traffic regulations**3.228**

- 1 **Restricted areas**, in which unnecessary navigation is prohibited, are established off Asdalstangen (59°05'·0N 9°37'·7E) (3.210) and Rafnes (59°06'·N 9°36'E) (3.211), and off the Oil/Naphtha Quay at Herøya (59°07'N 9°38'E) (3.234).

Speed. A speed limit of 6 kn has been established in the river above Torsberg (59°07'·4N 9°36'·4E).

- 2 **Vessels meeting on Skienselva.** Vessels bound up-river should give way and not hinder vessels bound down-river.

Porsgrunnsbrua (3.221) which is manned day and night, can be contacted by VHF or by sound signals and lights. Mariners who have requested permission to pass the bridge shall maintain a listening watch until the bridge opening has been cleared:

- 3 VHF requests for passage of the bridge up-river must be made after passing Torsberg and when proceeding down-river after passing Borgestad (59°09'·7N 9°38'·5E). See *Admiralty List of Radio Signals Volume 6* (2) for details.

Sound signal requests from vessels not equipped with VHF radio are one long and two short blasts when proceeding up-river and one long and one short blast when proceeding down-river.

- 4 Light signals from the bridge are as follows: red light on the N bridgehead means the bridge is closed; green light on the N bridgehead means the bridge is clear for passage; red rotating light on a warehouse on Østre quay, 4 cables ENE of the N

bridgehead, means there are problems with the bascule arms and that ships proceeding down-river must not pass Østre quay until this light is extinguished.

Quarantine**3.229**

- 1 Vessels under quarantine should be anchored on Frierflaket, as given at 3.209.

Harbour**General layout****3.230**

- 1 The deepest berths are at Herøya, on the NE shore of Frierfjorden at the mouth of Skienselva.

A buoyed entrance channel leads through Skienselva to the berths in Porsgrunn Harbour which line both banks of the river for 1¼ miles from the entrance.

Anchorage can be obtained only outside the river.

Hazards**3.231**

- 1 There is considerable traffic in Skienselva. In addition to navigational buoys marking the channel, several mooring buoys are laid in Skienselva, especially in the vicinity of Borgestad (59°10'N 9°39'E).

Flow**3.232**

- 1 In Skienselva, the out-going flow at Porsgrunn is always strong, with rates of up to 3 kn. However, it is not equally strong everywhere in the river and is weaker above Porsgrunn, but is stronger, with a rate of 4 kn or more, at Gråten (59°11'·5N 9°37'·3E).

Eddies can be expected to form along the quays upstream of Porsgrunnsbrua.

Directions for entering harbour

(continued from 3.208)

3.233

- 1 From a position 4 cables SW of Torsberg Light the track leads NE within a white sector (011°–052°) of the light which leads into the buoyed channel of Skienselva which is also marked by light beacons.

Alongside berths**Herøya****3.234**

- 1 The longest berth is Hovedkaien (Main Quay) (59°07'·0N 9°37'·7E) which has a length of 560 m and depths from 9.6 to 13.6 m alongside.

- 2 The deepest berth is Olje-Nafta quay (Oil/Naphtha Quay), 3 cables SE of Main Quay, which has a length of 50 m, with a 35 m extension, and depths from 11.5 to 14.7 m alongside. Approach to this quay is restricted, as given at 3.228.

- 3 A Ro-Ro ramp, with a width of 25 m and depths from 7.3 to 8.0 m is situated at the head of a 174 m quay which extends N from the NW end of Main Quay. This quay has depths from 7.9 to 9.6 m alongside.

There are two other berths.

Porsgrunn**3.235**

- 1 The deepest berth is Dypvannskaien (Deep Water Quay) (59°07'·6N 9°37'·1E) which has a length of 174 m and depths from 8.7 to 10.2 m alongside. Used for handling bulk cargo.

- 2 The longest berth is Electrometallurgiske's quay (Electro Metallurgical Quay), close NE of Deep Water Quay, which has a length of 357 m and depths from 5.1 to 6.7 m alongside.

There are 43 other berths for general and special cargoes with lengths between 12.5 and 230 m and depths between 6.0 and 8.6 m alongside.

Port services

Repairs

3.236

- 1 Repairs of all kinds can be effected at the shipyard on the W bank of Skienselva, 2½ cables SW of the bridge. This shipyard contains a dry dock which can accommodate vessels with a length of 150 m, beam of 20 m, draught of 4.0 m and displacement of 15 000 tonnes. There are also two slipways.

Other facilities

3.237

- 1 Compass and radio equipment can be adjusted; Deratting exemption certificates issued; large hospital and good medical services; limited reception facilities for oily waste by barge.

Supplies

3.238

- 1 Fuel is available at some berths and also by lighter; fresh water can be obtained alongside at Herøya and at some berths in Porsgrunn; provisions and ship's stores, including charts, can be obtained at short notice.

SKIEN

General information

Norwegian Chart 474 (see 1.29)

Position and function

3.239

- 1 Skien (59°12'N 9°37'E) is situated on the banks of Skienselva, about 6 miles from the entrance to the river at Porsgrunn (3.213).
- 2 The port handles container and general cargo, particularly wood products. Skien Harbour Terminal (59°07'.3N 9°33'.8E) (3.212) provides a deep water addition to the inner port. Local industries include cellulose, wood pulp and timber processing.
- 3 The town, which has a population of about 30 600, is the administrative centre for the district of Skien and one of the oldest trading ports in Norway.

Topography

3.240

- 1 General topography for Langesundsfjorden is described in 3.144.
- The whole area along Skienselva, from Frierfjorden to and including Skien, is densely built-up, with hills in the background. The Gothic Church in Skien, with two tall spires, stands on a hill to the N of the river and is prominent.

Port limits

3.241

- 1 The Harbour Area is bounded by the town to the N and by a line drawn from Kjørebekk (59°10'.6N 9°38'.1E) to

Menstad, 4 cables SSE, which stands about 4 miles above the entrance to Skienselva.

The area also includes the N part of Volls fjorden (59°07'.5N 9°33'.0E) and the facilities at Skien Harbour Terminal (3.212).

Approach and entry

3.242

- 1 The port is approached through Porsgrunn and entered above Menstad.

Traffic

3.243

- 1 In 2004 the port was used by 223 vessels with a total of 741 524 dwt.

Port Authority

3.244

- 1 See 3.147.

Limiting conditions

General remarks

3.245

- 1 Controlling size in the approach to Porsgrunn is given at 3.148.

Vertical clearance

3.246

- 1 There is a vertical clearance of 27 m under Menstad Bridge along with a channel width of 40 m.

Deepest and longest berth

3.247

- 1 The largest berth is Jernbanebrygga (59°12'.2N 9°37'.0E) (3.254).

Maximum size of vessel handled

3.248

The maximum size of vessel handled at Skien is length 85 m, beam 14 m and draught 5.0 m.

Arrival information

Port operations

3.249

- 1 See 3.150 to 3.155 for arrival information within Langesundsfjorden.
- Skien Harbour Control mans port radio frequencies as given in *Admiralty List of Radio Signals Volume 6 (2)*.

Regulations concerning entry

3.250

- 1 **Regulations** within Skienselva are given at 3.228.
- Speed.** An upper limit of 5 kn has been established in the river above Kjørebekk.
- Quarantine** anchorage is given at 3.229.

Harbour

General layout

3.251

- 1 The berths in Skien Harbour line both banks of the river for 2 miles above Menstad Bridge. Deep water berths at Skien Harbour Terminal are given at 3.212.

Hazards

3.252

- 1 There is considerable traffic in Skienselva. Drifting timber in the river can at times be troublesome to smaller vessels.

Natural conditions**3.253**

- / **Ice** does not hinder ship movements in the river between Porsgrunn and Skien.

Flow does not normally affect shipping in the river; however, it may reach a rate of 7 to 8 kn during strong spring-time floods and after heavy rain storms

Tides are almost negligible.

Berths**Alongside berths****3.254**

- / The largest berth is Jernbanebrygga (59°12'·2N 9°37'·0E), the railway wharf, which has a length of 300 m and depths 6·7 to 11·9 m alongside. There are 29 other berths along the river.

Port services**Repairs****3.255**

- / Repairs can be effected.

Other facilities**3.256**

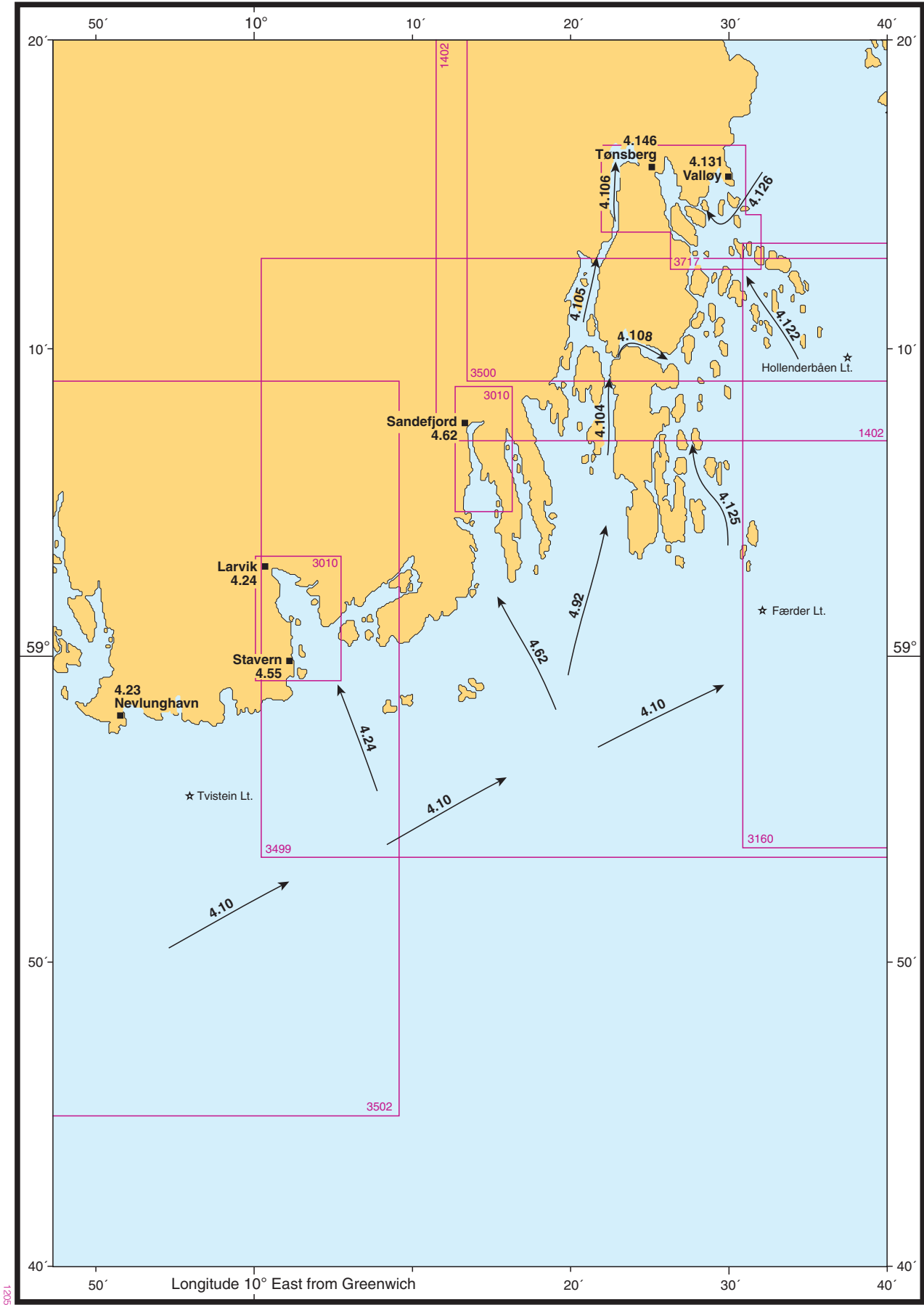
- / Chart agent; hospital and several doctors; limited reception facilities for oily waste by tank lorry.

Supplies**3.257**

- / Fuel alongside selected berths; water at most quays or by lighter; ships' stores and provisions can be obtained at short notice.



Chapter 4 - South-western approach to Oslofjorden with Tønsberg and approaches



CHAPTER 4

SOUTH–WESTERN APPROACH TO OSLOFJORDEN WITH TØNSBERG AND APPROACHES

GENERAL INFORMATION

Charts 3502, 3499, 3500

Scope of the chapter**4.1**

- 1 This chapter covers the SW approach to Oslofjorden from Langesundsfjorden (59°00'N 9°48'E) to Færder (59°02'N 10°32'E), at the S end of Oslofjorden. It also includes the three main fjords to the N of the approach route which, from W to E are, Larviksfjorden (59°00'N 10°05'E), Sandefjordsfjorden (59°03'N 10°15'E), and Tønsbergfjorden (59°05'N 10°22'E).

- 2 In addition, the W side of Oslofjorden, from Laksskjær (59°03'N 10°28'E) to Valløy, 12½ miles N (59°16'N 10°30'E), is included as it also forms part of the approaches to Tønsberg (59°16'N 10°24'E). The chapter is arranged as follows:

SW approach to Oslofjorden (4.9).

Tønsberg Havn and approaches (4.91).

Routes**4.2**

- 1 The SW approach to Oslofjorden includes the coastal route from Langesundsfjorden to Færder, a distance of about 25 miles, as given at 4.10.

The coastline is deeply indented along its length with offshore islands creating inshore routes, such as Skipsleia (59°00'N 10°10'E) (4.50) and Sandøundsleia (59°06'N 10°28'E) (4.116).

- 2 Tønsbergfjorden (4.92) provides the S approach to Tønsberg Havn (4.146), and from which via Tønsberg Kanal and a narrow channel, allows access to Oslofjorden. Tønsbergfjorden is also connected to Oslofjorden by a restricted and tortuous channel through Vrengen (59°10'N 10°24'E) (4.108).

Harbours**4.3**

- 1 The major harbours, which lie at the head of fjords extending inland from this stretch of coast, are:

Larvik Havn (59°03'N 10°02'E) (4.24).

Sandefjord Havn (59°07'N 10°14'E) (4.62).

Tønsberg Havn (4.146).

Hazards**4.4**

- 1 **Fishing.** A general description of fishing methods is given in *The Mariner's Handbook* and a summary of the methods used within the area covered by this volume is given at 1.19.

Drift net fishing for mackerel and salmon is carried out along the S coast of Norway as far E as the entrance to Oslofjorden between May and August.

- 2 **Dangerous waves.** The area to seaward of this part of the coast contains some of the conditions which allow the formation of dangerous waves, as described at 4.13. Caution is necessary.

Traffic regulations**4.5**

- 1 General traffic regulations are given at 1.69 and for tankers at 1.83. All the fjords in this chapter lie within Norwegian internal waters as described in Appendix I, which also contains traffic regulations.

- 2 Passage through Oslofjorden and the approaches to ports within this chapter, as given in the appropriate Directions, follow the specified leads or navigation routes given in Appendix I.

Mean tidal levels**4.6**

- 1 The tidal range in the harbours is very small and water levels are often dominated by meteorological conditions. Times of HW and LW are similar to those at Nevlunghavn (58°58'N 9°53'E) where the mean spring range is 0.3 m and the mean neap range is 0.15 m. See *Admiralty Tide Tables Volume 2* for further information.

- 2 General information on sea levels is given at 1.187.

Currents**4.7**

- 1 In the outer approaches to Oslofjorden the current usually sets N along the coast of Sweden to the vicinity of Nord–Koster (58°54'N 11°00'E) (Chart 3160) where it turns NW; it then sets W across the entrance to the fjord, passing S of Færder (59°02'N 10°32'E) and Svenner (58°58'N 10°09'E) and then sets SW off the SE coast of Norway.

- 2 Outside the entrance to Oslofjorden the rate will only exceed 1 kn during gales from the E; whereas gales from the W may reverse the direction and set towards the E shore of the fjord.

General information on currents is given at 1.176.

Coast radio**4.8**

- 1 A coast radio station is established on Tjøme (59°05'N 10°25'E), for details see *Admiralty List of Radio Signals Volume 1 (1)*.

SOUTH–WESTERN APPROACH TO OSLOFJORDEN

GENERAL INFORMATION

Charts 3502, 3499

Area covered**4.9**

- 1 This section covers the coastal waters from Langesundsfjorden (59°00'N 9°48'E) to Lille Færder

(59°02'N 10°32'E), a distance of about 25 miles. It includes descriptions of the major harbours of Larvik Havn (59°03'N 10°02'E) and Sandefjord Havn (59°07'N 10°14'E), along with the minor harbours of Nevlunghavn (58°58'N 9°52'E) (4.23) and Stavern (59°00'N 10°03'E) (4.55).

The section is arranged as follows:

Langesundsfjorden to Oslofjorden (4.10).

Larvik Havn and approaches (4.24).

Sandefjord Havn and approaches (4.62).

LANGESUNDSFJORDEN TO OSLOFJORDEN

General information

Charts 3502, 3499

Routes

4.10

- 1 **Coastal route.** From a position 10 miles SSE of the entrance to Langesundsfjorden (59°00'N 9°48'E) the coastal route towards the entrance to Oslofjorden leads ENE for about 25 miles, in deep water outside the 100 m depth contour, to the vicinity of 59°00'N 10°37'E, about 3 miles SE of Lille Færder (59°02'N 10°32'E).
- 2 **Tanker route.** Laden tankers of 40 000 dwt or greater are advised to start the coastal route at least 15 miles offshore, thence gradually close the coast to a position 3 miles SSE of Lille Færder. See 1.83 for details.
- 3 **Inner route.** There is no continuous series of channels inside the islands along this stretch of the coast. Skipsleia (59°00'N 10°10'E), an inner channel between Larviksfjorden and Sandefjordsfjorden is described at 4.50.

Topography

4.11

- 1 Between the E side of Langesundbukta, in the approach to Langesundsfjorden, and the entrance to Oslofjorden, 22 miles ENE, the coast is deeply indented, with many islands, islets and rocks lying up to 5 miles from the coast. Inland, the low-lying terrain, as far E as Larviksfjorden (59°00'N 10°05'E), consists mainly of barren hills of light grey stone backed by dark stands of trees so that, when seen from a distance offshore, they tend to merge and produce an impression on monotonous uniformity.
- 2 Stavernsalen (59°03'N 9°58'E), about 2 miles W of Larvik, has a deep cleft in the middle which is most apparent when seen from SW.
- 3 Kjerringfjellet (59°02'N 10°12'E) is situated near the coast. When seen from SW it appears to slope steeply towards the W and gradually towards the E. When seen from SE, out to a distance of 16–20 miles, it shows a deep cleft in the middle.

Depths

4.12

- 1 Depths along the coast are irregular.

Hazards

4.13

- 1 **Fishing** for mackerel and salmon, as given at 1.22, takes place throughout the area traversed by this route.
Dangerous waves, the general conditions for which are described at 1.192, may be encountered over a large area along this part of the coast. This area, which extends E from Tvistein Light (58°56'N 9°56'E) past Svenner, 7 miles ENE, to Færder (59°02'N 10°32'E), contains two of the basic conditions:
- 2 Depths from about 50 to 100 m interspersed with shoals.
A prevailing current, which is W-going and generally independent of tidal stream, with an average speed of 1½ knots.

- 3 In addition, waves from between SW and SE create several refraction centres within the area. Under these conditions it has been reported that, in the W—most part of the area, precipitous breakers have occurred with waves from the SW. In the E part of the area, winds from SE to SW create the heaviest seas with precipitous breakers. The sea has been described as turbulent with “returns from all directions”.

Traffic regulations

4.14

- 1 Traffic regulations are given at 4.5. The route given at 4.10 passes through the Norwegian territorial sea, as described in Appendix I.
A firing danger area, which extends from Rakke Gunnery Range (58°58'8N 10°02'3E), is described at 4.41.

Rescue

4.15

- 1 Rescue stations are established at Stavern (59°00'N 10°03'E) and Kruke (59°05'N 10°28'E) in Sandøsundet. See 1.128 for details of the search and rescue organization.

Natural conditions

4.16

- 1 **Flow.** For general information see 4.7. Off the S coast to the E of Langesundsfjorden the current is usually strong and W-going. However, wind conditions offshore in the Skagerrak influence this current which is liable to change with the wind under normal conditions. At times the current outside the islands may set in a different direction from that on the inside where it can set to the W at 3 to 4 kn.
- 2 **Local weather.** See climatic table at 1.229 and 1.234.

Directions

(continued from 3.118)

Principal marks

4.17

- 1 **Landmarks:**
 - 1 Tvistein Lighthouse (11 m in height) (58°56'N 9°56'E) standing on the island of Tvistein (4.19).
 - 2 Svenner Lighthouse (tower, 19 m in height) (58°58'N 10°09'E) standing on a small islet close S of Svenner.
- 2 Færder Lighthouse (red metal tower, white band, 43 m in height) (59°02'N 10°32'E) which stands on the middle islet in the Lille Færder or Tristeinane group.
- 3 **Major light:**
Færder Light — as above.

Other aids to navigation

4.18

- 1 **Racons:**
 - 1 Tvistein Light (58°56'N 9°56'E).
 - 2 Svenner Light (58°58'N 10°09'E).
 - 3 Færder Light (59°02'N 10°32'E).
- For details see *Admiralty List of Radio Signals Volume 2*.

Langesundsfjorden to Larviksfjorden

4.19

- 1 From the vicinity of 58°50'N 9°50'E the coastal route leads ENE for about 11 miles, keeping in depths of more than 100 m and clear of an area of dangerous waves (4.13), passing (with positions relative to Tvistein Light (58°56'N 9°56'E)):
- 2 SSE of the dangers which, with depths of 13 m, lie 1 mile W and, with depths of 16 m, 1¼ miles ESE

of Tvistein, which consists of two low black islets lying on a reef with depths of less than 2 m over it. Tvistein Light (4.17) is exhibited from the E islet. Thence:

- 3 SSE of Østre Skalbberghausen (4 miles E) which is the SE of the shoals extending SE from Rakkebåane (4.48).

(Directions continue for Larviksfjorden at 4.46)

Larviksfjorden to Sandefjordsfjorden

4.20

- 1 From the vicinity of 58°55'N 10°09'E the coastal route continues ENE for about 6 miles, keeping in depths of more than 100 m, passing (with positions relative to Svenner Light (58°58'N 10°09'E)):

SSE of Dypeskaten (1¼ miles SW), a rocky shoal marked by a spar buoy (port hand), thence:

- 2 SSE of the danger extending 5 cables SE from Svenner, the largest of Svennerholmene, a group of low and bare islets of light grey stone which glisten slightly against the browner background. Svenner Light (4.17) stands within the group. Thence:

SSE of Hettehausene (1¼ miles E), a rocky shoal lying 4 cables SSW of Hetta, an islet surrounded by dangers, thence:

- 3 SSE of Ertholmskaten (2¾ miles E), a shoal which lies 2½ cables SSE of Ertholmen which is the SE islet of Rauer, a group of low, bare and light grey islets, reported to be good navigation marks. Søre Rauerbåen (2½ miles E) is the S shoal in the group. Thence:

4 SSE of Søndre Bondeskatén (3½ miles ENE) which is the S extremity of the shoal extending 3 cables SSW from Bonden. Bonden, a small skerry, 1½ m high, on which stands a beacon (black truncated cone, 2½ m in height), is reported to be a good navigation mark.

(Directions continue for Sandefjordsfjorden at 4.80 and for Tønsbergfjorden at 4.100)

Sandefjordsfjorden to Oslofjorden

4.21

- 1 From the vicinity of 58°56'N 10°20'E the coastal route continues ENE for about 8 miles, keeping in depths of more than 100 m and clear of an area of dangerous waves (4.13), passing (with positions relative to Færder Light (59°02'N 10°32'E)):

- 2 SSE of shoals and shallow patches which extend up to 8 cables SSW from Sydostgrunnen (6½ miles WSW), a rocky shoal marked at its E and W ends by spar buoys. Sydostgrunnen Light-buoy (S cardinal) moored 4 cables S of Sydostgrunnen lies close S of a 9 m patch but 3 cables NNE of a shoal with a depth of 15 m over it. Thence:

- 3 SSE of Tjømeboskatet (3¾ miles WSW), two shoals lying 7 cables S of Tjømebåen, a low black rock marked by an iron beacon which is reported to be a good navigation mark but which merges with the background when viewed from a position 2 miles S. Østre Osgrund, a shoal marked by a spar buoy (port hand), lies 7 cables E of Tjømebåen. Thence:

- 4 SSE of Tristeingrunnen (8 cables SSW), the SW of the shoals extending SSW from Lille Færder, which is marked by a spar buoy (S cardinal).

The track then leads to the vicinity of 59°00'N 10°37'E, about 3 miles SE of Lille Færder.

4.22

- 1 **Useful marks** in the vicinity of Larviksfjorden are given at 4.46 and those at Sandefjordsfjorden are given at 4.80. (Directions continue, for Oslofjorden S part, main channel at 5.26, for the coastal passage SSE off the coast of Sweden at 7.18, and for the inner coastal route E and SE giving access to the outer approaches to Halden, Fredrikstad and Sarpsborg at 6.21) (Directions for Sandøundsleia are given at 4.125)

Nevlunghavn

Chart 3502

General information

4.23

- 1 **Description.** Nevlunghavn (58°58'N 9°52'E) consists of a small fishing harbour, with depths of 3 m in it, and an anchorage in a cove to the N of the harbour. The cove and the harbour are fronted by many islets and rocks but are exposed to much swell during strong winds from the S and E.

- 2 **Approaches.** The four approach channels to the harbour are reported to be clear and easy to navigate. Nevlunghavn Light (white lantern) which is situated S of the harbour, provides leading light sectors for three of the channels.

Tvistein Light (4.17), which is situated 2½ miles SE of the harbour, assists with identification.

LARVIK HAVN AND APPROACHES

General information

Charts 3502, 3499, 3010 plan of Larvik Havn

Position

4.24

- 1 Larvik Havn (59°03'N 10°02'E) is situated at the head of Larviksfjorden which extends 4 miles inland from its entrance at the coast.

Function

4.25

- 1 Larvik Havn, a major ferry port with links to Denmark and England, is a customs port of entry. There is also a considerable merchant fleet based in the harbour which supports a rich and comprehensive industry centred on timber, granite and pig iron. The town of Larvik, with a population of 21 140 in 1997, stands around the harbour.

Topography

4.26

- 1 Larviksfjorden is a deep-water arm of the sea which has a width of 1 mile and leads between numerous islets to a tree-covered mainland which is generally flat.

Port limits

4.27

- 1 The seaward limit of Larvik Harbour District extends from a position 5 miles WSW of Tvistein Light (58°56'N 9°56'E) to Søndre Bondeskatén, 15 miles ENE.

Approach and entry

4.28

- 1 The deep water approach to Larvik Havn is from the SSE between Svennerholmene (58°58'N 10°09'E) and Rakkebåane, 3 miles W. Entry is through Larviksfjorden.

- 2 Approach can also be made from E through Skipsleia (59°00'N 10°10'E) (4.50) which leads between, to the S, the dangers off the N side of Svenner (4.20) and Rauer, 2½ miles ENE (4.20); and, to the N, the dangers off-lying

the mainland between Larviksfjorden and Sandefjordsfjorden, 6 miles ENE. Local knowledge is required.

Traffic 4.29

- 1 In 2004 the port was used by 645 vessels with a total of 2 915 166 dwt.

Port Authority 4.30

- 1 **Address.** Larvik Havnevesen, Havnegaten 5, PO Box 246, N-3251 Larvik, Norway; with authority vested in the Harbour Master.

Website. www.larvikhavn.vf.no.

Email. lvh@larvikhavn.vf.no.

Limiting conditions

Controlling depth 4.31

- 1 Larviksfjorden affords a deep water approach and the controlling depth is that of the anchorage or berthing area as given at 4.52 and 4.54.

Deepest and longest berth 4.32

- 1 The deepest and longest berth is Kanalkaien Nord (4.54).

Mean tidal levels 4.33

- 1 See 4.6.

Density of water 4.34

- 1 The harbour generally contains salt water that is brackish at times.

Maximum size of vessel handled 4.35

- 1 Tankers up to 25 000 dwt, with LOA 196.5 m and draught 9.7 m have been berthed in the harbour.

Local weather 4.36

- 1 For ice during long cold winter periods see 4.45.

Arrival information

Port radio 4.37

- 1 There is a port radio station at Larvik. See *Admiralty List of Radio Signals Volume 6 (2)* for details.

Notice of ETA 4.38

- 1 If possible 24 hours notice should be given.

Outer anchorage 4.39

- 1 Østre Halsen (Hølen) (59°02'N 10°04'E) affords good anchorage, over a bottom of clay, and has a mooring buoy in deep water.

Pilotage and tugs 4.40

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*.

- 2 **Tugs.** A small tug is stationed in the harbour.

Regulations concerning entry 4.41

- 1 **Firing Danger Area.** The approach as given in the directions (4.46) passes through the Rakke Gunnery Range (58°58'8N 10°02'3E). When firing is in progress mariners wishing to enter Larviksfjorden should communicate with the patrol boat or firing range.

- 2 **Speed limit.** Vessels should not exceed 5 kn, N of a line drawn between Røbergodden (59°02'0N 10°01'6E) and Revet, 5 cables NE.

Quarantine 4.42

- 1 Quarantine anchorage is in the outer road of the harbour.

Notice of medical requirements 4.43

- 1 Advance notice should be given if an ambulance is required.

Harbour

General layout 4.44

- 1 Larvik Havn occupies the head of Larviksfjorden which is fed by a wide river in the SE corner of the harbour and by a narrow river at the NW end, immediately W of the N berths.

Natural conditions 4.45

- 1 **Current.** The current sets out of the fjord but its strength varies according to the outflow of water from the two rivers near its head and also on the wind in the Skagerrak.

Flow. A flow, which is usually W-going, may attain a rate of 3 to 4 kn in Skipsleia (59°00'N 10°10'E) and sometimes crosses Rakkeåane, 5 miles WSW, with sufficient strength to submerge spar buoys marking the S and SE sides of the bank.

- 2 **Ice.** The harbour is ice-free except during long cold periods in winter; it is then kept open by icebreakers. For further information see 1.95 and *Admiralty List of Radio Signals Volume 6 (2)*.

Climatic table. See 1.229 and 1.234.

Directions (continued from 4.19)

Principal marks 4.46

- 1 **Landmarks** (with positions relative to Oterøya Light (59°02'N 10°04'E)):

Stavernsodden Light (tower) (2½ miles SSW) standing on the S point of Stavernsøya.

Larvik Church (1½ miles NW).

- 2 Mølleberget (3 miles SSW) a grey, bare hill which is easily identified from seaward against the wooded islets which front the coast.

Svennerholmene (4¼ miles SE) and Svenner Light (4½ miles SE) (4.17).

Other aids to navigation 4.47

- 1 **Racons:**

Svenner Light (58°58'N 10°09'E).

Tvistein Light (58°56'N 9°56'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Approach and entry from south–south–east 4.48

- 1 From the vicinity of 58°55'N 10°09'E the white sector (332°–337°) of Larvik Havn Light (framework tower) (59°02'·9N 10°01'·4E) leads NNW in the approach and entrance to Larviksfjorden, in deep water, then through the fjord and into Larvik Havn, free from dangers, passing (with positions relative to Oterøya Light (59°02'N 10°04'E)):
- 2 Over or WSW of Dypeskaten (5 miles SSE) (4.20), thence:
WSW of Svennerskaten (4½ miles SSE) which is the SW of the shoals lying up to 9 cables SW from Svenner (4.20), and:
- 3 ENE of Rakkebåane Light–buoy (E cardinal) (4¾ miles S) which is moored off the SE end of the shoals extending SSE from Rakkebåane, an area of dangerous rocks which extends up to 2 miles S and SSE from the coast; irregular depths extend 1½ miles farther S. When rough, the sea breaks over most of Rakkebåane which is marked on its S side by a spar buoy (port hand), 9 cables WNW of the light–buoy, which is sometimes submerged by the strong flow (4.45). Spar buoys (lateral) and iron perches mark further shoals and rocks on the S and SE sides of Rakkebåane. Thence:
- 4 ENE of a shoal patch extending 2 cables ESE from Storja (3¾ miles SSW) which is awash and marked by an iron perch. Two shoals to the S and SE of Storja are marked by spar buoys (lateral). Thence:
WSW of the W entrance to Skipsleia (3 miles SSE) (4.50), thence:
WSW of Grunnfallen (2½ miles SE) an above–water rock marked by an iron perch, thence:
- 5 ENE of Stavernsøya (2½ miles SSW) an island which resembles a high cone and on the S end of which stands Stavernsodden Light (4.46), and:
WSW of Kirkebåen (2 miles SSE), a detached shallow patch marked by a spar buoy (starboard hand), thence:
- 6 ENE of the shallow bank extending 2 cables ESE from Ramsholmflua (2 miles S), a rock on which stands a light (post, 9 m elevation) which lies 1 cable NE of Ramsholmen, an islet with an elevation of 23 m. A spar buoy (port hand) is moored 1 cable E of the rock on the edge of the shallow bank. And:
- 7 WSW of Malmøybåen (1¾ miles SSE), a detached shallow patch marked by a spar buoy (starboard hand), thence:
ENE of Risøybåen (1¾ miles SSW) which lies off the N end of a group of islets extending N from Stavernsøya and is marked by an iron perch, and:
WSW of the bank fringing the SW extremity of Malmøya (1½ miles SE) a substantial islet situated in the entrance to Viksfjorden (4.56), thence:
- 8 ENE of Risøykalven (1½ miles SSW), an above–water rock lying off the N point of Risøya, thence:
ENE of Børstadbåen (1¼ miles SW) a shoal marked by a spar buoy (port hand), thence:
ENE of Agnesbåen (1 mile SW) which is awash and marked by an iron perch, thence:

WSW of Oterøybåen which is awash and lies near the edge of the bank extending 1 cable SW from Oterøya on which stands Oterøya Light (white lantern), thence:

- 9 ENE of Røbergodden, the headland on the W side of the entrance to the head of the fjord, thence:
WSW of the bank which dries in parts and extends 8 cables NW from Oterøya; its SW edge is marked by two spar buoys (starboard hand). Thence:
WSW of Revhaken (9 cables NW), a mole at the W extremity of Revet, from the head of which a light (post) is exhibited, thence:
- 10 WSW of Kjerkebåen (1¼ miles NW), a shallow spit extending S from the shore reef which is marked by two spar buoys (starboard hand).

4.49

Useful marks:

Hoppøy (2 miles SE), a small islet with two hummocks, which is distinguished by a prominent hill which falls away steeply to the NE. Hummarberget (8 cables SSE), which has two rounded summits and is precipitous on its S side.

Approach from east 4.50

- 1 **Skipsleia.** It should be noted that the lateral buoyage in Skipsleia is laid for passage from W to E.
From the vicinity of 58°59'·7N 10°13'·5E a white sector (263°–267°) of Stavernsodden Light (58°59'N 10°03'E) (4.46) leads through Skipsleia, passing (with positions relative to Svenner Light (58°58'N 10°09'E)):
- 2 S of Blyreva (1¾ miles NNE), a rock which lies on the SE edge of an extensive reef extending from the coast, which is marked by a spar buoy (port hand), and:
N of the shoal surrounding Suslingene (1¼ miles NE), the NE of the Svennerholmene group (4.20), thence:
- 3 Over or S of a detached 10 m patch (1½ miles N) which lies on the N limit of the sector, thence:
Over or N of Midtbåen (1¼ miles N) which lies within the S edge of the sector, thence:
S of Kattebåen (1½ miles N), a rock with a depth of 2 m or less over it, marked by a spar buoy (port hand), thence:
- 4 N of Seibåen (1¼ miles NNW) which is marked by a spar buoy (isolated danger), thence:
S of Kaupangbåen (1½ miles NNW) the N part of which is marked by a spar buoy (port hand); the S end of this shoal, with a depth of 9 m over it, touches the N limit of the white sector.

4.51

Useful mark:

A black beacon tower which stands on the islet of Svennerflaten (8 cables N).

Anchorage, berths and minor harbours

Anchorage 4.52

- 1 The preferred anchorage is in the W part of the harbour (58°02'·8N 10°01'·3E), in depths of up to 29 m, clear of outfall pipes, the mooring area (below) and of the approaches to the berths. The holding ground is good.
Restricted anchorage is also available in Jordebukta (59°01'·8N 10°01'·5E).

Moorings**4.53**

- 1 Moorings which are available on the W side of the head of the harbour have been used to stern moor vessels of up to 20 000 grt.

Alongside berths**4.54**

- 1 The largest berth on the E side of the harbour is Kanalkaien Nord (59°02'6N 10°03'0E) which has a length of 333 m with depths of about 10 m alongside.
Vestre Revkai, 1 cable SSW of Kanalkaien Nord, is 120 m long with a depth of 9 m alongside. It has a Ro-Ro ramp at its SW end with a width of 14 m and a least depth of 8.0 m which can accommodate vessels of 120 m in length.
- 2 The largest berth on the N side of the harbour is situated on the W side of Østre Brygge (59°03'0N 10°01'8E) which has a length of 130 m with depths of 8 m alongside. This berth connects with the Ferry Terminal and has a Ro-Ro facility on the W side.
There are seven other major berths.

Stavern**4.55**

- 1 **Description.** Stavern Havn (59°00'N 10°03'E), a small harbour on the W side of the entrance to Larviksfjorden, is used mainly by fishing vessels and leisure craft. The town of Stavern, with a population of 3900 in 1997, is a popular holiday resort.
Natural conditions. The flow in the harbour is usually S-going and onshore storms create a swell in the harbour.
- 2 **Harbour.** The harbour affords anchorage with good holding in clay, clear of submarine cables laid across the S entrance and a submarine pipeline laid across the NE entrance, as shown on the chart; and there are many berths and mooring bolts around its edge. An inner part of the harbour forms a marina for small craft.
- 3 **Entry.** The harbour can be entered from S, between the W side of Stavernsøya and Vadholmen, and from NE, between Risøybåen and the SE side of Risøya. Both entrances are well marked and a monument stands 3 cables W of the S entrance; however this may be difficult to identify against the background.

Viksfjorden**4.56**

- 1 Viksfjorden (59°02'N 10°07'E), an extensive but foul inlet at the SE end of Larviksfjorden, is lacking in navigation aids and is only suitable for coasters where local knowledge is available.
- 2 The principal entrance lies between Hummarberget, the NW entrance point, and Malmøya, 4 cables SE.
There are a number of good all-weather anchorage areas within the inlet and one small harbour with excellent facilities for small craft.

Østre Halsen**4.57**

- 1 Østre Halsen (59°02'N 10°04'E) (4.39), a creek on the E side of Oterøya, affords good anchorage clear of the marked submarine pipelines, and alongside berths with a depth of 6 m.

Ula**4.58**

- 1 Ula (59°01'N 10°11'E), a good harbour on the N side of Skipsleia, is protected by a mole but is exposed to winds from S. Anchorage can be obtained within the inlet leading to the harbour and there are mooring rings around the inlet. Within the mole there is a quay with a depth of 3 m alongside. Local knowledge is required.

Port services**Repairs****4.59**

- 1 Minor deck and engine repairs can be undertaken. There is no docking facility.

Other facilities**4.60**

- 1 Full facilities available; oily waste disposal can be arranged on request.

Supplies**4.61**

- 1 Fuel is available by road tanker, at 20 tonnes per hour; water is laid-on to all quays and available on request; provisions of all kinds can be obtained in the town.

SANDEFJORD HAVN AND APPROACHES**General information**

Charts 3499, 3010 plan of Sandefjord Havn

Position**4.62**

- 1 Sandefjord Havn (59°07'N 10°14'E) is situated at the head of Sandefjordsfjorden which extends 5½ miles N from its entrance at the coast.

Function**4.63**

- 1 Sandefjord Havn, a large and well sheltered harbour, is a major ferry port with links to Sweden.
A large merchant fleet which is based in the port supports significant industry in the town of Sandefjord which had a population of 34 283 in 1997. Ship and oil rig construction is also undertaken.

Topography**4.64**

- 1 Sandefjordsfjorden is a deep-water arm of the sea which is narrowed in several places by dangers which lie off both sides of the inlet. The surrounding land is low-lying and the E side is formed by a dark grey tongue of stone with sparse vegetation. The upper part of the fjord is well populated.
Offshore the inlet is fronted by a scattering of above-water and below-water dangers.

Port limits**4.65**

- 1 The seaward limit of Sandefjord Harbour District extends from Søndre Bondeskaten (58°59'N 10°16'E) to a position 3½ miles farther E.

Approach and entry**4.66**

- 1 A deep water approach to Sandefjord is from SSE between Sydostgrunnen (58°59'N 10°20'E) (4.21) and

Nordre Bondeskatén (4.81), 1½ miles W, with entry through Sandefjordsfjorden.

Traffic 4.67

- 1 In 2004 the port was used by 63 vessels with a total of 125 867 dwt.

Port Authority 4.68

- 1 **Address.** Sandefjord Havnevesen, Tollbugt 5, N-3200 Sandefjord, with authority vested in the Harbour Master.
Email. bjornar.christiansen@sandfjord.kommune.no.

Limiting conditions

Controlling depth 4.69

- 1 Sandefjordsfjorden provides a deep water approach and the controlling depth is that of the anchorage (4.86) or berthing area (4.87).

Deepest and longest berths 4.70

- 1 The deepest and longest berths are both at Framnes Industriutvikling (4.87).

Mean tidal levels 4.71

- 1 The tidal range is very small and similar to that given at 4.6.

Ice 4.72

- 1 For ice during long cold winter periods, see 4.79.

Arrival information

Port radio 4.73

- 1 There is a port radio station at Sandefjord, see *Admiralty List of Radio Signals Volume 6 (2)* for details.

Pilotage and tugs 4.74

- 1 **Pilotage** is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*.
2 **Tug** assistance is available if required.

Regulations concerning entry 4.75

- 1 **Speed limit** within the harbour is as follows:
7 kn between Asneset (59°06'N 10°14'E) and Framnes, 1½ miles NNW.
5 kn to the N of Framnes.

Quarantine 4.76

- 1 The quarantine anchorage for larger vessels is off Asneset.

Harbour

General layout of harbour 4.77

- 1 Sandefjord Havn is large and well sheltered with many quays and jetties around the shores of the harbour, which occupies the upper 2 miles of Sandefjordsfjorden.

Hazards 4.78

- 1 Information concerning fishing and dangerous waves in the outer approaches to Sandefjordsfjorden is given at 4.13.

Natural conditions 4.79

- 1 **Currents** are negligible inside Sandefjordsfjorden.
Ice. The harbour does not freeze except in winter with long cold periods; the fjord is then kept open by icebreakers. For further information see 1.95 and *Admiralty List of Radio Signals Volume 6 (2)*.
Climatic table. See 1.229 and 1.234.

Directions for entering harbour (continued from 4.20)

Principal marks 4.80

- 1 **Landmark:**
Kvernberget (59°04'N 10°15'E), a bare, brownish and rocky hill rising from a small peninsula which is joined to the E side of the fjord by a low isthmus.
2 **Major light:**
Færder Light (59°02'N 10°32'E) (4.17).

Approach from south-south-east 4.81

- 1 From the vicinity of 58°56'N 10°20'W the line of bearing, 344°, of the W extremity of Kvernberget (4.80), seen between the E side of Holskjærene (59°02'·5N 10°16'·1E) (4.82) and the mainland, leads NNW for 6 miles in the approach to Sandefjordsfjorden, in deep water, within a white sector (339°–344°) of Holskjær Light (white lantern on tripod), passing (with positions relative to the light):
WSW of the shoals which lie up to 5 cables SW of Sydostgrunnen (3¼ miles SSE) (4.21), thence:
2 ENE of a 14 m patch lying 3 cables E of the S end of Nordre Bondeskatén (3 miles S) which lies 4 cables NE of Bonden (4.20), thence:
ENE of Nordosta (2¼ miles SSE) which has the least depth and is at the SE extremity of a rocky patch extending 4 cables NW, thence:
ENE of Leikarhausen (9 cables S) which is marked by a spar buoy (port hand).
3 When clear of Leikarhausen the track leads NW for about 7 cables, passing SW of Leikrene (5 cables SSE), which is a group of islets and rocks extending 9 cable NNE; the group is marked near its centre by a spar buoy (starboard hand) and near its NW extremity by a spar buoy (isolated danger).

Sandefjordsfjorden 4.82

- 1 From a position 3 cables SW of Holskjær Light, a white sector (349¼°–353°) of Asneset Light (white lantern) (59°06'N 10°14'E) leads generally N through the fairway for 3½ miles, passing (with positions relative to the light):
E of Kirkebåen (3½ miles S) at the N end of Koksundbåen which is marked by a spar buoy (port hand), and:

- 2 W of Holskjærerne (3½ miles SSE), a group of islets and rocks on which stands Holskjær Light, situated close to the E entrance point of Sandefjordsfjorden. The N rock of this group, 3 cables NNW of the light, is marked by an iron perch. Thence:
E of Sua (3 miles S) which is marked by a spar buoy (port hand), and:
- 3 W of Ødegårdsbåen (2¾ miles SSE), which dries, thence:
E of Håholmbåene (2 miles S), which are dangerous rocks, marked by two spar buoys (port hand), extending up to 3 cables S from Håholmen, and:
W of the coastal bank, with a depth of 6 m over it (2 miles SSE), which extends SSW from Kvernberget (4.80), thence:
- 4 E of Kari (1½ miles S), an above-water rock marked by an iron perch and a rock, 2 cables N, also marked by an iron perch, and:
W of the coastal bank, with a depth of 6 m over it (1½ miles SSE) which extends up to 3 cables from the coast and lies close to the E edge of the sector, thence:
W of Hellesøya (1 mile SSE), an islet, and:
- 5 E of Beinskjera (1 mile S), which comprises an islet 4 m high and several rocks, above and below water and awash, thence:
W of Buerbåen (8 cables SSE), which dries and is marked by an iron perch, thence:
E of Fjordbåen (6 cables SSW), which is partly awash and marked by an iron perch.

Sandefjord Havn

4.83

- 1 When the SW extremity of Asneset (59°06'N 10°14'E), on which stands Asneset Light (4.82), is distant 2½ cables the track alters to NNW and leads in mid-channel for about 2 miles to the head of the fjord. After passing Asneset, the route leads ENE of Tranga, an islet from the E side of which a light (lantern on post, 3 m in height) is exhibited, and WSW of Langestrandsbåen, 9½ cables NNE of Asneset, which, with a depth of 6.6 m, extends up to 1 cable from the E side of the fjord to a position near the centre line.

Approach from south-west

4.84

- 1 From the vicinity of 58°59'7N 10°13'5E, at the E end of Skipsleia (4.50) and clear to the N of Rauer (4.20), a white sector (016°–039°) of Holskjær Light (59°02'3N 10°16'1E) (4.81) leads NNE for about 2½ miles, passing (with positions relative to the light):
- 2 WNW of Storekrakk (2¼ miles SSW), thence:
Over or ESE of Leihausene (2¼ miles SW) which is the SE extremity of a shoal which includes Granakrakkane, 2 cables WNW of Leihausene, which lies outside the white sector and is marked by a spar buoy (port hand). A rock (2 miles SW), with a depth of 16 m over it, lies within the white sector. Thence:
- 3 ESE of Melleskjerhausen (1¼ miles SW) which is marked at its N end by a spar buoy (isolated danger). A 17 m patch (1 mile SW) lies within the white sector. Thence:

WNW of Leikarhausen (9 cables S) (4.81), thence:
ESE of the shoal surrounding and extending 5 cables NNE from Flaten (1 mile WSW).

When clear of the dangers around Flaten the track leads generally N as given at 4.82.

4.85

1 Clearing line and marks:

The line of bearing, 011°, of the W extremity of Kvernberget (59°04'N 10°15'E) (4.80), just open E of Flaten, clears to the E of Leihausene and Melleskjerhausen.

- 2 The alignment (358°) of the W extremity of Håholmen (59°04'N 10°15'E) (4.82) with Asneset Light, 2 miles N, clears to the E of the dangers extending from Flaten to Sua.

Anchorage and berths

Anchorage and moorings

4.86

- 1 **Good anchorage** can only be obtained for larger vessels to the N of Asneset, in any part of the fjord, in depths from 6 to 31 m, clear of a submarine pipeline and several submarine cables laid across the fjord, as shown on the plan. The holding ground is good but the harbour is exposed to winds from S.

- 2 **Kjerringvik** (59°02'N 10°14'E) on the W side of Sandefjordsfjorden is a good sheltered harbour with ample swinging room and good facilities. Storms at sea can create a swell in the S part of this harbour. Local knowledge is required.

Spervikbukta (59°04'N 10°14'E) affords good anchorage in 4 to 7 m soft clay, clear of a marine farm (1.21) moored in the N entrance.

- 3 **Prohibited anchorage** area exists within 50 m of Jotun's Refinery (59°06'6N 10°13'6E) as shown on the plan.

Moorings are available in Vinndalbukta, 5 cables N of Asneset.

Alongside berths

4.87

- 1 Framnes Industriutvikling (59°07'1N 10°13'7E) contains the deepest berth with a length of 216 m and depths from 14.7 to 20.5 m alongside. This area also contains the longest berth, at its N end, with a length of 225 m and depths from 1.8 to 7.6 m alongside.
- 2 Utstikker 1, at the head of the harbour, is the ferry berth. There are many other large berths around the harbour.

Port services

Facilities

4.88

- 1 Repairs afloat can be undertaken.

Other facilities

4.89

- 1 Medical and hospital facilities are good.

Supplies

4.90

- 1 Fuel oil can be bunkered; fresh water is available at the quays; provisions and stores are obtainable.

TØNSBERG HAVN AND APPROACHES

GENERAL INFORMATION

Charts 3499, 3500

Area covered
4.91

- 1 **Tønsberg Havn** (59°16'N 10°24'E) (4.146), which is situated on the W side of Oslofjorden, at the head of Tønsbergfjorden, can be approached either through Tønsbergfjorden or from Oslofjorden. These approaches involve narrow passages and restricted depths, as given at 4.94 for Tønsbergfjorden and 4.151 for Oslofjorden. The approach through Oslofjorden also passes through Tønsberg Kanal (4.151) before reaching the inner harbour.
- 2 **Minor harbours:**
Vrengen (59°10'N 10°24'E) (4.108) which can be approached from both Tønsbergfjorden and Oslofjorden through restricted channels.
Valløy (59°15'·5N 10°30'·0E) (4.131) which can be approached from both N and S.
- 3 **Minor anchorages and ports:**
Mefjorden (59°05'N 10°17'E) (4.112).
Tenvik (59°10'·4N 10°21'·9E) (4.113).
Melsomvik (59°13'N 10°20'E) (4.114).
Måkerøyflakket (59°09'N 10°27'E) (4.140).
- 4 **The section** is arranged as follows:
Approach to Tønsberg Havn through Tønsbergfjorden (4.92).
Approach to Tønsberg Havn from Oslofjorden (4.116).
Tønsberg Havn (4.146).

**APPROACH TO TØNSBERG HAVN
THROUGH TØNSBERGFJORDEN****General information**

Charts 3499, 3500

Approach from south
4.92

- 1 The main approach to Tønsberg Havn (59°16'N 10°24'E) from S is through Tønsbergfjorden (59°05'N 10°22'E) which extends 14 miles N from its entrance between Skåtangen (59°03'N 10°24'E) and the E entrance point of Mefjorden, 3 miles W. This fjord is bounded by a peninsula of the mainland, on the W side, and by the islands of Tjøme (59°07'N 10°24'E) and Nøtterøy, close N, on the E side, which separate the fjord from Oslofjorden (5.1).
- 2 The S part of Tønsbergfjorden is difficult to navigate due to the numerous islets, rocks and shoals scattered across the width of the channel. The middle reaches are encumbered by mid-lying islands which restrict vessels to narrow passages on either side of the fjord. The E of these passages, Tjømekjæla (below), also affords access to Vrengen (59°10'N 10°24'E) (4.108) at its N end, which connects Tønsbergfjorden with Oslofjorden through a narrow and tortuous channel.
- 3 The narrowed N extremity of the fjord, to the N of Kausen Light (59°13'N 10°22'E), known as Vestfjorden, connects Tønsbergfjorden with Tønsberg Havn (59°16'N 10°25'E) (4.146) which is connected to Oslofjorden by Tønsberg Kanal, close S of the town.
Tønsbergfjorden provides the deepest approach to Tønsberg Havn.

Routes**4.93**

- 1 The main channel through Tønsbergfjorden to Tønsberg Havn leads NNE through the middle of the entrance towards Tjømekjæla (59°07'N 10°23'E) (4.104), thence generally N through Tjømekjæla, close along the W side of Tjøme; the route then continues N along the W side of Nøtterøy, through the N part of the main fjord. From a position SW of Kausen Light (59°13'N 10°22'E) a narrow channel in Verjøsundet (59°13'·2N 10°22'·4E), reported to have been dredged (1993) to a depth of 9 m over a width of 50 m, leads into Vestfjorden (4.92) and thence to Tønsberg Havn at the N end of Nøtterøy.
- 2 Directions at 4.100 are given for the main channel only.
An alternative channel to Verjøsundet is Brunstadsundet, lying parallel and 2 cables NW, which has been dredged to a depth of 8 m over a width of 80 m.
There are two other entrance channels at the S end of Tønsbergfjorden, as given below, for both of which local knowledge is required.
- 3 On the W side, Tønnegapet (59°03'·5N 10°18'·7E) is very narrow at its S end and is limited to vessels with a draught of not more than 4·3 m; this channel should not be used by smaller vessels during fresh onshore winds as the sea breaks all over it. A channel then continues generally N from Tønnegapet for about 6 miles passing W of the central chain of islets and rocks.
- 4 On the E side, Svartskjærenna (59°02'N 10°24'E) passes between unmarked shoals and is suitable for small vessels only.
An approach to Vrengen from Oslofjorden is given at 4.141 and an approach to Tønsberg Havn from Oslofjorden is given at 4.148.

Limiting conditions**4.94**

- 1 **Vrengen.** A bridge with a vertical clearance of 28 m spans Vrengen (4.108) 5 cables within the W entrance, as shown on the chart; see also 1.9.
Tønsberg Havn. The maximum draught for vessels using the approach to Tønsberg through Tønsbergfjorden is 6·4 m. The controlling depth for an approach from Oslofjorden is given at 4.117.

Hazards**4.95**

- 1 **Fishing and dangerous waves.** Information concerning fishing and dangerous waves in the outer approaches to Tønsbergfjorden is given at 4.13.
Caution. A number of shoals, over which the sea breaks in stormy weather, lie in the various channels through Tønsbergfjorden; under such conditions it is essential that the position of a vessel should have been determined definitely before entering the fjord.

Pilotage**4.96**

- 1 Pilotage is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6* (2).
- 2 The pilot boards at the Færder Pilot Station (59°04'·5N 10°34'·5E).

Traffic regulations**4.97**

- 1 The approach to Tønsberg through Tønsbergfjorden is part of a specified lead as given in Appendix I.

Rescue**4.98**

- 1 A rescue station is established at Kruke (59°05'N 10°28'E) in Sandøsundet. See 1.128 for details of the search and rescue organization.

Natural conditions**4.99**

- 1 **Flow.** A definition and general information on flow is given at 1.176 and on the flow within fjords at 1.181. In Tønsbergfjorden, the flow is fairly unpredictable both in direction and rate. During "Solangsver" (1.214) the flow changes with the wind, sometimes a little before or after the wind.
 - 2 **Ice.** The approach to Tønsberg through Tønsbergfjorden is affected by ice in most winters from the beginning of January to the middle of March, due to the discharge of fresh water from a river; in long seasons this can be from the beginning of December to the end of March.
 - 3 The thickness of the ice is normally in the range of 20 to 30 cm, in the part of the fjord between the mainland and the W coast of the island of Nøtterøy, but it can be up to 1 m in some areas of Vestfjorden, the narrow N part of Tønsbergfjorden.
 - 4 The channel is kept open as required. For further information see 1.95 and *Admiralty List of Radio Signals Volume 6* (2). Conditions in Tønsberg Kanal (59°16'N 10°25'E) are given at 4.156.
- Local weather.** A description of the winds during "Solangsver" is given at 1.214. For climatic table see 1.229 and 1.234.

Directions*(continued from 4.20)***Principal marks****4.100****Landmarks:**

- 1 Kjerringfjellet (59°02'N 10°12'E) (4.11) which is the highest landmark in the approach to Tønsbergfjorden.
Torås (59°04'5N 10°24'8E) at the S end of Tjøme, which appears as two rounded peaks side by side. A radio mast, with an elevation of 50 m, marked by red obstruction lights, stands 3 cables NW of Torås.
- 2 Tønsberg Tønne Beacon (black truncated cone with broad white stripe, black barrel topmark, with an elevation of 37 m) (59°04'N 10°19'E) which stands on the W side of the entrance to the fjord.
Tjøme Church (59°06'8N 10°23'6E) merges with the land due to its grey colour but the tower stands out clearly on the skyline from the outer approach.

4.101**Major light:**

Færder Light (59°02'N 10°32'E) (4.17).

Main channel from sea to Tjømekjæla**4.102**

- 1 From the vicinity of 58°56'N 10°20'E the track leads 344° for 3 miles, following the initial directions given at 4.81. When Holskjær Light is distant 3½ miles the track alters to NNE, on the alignment (018°) of Barkevik

Leading Lights (white lanterns) (59°06'N 10°23'E), the structures of which are prominent from within the fjord. This track, which has a least charted depth of 8 m (59°03'N 10°21'E), passes (with positions relative to Holskjær Light):

- 2 WNW of the shoals which lie up to 5 cables SW of Sydostgrunnen (3¼ miles SSE) (4.21), thence:
WNW of several shoals which extend up to 1½ miles WSW and SSW from Vestre Osgrund (¾ miles E). Vestre Osgrund is a dangerous reef on the E side of the channel, marked at its N end by an iron perch. Thence:
- 3 ESE of Mellomgrunn (2 miles E), which lies 2½ cables WSW of Lyngholmshausen, a rock awash marked by an iron perch, thence:
Over an 8 m patch (2½ miles ENE), which lies on the leading line, and:
- 4 WNW of a shoal, with a depth of 7 m over it, which lies 2½ cables W of Osskjær (¾ miles ENE) a rocky islet with an elevation of about 5 m, on which stands a beacon (white truncated square pyramid, 4 m in height), thence:
- 5 ESE of Svartebåen (2½ miles ENE), a rock awash marked by an iron perch. A dangerous wreck lies close NE of the rock. Thence:
WNW of Mefjæra (¾ miles ENE), a long low rock, on which stands a beacon (black truncated cone with a white band and white stripe, 4 m in height), thence:
- 6 ESE of a shoal, with a depth of 7 m over it, which lies 4 cables E of Stauperlufa (3 miles NE), a small low rock, on which stands a beacon (black truncated cone with a white band, ¾ m in height), thence:
- 7 Close ESE of Nylandsbåen (¾ miles NE), a shoal which is marked at its S and N extremities by spar buoys (lateral), thence:
WNW of Kjøibåen (¾ miles NE), a reef close to the edge of the coastal bank.

4.103**Useful marks:**

- 1 Tønsberg Tønne Light (lantern on post, with an elevation of 21 m) (1¾ miles NE), standing 1½ cables S of Tønsberg Tønne Beacon (4.100).
Trubberodden Light (white lantern, elevation 11 m) (2½ miles NE).

Tjømekjæla**4.104**

- 1 When the front leading light at Barkevik (59°06'N 10°23'E) is distant 4½ cables the track alters to the N for about 4 miles, keeping in mid-channel between the W side of Tjøme (5.18) and a chain of islets and rocks which, with Hui (59°07'N 10°22'E) and Veierland, 5 cables N, form the W side of Tjømekjæla. The fairway at the N end of this channel tends to the W side when passing W of Havnebåen, a 7 m rock, 2 cables SW of Saltbu Light (59°09'4N 10°22'5E); the NE extremity of Veierland should be given a berth of 1½ cables.
At night, the sectors of the lights given as useful marks (below) assist in following the fairway of the channel.
- 2 **Useful marks** (with positions relative to Saltbu Light):
Svarteskjærskaten Light (lantern on post) (2 miles S), standing on the W side of the channel. A stranded wreck lies close W of the light.
- 3 Østre Vakerholmen Light (white lantern on framework structure) (1½ miles S).

Saltbu Light (white lantern), standing on the E shore of Tjømekjæla.

Saltbuflu Light (lantern on post) (3 cables N), situated at the end of a rocky spit extending NW from Tjøme.

North part of Tønsbergfjorden

4.105

- 1 From the N end of Tjømekjæla the track leads NNW for 6 cables then generally N, passing (with positions relative to Tinviksjær Light (59°10'4N 10°21'9E)):

WSW of Tinvikskjær Light (white lantern), situated on a rock close to the SW end of Nøtterøy, thence: Through the middle of the narrow channel between Håøy (4 cables NW) and Nøtterøy, thence:

- 2 E of Ramnøya (1 mile NNW) and Gåsø (1¾ miles NNW).

At night, the sectors of Tinvikskjær Light and Kausen Light (4.106) assist in following the fairway of the channel.

Charts 3500, 3717 plan of Tønsberg Havn

Vestfjorden

4.106

- 1 From a position 5 cables SSW of Kausen Light (59°13'N 10°22'E) the track leads NNE into Vestfjorden, passing (with positions relative to the light):

ESE of Trælsodden (2½ cables WSW), thence:

WNW of Kausen Light (white lantern) situated on a rocky islet on the E side of the entrance to Vestfjorden, thence:

- 2 Through the dredged and buoyed channel in Verjøsundet (4 cables NNE), which lies SE of Verjø and is deeper but narrower than Brunstadsundet (4.93). A white sector (028¾°–031½°) of Furuodden Light (white lantern on column) (9 cables NNE) leads through the fairway of Verjøsundet. Thence:
- 3 WNW of Furuodden Light, exhibited from the E shore of the fjord.

4.107

- 1 Thence, from a position in mid-channel, 4 cables N of Furuodden Light, a white sector (358°–003¾°) of Munkerekka Light (white lantern) (59°15'N 10°23'E) leads in mid-channel for about 7 cables. The track the leads generally NNW then N, for about 1¾ miles, to a position NNE of Smørberg Light (white lantern) (59°16'N 10°23'E) exhibited from the W shore of Vestfjorden.

- 2 **Useful mark:**

Tower at Slottsfjellet (59°16'3N 10°24'3E).

(Directions continue for entering Tønsberg Havn at 4.168)

Vrengen

Chart 3500

General information

4.108

- 1 **Vrengen** (59°10'N 10°24'E), the sound between the N side of Tjøme and the S side of Nøtterøy, connects Tønsbergfjorden with Oslofjorden, 2½ miles E, through a channel that is narrow and tortuous.

This sound also forms a natural harbour, with port facilities at both the E and W ends of the area.

- 2 **Speed** is limited to 8 kn within the narrowest part of the channel, from the S end of the W entrance to a position 6 cables ESE of Tuten Light (59°10'5N 10°23'8E).

Buoyage direction is from W to E.

Bridge. A bridge which spans the channel 5 cables within the W entrance, has a least vertical clearance as

given at 4.94. Two fixed red lights, vertically disposed, are exhibited from the centre of the bridge.

Directions

4.109

- 1 **Approach to Vrengen from west.** The W entrance channel into Vrengen is entered N of Saltbuflu Light (59°10'N 10°23'E) (4.104), at the N end of Tjømekjæla.

Useful mark:

Tuten Light (white lantern) exhibited from the N shore of the sound, 1 mile NE of Saltbuflu Light.

- 2 **Passage through Vrengen.** The channel through Vrengen is obstructed by foul ground and islets making local knowledge essential for safe passage within the harbour and onward towards Oslofjorden.

- 3 **Approach to Vrengen from south-east.** The approach from Oslofjorden, given at 4.141, continues as far as Måkerøyflakket (59°09'N 10°27'E) (4.140), the anchorage off the E entrance to the sound.

Moorings and berths

4.110

- 1 **Moorings.** Two mooring buoys, with a maximum depth of 6.5 m, are available in Måkerøy (59°09'4N 10°26'0E), a bay at the SE end of the harbour.

- 2 **Berths.** The largest berth, which has a length of 45 m and depths from 6.6 to 9.5 m alongside, is situated in Kjøpmannskjær at the W end of the sound. There are some 15 other berths and it is reported that larger vessels are often laid-up in Vrengen.

Repairs

4.111

- 1 Repairs can be undertaken at a shipyard in Måkerøy, which has a slipway with a length of 60 m, width of 10 m and depth of 4 m.

Minor harbours and anchorages

Chart 3499

Mefjorden

4.112

- 1 **Description.** Mefjorden (59°05'N 10°17'E) extends 5 miles N from its entrance, 1 mile NE of Holskjær Light (4.81). This fjord is encumbered with islets and rocks, many of which are marked by a perch or a spar buoy. Local knowledge is required.

- 2 **Anchorages.** Small coasters may obtain anchorage in Mefjorden, over a bottom of sand and clay. The inner anchorage, about 1 mile from the head of the fjord, is safe in all weathers.

Chart 3500

Tenvik

4.113

- 1 Tenvik (59°10'4N 10°21'9E), situated at the SW end of Nøtterøy, contains three quays with depths between 3.6 and 10.1 m. Boat building is carried out in this harbour.

Melsomvik

4.114

- 1 **Description.** Melsomvik (59°13'N 10°20'E), situated in the N part of Tønsbergfjorden, contains a quay with a length of 80 m and depths from 3.9 to 4.0 m alongside. A large marina at the head of the harbour is protected by a floating breakwater.

Traffic. In 2002, Melsomvik was visited by three ships totalling 5860 dwt.

Charts 3499, 3717 plan of Tønsberg Havn

Anchorage

4.115

- 1 **Tallakshavn**, 1¼ miles N of Tønsberg Tønne Beacon (59°03'6N 10°18'6E), which is exposed to strong winds from the SE, affords anchorage in a depth of 6 m, over a bottom of sand, with moderately good holding ground. A rock close S of the anchorage position is marked by an iron perch which is used as a mooring post in addition to mooring rings which are available on the W shore. Local knowledge is required.
- 2 **Tjømekjæla** affords anchorage 4 cables SSW of Østre Vakerholmen Light (59°08'N 10°23'E), in depths from 15 to 20 m, clay, and in a position 1¼ miles NNW of the light, in a depth of 20 m. The anchorages are shown on the chart.
- 3 **Vestfjorden** affords anchorage at the N end of the fjord, 2 cables NE of Smørberg Light (59°16'N 10°23'E) (4.107), as shown on the chart, in a depth of 11 m, clear of a submarine cable which is laid across the fjord 2 cables S of the anchorage position. This is the quarantine anchorage for Tønsberg Havn.

APPROACH TO TØNSBERG HAVN FROM OSLOFJORDEN

General information

Charts 3499, 3500, 3717 plan of Tønsberg Havn

Approach routes

4.116

- 1 **Huikjæla**. The deepest and widest approach is from SW through Huikjæla (59°11'N 10°33'E). Approach can also be made from S through Sandøundsleia (59°07'N 10°27'E); and from NE through Granabåsundet (59°14'7N 10°30'6E). Huikjæla is the preferred channel for approaching Tønsberg from Oslofjorden as it has the clearest waterway. Directions are given at 4.121.
- 2 **Sandøundsleia**, commonly known as Leia, an inner channel on the W side of Oslofjorden, continues N from Sandøsundet (59°05'N 10°27'E) to Valløy, 10 miles N. It is generally narrow but well marked and presents no difficulties to navigation for coasters and small craft, in good visibility, along the route described at 4.125. However, local knowledge is required.
This channel is connected with Tønsbergfjorden by Vrengen (59°10'N 10°25'E) (4.108) and with Tønsberg by Husøysundet (59°14'7N 10°27'7E) (4.169).
- 3 **Granabåsundet** (59°14'7N 10°30'6E), which is the principal route from NE into Sandøundsleia and thence to Tønsberg, has a least charted depth of 10 m and a narrow section with a width of about 100 m. Directions for this channel, in which the direction of buoyage is N-going, are given at 4.126.

Limiting depth

4.117

- 1 The maximum draught for vessels approaching from Oslofjorden and entering through Husøysundet and Tønsberg Kanal is 5.5 m.
The controlling depth for an approach through Tønsbergfjorden is given at 4.94.

Pilotage

4.118

- 1 Pilotage is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours.

For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*.

- 2 The pilot boards at Færder Pilot Station (59°04'5N 10°34'5E).

Regulations

4.119

- 1 Anchoring, diving and fishing with bottom gear is prohibited on the W side of Bolærne within an area which extends up to 1¼ miles SSE and E from Hvaløy Light (59°12'7N 10°29'8E) as shown on the chart and plan.

Natural conditions

4.120

- 1 **General** conditions for Oslofjorden are given at 5.11.
Flow along the W side of Oslofjorden at its S end is described at 5.25.
Ice conditions in the S part of Oslofjorden are given at 5.11.

Directions

Principal marks

4.121

- 1 **Landmarks:**
Hollenderbåen Light (59°10'N 10°38'E) (5.26).
Fulehuk (59°11'N 10°36'E) (5.26).
Veten (59°10'6N 10°25'8E) (5.26).
Tower at Slottsfjellet (59°16'3N 10°24'3E).

Approach to Tønsberg from south-east through Huikjæla

4.122

- 1 From the vicinity of 59°09'N 10°36'E the line of bearing, 321°, of the tower at Slottsfjellet (4.121), which can be clearly seen near the middle of the entrance to Huikjæla, well open NE of Hvaløy (59°12'N 10°30'E), leads NW through the fairway, passing (with positions relative to Huikjæla Light (59°11'N 10°33'E)):
- 2 SW of Rauergrunnen (2½ miles SE); see clearing line (4.124). Thence:
SW of the bank fringing Store Rauer (1½ miles SE), and:
NE of the bank and shoals surrounding Vierskjera (1¼ miles S), a group of above-water and below-water rocks on which stands a beacon (black tower), thence:
- 3 SW of a reef, marked by an iron perch, which extends 1½ cables SSW from Klauver (7 cables SSE), thence:
NE of Store Hui (6 cables SSW), a bare, brown island with a steep fall at its S end, thence:
- 4 SW of Huikjæla Light (white lantern on tripod) which stands on the S extremity of Ramsholmen, thence:
NE of the bank and shoal extending NE from Skjellerøy (6 cables W), and:
SW of the drying reef which lies over a cable SW of Trollholmen (6 cables NNW).

4.123

- 1 From a position 9 cables WNW of Huikjæla Light the track given above leads very close to the SW side of the channel and deeper water will be found within a white sector (133°–136°) of Huikjæla Light, astern, which continues NW in the fairway, passing (with positions relative to the light):
- 2 NE of the bank and rocks fringing Gåsøy (1¼ miles WNW), and:

SW of the extensive shoal extending W from Bolærne (5.31) (1½ miles NW), thence:

NE of the rocks fringing Hvaløy (2 miles NW) on the N extremity of which stands Hvaløy Light (4.125), thence:

- 3 SW of Espelund (2¼ miles NW), thence:
SW of Søre Langskjærbåen, 7 cables NNW of Hvaløy Light, which extends ¾ cable WSW from Langskjæra. There are rocks awash on Søre Langskjærbåen, the edge of which is marked by a spar buoy (starboard hand).

4.124

1 Clearing line:

The alignment (285°) of the N extremity of Vierskjæra (4.122) with Vetten (59°10'6N 10°25'8E) (5.26) clears S of Rauergrunnen (4.122).

(Directions continue at 4.169)

Approach to Tønsberg from south through Sandøundsleia

4.125

- 1 **Approach to south entrance from south.** A deep water approach to Sandøundsleia (59°06'N 10°27'E) from the S can be made through a channel passing W of Lille Færder (59°02'N 10°32'E) (4.17) and E of Laksskjær Light (white lantern on tripod, 10 m in height), 2¼ miles NW.

- 2 Thence the approach leads between Store Færder (59°04'N 10°31'E) (5.26) and Sandøy, 1½ miles W, keeping clear of Mefjæra (59°04'N 10°30'E) and Kringlene, 1¼ miles N, both of which lie in the channel and are marked with a perch.

- 3 **Approach to south entrance from east.** Approach can also be made from the E through a channel between Store Færder and Melleskjærhausen, 1 mile NNW, which is marked by a spar buoy (port hand).

- 4 **Sandøundsleia.** Entry can then be made from either of the above approaches through Busteinsløpet (59°05'5N 10°28'5E) which connects with the S end of Sandøundsleia from whence the fairway, which leads N for about 7 miles, is generally indicated by white light sectors which do not, however, guarantee the deepest water, as follows:

- 5 354°–000° of Kongsholmen Light (white lantern) (59°07'3N 10°27'3E) ahead, then 186°–188° astern. Thence:
014°–024° of Vasholmen Light (white lantern) (59°10'6N 10°28'5E) ahead, then 182°–185° astern. Thence:
- 6 024°–027½° of Hvaløy Light (white lantern on concrete base) (59°12'7N 10°29'8E) ahead.

Hvaløy Light marks the N limit of the narrow channel. From this position Sandøundsleia passes through more open waters with the route N generally indicated by a white light sector (145°–158°) of Hvaløy Light astern; thence N through Husøyflaket (59°14'N 10°29'E).

(Directions continue at 4.169)

Approach to Tønsberg from north-east through Granabåsundet

4.126

- 1 From the vicinity of 59°16'N 10°32'E the alignment (210½°) of Granabåsundet Leading Lights (lanterns on posts, elevation: front 3 m, rear 9 m) (59°13'8N 10°29'6E)

leads SSW through Granabåsundet, passing (with positions relative to the front light):

- 2 ESE of Torgersøy (1 mile NNE) on which stands a beacon (black and white), and:
WNW of a rock awash, (1¼ miles NNE) which is the N of the dangers extending W from Fjærskjær; the rock is marked by a spar buoy (starboard hand). Thence:
- 3 Through the narrows (1 mile NNE) between Granabåene, the SE edge of the reef extending 1 cable SE from Torgersøy, marked by two spar buoys (port hand), and Fjærskjærbåen, the W side of which is marked by a spar buoy (starboard hand), thence:
- 4 WNW of Kjerkebåen (5 cables NE), a rocky shoal lying 1½ cables off the W side of Tørfest, which is marked by a spar buoy (starboard hand), and:
ESE of Ormøysteinane (4 cables N), a reef which extends 3 cables S from Ormøy, marked on its S end by a spar buoy (port hand).

4.127

- 1 **Shortest route to Husøyflaket.** From a position 3 cables NNE of Granabåsundet Front Leading Light the track can be altered W to pass between the S side of Ormøysteinane and the N side of Sørensbåen, 2¼ cables NNW of the front leading light, which consists of two rocks, ½ cable apart, the W and deeper of which is marked by a spar buoy (W cardinal). This track leads into Sandøundsleia at Husøyflaket and towards Husøysundet (4.169).

(Directions continue at 4.169)

4.128

- 1 **Alternatively and at night.** From a position 3 cables NNE of Granabåsundet Front Leading Light (59°13'8N 10°29'6E) a white sector (185°–188°) of Hvaløy Light (59°12'7N 10°29'8E) (4.125) leads S through the fairway, passing (with positions relative to Hvaløy Light):
- 2 Over or W of a rock (1¼ miles N), with a depth of 9 m over it, thence:
E of the N islet of Langskjæra (1 mile N), on which stands Granabåsundet Front Leading Light, thence:
- 3 W of two shoals (7½ cables N and 1 mile N) which lie up to 4½ cables N of Espelund, the S of which is marked by a spar buoy (starboard hand), and:
E of a chain of islets and rocks which lie over 1 cable E of Langskjæra (8 cables NNW).

4.129

- 1 When clear of the bank extending 2 cables S from Langskjæra the track can be altered W then NW into another white sector (145°–158°) of Hvaløy Light which, astern, leads in clear water between the dangers surrounding Steinkløss (59°13'1N 10°28'6E), on the NE islet of which stands a beacon (tower, black with white band), and the dangers extending 1 cable SW from Langskjæra, marked by a spar buoy (starboard hand), 3 cables ENE of the beacon.

4.130

- 1 When clear of the dangers extending W from Langskjæra, a white sector (346°–350°) of Jersøy Light (white lantern) leads NNW towards Husøysundet, and within 1 cable of the light, passing (with positions relative to the light):
- 2 ENE of Fjærholmbåen (9½ cables S) which has a depth of 2 m or less over it and is marked by a spar buoy (port hand), thence:
WSW of Nordre Langskjærbåen (8 cables SSE) which is marked by a spar buoy (starboard hand), thence:

- 3 WSW of Sørensbåen (6½ cables SE) (4.127), and: ENE of Husøy (4 cables S) which is steep-to on its E side.

(Directions continue at 4.169)

Valløy and approaches

Charts 3500, 3717 plan of Tønsberg Havn

General information

4.131

- 1 **Description.** The peninsula of Valløy (59°15'·5N 10°30'·0E) (Vallø on Chart 3500), which encloses the bay of Valløybukta, is occupied in the main by a tank farm and an oil refinery. This installation has three jetties, on the W side of the peninsula.
- 2 On the W side of the bay, near the SW entrance, a large industrial complex with a major berth is established on the NE side of Jersøy (59°14'·9N 10°28'·5E).
- 3 **Approach and entry.** Valløybukta can be entered through Husøyflaket (59°14'N 10°29'E) (4.160) or direct from Oslofjorden through Torgersøygapet (59°15'N 10°30'E), a narrow channel with a least depth of 5·5 m on the N side of the fairway, 1 cable NE of Torgersøy Light, that is suitable for small vessels.

Directions for entering harbour

4.132

- 1 **Routes via Husøyflaket.** Approaches to Husøyflaket are given as follows:
- From SE, through Huikjæla (59°11'N 10°33'E), at 4.116.
- From NE, through Granabåsundet (59°14'·7N 10°30'·6E) at 4.116.
- 2 From Husøyflaket a clear channel leads N into Valløybukta passing W of Ormødynga (59°14'·9N 10°29'·5E), a reef which partly dries and is marked along its NW side by two spar buoys (starboard hand).

Useful mark:

Narverød Light (white lantern) (59°15'·2N 10°28'·8E).

4.133

- 1 **Torgersøygapet.** From a position 5 cables ENE of Torgersøy Light (59°15'N 10°30'E) the line of bearing, 260°, of the NW point of Torgersøy (4.126) leads into Torgersøygapet, passing (with positions relative to the light):
- S of a charted depth of 6·5 m (3 cables ENE) which is marked close NE by a spar buoy (port hand), thence:
- 2 S of a rock (1 cable NE) which is the least depth in the channel, as given at 4.131. This rock lies within a white sector (272°–274°) of Narverød Light (4.132).
- After passing the least depth the track is altered to the W to pass ½ cable N of Torgersøy Light (white lantern on concrete base) and S of the S edge of Hestebåen, a reef extending 2 cables S from Valløy, which is marked along its S edge by two spar buoys (port hand).
- 3 When clear of Hestebåen the track is altered NW into Valløybukta, passing NE of Ormødynga (4.132).

Anchorage

4.134

- 1 Valløybukta affords good anchorage to small vessels 4½ cables NE of Narverød Light, as shown on the chart, in depths from 10 to 20 m, clay, clear of a pipeline and a

submarine cable (1.69) 2 cables SW of the anchorage. Strong winds from the S and SE can create a considerable sea; however, this anchorage is frequently used by larger vessels.

Berth

4.135

- 1 The largest berth, which is situated on the NW side of the S jetty at the refinery, has a length of 82 m with depths from 10·1 to 8·3 m alongside the outer 65 m.

Anchorage and minor harbours

Chart 3499

Røssesundet

4.136

- 1 Røssesundet (59°05'·0N 10°25'·5E) lies between the E side of Tjøme and the W sides of Hvasser and Brøtsøy, close N. The approach from S is full of shoals and skerries and can appear impassable due to a confused sea during onshore winds. However, during the summer, the area is busy with small craft and the sound contains a number of good harbours, including:
- 2 Ormelet (59°06'·3N 10°25'·1E), situated close N of a bridge which spans the sound, with a vertical clearance of 14 m (see 1.9), which contains a marina.
- Verdens Ende (59°03'·5N 10°24'·6E), situated along the SE extremity of Tjøme, which contains a good harbour protected by a mole with plenty of moorings for visitors.

Sandøundet

4.137

- 1 **Description.** Sandøundet (59°04'·5N 10°27'·5E), which lies between the E side of Hvasser and the W side of Sandøy, contains the small harbour of Kruke which has been dredged to a depth of 3·5 m but is subject to a steady silting of sand and mud. This harbour, which is protected by two moles, contains seven main berths and good facilities for small craft.
- 2 **Directions.** Krukepynten Light (white lantern) stands on the E side of the harbour and is the front light of leading lights, with Sandvikberget Light (white lantern), 6 cables NNW, as the rear light; which, in alignment (345½°) lead into Sandøundet.

Vestgardskilen

4.138

- 1 Vestgardskilen (59°06'·5N 10°26'·5E), an inlet which extends 3 miles S from Burøy, contains a number of good anchorages but is foul and local knowledge is required. The most frequented anchorage lies in a cove on the E side of Brøtsøy in depths from 7 to 8 m clay and mud, as shown on the chart. Repairs and winter storage are available.

Holtekjærkilen

4.139

- 1 Holtekjærkilen (59°08'·5N 10°25'·5E), a bay on the E side of Tjøme, contains several good anchorages, as shown on the chart, with depths from 8 to 17 m clay and rock in places, clear of submarine cables and marine farms (1.21). There is an alongside berth at Grimestad in the SW part of the bay.

Måkerøyflakket**4.140**

- 1 **Description.** Måkerøyflakket (59°09'N 10°27'E) situated between Mågerø and the islet of Reieren, 7 cables E, affords anchorage suitable for small vessels. The recommended anchorage lies 5 cables SE of Måkerøytangen Light, on the alignment (016°) of the E extremities of Søndre Årøy and Norde Årøy, in depths from 15 to 22 m, sand and clay, clear of Herbergbåen, 8 cables SSW of the light, which is marked by an iron perch. Winds from the S can set up a considerable sea.

4.141

- 1 **Approach** to Måkerøyflakket, and to Vrengen (59°10'N 10°24'E) (4.108), from SE can be made through Leisteinsløpet (59°08'4N 10°29'7E), the channel close S of Leistein, in a least charted depth of 10 m, thence either side of Reieren (59°09'N 10°28'E). The deeper channel lies to the N of the island; the channel to the S, which is marked by a white sector (107°–112°) of Leistein Light, has a least depth of 7 m within the sector.

4.142

- 1 **Directions.** From a position 2 miles SE of Leistein the line of bearing, approximately 327°, of the SW point of Skråslingskalven (59°09'5N 10°28'6E) just visible W of Leistein, leads NNW for about 1½ miles, within a white sector (323°–331°) of Leistein Light (white lantern on tripod), passing (with positions relative to the light):

- 2 WSW of Hanshausen (1½ miles SE), thence:
ENE of Drillenflakket (1½ miles S), a reef with depths of 2 m or less over it, marked off its SW extremity by a spar buoy (starboard hand), thence:
ENE of a shoal, with a depth of 4.5 m over it (5½ cables SSE).

- 3 **Useful mark:**

Beacon tower (black with white bands) standing on Lille Fjærskjær (2¼ miles S).

4.143

- 1 When the light is distant about 4 cables the track alters to the NW for about 1 mile, passing (with positions relative to Leistein Light):

Close SW of a 7 m rock which extends 1¼ cables W from the light, and;

NE of the dangers surrounding the two islets of Leisteinskjera (4 cables SW), thence:

NE of a 7 m patch (5 cables WNW).

- 2 When close to Reieren the track alters NNW for about 3 cables, to pass through a narrow channel between the NE side of Reieren and Reierenbåen, 1 cable NE, a reef marked by two iron perches.

- 3 When 2 cables N of Reieren the track alters towards the W passing N of the shoal extending 1½ cables N from Reieren, marked off its W side by a spar buoy (starboard hand). This track leads into the anchorage at Måkerøyflakket (59°09'N 10°27'E) (4.140), initially within a white sector (268°–308°) of Måkerøytangen Light (white lantern) situated at the NW end of the anchorage and on the S side of the E entrance to Vrengen (4.108).

4.144

- 1 **Useful marks:**

Østre Bustein (59°06'N 10°30'E) and Vestre Bustein, close W, stand out from other islands in the vicinity; Vestre Bustein has a steep fall on its W side.

- 2 Beacon tower (white), standing on Leistein (59°09'N 10°30'E).
Veten (59°11'N 10°26'E) (5.26).

Three conspicuous spherical tanks which stand near the E coast of Måkerøy (59°09'N 10°27'E).

*Chart 3500***Bjerkø Sund****4.145**

- 1 Bjerkø Sund (59°12'5N 10°27'5E) affords anchorage throughout its length, clear of submarine cable areas. The depths are shallow and the bottom is sand and mud. The middle of the sound is spanned by an overhead cable with a vertical clearance of 28 m (see 1.9). Knarrberg (59°12'5N 10°27'3E), on the NW side of the sound, is a large harbour for small craft with berths for visitors and good facilities. The SE corner of this harbour is spanned by an overhead cable with a vertical clearance of 4 m.

TØNSBERG HAVN**General information**

Charts 3500, 3717 plan of Tønsberg Havn

Position and function**4.146**

- 1 Tønsberg Havn (59°16'N 10°24'E) is situated on the W side of Oslofjorden, at the head of Tønsbergfjorden (4.92) which extends 14 miles inland from its entrance on the S coast.

- 2 Tønsberg, built mainly on the NE side of the harbour, is the capital of Vestfold with both state and council administration facilities. With a population of 41 345 in 1998 this is a bustling town with considerable shipping and industrial interests, including a major shipyard.

Port limits**4.147**

- 1 The harbour area extends from a position 1½ cables S of Smørberg Light (59°16'N 10°23'E), at the N end of Tønsbergfjorden, to the E entrance of Husøysundet (59°14'6N 10°28'0E), on the W side of Oslofjorden.

Approach and entry**4.148**

- 1 **From south.** Tønsberg can be approached from seaward through the full length of Tønsbergfjorden as given at 4.93 and entered at the W end of the harbour.

- 2 **From west.** Tønsberg can be approached from Oslofjorden via several routes as given at 4.116. Entry from the W approaches is through Husøysundet (59°14'N 10°29'E) (4.169), and thence through Tønsberg Kanal (59°15'7N 10°25'0E) (4.157), which is dredged through the passage N of Nøtterøy.

Traffic**4.149**

- 1 In 2004 the port was used by 289 vessels with a total of 327 156 dwt.

Port Authority**4.150**

- 1 **Address.** Tønsberg Havnevesen, Nedre Langgaten 36, N-3126 Tønsberg, Norway.

Email. tonsberg.havn@tonsberg.havn.no.

Limiting conditions**Controlling depths****4.151**

- 1 **From south.** The controlling depth in the approach from S through Tønsbergfjorden, which is the deepest channel, is given at 4.94.

From Oslofjorden. The maximum draught for vessels approaching from Oslofjorden and entering through Husøysundet and Tønsberg Kanal is given at 4.117.

- 2 **Tønsberg Kanal**, which links Tønsbergfjorden with Oslofjorden is a dredged channel with a least depth of 6.5 m. Vessels using this canal are limited to a draught of 6 m and a width of 22 m.

Deepest and longest berths

4.152

- 1 The deepest and longest berth for commercial use is Kanalbrygga (4.172). A larger berth, which is located in the shipyard, is given at 4.173.

Mean tidal levels

4.153

- 1 The tidal range in the harbour is very small and water levels are often dominated by meteorological conditions (1.187). The tides vary approximately as at Nevlunghavn (58°58'N 9°53'E), about 27 miles SW of Tønsberg, where the mean spring range is 0.3 m and the mean neap range 0.15 m. See *Admiralty Tide Tables Volume 2* for further information.

Density of water

4.154

- 1 The water is occasionally brackish.

Maximum size of vessel handled

4.155

- 1 The maximum size of vessel handled is reported to be 14 000 dwt in ballast.

Ice

4.156

- 1 Ice usually forms in the passage N of Nøtterøy during January and February. However, Tønsberg Kanal and a channel connecting it with Oslofjorden are kept open during normal winters. For ice conditions in Tønsbergfjorden see 4.99 and in Oslofjorden see 5.11.

Bridges

4.157

- 1 A swing bridge spans the canal near its SE end. There is a depth of 6.7 m in the channel by the bridge; the channel has a width of 26 m when the bridge is opened. Signs on the bridge piers show the vertical clearance under the bridge when closed.
- 2 This bridge, which is opened on request, is controlled by normal bridge opening times which, from April 1st to October 1st are 0730–2000 on working days and 0730–1700 on holidays; see 4.166 for signals. During winter the bridge is manned from 0730–1530 Monday to Friday. Within these times there are special opening periods for small craft. Bookings can be made during working hours for an opening of the bridge outside the normal hours.

A second bridge, which also opens, spans the canal at its NW end near Kaldnes. When closed it has a vertical clearance of 5.1 m.

Arrival information

Port radio

4.158

- 1 There is a port radio station at Tønsberg which is manned during working hours. For further information see *Admiralty List of Radio Signals Volume 6 (2)*.

VHF facilities for the coast radio service are located in Tønsberg, for further information see *Admiralty List of Radio Signals Volume 1 (1)*.

Notice of ETA

4.159

- 1 Cable ETA via Tjøme Radio prior to arrival.

Outer anchorages

4.160

- 1 **Husøyflaket** (59°14'N 10°29'E), between the W side of Ormøy and the E side of Husøy, 5 cables WSW, affords well sheltered anchorage for small vessels in depths from 20 to 25 m, clay. However, winds from the E and SE can be troublesome.
- 2 **Husøysundet** affords good anchorage for coasters 1½ cables WNW of Jersøy Light (59°14'.5N 10°28'.6E) in a depth of 12 m, as shown on the plan, clear of a submarine cable 1 cable SE. Stern hawsers can be secured either to Jersøy or to the NE side of Husøy.

Pilotage and tugs

4.161

- 1 **Pilotage.** See 4.118.
Tugs are available.

Regulations concerning entry

4.162

- 1 There is a speed limit of 3 kn in Tønsberg Kanal. Special regulations which apply in the vicinity of the Bolærne Group of islands (59°12'.5N 10°33'.5E) are given at 5.31; and those which apply in Huikjæla (59°11'N 10°33'E) are given at 4.119.

Quarantine

4.163

- 1 Quarantine anchorage for vessels approaching from Oslofjorden is in Husøyflaket (4.160); and for vessels approaching through Tønsbergfjorden in Vestfjorden (4.115).

Harbour

General layout

4.164

- 1 Tønsberg Havn is formed on both sides of the passage N of Nøtterøy which contains Tønsberg Kanal and is spanned by a swing bridge towards its SE end. Many large commercial berths lie SE of the bridge whilst a major shipyard occupies the S side of the harbour to the NW of the bridge.

There are several enclosed anchorages within the port limits.

Buoyage

4.165

- 1 The direction of buoyage is SE between Tønsberg and Husøyflaket, 3 miles SE; it is therefore correct for leaving harbour to the SE and not for entering from Oslofjorden.

Traffic signals

4.166

- 1 Tønsberg Kanal Bridge normal opening hours are given at 4.157. Mariners wishing to transit the canal must contact the bridge watch by radio, or sound 1 long and 2 short blasts on the whistle prior to approaching the bridge.

- 2 Traffic signals for vessels transiting in both directions are displayed on the watch tower of the bridge, with meaning as follows:

Green light: canal open for passage; bridge can be opened.

Red light: canal is not clear and bridge is not open to traffic facing the direction of this light.

Green and red lights together: Canal is open as far as the berths facing these lights but the bridge is not open to traffic.

Natural conditions

4.167

- 1 **Flow.** Within Tønsberg the flow is unpredictable and changes readily with the wind. General information on flow is given at 4.7.

Climatic table. See 1.229 and 1.234.

Directions for entering harbour

Chart 3717 plan of Tønsberg Havn

Entering harbour from Tønsbergfjorden

(continued from 4.107)

4.168

- 1 From a position $3\frac{1}{2}$ cables NNE of Smørberg Light ($59^{\circ}16'0N$ $10^{\circ}22'7E$) (4.107), a buoyed channel, dredged to a depth of 8 m, leads E across the bar which extends N from the N side of Nøtterøy to the mainland and separates Vestfjorden from Tønsberg Havn.
- 2 **Leading lights.** The alignment ($095\frac{1}{2}^{\circ}$) of the leading lights at the W end of Tønsberg leads through the channel into Tønsberg Havn:
 Nordbyen Light (lantern on tripod) ($59^{\circ}16'3N$ $10^{\circ}24'1E$) on the shore of the inner harbour.
 Slottsfjellet Light (post) (1 cable E of the front light).

Entering harbour from Oslofjorden

(continued from 4.124, 4.125, 4.127 and 4.130)

4.169

- 1 **Husøysundet** ($59^{\circ}14'6N$ $10^{\circ}28'0E$), the E entrance to which lies S of Jersøy, consists of a narrow dredged channel at its E end, marked by spar buoys (lateral), with a light-buoy (port hand) on the N side of the channel at the W end of the narrow section.
- 2 By proceeding through the dredged channel on the dividing line of the green and red sectors of Jersøy Light, bearing 104° , astern, the depth will not be less than 7.0 m. Also, the dividing line of the green and red sectors of Kalvetangen Light (white lantern, concrete base) ($59^{\circ}14'7N$ $10^{\circ}26'8E$), bearing 282° ahead leads through the fairway to within 1 cable of the light.
- 3 From a position $1\frac{1}{2}$ cables NNW of Kalvetangen Light, the white sector (154° – 168°) of this light, astern, leads NNW for $4\frac{1}{2}$ cables towards the SE end of Tønsberg Kanal, which is marked by Tønsberg Kanal Light-buoy (starboard hand), $6\frac{1}{2}$ cables NNW of Kalvetangen Light, on the SW side; and by a spar buoy (port hand), close NE, on the NE side. Træla Light-buoy (port hand), $5\frac{1}{2}$ cables NNW of Kalvetangen Light, is moored on the leading line to the SE of the entrance.
- 4 When the alignment ($117\frac{1}{2}^{\circ}$), astern, of the leading lights on Nordre Nes (lanterns on posts) ($59^{\circ}15'1N$ $10^{\circ}27'1E$) is reached, or the light on the swing bridge is

aligned (298°) with Kalnes Light (lantern on column), ahead, the track leads into Tønsberg Kanal.

Anchorage and berths

Outer berths

4.170

- 1 A pier which extends 40 m from the coast at Tangen ($59^{\circ}14'8N$ $10^{\circ}28'2E$) provides a bunkering berth with a length of 32 m and depths from 3.5 to 3.6 m alongside its head. A number of oil tanks stand at the root of this pier.
 A quay on the NE side of Husøy ($59^{\circ}14'3N$ $10^{\circ}28'0E$) has a length of 98 m and depths from 3.6 to 5 m alongside.

Anchorage

4.171

- 1 Træla ($59^{\circ}15'N$ $10^{\circ}26'E$), a basin between Husøysundet and the town, affords anchorage 3 cables NW of Kalvetangen Light, as shown on the chart, in a depth of 12 m. This anchorage is to be used for vessels approaching from Oslofjorden which have not been allocated an anchorage or mooring.

Alongside berths

4.172

- 1 The longest commercial berth, with a length of 248 m and depths from 3.6 to 6.7 m alongside, is Kanalbrygga which extends along the N side of the entrance to Tønsberg Kanal, close SE of the bridge.
 A Ro-Ro installation, with a length of 78 m and depths from 5.7 to 6.5 m, which extends E from Kanalbrygga, contains a ramp with a width of 13 m and depths from 6.0 to 7.4 m.

Port services

Repairs

4.173

- 1 Repairs of all kinds can be carried out. The largest dry dock, which is in the Kaldnes de Groot Shipyard, situated on the S side of the harbour at the W end of the canal, has a total length of 150 m, width of 21 m and depth of 6.9 m. There is also a patent slip for vessels up to 1000 dwt and 61 m in length.
- 2 This shipyard, which repairs and builds vessels up to 50 000 dwt, contains a jetty with a length of 290 m and depths from 5.6 to 8.5 m alongside. The harbour also contains a special crane with a lifting capacity of 125 tonnes.

Other facilities

4.174

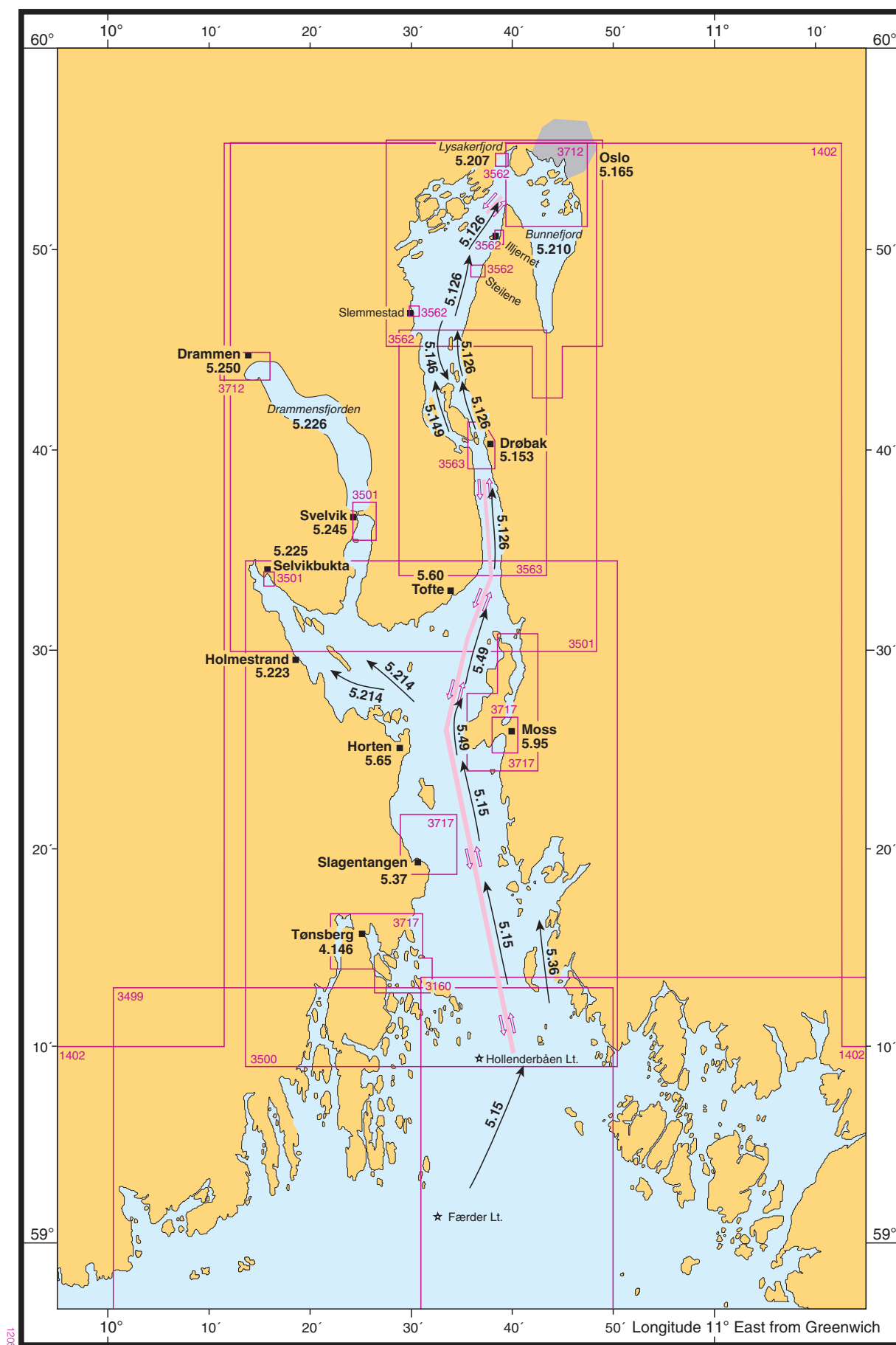
- 1 Deratting Exemption Certificates can be issued; medical and hospital facilities are available.

Supplies

4.175

- 1 Fuel deliveries in the harbour are by road tanker only; there is a bunkering berth (4.170) outside the harbour. Fresh water is laid on to all berths. Provisions and all usual stores, including charts, can be obtained in the town.

Chapter 5 - Oslofjorden



CHAPTER 5

OSLOFJORDEN

GENERAL INFORMATION

Charts 3499, 3160, 3500, 3501

Scope of the chapter

5.1

- 1 This chapter covers the main channel of Oslofjorden (59°30'N 10°30'E) which extends 55 miles N from the NE end of the Skagerrak to Oslo at its head.

Other parts of this extensive fjord are given as follows:

- 2 The W side of the fjord, at its S end, from Laksskjær (59°03'N 10°28'E) to Valløy (59°16'N 10°30'E), 12½ miles N, in chapter 4, as outlined at 4.1, as it forms part of the inner approach to Tønsberg (59°16'N 10°24'E) (4.146).
- 3 The E side of the fjord at its S end, in chapter 6, as outlined at 6.1, as it forms part of the approach to Fredrikstad (59°12'N 10°57'E) (6.78).
The chapter is arranged as follows:
Oslofjorden – S part (5.13).
- 4 Oslofjorden – central part (5.47).
Oslofjorden – N part (5.124).
Drammensfjorden and approaches (5.212).

Channel

5.2

- 1 From its principal entrance, between Lille Færder (59°02'N 10°32'E) and Torbjørnskjær, 8 miles ESE, the S part of the fjord, which is wide and deep in the fairway, extends 25 miles N to Gullholmen (59°26'N 10°35'E) (5.56) where its navigable width is reduced to 2 miles.
- 2 From Gullholmen the fjord divides NW into Breidangen (59°30'N 10°27'E) and thence Drammensfjorden (59°40'N 10°25'E) (5.226); whilst the main channel, which continues N for 30 miles to Oslo, is much reduced in width and constricted in places.

Route

5.3

- 1 The main shipping route through the S and central parts of Oslofjorden leads from the vicinity of Færder Light (59°02'N 10°32'E) to the appropriate lane of the TSS E of Hollenderbåen, thence to Filtvet Light (59°34'N 10°37'E).
To the N of Filtvet, the main route follows the channel N, passing through the narrows of Drøbaksundet (59°40'3N 10°36'9E).
- 2 Reports indicate that, despite being constricted in parts, there are no particular difficulties along this route which is well-marked by day and at night and covered by adequate charts. However, the passage N of Drøbak is both narrow and busy and is better made by day, especially for larger vessels.

Harbours and berths

5.4

- 1 **Major harbours:**
Horten (59°25'N 10°29'E) (5.65), a major naval base and industrial centre.

Moss (59°26'N 10°40'E) (5.95), a commercial and industrial town.

- 2 Oslo Havn (59°54'N 10°44'E) (5.165) which is the principal harbour in Norway.

Drammen Havn (59°44'N 10°14'E) (5.250) a commercial and industrial centre which specialises in the import of vehicles.

- 3 **Major berth:**

Slagentangen Oil Terminal (59°19'N 10°31'E) (5.37), which can handle vessels over 250 000 tonnes.

Minor harbours are listed at 5.14 for those in the S part of the fjord; at 5.48 and 5.213 for the central part; and at 5.125 for those in the N part.

Topography

5.5

- 1 Oslofjorden differs from the great fjords on the W coast of Norway in that its shores are neither so high nor as precipitous; it is also shallower and contains many small islands. These islands, and the hills on both sides of the fjord, belong to the great gneiss formation (1.172) so prevalent in Norway. They are generally covered with fir and pine trees, interspersed with clear patches containing farms which are distinguished by groups of buildings.
- 2 Between Drøbak (59°40'N 10°38'E) (5.153) and Oslo, 15 miles N, the fjord expands into an irregular basin, the shores are steeper and more varied by areas of cultivation and deciduous trees. Numerous detached houses stand on the low grounds and the hills inland are bold and striking.
- 3 The tangents of the islands and numerous islets, most of which are wooded nearly to the water's edge, afford excellent marks for fixing the position of a vessel. Even when nearing Oslo, there are sufficient well-defined points to allow positive fixing without the need to depend on prominent features in the city.

Depths and sea level

5.6

- 1 **Depths**, which vary greatly within the fjord, are of particular significance in the N part. The least charted depth in the fairway to Oslo Havn is given at 5.128.
- 2 **Sea level** within the fjord can be affected by the winds in the surrounding area as they are not necessarily the same in Oslofjorden and Kattegat as they are in the Skagerrak. Thus it may well be that W and NW winds in Skagerrak combine with S winds in Kattegat and Oslofjorden to drive water into the fjord and raise the sea level. Conversely, E and SE winds in Skagerrak may combine with N winds in Oslofjorden and Kattegat to reduce the sea level.
- 3 General information on sea level is given at 1.187.

Hazards

5.7

- 1 **Fishing.** A general description of fishing methods is given in *The Mariner's Handbook* and a summary of the

methods used within the area covered by this volume is given at 1.19.

Drift net fishing for mackerel and salmon is carried out off the entrance to Oslofjorden between May and August.

- 2 **Purse net and land net fishing** for sprats is popular within the fjord between June and September.

Marine farms. Many marine farms are established within the N part of Oslofjorden, not all of which are shown on the charts. In general they are marked by buoys, which may be lit. See 1.21.

- 3 **Buoyage.** The positions of the numerous small spar buoys marking dangers in the approach are often changed and may not always conform to the charted positions. These buoys are not easy to see and do not paint well on radar.

Pilotage

5.8

- 1 Pilotage is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*.

Pilots are embarked at the Færder Pilot Station (59°04'5N 10°34'5E) for vessels bound for Tønsberg (59°16'N 10°25'E) (4.146), for the W approach to Borg (59°12'N 10°57'E) (6.33) and all other ports within Oslofjorden.

- 2 The boarding area may be modified during winds from the W to obtain a lee. When conditions make it necessary for pilot vessels to be moved from their stations, they will be sheltered, on the E side of Oslofjorden, under the lee of Søstrene and Struten (59°07'N 10°45'E); and, on the W side of the fjord, under the lee of Bolærne (59°13'N 10°34'E), a group of islands 8 miles N of Store Færder, or farther inshore if necessary.
- 3 Pilots, who are based in Kruke (4.137) (59°05'N 10°27'E), board from a white boat, 20 m in length, marked LOS and capable of 18 kn.

Vessel traffic service

5.9

- 1 A vessel traffic service is established, mandatory for all vessels of 24 m or more in length, which covers the Oslofjorden area. It is operated by Traffic Centres at Horten (59°25'N 10°29'E) and Oslo Havn (59°54'N 10°44'E). For full details see *Admiralty List of Radio Signals Volume 6 (2)*.

Traffic regulations

5.10

- 1 **General information.** General traffic regulations are given at 1.69 and for tankers at 1.83.
Oslofjorden lies within Norwegian internal waters as described in Appendix I, which also contains traffic regulations.
- 2 Passage through Oslofjorden and the approaches to ports within the fjord, as given in the appropriate directions, follow the specified leads or navigation routes given in Appendix I.
- 3 **Traffic separation schemes.** An extensive scheme is established within the southern and central parts of Oslofjorden, and a smaller TSS exists at the N end of the fjord, off Nesodden.

- 4 The part of the fjord between the two schemes is designated a precautionary area. Recommended directions of traffic flow are established within the area, as shown on the chart. However, due to restrictions affecting vessels passing, overtaking and meeting in the precautionary area, the route to be used will be as directed by the vessel traffic service (5.9).

- 5 It is reported that deep-draught vessels are routed to pass W of Gåsungane (Gasungene on Chart 3562).

Tankers of 20 000 dwt or more, laden with crude or black oil, bound for or leaving Slagentangen (59°19'N 10°31'E) (5.37) will be escorted by a tug while navigating in Oslofjorden, for safety and environmental reasons.

Natural conditions

5.11

- 1 **Wind.** General information on winds within the area is given at 1.211. A description of the winds during 'Solgangsver' is given at 1.214.
- 2 **Current.** In the outer approaches to Oslofjorden the current usually sets N along the coast of Sweden to the vicinity of Nord-Koster (58°54'N 11°00'E) (Chart 879) where it turns NW; it then sets W across the entrance to the fjord, passing S of Færder (59°02'N 10°32'E). Outside the entrance to Oslofjorden the rate will only exceed 1 kn during gales from the E; whereas gales from the W may reverse the direction and set the current towards the E shore of the fjord.
- 3 **Flow.** General information on flow, including use of the term 'flow' in Norwegian publications, is given at 1.176; and detailed information on the flow in fjords is given at 1.181.
- 4 Within Oslofjorden and its associated inlets, there is normally no appreciable flow except in certain narrow channels both in Oslofjorden itself and in some of the inter-connected fjords. Such general flow as does exist, is usually outgoing, particularly when the rivers are in flood (1.182). Strong winds from the N favour outflow and strong winds from the S favour inflow. However the correlation between wind and flow is complicated; for further details see 1.187.
- 5 **Ice.** The ice season lasts normally between January and March. It is improbable, though not unheard of, to have ice formation before late December. In general, the size of the area covered with ice reaches a maximum in February but in some ports the problems caused by ice are greater in March due to the appearance of a larger amount of drifting ice.
- 6 It is unusual to find ice in Oslofjorden S of a line joining Horten and Moss; even N of this line it is very rare to observe the fjord totally covered by ice. Instead, ice tends to be localised along the shores, where its thickness can easily reach 50 cm. The fairways distant from the shores, used for approaching Oslo Havn, are almost always open due to heavy traffic. If necessary the fairways are kept open by icebreakers. For further information see 1.95 and *Admiralty List of Radio Signals Volume 6 (2)*.

Coast radio

5.12

- 1 A coast radio station is situated on Tjøme in position 59°05'N 10°25'E. VHF facilities are located at major ports, as given in the text. For details see *Admiralty List of Radio Signals Volume 1 (1)*.

OSLOFJORDEN — SOUTHERN PART

GENERAL INFORMATION

Charts 3499, 3160, 3500

Area covered

5.13

- 1 This section covers the S part of Oslofjorden which extends from its entrance, between Lille Færder (59°02'N 10°32'E) and Torbjørnshjør, 8 miles ESE, to Bastøy (59°23'N 10°32'E), 21 miles N.

Harbours and anchorages

5.14

- 1 **Major harbours and berths** are given at 5.4.
Minor harbours:
Engalsvik (59°15'N 10°44'E) (5.44), a fishing port.
Krokstadleira (59°18'N 10°43'E) (5.45), an open roadstead.

OSLOFJORDEN MAIN CHANNEL — LILLE FÆRDER TO BASTØY

General information

Charts 3499, 3160, 3500

Main channel and route

5.15

- 1 A general description of the main channel and route through the S and central parts of Oslofjorden is given at 5.2.
- 2 The main channel through the S part of Oslofjorden from the entrance, to Bastøy (59°23'N 10°32'E), 21 miles N, is deep, has few dangers and is not difficult to navigate in moderate or good visibility. The tangents of the numerous islands provide excellent fixing marks.
- 3 The main shipping route through Oslofjorden is established by the appropriate lanes of the TSS, as shown on the charts and described at 1.82.

Inner channels on the west side of Oslofjorden

5.16

- 1 **Sandøundsleia** (59°07'N 10°27'E) is described at 4.116.
Bastøyrenna (59°23'N 10°30'E), which continues N from Sandøundsleia to Horten, 9 miles N, is described at 5.81.

Inner channel on the east side of Oslofjorden

5.17

- 1 **Rauøyfjorden** (59°15'N 10°43'E) forms part of an inner route from Strømtangen (59°09'N 10°50'E) to Larkollen, 12 miles NNW. This channel, described at 5.36, is well marked.

Topography

5.18

- East side of Oslofjorden.** At its S end the E side of Oslofjorden is protected by the Hvaler group of islands (59°06'N 10°53'E) (6.5). On the mainland to the N of Hvaler the hills are generally so long and narrow that they appear to blend with each other and do not provide definite navigation marks. One identifiable hill is Onsøyknipen (59°13'N 10°48'E) which appears in the background as a long ridge with two summits.
- 1 **West side of Oslofjorden.** At its S end the W side of Oslofjorden, is formed by the large islands of Tjøme (59°07'N 10°24'E) and Nøtterøy, close N, and numerous

islands, islets and rocks which lie up to 4 miles off the main islands, with a number of passages leading in from the sea. Distinctive among the offshore islands are Søndre Mostein (59°08'N 10°28'E), a bare islet which has the wooded islet of Burø, 5 cables W; also Ildverket, 1 mile S, which can be identified by a ledge at its S end. The areas between the S end of Tjøme and the W side of Hvasser are closely built-up with summer houses and cabins; in summer pleasure craft abound.

- 2 Farther N, on the W side, between Valløy (59°15'N 10°30'E) (Vallø on Chart 3500) and Borre, 8 miles N, the land is fairly low and falls gently towards the sea. The hinterland is made dark by the coniferous trees which cover the hills. The coastal area is comparatively built-up with the oil refinery at Slagentangen (59°19'N 10°31'E), which has a large tank installation, dominating the surrounding terrain. Bastøy (59°23'N 10°32'E) appears as a gentle, dark, tree-covered hill with Bastøykalven, its NW extremity, appearing as a separate islet when viewed from E.

Depths

5.19

- 1 Whilst the main channel is generally deep the depths in the fjord are very uneven and can vary by as much as 200 m in a distance of 5 cables (59°16'N 10°38'E).
The level of the sea within the fjord is affected by the wind as given at 5.6.

Hazards

5.20

- 1 **Fishing** within Oslofjorden is given at 5.7.
Buoyage. For changes in position see 5.7.

Pilotage

5.21

- 1 Information on pilotage is given at 5.8.

Traffic regulations

5.22

- 1 **Traffic regulations** for Oslofjorden are given at 5.10. For details of Oslofjorden VTS see 5.9 and *Admiralty List of Radio Signals Volume 6* (2).

Prohibited areas. Landing and unauthorised approach within 50 m of the coast are prohibited around the military restricted areas of the Bolærne islands (59°13'·0N 10°33'·0E) and Rauer (59°14'·0N 10°42'·0E) except for the area of Bogen (59°13'·4N 10°42'·0E) and Rauerkalven (59°15'·1N 10°42'·4E).

Dumping grounds

5.23

- 1 Dumping grounds for explosives, as shown on Chart 3500, are established as follows:
Close W of the fairway, in the vicinity of 59°17'N 10°34'E.
In the SW approach to Moss, centred on 59°23'N 10°36'E.

Rescue

5.24

- 1 A rescue station is established at Kruke (59°05'N 10°27'E) and a life-boat is stationed at Drøbak (59°40'N 10°38'E). See 1.128 for details of the search and rescue organization.

Natural conditions**5.25**

- 1 **Currents.** General information on currents is given at 1.176 with special mention of the current off the entrance to Oslofjorden at 5.11.

Flow. General information on the flow in Oslofjorden is given at 5.11.

- 2 In the entrance to Oslofjorden the flow is irregular but is usually out-going in calm winds; there may, however, be an in-going flow during winds from the S. The out-going flow is strongest and most frequent on the W side of the fjord; whilst the in-going flow is strongest and most frequent on the E side. Rates, both out-going and in-going, of up to 1 kn have been experienced.

- 3 On the W side of the fjord, at the S end, the flow is completely dependent on the wind conditions, especially between the islands off Tjøme and Nøtterøy and in Sandøundsleia, where it is unpredictable and can be strong enough to be troublesome to navigation.

- 4 In the fairway E of Slagentangen (59°19'N 10°31'E) and farther N, the flow, which is barely discernible, follows the rule of setting N with winds from the S and setting S with winds from the N. However, when the S winds eventually slacken the flow usually sets to the S to dispose of the piled-up water in the upper reaches. Equally, after N winds, the flow sets to the N to restore the water level.

- 5 **Ice** conditions within Oslofjorden are described at 5.11.

Wind and sea level. Water can be driven into Oslofjorden by winds from the S and out by winds from the N, as described at 5.6.

Climatic tables. See 1.229, 1.234 and 1.235.

Directions

(continued from 4.22)

Principal marks**5.26**

- 1 **Landmarks:**

Two towers on Nord-Koster (58°54'N 11°01'E) (Chart 879) (7.18).

Torbjørnskjær Lighthouse (tower, 18 m in height) (59°00'N 10°47'E) which is conspicuous and, when approached from SW, can be identified from a distance.

Færder Lighthouse (59°02'N 10°32'E) (4.17).

- 2 Store Færder (59°04'N 10°32'E) a bare, dark grey island, 2 miles N of Færder Light, which can be easily identified by a deep cleft on its S edge which is visible from E and W. The islets off the S side are lower by comparison.

Hollenderbåen Light (lantern on column, 29 m in height) (59°10'N 10°38'E).

- 3 Fulehuk disused lighthouse (white wooden building with 15 m high tower) (59°11'N 10°36'E) which stands on Nordre Fulehukskjær. Fulehuk Light (red tower, white stripes, elevation 9 m) stands 40 m N of the disused light.

Veten (59°10'6N 10°25'7E) which is the highest point on Nøtterøy, is conspicuous from E.

5.27

- 1 **Major light:**

Færder Light (59°02'N 10°32'E) (4.17).

Other aids to navigation**5.28**

- 1 **Racons:**

Færder Light (59°02'N 10°32'E).

Hollenderbåen Light (59°10'N 10°38'E).

Medfjordbåen Light (59°20'N 10°34'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Charts 3499, 3500

Færder to Hollenderbåen**5.29**

- 1 From a position about 3 miles SE of Færder Light, in the vicinity of 59°00'N 10°37'E, the direct track towards and into the N-bound lane of the TSS E of Hollenderbåen (59°10'N 10°38'E) leads N for about 10 miles, within a white sector (317°–008°) of Hollenderbåen Light (59°10'N 10°38'E) (5.26) for the first 9 miles, passing (with positions relative to Struten Light (59°07'N 10°44'E)):

W of Skjærskrakkene (7 miles S) (6.24), thence:

- 2 E of Bølebåen (8 miles SW), marked at its N end by a spar buoy (starboard hand), which is the middle of a number of shoals extending 1 mile NNE from Færder Light, thence:

E of foul ground surrounding Knappen (7½ miles WSW), the E islet of a group of islands and islets of which Store Færder (5.26) is the largest and on the N end of which stands Store Færder Light (white lantern on framework structure), thence:

- 3 W of Høka (2 miles SW) which is the W-most of isolated shallow patches extending over 2 miles SW from Søstrene, two islands which are good landmarks and distinctive due to their dark brown colour and steep fall to the sea, thence:

- 4 W of the shallow bank which extends 3½ cables NW from Struten, on which stands Struten Light (white lantern, 13 m in height). The NW extremity of the bank is marked by Strutsrevet Buoy (N cardinal). And:

E of Søndre Medfjordbåen (4½ miles W), thence:

W of Skjolden, (2½ miles NNW) an unmarked shoal.

- 5 The track then leads to a position 1 mile E of Hollenderbåen (4¼ miles NW), from the S extremity of which Hollenderbåen Light is exhibited. This shoal is marked by breakers during gales from the S.

5.30**Useful marks:**

Østre Bustein (59°06'N 10°30'E) and Vestre Bustein, close W, as described at 4.144.

The beacon-tower on Leistein (7½ miles W).

(Directions for Tønsberg are given at 4.121)

(Directions for Fredrikstad are given at 6.40)

Chart 3500

Hollenderbåen to Medfjordbåen**5.31**

- 1 From the position 1 mile E of Hollenderbåen Light (59°10'N 10°38'E) the N-bound lane of Oslofjorden TSS leads 350° for 5½ miles, within limits as shown on the chart, passing (with positions relative to Veslekalv Light (59°15'N 10°42'E)):

W of Langgrunnen (5¼ miles S) which, with a depth of 2 m or less over it, extends up to 5 cables S from Søndre Missingen, the largest island of a group, on which stands a beacon, thence:

- 2 W of Skatet (4½ miles S), a reef awash which extends 3 cables N from Søndre Missingen, thence: E of Fulehukskatet (6 miles SW) a reef extending 3 cables S from Søndre Fulehukskjær, a skerry 1 cable S of Nordre Fulehukskjær on which stands Fulehuk Light (5.26), thence:

- 3 E of the bank surrounding Garnholmen (5 miles SW), a small islet lying close E of Østre-Bolærne, the E of the Bolærne chain of islands which extend

1½ miles WNW. It is prohibited to approach within 50 m or to land on these islands and within an area which extends S to the S extremity of Skarvesete, 7 cables SSW of Garnholmen, as shown on the chart; see also 1.79. Thence:

- 4 W of the bank extending 2½ cables from the W side of Rauer (1 mile S), a wooded island with rock of a reddish colour. It is prohibited to approach within 50 m or to land on Rauer, as shown on the chart; see also 1.79. Thence:

E of Teinebåane (5¼ miles WSW), an extensive shoal which dries and is marked by three spar buoys and a perch.

- 5 This section of the track lies within a white sector (338°–348°) of Medfjordbåen Light (framework structure, 21 m in height) (59°20'N 10°34'E).

5.32

- 1 From a position 2¾ miles W of Veslekalv Light the N-bound lane of the Oslofjorden TSS continues 350° for a further 5 miles, passing (with positions relative to Medfjordbåen Light):

- 2 Clear, depending on draught, of Bjørnen (4½ miles SSE). This shoal, which surmounts an area of very uneven depths, is the W of banks and shoals surrounding and extending from Mellom Sletter and Søre Sletter, small islands at the S end of a chain which extends 3½ miles along the E side of Oslofjorden. Thence:

- 3 W of Eldøygrunnen (2¼ miles SE) which is the W of banks and shoals which extend NNW then W from Store Sletter (3½ miles SE), the largest of the chain of islands mentioned above, thence:

E of the bank extending 3 cables ENE from the point at Slagentangen (1¾ miles SW) (5.37), which is marked by a light-buoy (port hand), thence:

- 4 W of Eldøyrevet (2 miles ESE), a drying reef which extends 3 cables from the W side of Eldøya, the W extremity of which is marked by an iron perch. A spar buoy (starboard hand) (2 miles E) marks the edge of the bank extending 3 cables W from Kollen, the N of the chain of islands mentioned above.

5.33

- 1 **Useful marks:**

Veslekalv Light (6½ miles SE) (5.36).
Torgersøy Light (5½ miles SSW) (4.133).
Tower at Slottsfjellet (59°16'3N 10°24'3E).

Medfjordbåen to Bastøy

5.34

- 1 From a position E of Medfjordbåen Light the N-bound lane of the TSS leads 347° for 4 miles, passing (with positions relative to the light on the NE point of Bastøy (59°23'N 10°32'E)):

E of Medfjordbåen (3¼ miles SSE), a shoal on which stands Medfjordbåen Light (5.31) and of Nordostgrunnen, 2 cables NE, and:

- 2 W of Lossgrunnen (4¼ miles SE) and of Botnegrunnene, 5½ cables N, both being unmarked shoals lying up to 7½ cables off the E coast of the fjord, thence:

E of Hauken (2¾ miles S), the SE extremity of the bank and shoals which extend 1¾ miles SSE from Bastøy (5.18), thence:

- 3 Over a cable area (2 miles SE) in which anchoring and trawling are prohibited, and:

E of Bastøygrunnen (1½ miles S) which extends 4½ cables SE from the S point of Bastøy, thence: W of Fuglen (3 miles E) which is the S extremity of a bank and shoal which extend a total of 1 mile S from Revlingen (5.114), and:

- 4 E of the shoal fringing the E coast of Bastøy as far N as Bastøy Light (lantern on post) which stands on the NE point of Bastøy, close NE of a white stone house with a low tower, 14 m in height, which is a conspicuous disused lighthouse.

5.35

- 1 **Useful marks:**

Østenskjaer Light (white lantern on cairn) (1¾ miles SSW).

Revlingen Light (3 miles ENE) (5.114).

(Directions continue for Oslofjorden main channel at 5.55)

(Directions are given, for Horten at 5.84, for Moss at 5.114, and for Drammensfjorden at 5.218)

Side channel

Rauerfjorden

5.36

- 1 **Directions.** From a position 1¼ miles WSW of Strømtangen Light (59°09'N 10°50'E) the approach from S and the fairway through Rauerfjorden is generally indicated by white light sectors, which do not, however, guarantee the deepest water, as follows:

- 2 145°–151° of Papperhavn Light (lantern on framework structure) (59°06'6N 10°50'0E) which stands on Lyngholm, astern, thence:

341°–345¾° of Veslekalv Light (white lantern, 3 m in height) (59°15'N 10°42'E) ahead, then 164¾°–170¼° astern, thence:

- 3 341°–343½° of Larkollen Light (lantern on tripod, 7 m in height) (59°19'4N 10°40'1E) ahead, then 151½°–157¾°, astern, which leads towards the main channel of Oslofjorden but passes over Botnegrunnene, 1¾ miles NNW of the light.

- 4 **Useful mark:**

Garnholmen Light (white lantern on tripod, 6 m in height) (59°11'5N 10°45'9E) standing on Nordre Garnholmene with a beacon (hexagonal stone cairn, surmounted by an anchor) close N.

Slagentangen

Chart 3717 plan of Slagentangen

General information

5.37

- 1 **Position and function.** Slagentangen Oil Terminal (59°19'N 10°31'E), which stands on the point of that name on the W side of Oslofjorden, about 20 miles N of Færder Light, services Slagen Refinery.

Port limits. The terminal lies within the Tønsberg Harbour District.

- 2 **Traffic.** In 2002 the port was used by 831 vessels with a total of over 13½ million dwt.

Port Authority:

Address. Esso Norge A/S, PO Box 2001, N-3103 Tønsberg, Norway.

Email. slagen.harbour@exxonmobil.com.

Limiting conditions

5.38

- 1 **Controlling depth** in the approach is 25 m which is greater than the depth alongside.

Deepest and longest berth is No 1 berth on the E side of the jetty (5.42).

Density of water. Varies from 1.017 to 1.020 g/cm³.

- 2 **Maximum size of vessel handled.** Tankers up to 285 000 dwt provided the draught does not exceed 18.2 m.

Currents generally set SE across the jetty which is aligned N/S. The marine terminal, which has a current speed and direction meter, provides advice.

- 3 **Ice** affects navigation at the terminal about every 6 years.

Arrival information

5.39

- 1 **Port radio** is manned by Slagen Harbour Office; for details see *Admiralty List of Radio Signals Volume 6 (2)*.

Notice of ETA required: 72 hours prior to arrival at pilot embarkation area; repeated at 48, 24 and 12 hours.

- 2 **Anchorage.** Three anchorages are available, in depths from 50 to 60 m, situated 6 cables respectively NNW, N and NE from the pier head, as shown on the chart. Anchorage closer to the jetty than the charted anchorages is prohibited due to the presence of cables and a submersible oil boom.
- 3 **Pilotage** is compulsory for all foreign vessels. Pilotage facilities and regulations within Oslofjorden are given at 5.8. Sea pilots generally carry out the berthing at Slagentangen but for larger vessels a berthing pilot is embarked off Slagentangen Light-buoy (59°19'1N 10°32'3E).

- 4 **Tugs.** A total of eight tugs can be made available, given notice.

Regulations. For regulations within Oslofjorden see 5.10. A safety zone, into which entry is restricted, is established around the terminal from a point on the coast 7½ cables SSE of the root of the jetty to a point 3 cables WSW, as shown on the plan.

- 5 **Quarantine.** Normal clearance is carried out on arrival. However, the Port Authority must be informed in advance where disease or fever is suspected.

Oil terminal

5.40

- 1 The terminal consists of a single finger jetty which extends 3 cables N from the N coast at Slagentangen.

A submerged oil boom, which encloses the entire jetty, has equipment extending out to 200 m from the jetty as shown on the plan. Anchoring is prohibited within this area to avoid damage to the equipment.

Directions

5.41

- 1 The deep water approach to the jetty is marked by private leading lights:

Front, near the head of the jetty.

Rear, 1¼ miles NW of the front light, standing on the coast 1 cable SSE of another light, also on the coast, at Teigsverven.

- 2 The alignment (308°) of these lights leads towards the jetty in a least depth of 25 m between Slagentangen Light-buoy (59°19'1N 10°32'3E) and the jetty.

Berths

5.42

- 1 The largest berth is No 1 on the E side of the jetty which has a depth of 21 m and can accommodate vessels of 250 000 dwt with a length of 350 m and a draught of 20.1 m.

There are two other berths, both on the W side of the jetty.

Port services

5.43

- 1 **Repairs** of all kinds can be undertaken by nearby shipyards.

Other facilities: medical attention and hospital facilities are available; oily waste reception facilities are available from a small boat; tank washings can also be disposed of, but advance notice is required for both facilities.

- 2 **Supplies:** all grades of fuel; fresh water at the jetty; stores available.

Anchorage and harbour on the east side of Oslofjorden — southern part

Chart 3500

Engalsvika

5.44

- 1 **Description.** Engalsvika (59°15'N 10°44'E), a fishing port with a least depth of 6.0 m in the entrance, contains many berths and a public quay with a length of 25 m and depths from 1.0 to 3.4 m alongside.

- 2 **Approach and entry.** The best approach is from the S through Rauerfjorden (5.36), passing E of Larshausen (59°14'4N 10°43'7E), then between the E side of Teineholmen, an islet situated 1½ cables SW of the entrance, and the mainland, passing E of a rock marked by an iron perch which lies near the E side of the islet. Entry is made between two moles, from the heads of which lights are exhibited. There is a speed limit of 5 kn within the moles.

- 3 Winds from SW can be troublesome in the harbour but the moles protect against swell. Berths and facilities are also available for small craft.

Supplies. Fresh water and fuel can be obtained.

Krokstadleira

5.45

- 1 **Description.** Krokstadleira (59°18'N 10°43'E), a large open roadstead, affords anchorage suitable for small vessels, clear of shoal patches and a submarine pipeline extending 2 cables NW from Saltholmen, as shown on the chart. The holding is good in clay and sand but winds from the SW raise a considerable sea.

- 2 **Approach.** From Oslofjorden the recommended approach leads between Veslekalv (59°15'N 10°42'E) (5.36) and Svartebåene, 6 cables NNW, keeping at least 3 cables off the NW coast of Rauer; thence either side of Rødskjær, 1½ miles NNE of Veslekalv, noting that a white sector (197°–202°) of Veslekalv Light, astern, leads E of the islet and towards the anchorage. Local knowledge is required.

South-east of Eldøya

5.46

- 1 **Description.** Anchorage, suitable for coasters, can be obtained SE of Eldøya in a position 5 cables SSW of Larkollen Light (59°19'4N 10°40'1E) (5.36). There is a depth of 20 m in the anchorage, over a bottom of firm clay.

- 2 **Approach** can be made from SW within a white sector (023°–032½°) of Larkollen Light, which passes close SE of Hellene, 1 mile SW of the light, which is marked by breakers in heavy seas, and over a least charted depth of 4 m on the SE limit of the sector.

OSLOFJORDEN — CENTRAL PART

General information

Charts 3500, 3501

Area covered

5.47

- 1 This section covers the central part of Oslofjorden from Bastøy (59°23'N 10°32'E) to Filtvet (59°34'N 10°37'E), 12 miles NNE, and includes the central part of the main channel. The section is arranged as follows:
- 2 Oslofjorden main channel – Bastøy to Filtvet (5.49).
Horten and approaches (5.65).
Moss and approaches (5.95).

Harbours and anchorages

5.48

- 1 Major harbours are Horten (59°25'N 10°29'E) and Moss (59°26'N 10°40'E).
- Minor harbours:
Tofte (59°33'N 10°34'E) (5.60).
Sagene (59°32'N 10°32'E) (5.61).

OSLOFJORDEN MAIN CHANNEL —
BASTØY TO FILTVET

General information

Charts 3500, 3501

Route

5.49

- 1 From Gullholmen (59°26'N 10°35'E), 3 miles NNE of Bastøy, Oslofjorden branches NW into Breidangen (5.212), whilst the main channel of the fjord continues N and NNE into a narrow section abreast Filtvet (59°34'N 10°37'E).
- 2 From a position 1 mile NE of Bastøy Light (59°23'N 10°32'E) the main shipping route through Oslofjorden towards Oslo is established by the appropriate lanes of the TSS as shown on the chart and described at 1.82.

Topography

5.50

- 1 General information on the topography in Oslofjorden is given at 5.5. Within the central part of the channel the chimneys of large cellulose factories are evident at Sagene (59°32'N 10°32'E) (5.61) and at Tofte (59°33'N 10°34'E) (5.60).

Controlling depth

5.51

- 1 Whilst the main channel continues generally deep, there are wide variations in depths as mentioned at 5.6.

Hazards

5.52

- 1 Fishing within Oslofjorden is given at 5.7.
Buoyage. For changes in position see 5.7.
Ferry. The Horten–Moss ferry crosses the fjord along the parallel of 59°24'8N, as shown on the chart.

Traffic regulations

5.53

- 1 Traffic regulations for Oslofjorden are given at 5.10.
For details of Oslofjorden VTS see 5.9 and *Admiralty List of Radio Signals Volume 6 (2)*.

Natural conditions

5.54

- 1 Flow. General information on flow is given at 5.11.

In the central part of Oslofjorden, between Hurum (59°31'N 10°28'E) and Slagentangen, 12 miles S, the flow is normally imperceptible. However, a fairly strong flow can be caused by the wind and also, to some extent, by an outflow from the mouth of Drammensfjorden (59°32'N 10°24'E) as given at 5.234.

- 2 As a general rule the flow in the main channel is to the N with a S wind and to the S with a N wind. However, to the N of Mølen (59°29'N 10°30'E) the flow usually sets E with S winds and W with N winds.

Ice conditions within Oslofjorden are described at 5.11.

Directions

(continued from 5.35)

Principal mark

5.55

- 1 Landmark:

Filtvet Light (column, 14 m in height) (59°34'N 10°37'E), standing alongside a disused lighthouse (white wooden building, 14 m in height).

Bastøy to Gullholmen

5.56

- 1 From the vicinity of Bastøy (59°23'N 10°32'E), the track through Oslofjorden continues 347° for 3 miles, as shown on the chart, passing (with positions relative to Gullholmen Light (59°26'N 10°35'E)):

WSW of Stallene (1¾ miles SSE) and of a 14 m patch which lies midway between Stallene and Stalsberget (5 cables N), the SW point of Jeløya, thence:

- 2 WSW of Sautogrunnen (6 cables S), which is marked by breakers in a heavy sea, and:
ENE of Hortenskrakken (2 miles WSW) (5.85), thence:
- 3 WSW of Gullholmkraakken, marked on its W side by a spar buoy (starboard hand); this shoal lies 2 cables WSW of Gullholmen, a small islet close off the W side of Jeløya. Gullholmen Light (white lantern, 8 m in height) is exhibited from the W side of the islet close to a disused lighthouse.

5.57

- 1 Clearing marks:

Tofteholmen (4¾ miles N) (5.58) seen well clear to the W of Gullholmen clears to the W of Sautogrunnen.

Useful marks:

Horten Light (2¾ miles WSW) (5.85).
Church spire (2¾ miles W) (5.84).

Gullholmen to Filtvet

5.58

- 1 From a position W of Gullholmen the N-bound lane of the TSS leads 010° for nearly 5 miles, passing (with positions relative to Mølen Light (59°29'N 10°30'E)):

E of Vealøs (2¼ miles S) (5.87), thence:

- 2 W of Langgrunnen (3½ miles E), a rocky patch marked along its E side by two spar buoys (starboard hand). Langgrunnen lies near the S end of a chain of rocky shoals which lie up to 1 mile off the W coast of Jeløya. And:
E of the bank fringing and extending NNE from Mølen (5.87), thence:
- 3 W of Neskrakken (3½ miles E), a group of rocks with depths of 2 m or less over them which are

marked at the N and S end by spar buoys (starboard hand), thence:

W of Bilekrakken (3½ miles ENE), a rocky patch marked near its NW end by a spar buoy (starboard hand), thence:

- 4 W of Lindholmgrunnen (3¾ miles ENE), a rocky patch marked on its W side by a spar buoy (starboard hand), and:

E of the bank fringing Tofteholmen, an islet (2¾ miles NE).

5 **Useful marks:**

Østnæstangen Light (white lantern) (2¼ miles NNE) exhibited from the S end of a small peninsula.

Ramvikholmen Light (white lantern on framework structure) (2½ miles NNE) exhibited from the N extremity of the islet.

5.59

- 1 From a position E of Tofteholmen the N-bound lane of the TSS leads 026° for 3½ miles, passing (with positions relative to Filtvet Light (59°34'N 10°37'E)):

WNW of Storholmgrunnen (3 miles S) and Asbjørngrunnen, 3 cables farther NE, thence:

- 2 WNW of Bevøykollen (2½ miles S), a rock awash in the NW approach to Mossesundet (5.101) which is marked by an iron perch.

The track then leads to a position 7 cables ESE of Filtvet, the W entrance point of Inner Oslofjorden, on which stands Filtvet Light (5.55).

(Directions continue for Oslofjorden main channel at 5.133)

(Directions for the approach to Moss from N are given at 5.115)

Harbours

Tofte

5.60

- 1 **Description.** Tofte (59°33'N 10°34'E), with a population of 1850 (1992), contains Norway's largest cellulose factory on the W side of a small but deep harbour. This harbour, protected by a mole from which a private light is exhibited, is made up of two projecting wharves and a quay.

- 2 **Traffic.** In 2004 the port was used by 284 vessels with a total of 1 407 301 dwt.

Tugs. A tug is usually stationed in the harbour.

- 3 **Anchorage** can be obtained close S of the harbour, as shown on the chart, clear of a submarine pipeline (1.69) which extends SSE from the shore.

A **mooring buoy** is established on the E side of the harbour.

- 4 **Alongside berths.** The largest berth, which is alongside the quay on the E side of the harbour, has a length of 102 m and depths from 12.1 to 15.4 m alongside.

On the W side of the harbour a projecting wharf contains a Ro-Ro ramp with a width of 22 m and depths from 3.7 to 4.5 m alongside.

There are six other berths.

- 5 **Facilities.** Medical facilities are available.

Supplies. Fresh water is laid on to the berths.

Sagene

5.61

- 1 **Description.** Sagene (59°32'N 10°32'E), which supports a large cellulose factory, contains a quay with a length of 153 m and depths from 4.3 to 7.9 m alongside.

Supplies. Fresh water is available.

Anchages

Mølen

5.62

- 1 Anchorage can be obtained 3 cables E of the S end of Mølen (59°29'N 10°30'E) at Sydostgrunnen in depths from 20 to 31 m, sand.

Nesbukta

5.63

- 1 Nesbukta (59°30'N 10°38'E) affords anchorage in depths from 20 to 27 m on sand and clay.

Kjøvangbukta

5.64

- 1 Kjøvangbukta (59°32'N 10°40'E), a cove on the E side of the main fjord, affords anchorage, clear of a submarine cable (1.69) laid across the mouth of the cove. It also contains mooring rings and a small quay, with a depth of 5 m alongside. Local knowledge is required.

HORTEN AND APPROACHES

General information

Chart 3500

Position

5.65

- 1 The town of Horten (59°25'N 10°29'E) stands between Horten Outer Harbour, to the E, and Horten Inner Harbour, to the N. Karljohansvren stands on the E side of the inner harbour.

Function

5.66

- 1 Horten is a large industrial town with a shipyard, tank cleaning plant and good communications by land and sea. It is also the base of the State Pollution Inspectorate.

Karljohansvern contains a naval base and is the headquarters of the Royal Norwegian Navy.

The combined population of the town and naval base is about 15 140 (1997).

Port limits

5.67

- 1 **Horten Outer Harbour**, which is the commercial harbour of Horten, is limited as follows:

To the south, by a line between the W extremity of Bastøy (59°23'N 10°32'E) and Borre Church, 1¼ miles W.

- 2 **To the east**, by a line between Bastøy Light, on the NE extremity of the island, and the S extremity of Mølen (59°29'N 10°30'E) an island 6 miles NNW.

To the north, by a line between the S extremity of Mølen and Varnestangen (59°27'N 10°25'E), ¾ miles SW.

- 3 **Horten Inner Harbour**, which is the Naval Harbour, is not included within the outer harbour (above). The seaward limit of this harbour is given by a line between the beacon on Møringa (59°26'N 10°30'E) and the E extremity of Vealøs, 7 cables NNW; thence to the N extremities of Østøya (59°27'N 10°29'E) and Løvøya, 1¼ miles W. For regulations within the Naval Harbour see 5.79.

Approach and entry

5.68

- 1 **The outer harbour** can be approached direct from the main channel of Oslofjorden, as given at 5.85, or through Bastøyrenna (59°23'N 10°30'E), as given at 5.86.

The inner harbour can be approached as above and is entered from the N, between Vealøs (59°26'·5N 10°29'·5E) and Østøya, close W, as given at 5.88.

Traffic

5.69

- 1 In 2004 the port was used by 179 vessels with a total of 346 645 dwt.

Port Authority

5.70

- 1 **Address.** Horten Havnevesen, PO Box 167, N-3192 Horten, Norway.
Email. horten.havnevesen@horten.kommune.no.

Limiting conditions

Controlling depth

5.71

- 1 **Outer harbour.** A deep water approach can be made direct from the main channel, thus the controlling depth is at the berth.

Bastøyrenna. The least charted depth in the fairway of Bastøyrenna (5.81) is 12 m.

Inner harbour. The least charted depth is 8·5 m at the S end of the entrance channel.

Deepest and longest berths

5.72

- 1 The deepest and longest commercial berth in the outer harbour is at Dypvannskaien as described at 5.90.

Mean tidal levels

5.73

- 1 See information in *Admiralty Tide Tables Volume 2*. HW and LW occur on average 17 minutes later than at Nevlungshavn.

Mean spring range about 0·3 m; mean neap range about 0·15 m. Meteorological conditions can have a pronounced influence on the water level as described at 5.6.

Maximum size of vessel handled

5.74

- 1 Largest vessel handled was about 30 000 dwt.

Ice

5.75

- 1 Ice conditions within Oslofjorden are described at 5.11.

Arrival information

Port radio

5.76

- 1 VHF facilities for the Coast Radio Station (4.8) are located in Horten. VTS Horten operates the S sector of Oslofjorden VTS (5.9) from the town.

For further information see *Admiralty List of Radio Signals Volume 1* (1).

Pilotage

5.77

- 1 Information on pilotage is given at 5.8.

Tugs

5.78

- 1 Tugs are available if required.

Regulations concerning entry

5.79

- 1 Foreign vessels are prohibited from entry into the Naval Harbour (5.67).

Landing and unauthorised approach is prohibited within 50 m of the coast around Vealøs, Østøya and Mellomøya. However, passage without stopping is permitted between Vealøs and Østøya (harbour entrance).

- 2 Speed limit within the inner harbour is 6 kn.

Anchoring is prohibited between Hortenskrakken (59°25'·3N 10°30'·8E) and the shore.

Quarantine

5.80

- 1 Vessels under quarantine must be anchored in Langgrunna (59°24'N 10°31'E) (5.89) in a position such that Bastøy Light (59°23'N 10°32'E) is visible clear of Bastøykalven, 7 cables WNW.

Harbour

General layout of harbour

5.81

- 1 Horten Harbour is made up of two distinct parts:
 Outer Harbour which extends along the W side of Bastøyrenna (59°23'N 10°30'E), an inner channel to the W of Bastøy, between Horten Light (59°25'N 10°30'E) and Borre Church, 2¼ miles SW.

Inner Harbour (Orlogshavn) which occupies an enclosed expanse of water to the N of the town.

Measured distance

5.82

- 1 North of Horten, between Mellomøya (59°27'N 10°28'E) and Løvøya, 1 mile W, there is a measured distance of one nautical mile, the limits of which are marked by two beacons (masts with white triangular topmarks point up).
 2 East limit marks on the E side of Mellomøya.
 West limit marks on the W extremity of Løvøya and on the mainland S.
 Distance: 1852 m.
 Running track: 274½°–094½°.

Natural conditions

5.83

- 1 **Flow** in Oslofjorden is given at 5.11.
 In Bastøyrenna the flow often sets in a direction opposite to that in the main channel of Oslofjorden.
 2 North of Østøya (59°27'N 10°29'E) the flow is usually E-going, due to the outflow from Drammensfjorden in position 59°32'N 10°24'E. This flow then joins the N-going or S-going flow in the main channel of Oslofjorden. Farther N, off the N end of Mølen, it is usually E-going during S winds and W-going during N winds, though an E-going flow is more frequent.
 3 At flood time in spring (1.182) a S-going flow is reported in Breidangen (5.214), and between Østøya and Vealøsfaket, 5 cables ESE, which is in the harbour entrance.

In the inner harbour the flow is weak and irregular and depends on the wind.

Ice. The outer harbour is usually ice-free throughout the year.

Directions for entering harbour

Principal mark

5.84

- 1 **Landmark:**
 The spire of a church (59°25'·6N 10°29'·4E) standing on the E side of Horten.

Approach to Horten Outer Harbour from main channel

5.85

- 1 On leaving the TSS in the vicinity of 59°24'N 10°34'E a white sector (273°–322°) of Horten Light (white lantern) (59°25'N 10°30'E), exhibited from the N end of the canal mole arm, leads WNW in deep water towards the N end of Horten Outer Harbour, passing (with positions relative to the light):
- 2 NNE of the main anchorage area in Langgrunna (1 mile SE) (5.89), thence:
SSW of Hortenskrakken (6 cables NE), a detached rocky patch marked on its S and E sides by spar buoys (port hand) and on its N and W sides by spar buoys (starboard hand).

Approach through Bastøyrenna

5.86

- 1 From a position 1 mile SSW of Medfjordbåen Light (59°20'N 10°34'E) the track into Bastøyrenna (59°23'N 10°30'E) leads NW for 3½ miles, passing (with positions relative to Østensker Light (59°21'6N 10°30'6E)):
SW of Medfjordbåen Light (2½ miles SE) (5.31), thence:
- 2 NE of Slagentangen Oil Terminal (2 miles S) (5.37), thence:
SW of Hauken (1½ miles SE) (5.34), thence:
SW of Skjergrunnen (6 cables SSE) situated at the S end of a bank which extends 1 mile from Bastøy and is marked on its S extremity by a spar buoy (starboard hand), and:
- 3 NE of the rocky bank surrounding and extending NW from Østre Småskjer (7½ cables SSW) which lies near the middle of the channel, thence:
SW of Østensker, a skerry from which stands Østensker Light (5.35) is exhibited.
- 4 When clear of Østensker, a white sector (357°–010°) of Horten Light (59°25'N 10°30'E) (5.85) leads N in the fairway, passing (with positions relative to the light):
W of Steinbåen (2¾ miles S) which just touches the E limit of the white sector, thence:
- 5 W of Bastøybåen (1¾ miles S) which is a reef marked on its S end by a light (lantern on post) and along its W side and N end by spar buoys (starboard hand).

Approach to Horten Inner Harbour from main channel

5.87

- 1 On leaving the TSS in the vicinity of 59°27'N 10°34'E the direct approach to the inner harbour leads WNW towards Mølen (59°29'N 10°30'E), an island from the SW end of which Mølen Light (lantern on post) is exhibited, passing (with positions relative to Horten Light (59°25'N 10°30'E)):
- 2 NNE of the reef extending 2 cables E from Vealøs (1½ miles N), an islet which is joined by a causeway to the mainland at Møringa (1 mile N), thence:
NNE of Nøttekrakken (2½ miles N) (5.88).
Thence as required for entering harbour, as given below.
(Directions continue for the approach to Drammensfjorden at 5.218)

Entering Horten Inner Harbour from north

5.88

1 Inner Harbour leading line:

- 1 Front mark. Horten Inner Light (lantern on column) (59°26'2N 10°29'1E).
Rear mark. Beacon (framework tower) (3½ cables farther S).
- 2 From the vicinity of 59°28'0N 10°29'4E the alignment (187½°) of these marks leads through the centre of the entrance channel, passing (with positions relative to the W extremity of Vealøs (59°26'6N 10°29'3E)):
- 3 W of Nøttekrakken (9 cables N) which is the N extremity of the coastal bank, thence:
Close E of Østøybåen Light (lantern on column) (4 cables NNW) which stands clear E of Østøybåen, a rock lying 1 cable E of the NE extremity of Østøya, and:
W of Hårfagrebaen (4 cables N), thence:
- 4 W of the spar buoy (N cardinal) which marks the N end of the reef extending 2 cables N from Vealøs, thence:
Between the breakwater on the NW extremity of Vealøs, from which a light is exhibited, and the E edge of foul ground, fringing the E side of Østøya.

Anchorage and berths

Anchorage

5.89

- 1 **Langgrunna** (59°24'2N 10°31'0E) is the main anchorage, with good holding on sand and clay; however, strong winds from the S and E create a considerable sea in the area. This anchorage must be used for vessels which have not been allocated an anchorage or berth. Larger vessels should anchor in a position with Bastøy Light bearing 344°, distant 1.2 miles. Quarantine anchorage is given at 5.80.
- 2 **Bastøybukta** affords anchorage in a position 4 cables NNW of Bastøy Light in depths from 16 to 25 m, over a bottom of sand.
Løkeberggrunnen affords anchorage in position 3 cables NNE of Bastøy Light in depths from 16 to 20 m.
Vealøsflaket (59°27'N 10°30'E) affords anchorage in depths from 13 to 15 m, sand and clay, clear of Hårfagrebaen and the reef extending NE from Vealøs.
- 3 **Bastøyrenna** (59°23'N 10°30'E) is encumbered with submarine cables (1.69), which cross the channel, and with submarine pipelines which extend from the W shore. Prohibited anchorage areas are shown on the chart in a position 5 cables N of Åsgårdstrand (59°21'N 10°28'E), on the W side of the channel and across the channel from a position 5 cables SSE of Åsgårdstrand to the S extremity of Bastøy.

Alongside berths

5.90

- 1 **Horten Outer Harbour.** The largest berths lie alongside a narrow jetty which projects 199 m from the coast in position 1 cable SW of Horten Light. This jetty, with maximum depths of 10.8 m alongside can accommodate tankers of 100 000 dwt for tank cleaning.
- 2 The largest commercial berth is along the NE side of Dypvannskaiaen (59°24'8N 10°29'6E), which has a length of 178 m and depths from 7.6 to 8.5 m alongside most of its length. This concrete jetty has a Ro–Ro ramp at the root of its SW side.

- 3 The main Ro–Ro quay, which is S of Hortensbrygga, 2 cables SW, as shown on the chart, is the permanent berth for the Bastøy Ferry. There are 11 other berths.

Horten Inner Harbour. The largest berth is Horten Verft (59°25'6N 10°28'9E) with a length of 359 m and depths from 4.3 to 8.2 m alongside. There are seven other berths.

Port services

Repairs

5.91

- 1 Repairs of all kinds can be carried out at the shipyard in the inner harbour which has two dry docks, and cranes with a 60 tonne lift.

The largest dock, which has a length of 244 m and width of 34 m, can accommodate a vessel of 60 000 dwt and draught of 7.5 m.

- 2 A safe area for laying-up large vessels (450 000 dwt) is available at Holmestrand (59°29'N 10°19'E) (5.223), about 6 miles NW.

Other facilities

5.92

- 1 Compass adjustment can be carried out along with the adjustment of most other ship's instruments; medical facilities; oily waste reception facilities available.

Supplies

5.93

- 1 **Fuel.** All grades of fuel oil are available at Dypvannskaiaen or by lighter to other berths.

Fresh water is laid on to most berths, otherwise by lighter.

Provisions and stores can be obtained from a bonded warehouse.

There is also a chart agent.

Minor harbour

Kanalhavna

5.94

- 1 Kanalhavna, at Fyllingen (59°25'N 10°30'E) has depths of 2.8 m in the entrance but shoals within. This harbour, which is protected by a mole, has berths along the inside of the mole for coasters and several finger berths for small craft.
- 2 A canal, with a least depth of 0.7 m and several low bridges, connects Kanalhavna with the inner harbour; there is a speed limit of 3 kn in this canal.

MOSS AND APPROACHES

General information

Charts 3500, 3717 plans of Mossesundet and Moss

Position

5.95

- 1 The town of Moss (59°26'N 10°40'E) stands across and around the isthmus joining Jeløya to the mainland. The S part of the harbour is in Verlebukta and the N part is in Mossesundet.

Function

5.96

- 1 Moss is a typical industrial and commercial town with a shipyard and engineering works. It also has good domestic

and foreign shipping services. The port handles containers, steel, bulk, general cargo and Ro–Ro traffic, as well as passengers.

In 1997 the population was 30 359.

Harbour limits

5.97

- 1 Moss Harbour District limit, extending SW from the mainland in position 59°25'1N 10°39'4E, includes Jeløya and off-lying islets and shoals, and has its N limit at Løvikholmen (59°29'3N 10°41'2E), as shown on the plan.

Approach and entry

5.98

- 1 The S part of the harbour is approached from the main channel of Oslofjorden, in the vicinity of 59°24'N 10°37'E, passing S of Jeløya, then entered through Verlebukta as given at 5.114.

The N part of the harbour is approached from the main channel of Oslofjorden, in position 59°32'N 10°38'E (Chart 3154), passing N of Jeløya, then entered through Mossesundet (5.101) as given at 5.115.

Traffic

5.99

- 1 In 2004 the port was used by 759 vessels with a total of 2 850 340 dwt.

Port Authority

5.100

- 1 **Address.** Moss Havnevesen, PO Box 5020, N–1500 Moss, Norway.

Email. firmapost@moss-havn.no.

- 2 **Remarks.** Local control is vested in the Port Captain and the Harbour Master. The Harbour Office is in the Moss Maritime Senter, Strandgate 10, at the S end of the canal, as shown on the plan of Moss.

Limiting conditions

Controlling depth

5.101

- 1 **Verlebukta.** It is reported as being safe to approach the berths in Verlebukta with a draught of 9 m.

Mossesundet (59°29'N 10°41'E), a narrow arm of the sea between Jeløya and the mainland, provides a deep water approach to Moss in which charted depths of more than 20 m can be maintained to a number of the major berths.

Mosskanalen

5.102

- 1 Mosskanalen, which connects Verlebukta with Mossesundet, has a depth of 4 m, width of 10 m and vertical clearance (1.9) of 4.5 m under a bascule bridge which is permanently closed.

Deepest and longest berths

5.103

- 1 The deepest and longest berths in Verlebukta and Mossesundet are given at 5.118.

Mean tidal levels

5.104

- 1 The tides are regular with a mean spring range of about 0.3 m.

Meteorological conditions can have a pronounced influence on the water level as described at 5.6.



Moss Harbour from S (5.95)

(Original dated 2000)

(Photograph – Moss Havnevesen)

Maximum size of vessel handled**5.105**

- 1 The largest vessel handled in:
Verlebukta was 20 000 dwt with a draught of 9.5 m.
Mossesundet was 28 000 dwt with a draught of 11 m.

Ice**5.106**

- 1 Mossesundet is normally frozen in winter. Some problems due to sea ice are thus expected in the N part of the harbour of Moss which lies in Mossesundet. The port remains open, even in very cold winters, when the assistance of an icebreaker is required.
- 2 The S part of the port is not so problematic. However, strong S winds may bring drifting ice from the Kattegat and create an accumulation of ice in the S part of the port. It is a situation that occurs seldom and does not last for more than a few days.

Arrival information**Outer anchorages****5.107**

- 1 **Verlebukta**, E of a line from the light on Revlingen (59°24'N 10°38'E) to the light on Verlebrygga, 2 miles NNE, is to be used as an anchorage for vessels which approach Moss from the S and have not been allocated a berth or anchorage.
- 2 **Mossesundet**, in the bay to the W of a line from Kippenes Light (59°29'N 10°40'E) to Kjellandsviktangen, 1½ miles SSW, is to be used as an anchorage for vessels which approach Moss from the N and have not been allocated a berth or anchorage.

Pilotage and tugs**5.108**

- 1 **Pilots.** Information on pilotage is given at 5.8.
Tugs are available from Horten or Fredrikstad.

Regulations concerning entry**5.109**

- 1 There is a speed limit of 4 kn between Reiertangen (59°25'N 10°38'E) and Mosskanalen, 1 mile NE; thence through the canal and N in Mossesundet to Rossnestangen (59°26'8N 10°39'5E).

Quarantine**5.110**

- 1 Vessels under quarantine should be anchored in one of the outer anchorages as given at 5.107.

Harbour**General layout****5.111**

- 1 Moss Harbour contains two harbour areas, one N and one S of the town, connected by Mosskanalen which has severe limitations, as given at 5.102. However, both areas can be approached independently.
- Mossesundet has two main port areas, the S being at Moss, in the vicinity of the canal, and the N being at Kambo, 2¾ miles NNE of the canal.

Buoyage direction**5.112**

- 1 The direction of buoyage is from S to N in Verlebukta, through Mosskanalen and thence in Mossesundet, although normal entry to Mossesundet is from N to S.

Natural conditions**5.113**

- 1 **Flow** in Oslofjorden is given at 5.11. The flow in Mosskanalen changes with the tide and wind. There is usually little movement but, during stormy weather, the flow can set at more than 1 kn in either direction, dependent on the wind. The wind is generally SW in summer and N in winter.

Directions for entering harbour**Approach from south through Verlebukta****5.114**

- 1 From the vicinity of 59°24'N 10°37'E, the track, initially within a white sector (031°–036°) of Verlebukta Light (white lantern, stone base) exhibited from the head of Verlebrygga at the S end of the canal, leads NNE for about 1¾ miles, passing (with positions relative to Revlingen Light (59°24'N 10°38'E)):
- 2 WNW of Revlingrevet which, with a depth of less than 4 m, extends 2¼ cables NW from Revlingen, a small islet on the NW extremity of which stands Revlingen Light (lantern on tripod, 4 m in height). The NW edge of the bank is marked by a spar buoy (starboard hand) which is moored within the 20 m depth contour. This contour extends into the white sector on the light with a depth of 18 m. And:
- 3 ESE of Steinergrunnen (5½ cables NW), the 20 m depth contour of which just touches the white sector, thence:
- ESE of the reef fringing Reiertangen (1¼ miles N) which is marked off its S end by a spar buoy (port hand), thence:
- 4 Clear of Espenesgrunna (1 mile NNE) which extends over the E half of the white sector and is marked on its E side by a spar buoy (isolated danger), also of a 10 m patch close NNE, thence:
- ESE of Grimsrødhausen (1¼ miles N) which is marked on its W side by a spar buoy (port hand), thence:
- 5 ESE of isolated rocks (1¼ miles NNE) with a charted depth of 9.5 m and of 9.7 m, 1½ cables farther NNE, both of which lie on the NW edge of the white sector, thence:
- ESE of a wreck (1½ miles NNE), with a least depth of 8 m over it, which also lies on the NW edge of the white sector.

Charts 3501, 3717 plans of Mossesundet and Moss**Approach from north through Mossesundet****5.115**

- 1 From the vicinity of 59°32'N 10°38'E, a white sector (128°–162°) of Saueholmene Light (white lantern, 3 m in height) on the W side of the S of a chain of islets, leads from Oslofjorden towards the entrance to Mossesundet, passing (with positions relative to the light):
- NE of Bevøykollen (1¾ miles NW) (5.59), thence:

- 2 SW of Middelgrunnen (5 cables N) which is marked by spar buoys (S cardinal at its S end and starboard hand at its N end).

Clearing line. The line of bearing, 176°, of the E extremity of GjØva (59°30'N 10°40'E) (5.116), open W of the S islet of Saueholmene, 5 cables N, clears close W of Middelgrunnen.

Mossesundet

5.116

- 1 When Saueholmene Light is distant 5 cables the track is adjusted as necessary to remain in mid-channel for the passage through Mossesundet, passing (with positions relative to Kippenes Light (59°29'·2N 10°40'·6E)):
- 2 SSW of Saueholmene, thence:
NNE then ENE of GjØva (1 mile NNW) which is an islet close off JelØya, thence:
ENE of a 9·6 m rock which lies close NE of Spetalgrunnane (3 cables N), a rocky patch with a least depth of 4 m over it, which is marked on its NE side by a spar buoy (port hand), thence:
- 3 Between Kippenes, on which stands Kippenes Light (lantern on framework structure, 6 m in height), and a 9 m rock, 2 cables E, which lies on the E side of the channel, thence:
ESE of Kjellandsvikskjera (1¼ miles SSW), a chain of underwater and submerged rocks which extends 2 cables SSW from Kjellandsviktangen and is marked at its S end by an iron perch, thence:
- 4 Over or clear of a 21 m patch (2 miles SSW) which lies in mid-channel, thence:
ESE of Rossnestangen (2½ miles SSW), thence:
NW of Sagmuggkanten (2¾ miles SSW) a bank which dries and extends nearly 1 cable W from the mouth of Mosseelva. The bank is marked on its W edge by a spar buoy (starboard hand).

Anchorage and berths

Anchorage

5.117

- 1 **Outer anchorages** are given at 5.107.
Approach from south. Anchorage suitable for coasters can be obtained off the NE side of Revlingen (59°24'N 10°38'E) (5.114) in a depth of 18 m.
- 2 **Mossesundet.** Anchorage can be obtained at the following places:
Kongshamn (59°29'·8N 10°40'·0E), which affords anchorage for coasters in a position 6 cables NNW of Kippenes, with a depth of 20 m, clay, with Saueholmene hidden by GjØva. The bottom slopes steeply E and is rocky to the N.
- 3 The bay N of Kjellandsviktangen (59°28'N 10°40'E). This bay affords good anchorage 5 cables N of the point and 1½ cables from the shore in depths from 12 to 20 m, clay and sand. This is a laying-up area for large tankers.
- 4 At the S end of Mossesundet, off the town of Moss. Anchorage is recommended off the W shore, 2 cables N of the canal entrance; and off the E shore, 6 cables NNE of the canal entrance; as shown on the plans.

Alongside berths

5.118

- 1 **Verlebukta.** The longest berth, with a length of 243 m and depths alongside of 5·9 to 10·2 m, lies on the E side of

Verlebrygga, the mole on the E side of the canal. This is a Ro-Ro berth with a width of 24 m.

- 2 The deepest berth, with a length of 190 m, including dolphins, and depths alongside of 8·8 to 10·8 m is alongside the Container Terminal, 3 cables SSE of the canal.

There are six other berths, including one other major Ro-Ro berth.

- 3 **Mossesundet at Moss.** The largest berth, with a length of 150 m and depths alongside of 9·7 to 12·1 m, lies on the NW side of Moss Aktiemøllers, ¾ cables NE of the canal.

There are 13 other berths including three in the shipyard area.

- 4 **Mossesundet at Kambo.** The deepest berth at Kambo (59°28'·5N 10°41'·3E) with a length of 61 m and depths from 14·4 to 17·7 m alongside is at Norsk Gulf, an oil terminal, as named on the plan, which can accommodate vessels of 20 000 tonnes. Larger vessels can be anchored off and secured by the stern.

- 5 The longest berth, with a length of 144 m and depths from 9·7 to 11·7 m alongside, is at Felleskjøpet, as named on the plan, which handles feedstuffs.

There are two other berths and a mooring buoy.

Port services

Repairs

5.119

- 1 Repairs to hull and machinery can be carried out.

Other facilities

5.120

- 1 Deratting Exemption Certificates issued; medical facilities and a hospital are available; oily waste reception facilities also available.

Supplies

5.121

- 1 Fuel can be obtained at some berths, otherwise by lorry or barge; fresh water is available at all berths; provisions and stores, including charts, are also available.

Son

General information

5.122

- 1 **Description.** Son (59°31'N 10°41'E), a secure fishing port on the NE side of the entrance to Mossesundet, contains a large trading area with good communications.

Traffic regulation. There is a speed limit of 4 kn in the harbour.

Submarine pipeline. A pipeline is laid from the N side of Sonsbukta, across the bay in a S direction and thence through Saueholmsundet. For further information on submarine pipelines see 1.69.

Anchorage and berth

5.123

- 1 **Anchorage** can be obtained in depths from 18 to 25 m, with good holding ground, avoiding the submarine pipeline, in the middle of the bay. Mooring rings are available along the NW side of the harbour.

- 2 **Berths.** The largest berth is the Old Service Boat Quay, with a length of 46 m and depths from 2·6 to 3·1 m alongside. There are two marinas with full supporting facilities including fuel and water.

OSLOFJORDEN — NORTHERN PART

GENERAL INFORMATION

Chart 3501

Area covered

5.124

- 1 This section covers the N part of Oslofjorden, which extends N from Filtvet (59°34'N 10°37'E) to the head of the fjord at Oslo Havn (59°54'N 10°44'E), then S for about 10 miles to the head of Bunnefjorden (59°43'N 10°43'E). The main channel through this section is the approach to Oslo Havn. The section is arranged as follows:

Oslofjorden main channel – Filtvet to Oslo Havn (5.126).

Oslo Havn (5.165).

Harbours

5.125

- 1 **Major harbour.** Oslo Havn (59°54'N 10°44'E) (5.165).
Minor harbours:
Halvorshavn (59°35'N 10°37'E) an oil depot (5.151).
Drøbak (59°40'N 10°38'E) a commercial port (5.153).
Engene (59°41'N 10°32'E) which contains an explosives factory (5.154).
- 2 Fagerstrand (59°44'N 10°32'E) an oil depot (5.155).
Granerudstøa (59°47'N 10°36'E) which contains a repair yard (5.156).
Slemmestad (59°47'N 10°30'E) commercial port (5.157).
Bjørkåsholmen (59°47'·6N 10°30'·0E) commercial port (5.158).
- 3 Sandvika (59°53'N 10°32'E) commercial port (5.159).
Lysaker (59°54'·7N 10°38'·6E) oil depot and commercial port (5.209).

OSLOFJORDEN MAIN CHANNEL —
FILTRET TO OSLO HAVN

General information

Charts 3501, 3563, 3562

Main channel and route

5.126

- 1 **First leg.** From a position E of Filtvet Light (59°34'N 10°37'E) the main channel continues N for about 5½ miles through a part of the fjord which is narrow but clear in the fairway, with Oslofjorden TSS north limit at Elle Light (59°38'·4N 10°38'·2E).
- 2 **Second leg.** From the vicinity of Drøbak (59°40'N 10°38'E) the main channel follows the E side of the fjord, over the least charted depth in the channel (5.128) and through the narrows of Drøbaksundet (59°40'·3N 10°36'·9E), and E of Askholmene and Storegrunnen. Thence the recommended direction of flow for N-bound traffic continues between the E shore and the islands of Aspond, Lågøya and Søre Langåra to a position NNW of Spro Light.

The recommended S-bound route passes W of Søre Langåra, Lågøya and Aspond, then W of Askholmene.

- 3 **Third leg.** From a position NW of Spro (59°46'N 10°35'E) the recommended N-bound route passes W of Steilene and SE of Gåsungane (Gasungene on Chart 3562), to the TSS W of Nesodden.

The recommended S-bound route from Nesodden TSS passes SE of Gåsøya and NW of Gåsungane, then continues S to a position W of Søre Langåra.

Topography

5.127

- 1 General information on the topography in Oslofjorden is given at 5.5. Within Oslofjorden the waterways are well marked and should present no difficulty to navigation in good visibility.

The NW end of the fjord (59°53'N 10°34'E), which is obstructed by many islands, islets and rocks, is described at 5.150.

Depths

5.128

- 1 **Depth variation.** The S part of the channel passes through deep water which is very uneven, with variations of over 100 m within a distance of 3 cables, in the vicinity of Nygrunnen (59°36'N 10°38'E) and again 3 miles N.
- 2 **Least charted depth** in the fairway of the channel is 15 m in position 59°40'·0N 10°37'·1E, to the W of Drøbakgrunnen, along the track given at 5.136.
- 3 **Draught limitations** are given at 5.130 and 5.131.
- 3 **General information** on depths and sea level is given at 5.6.

Hazards

5.129

- 1 **Fishing** within Oslofjorden is given at 5.7.
Buoyage, for changes in position see 5.7.
Ferry. A ferry route crosses the fjord between Drøbak (59°40'N 10°38'E) and Slottet, 1 mile SW.

General traffic regulations

5.130

- 1 **General remarks.** Traffic regulations for Oslofjorden are given at 5.10.
For details of Oslofjorden VTS see 5.9 and *Admiralty List of Radio Signals Volume 6* (2).
- 2 **Speed restrictions.** Between Filtvet Light and Oslo, vessels must proceed at moderate speed so that their wash does not cause damage to quays and wharves or inconvenience vessels berthed at them. It has been reported that a maximum speed of 8 to 10 kn may be necessary for larger vessels to avoid excessive wash, particularly in the narrower sections. Mariners offending against this regulation may be subject to a fine and may be responsible for any damage caused.
Within Sætrepollen (59°41'N 10°32'E) and Sandspollen, 2 miles SE, a speed limit of 5 kn applies.
Speed restrictions within the islands in the NW part of the fjord are given at 5.150.
- 3 **Prohibited activities.** Anchoring, diving and fishing are prohibited within an area which is limited to the N by a line extending WNW from Husvik (59°40'·6N 10°37'·3E) to the N point of Nordre Kaholmen, 5½ cables WNW; and, to the S, by a line from the S point of Søndre Kaholmen, 5 cables WSW of Husvik, to a position 5½ cables SSE and thence E to the coast in the vicinity of Drøbak, as shown on the plan.
- 4 **Prohibited area.** Unauthorised approach is prohibited within 50 m of the coast in an area around Nordre Kaholmen and Søndre Kaholmen (above) and within the same distance of the coast of Bergholmen, 3 cables W of Søndre Kaholmen. Navigation without stopping is permitted through Kloasundet, the sound to the N of Bergholmen.

- 5 **Movement.** Vessels with a draught of more than 9.1 m are not permitted to pass N of Drøbak (59°40'N 10°38'E) after dark.

Enforcement. Contravention of these regulations is punishable by fines.

Additional regulations for tankers

5.131

- 1 **Draught limitations.** The maximum draught permitted for tankers calling at oil installations N of Drøbak is 11 m by day and 9.1 m at night.

Signals. Tankers of more than 10 000 dwt, underway in the N part of Oslofjorden between Filtvet and the oil installations (above) are required to display the following signals:

- 2 By day — Black cylinder, not less than 0.61 m wide and 1.07 m long, where best seen.
At night — In addition to the lights prescribed in *The International Regulations for Preventing Collisions at Sea* (1972), three red lights disposed vertically, not less than 1.83 m apart, and with all-round visibility of 2 miles.

- 3 In addition, at any time of the day or night, tankers may use a sound signal of 1 long blast followed by 2 short blasts.

Movement. Tankers of more than 35 000 dwt are not allowed to pass Drøbak when loaded.

Natural conditions

5.132

- 1 **Flow.** General information on the flow in Oslofjorden is given at 5.11. In the N part of Oslofjorden the flow is influenced by the tides but is also dependent on the wind to a large degree outside the fjord.

- 2 Between Drøbak (59°40'N 10°38'E) and Digerudgrunnen, 3½ miles NNW, the flow is usually out-going and is often strong, especially during N winds and when the snow is melting. This flow is particularly noticeable in the narrows of Drøbaksundet (59°40'3N 10°36'9E), where the spar buoy (port hand) on Drøbakgrunnen, 3 cables NNW of the harbour, is often forced below the surface by the strength of the flow.

- 3 Strong winds from the S create a N-going flow and many reports have been received of a flow with a rate of 1 to 3 kn in both directions.

The flow often sets in opposite directions along the shore to that in mid-channel.

- 4 **Ice** conditions within Oslofjorden are described at 5.11.

Directions – northbound

(continued from 5.59)

Principal marks

5.133

- 1 **Landmarks:**

Filtvet Light (59°34'N 10°37'E) (5.55).

Digerudgrunnen Light (lantern on framework structure, 11 m in height) (59°43'2N 10°35'2E).

- 2 Steilene Light (white lantern on concrete column) (59°49'0N 10°35'6E) exhibited from the SW point of Steilene, about 5 m from the old dwelling of the lighthouse-keeper.

- 3 Illjærnsflu (Ildjærnsflua on Chart 3501) Light (lantern on column, 14 m in height) (59°51'4N 10°37'9E).
Dyna Lighthouse (59°53'7N 10°41'3E) (5.190).

Other aid to navigation

5.134

- 1 **Racon:**

Gåsungane Light (59°50'4N 10°35'2E).

For details see *Admiralty List of Radio Signals Volume 2*.

Filtvet Light to Drøbak

5.135

- 1 From a position 7 cables ESE of Filtvet Light (59°34'N 10°37'E) the line of bearing, 356°, of Drøbak Church (59°40'N 10°38'E), which is white but small and not prominent, leads in the N-bound lane of the TSS for 4½ miles, within a white sector (358°–138°) of Elle Light (white lantern), 1½ miles S of Drøbak Church, passing (with positions relative to Elle Light):

- 2 Over submarine cable areas (1.69) (3½ miles S) which cross the fjord and are marked by lights near the landing areas, as shown on the chart, and:
E of Halvorshavn (3½ miles SSW) (5.151), thence:
3 W of Hvitsten (2½ miles S) a popular holiday resort which has a chemical factory, thence:
E of Nygrunnen, 7 cables WNW of Hvitsten, which is an isolated pinnacle, thence:
W of the coastal bank extending 1 cable W from Elle Light.

- 4 After passing Elle Light the track leads into a designated Precautionary Area, and is adjusted to pass clear W of the coastal bank on which lies a 7.8 m rock, 5 cables NNW of the light.

Drøbak to Aspond

5.136

- 1 When Drøbak Church is distant 9 cables, the alignment (341°) of the E extremity of Nordre Kaholmen (59°40'7N 10°36'4E), from which Kaholmen Light (white lantern) is exhibited, with the E extremity of Askholmene, 1½ miles NNW, on which stands Askholmene Light (5.138), leads NNW in the fairway for 1¼ miles, within a white sector (336°–348°) of Kaholmen Light, passing (with positions relative to Drøbak Church):

- 2 WSW of Drøbakbanken (8 cables S) which extends about 1 cable from the E side of the fjord, thence:
ENE of Storskjær (7 cables SW), a bare rock which lies near the E edge of a shallow spit extending 2½ cables E from the W side of the fjord in the vicinity of Slottet, thence:

- 3 ENE of Småskjæra (4½ cables W), two above-water rocks lying on a shallow bank which extends 3 cables W to the mainland and 4 cables NNW to Søndre Kaholmen, and which is marked on its E side by a buoy (port hand), thence:

- 4 WSW of Drøbakgrunnen (2¼ cables WNW), a shallow rock lying on the E side of a spit which crosses the fjord and establishes the least charted depth in the fairway, as given at 5.128. Drøbakgrunnen is marked on its W side by a light-buoy (W cardinal) and on its E side by a spar buoy (port hand). And:

- 5 ENE of a charted depth of 10 m (3¾ cables WNW) which lies on the spit (above). Deviation from the alignment given for this track may result in shallower depths than those given at 5.128. It should be noted that, in this vicinity, the white sector of Kaholmen Light passes over charted depths of 10 m on its W side and 13 m on its E side. Thence:

- 6 ENE of a pair of spar buoys (lateral) (6 cables WNW) which mark a passage through the spit connecting Småskjera to Søndre Kaholmen as given at 5.149.

5.137

- 1 When Kaholmen Light is distant 5 cables the track is altered towards the N for about 6½ cables, passing (with positions relative to the light):

E, distant 1 cable, of Søndre Kaholmen, the S of two islets which lie near the middle of the channel, and:

- 2 W of Husvikbåen (4 cables SE), a rock with a depth of 1.5 m over it which lies on the edge of the fringing bank, and is marked by an iron perch, thence:

E, distant 1 cable, of Nordre Kaholmen.

- 3 Immediately after passing Nordre Kaholmen the track is altered to the NW for about 3 cables, within a white sector (311°–321°) of Tronstadodden Front Leading Light (59°41'·5N 10°35'·5E) (5.148), passing NE of Kaholmgrunnen, 6½ cables SSE of the light, which is marked on its NE side by a spar buoy (port hand).

5.138

- 1 When clear, a white sector (163°–167°), astern, of Kaholmen Light leads NNW for about 8 cables, with the best safety margin on the W side of the sector; thence into a white sector (343°–347°) of Digerudgrunnen Light (59°43'·2N 10°35'·2E) (5.133) for 1 mile farther NNW, with the best safety margin on the E side of the sector, passing (with positions relative to Tronstadodden Light):

- 2 WSW of the reef which extends 1½ cables from the W side of Hallangstangen (4½ cables E) which is marked by a beacon (cairn) off Kongen and by three iron perches farther S. An isolated patch, with a depth of 7 m over it, lies off the S part of this reef and is marked by Langebåt Light (metal post). Thence:

- 3 WSW of Båstø Light (lantern on post) (4 cables ENE) marking the N part of the reef off Hallangstangen, thence:

ENE of the E islet of Askholmene (6½ cables N), a group of islets near the middle of the channel which are foul off their W side. Askholmene Light (lantern on post) is exhibited from the N end of the E islet. Thence:

ENE of Storegrunnen (1 mile N), a shoal in the middle of which stands Storegrunnen Light (column).

- 4 When clear of Storegrunnen the track is adjusted to the W to enter a white sector (164°–166°), astern, of Storegrunnen Light which leads NNW passing close to the bank extending 1 cable W from Digerud, off which stands Digerudgrunnen Light (5.133). The W side of the sector provides the best safety margin.

5.139

- 1 **Clearing marks:**

The alignment (345°) of the coast at Digerud (59°43'·2N 10°35'·3E) with the NE extremity of Søre Langåra, 2½ miles NNW, clears WSW of the reef fringing Hallangstangen.

Aspond to Spro

5.140

- 1 When Digerudgrunnen Light bears 150° the track is adjusted towards the E to enter a white sector (168°–172°) astern, of the light, which leads NNW for about 2¼ miles, passing (with positions relative to the light):

- 2 ENE of a shallow ridge, with a least depth of 8 m over it, which lies 1½ cables NNE of Aspond Light (lantern on post) (4 cables NNW) which stands on the E side of Aspond, an islet on the W side of the fairway, thence:

- 3 WSW of Fagerstrand (9 cables N) (5.155), near the coast of which stand conspicuous white oil tanks, thence:

Very close to the coastal bank extending ½ cable W from the E shore (1¼ miles NNW) with depths of less than 20 m. The W side of the sector provides a greater safety margin at this point. And:

- 4 ENE of a reef which extends 1 cable NNE from the N point of Lågøya (1¼ miles NNW) and is marked on its NE side by an iron perch. A rock with a depth over it of 6.5 m, 1½ cables farther N, is marked by a spar buoy (isolated danger). Thence:

- 5 ENE of Sydostgrunnen (1¾ miles NNW), the E of several shoals lying off the S end of Søre Langåra, which is marked by a spar buoy (port hand), thence:

ENE of the reef and bank fringing the E side of Søre Langåra (2¼ miles NNW), on the E side of which stands Langåra Light (lantern on post), and near its N extremity stands a beacon, thence:

- 6 WSW of a rock awash (2½ miles N), which is marked by an iron perch and lies close SW of a point on which stands Spro Light (framework structure), and:

Close ENE of Langårrabbane (2¾ miles NNW) a spit which extends 2 cables N from Søre Langåra with a depth of 5 m over its N end where it is marked by a spar buoy (port hand).

Chart 3562

Spro to Østre Måsane

5.141

- 1 From a position 7 cables NNW of Spro Light (59°46'N 10°35'E) (5.140), the route leads 2 miles N, thence 8 cables NNE, passing (with positions relative to Steilene Light (59°49'·0N 10°35'·6E)):

E of Håmerrgrunnen (2¾ miles SW), thence:

- 2 W of Krøklegrunnen (1½ miles S), a rock with a depth of 0.7 m over it, which is marked by an iron perch and a spar buoy (starboard hand). Nordre Krøklegrunnen, with a least depth of 6.8 m over it, extends 2½ cables NW from the perch. Thence:

- 3 W of Søre Steilesand (6 cables SSW) which is marked on its W side by a spar buoy (starboard hand), and:

E of Storegrunnane (9 cables WSW), thence:

- 4 W of Torskegrunn (2 cables W), a group of rocks with a least depth of 8.9 m over them which lie on the W edge of the bank extending a total of 4 cables WSW from the W islet of the Steilene group. Steilene Light (5.133) is exhibited from the SW end of the SW islet. A second light (white lantern) is exhibited from the NE end of the same islet. Thence:

- 5 Clear, depending on draught, of a detached patch (5 cables WNW), with a depth of 12.5 m over it, which lies within the E part of a white sector (174°–179°), astern, of Spro Light.

Useful mark:

Bjørkøygrunnen Light (lantern on post) (2¼ miles WNW).

Østre Måsane to Nesodden**5.142**

- 1 From a position NW of Steilene Light (5.133), the recommended route leads 3½ miles NE, passing (with positions relative to Illjærnsflu (Ildjærnsflua) Light (59°51'4N 10°37'9E)):

Clear of Østre Måsane (2¼ miles SW) a group of shoals marked on their NW side by a light-buoy (isolated danger), thence:

- 2 NW of Merseflua (1¾ miles SSW), a group of shoals marked by two buoys (starboard hand), and:

SE of Gåsungane (Gasungene on Chart 3562) (1½ miles SW), a reef which dries in parts, on the SW end of which stands Gåsungane Light (tripod). The SW and NE ends of the reef are marked by buoys (starboard hand and port hand, respectively) and a beacon-tower (black with white band) stands 1½ cables ENE of the light. A shoal patch, with a least depth of 11.5 m over it, lies 4 cables E of the light. Thence:

SE of Gåsøya Light (lantern on post) (1¼ miles WSW), standing on Arnesflua, a rock close off the SE side of the island, thence:

- 3 NW of Illjærnsflu (Ildjærnsflua) Light (5.133), standing near the centre of a ridge on which depths of less than 12 m extend up to 3 cables NE and SW from the light.

The track then leads to the NE-bound lane of Nesodden TSS. Nesoddtangen Light-buoy (safe water) marks the NE end of the separation zone; on the SE side of the lane, a spit with a depth of 9 m over it extends 1½ cables NW of Nesodden Light (tripod, 5 m in height).

(Directions continue for Oslohavn Western Channel at 5.190, for Oslohavn Southern Channel at 5.195, and for Lysakerfjorden at 5.208)

Directions – southbound**Principal marks****5.143**

- 1 **Landmarks:**

Digerudgrunnen Light (59°43'2N 10°35'2E) (5.133).
Steilene Light (59°49'0N 10°35'6E) (5.133).
Illjærnsflu Light (59°51'4N 10°37'9E) (5.133)

Other aid to navigation**5.144**

- 1 **Racon:**

Gåsungane Light (59°50'4N 10°35'2E).

For details see *Admiralty List of Radio Signals Volume 2*.

Nesodden to Gåsungane**5.145**

- 1 From a position 5 cables NW of Nesodden Light (59°52'N 10°39'E) in the SW-bound lane of Nesodden TSS, the track leads 2¾ miles SW, passing (with positions relative to Illjærnsflu (Ildjærnsflua) Light (59°51'4N 10°37'9E)):

SE of Geitegrunnen (1¼ miles NNE), marked at its NE end by a buoy (port hand), thence:

- 2 SE of Vassholmgrunnen (1 mile N), the SE of the shoals lying SE of Vassholmene, two islets containing a marina, thence:

Clear, depending on draught, of Storesanden (6 cables NW), an extensive ridge about 8 cables in length, orientated ENE/WSW, with a least depth of 11 m near its centre, thence:

NW of Illjærnsflu (Ildjærnsflua) Light (5.133), thence:
SE of Gåsøya Light (1¼ miles WSW) (5.142), thence:
NW of Gåsungane (Gasungene on Chart 3562) (1½ miles SW).

Gåsungane to Spro**5.146**

- 1 From a position NW of Gåsungane the track leads 4¾ miles SSW and S, passing (with positions relative to Steilene Light (59°49'0N 10°35'6E)):

Clear, depending on draught, of a patch (1¼ miles NNW), with a least depth of 13.5 m over it, thence:

- 2 ESE of Vestre Måsane (1½ miles NW) a group of shoals marked by a light-buoy (port hand), thence: WNW of Østre Måsane (7 cables NNW), thence: W of Steilene Light (5.133), thence:

- 3 Clear, depending on draught, of Storegrunnane (1 mile WSW), a group of shoal heads lying on the W side of the fairway, and with a least depth of 13.5 m, thence:

E of Håmerrgrunnen (2¾ miles SW) and Torpene, 7 cables farther S, which is marked by a spar light-buoy (port hand).

*Chart 3563***Spro to Aspond****5.147**

- 1 From a position W of Spro Light (59°46'N 10°35'E), the recommended route leads 2 miles S on the W side of the precautionary area, passing (with positions relative to Nordre Sundbyholmen Light (59°43'6N 10°32'1E)):

W of the bank fringing Søre Langåra (2¼ miles NNE) (5.140), and:

- 2 E of Langårgrunnen, a chain of shoals extending 6 cables S from Klokkegrunnen (2 miles N), which is the least depth along the chain, and is marked by a buoy (port hand), thence:

W of Sydvestgrunnen (1½ miles NNE), marked by an iron perch, thence:

E of Østre Ramtongrunnen (1 mile N), marked at its NE end by a spar buoy (port hand), thence:

- 3 W of Lågøya (1 mile NE); shoal ground extending 2 cables W of the island is marked by a spar buoy (starboard hand). And:

E of the reef extending 2 cables NNE from Høvikskjera (4 cables NNW), marked near its N end by an iron perch.

- 4 Thence the track leads 6 cables SE into Ristsundet, in a white sector (143°–145°) of Storegrunnen Light (59°42'6N 10°35'3E), passing (with positions relative to the light):

NE of Nordre Sundbyholmen Light (column) (2 miles NW), thence:

NE of Flågrunnen (1½ miles NW), a reef extending 3 cables NW from the NW part of Nordre Håøya and marked by an iron perch at its NW end, thence:

- 5 SW of Aspond (1 mile NNW) (5.140). A shoal with a least depth of 3.5 m lies 1 cable W of the S point of the island and is marked by a spar buoy (starboard hand). And:

NE of the bank fringing the N coast of Nordre Håøya (1 mile NW), marked nearest the track by a spar light-buoy (port hand).

Aspond to Kaholmen

5.148

- 1 From a position in Ristsundet (59°43'·2N 10°34'·4E), between Aspond and Nordre Håøya, the route leads 1½ miles SSE on the alignment (160°) of Tronstadodden Leading Lights (front light on column, rear light on cairn 50 m farther SSE) (59°41'·5N 10°35'·5E), passing (positioned from the front light):

WSW of Storegrunnen Light (1 mile N) (5.138) and Nordre Torskekrakken, an underwater rock lying 1 cable W of the light, thence:

- 2 WSW of Søre Torskekrakken (8 cables NNW), a shoal marked by a light (lantern on post), thence: ENE of Galteryggen (6 cables NNW), a shoal marked by a light (metal post), and:

WSW of the Askholmene group of islets (6 cables N) (5.138). The W side of the group is marked by a spar buoy (starboard hand), and the SW danger, Askholmgrunnen, is marked by a light (metal post).

- 3 Thence the track is adjusted to pass E of Tronstadodden and enter a white sector (311°–321°), astern, of the front leading light, which leads SW of Langebåt Light (5.138) to rejoin the N-bound route NE of Nordre Kaholmen (59°40'·7N 10°36'·5E).

The S-bound route continues as the reverse of the N-bound route, with directions given at 5.136.

Side channel

Vestfjorden

5.149

- 1 **Description.** Vestfjorden (59°42'N 10°33'E) branches NW from the main fjord S of Søndre Kaholmen (59°40'·5N 10°36'·4E) (5.137) and then leads N, passing to the W of Håøya, rejoining the main channel N of Søre Langåra (59°45'N 10°34'E). The SE entrance to Vestfjorden is obstructed by the shallow bank extending S and W from Søndre Kaholmen, as described at 5.136, so that this channel is normally entered from the N.

- 2 However, a narrow channel through the bank, with a depth of 9 m in it, lies about 5 cables SSE of Søndre Kaholmen and is marked by two spar buoys (port hand to the S and starboard hand to the N); depths immediately N and S of the spar buoys are 1·3 and 1·4 m respectively. A second channel, with a depth of about 2 m in it, leads N through the bank close to the W shore, just off the quay at Slottet.

- 3 There are several dangers in the fairway of Vestfjorden which can best be seen on the chart. Stedgrunnen, marked by a private light (lantern on post) and a spar buoy (S cardinal), lies in mid-channel in the SE part of the fjord, 1 mile W of Søndre Kaholmen.

- 4 **Directions.** A white sector (342½°–348°) of Nordre Sundbyholmen Light (59°43'·6N 10°32'·1E) (5.147) leads clear through the N part of Vestfjorden.

Regulations are given at 5.130.

Anchorage and berths are given under the name of location.

Oslofjorden north-west part

Chart 3562

General information

5.150

- 1 **Description.** The NW part of Oslofjorden, to the W of Nesoddtangen Light (59°52'N 10°39'E), is encumbered with

islands, islets and rocks, traversed by sounds and surrounded by bays. Channels through the area give access to Sandvika (59°53'N 10°32'E) (5.159); and the area generally affords safe anchorage as required, clear of submarine cables (1.69), as shown on the chart.

- 2 **Speed restriction.** A speed limit of 15 kn exists in an area extending from Sandvika to Lilleostangen, 2¼ miles SSE; thence ENE for 2 miles to Vassholmane (59°52'·4N 10°37'·3E); thence to Geitholmen, 7 cables NE; thence NNE through Svarteskjær (59°54'·5N 10°38'·6E) to the boundary of Oslo Harbour Authority, 2 cables NNE. Within this area an additional restriction of slow speed (not over 5 kn) exists within 150 m of all beaches, boat harbours, anchored boats, fishing places, and other similar features.

- 3 **Anchorage and berths** are given under the name of location.

Anchorage and harbours

Chart 3563

Halvorshavn

5.151

- 1 Halvorshavn (59°35'N 10°37'E), an oil depot on the W side of the main channel, contains a concrete quay with a length of 70 m and depths from 10·7 to 12·2 m alongside the outer face. Conspicuous white tanks serve to identify the area.

The depot contains limited facilities for the reception of oily waste. In 2002 the berth was used by eight vessels totalling 28 700 dwt.

Ellingstad

5.152

- 1 Ellingstad (59°39'·4N 10°36'·1E), a large sand quarry on the W side of the main channel, opposite Drøbak, contains a concrete quay with a length of 38 m and depths from 2·2 to 3·1 m alongside. This quay, which is protected by two moles extending from the coast, is approached through a channel with a width of 20 m and depth of 3 m.

Drøbak

5.153

- 1 **Position and function.** Drøbak (59°40'N 10°38'E), a substantial town with a population of about 10 000 (1992) is the centre of local administration.

Port limits consist of the E side of the fjord from latitude 59°38'·9N to Gylteholmen, 2¼ miles N.

- 2 **Pilotage** can be arranged through Horten Pilot Booking Centre, Oslofjorden, if required.

Restrictions in anchoring, fishing, diving and approaching the coast are given at 5.130.

Local conditions. Due to a local wind (the sea breeze) in Drøbaksundet (59°40'·3N 10°37'·0E) and the heavy traffic in Oslofjorden it is at times too rough and exposed to berth at any of the quays on the outside of the mole.

- 3 **Anchoring** is permitted N of Drøbakbanken (59°39'·2N 10°37'·9E), in 23 m sand and mud; and also to the S of Storskjeret, 7 cables NW, on sand, clear of the prohibited areas mentioned above.

- 4 **Alongside berths.** The largest berth, with a length of 45 m and depths from 2·3 to 3·5 m alongside, lies along the Public Quay on the mole of the small craft harbour (59°39'·8N 10°37'·6E). There are five other berths.

Supplies. Normal supplies of fuel, water and provisions are available.

- 5 **Rescue.** A life-boat is stationed at Drøbak.

Engene**5.154**

- 1 **Position and function.** Engene (59°41'N 10°32'E), which contains an explosives factory, is situated at the SE end of Sætrepollen, a large harbour on the SW side of Vestfjorden (5.149). Sætrepollen is entered between Torvøya and Bjørnnes, 1½ cables SE, from the N extremity of which a light is exhibited.
- 2 **Traffic.** In 2004 Sætrepollen was used by two vessels with a total of 9493 dwt, and Engene was used by five vessels with a total of 19 177 dwt.
- Regulations.** Entry to part of the area surrounding Engene is sometimes prohibited for safety when testing explosives. This area is marked by buoys and signs and a red flag is shown during blasting.
- 3 **Submarine pipelines** extend across the harbour and through the entrance towards Drøbak, 3 miles SE, as shown on the chart.
- 4 **Berth.** The factory at Engene is served by a concrete quay with a length of 36 m and depths from 9.2 to 9.4 m alongside.

Fagerstrand**5.155**

- 1 **Description.** Fagerstrand (59°44'N 10°35'E), an oil depot on the E side of the main channel, contains a concrete jetty with a length of 200 m and depths from 8.9 to 12.0 m alongside its outer face. Tankers up to 35 000 dwt can be accommodated. There are nine other berths.
- Traffic.** In 2004 the depot was used by seven vessels with a total of 22 680 dwt.
- 2 **Port Authority.** Statoil Norge A/S Fagerstrand, N-1454 Fagerstrand, Norway.
- Supplies:** fresh water is laid on to all berths; the depot may be used as a fuelling stop for vessels enroute to Oslo Havn.

*Chart 3562***Granerudstøa****5.156**

- 1 Granerudstøa (59°47'N 10°36'E), a hull and engine repair site on the E side of the main channel can be identified by a number of tanks in the vicinity as this was previously an oil depot. The largest berth, with a length of 160 m and depths from 9.6 to 15.4 m alongside, lies on the NW side of the S of two angled concrete jetties which lie parallel to the coast.
- There are 11 other berths.

*Chart 3562 plan of Slemmestad***Slemmestad****5.157**

- 1 **Description.** Slemmestad (59°47'N 10°30'E), the site of a packing and silo station on the W side of the main channel, can be identified by a large factory (former cement works) which dominates the harbour. The largest berth, with a length of 180 m and depths from 7.2 to 12.3 m alongside, lies on the NW side of the basin.
- 2 **Traffic.** In 2004 the port was used by 39 vessels with a total of 56 000 dwt.
- Directions.** Slemmestad is approached between shoals which lie close offshore and are marked by spar buoys.

*Chart 3562***Bjørkåsholmen****5.158**

- 1 **Description.** Bjørkåsholmen (59°47'.6N 10°30'.0E), situated on the W side of Oslofjorden, contains two concrete quays in the bay on its N side. The largest of these, which has a length of 105 m and depths from 7.9 to 10.1 m alongside, is poorly fendered.
- On the S side, at Tajet, two large moles protect a harbour for small vessels. A light (lantern on post) is exhibited from the head of the NE mole.
- 2 **Submarine pipelines.** A sewer outfall area, centred 4½ cables ENE of Tajet Light, with a radius of 180 m, is marked at its centre by a light-buoy (special). A submarine pipeline is laid from the head of the bay on the N side of Bjørkåsholmen in a NE direction across Oslofjorden.

Sandvika**5.159**

- 1 **Position and function.** Sandvika (59°53'N 10°32'E) lies at the W end of Sandviksbukta, a harbour at the NW end of Oslofjorden in an area described at 5.150. Sandvika is an administrative centre for local government and home to local industry.
- 2 **Ice.** Sandviksbukta and the channels between the offshore islands fronting the bay freeze almost every year in December, January and February. The break-up of the ice occurs normally in late March.
- 3 **Approach.** From a position 4½ cables W of Gåsungane (Gasungene on Chart 3562) (59°50'.4N 10°35'.2E) (5.142) the recommended approach follows the leading line (343½°) as shown on the chart; thence through Viernrenna, Viernbukta and Store Ostsund (59°52'.0N 10°33'.3E) at its N end; thence along the leading line (329°) as shown on the chart, as far as Kalvøygrunnen, 1 mile NNW; thence ENE between Kalvøya and Dynga, a shoal 1 cable SSE; thence along the leading line (011°) as shown on the chart, into the harbour entrance.
- 4 **Anchorage.** Sandviksbukta affords anchorage in a maximum depth of 10.5 m.
- Berths.** The largest berth lies on a quay with a length of 30 m and depths from 4.9 to 5.7 m alongside.
- Medical facilities** are available and there is a chart agent.

*Chart 3562 plan of Illjernet***Kavringen****5.160**

- 1 Kavringen (59°50'.8N 10°38'.7E), an islet 1½ miles S of Nesodden, contains several quays, the largest of which has depths from 5 to 6 m alongside, and a shipyard with two slipways suitable for vessels with a length of 30 m, beam of 7 m and draught of 4 m. The largest slip can handle a vessel of 100 tonnes displacement.

Minor harbours and anchorages*Chart 3501***General information****5.161**

- 1 There are many bays and harbours for small vessels within Oslofjorden. Those facilities which are enclosed within or form part of a commercial harbour are given with that harbour. The independent facilities given below are grouped by area under the headings: main channel; Vestfjorden; and Oslofjorden NW part.

Charts 3563, 3562 plan of Illjernet

Main channel

5.162

- 1 **Skiphellebukta** (59°38'N 10°39'E), on the E side of the channel, affords anchorage with good holding on clay that is sheltered during winds from the N but is exposed to the S.

Håøya. A bay to the W of Håøyagrunnen (59°42'3N 10°34'2E) affords good anchorage in depths from 25 to 30 m, over a bottom of clay.

- 2 **Illjernet** affords anchorage in Suterembukta (59°50'5N 10°38'3E), a sound on its S side, in a depth of 21 m, over a bottom of clay.

Charts 3563, 3562

Vestfjorden and the west side of Oslofjorden

5.163

- 1 **General information** on Vestfjorden is given at 5.149.
Sandspollen (59°40'N 10°35'E), an inlet on the S side of Vestfjorden, near its SE end, is a good harbour which provides anchorage for small vessels
- 2 It is reported that the best anchorage is in the NW corner to obtain shelter from the N wind which can be quite strong in the early morning. The entrance has a width of 60 m between rocks marked by perches.
- 3 **Bjørnhubukta** (59°42'9N 10°33'2E) is a fine harbour on the W side of Nordre Håøya. Depth in the entrance is 30 m and the bottom in the harbour is mud. This harbour is exposed to winds from the S.
- 4 **Nærnesbukta** (59°45'7N 10°30'0E), a bay on the W side of Oslofjorden, affords anchorage with good holding clear of a pipeline (1.69) which is laid N from Nærnestangen. There are several berths within the harbour.
- 5 Boat repairs of all kinds can be carried out with five slipways, the largest of which can accommodate craft with a length of 27 m. Fresh water is laid on to the visitors' quay.
Vollenbukta (59°49'N 10°30'E), a bay on the W side of Oslofjorden at its N end, affords anchorage in depths of 15 m on clay.

Chart 3562

Oslofjorden north-west part

5.164

- 1 **Remarks.** General information on the area at the NW end of Oslofjorden is given at 5.150. Within this area anchoring is permitted anywhere around the islands off Sandvika (59°53'N 10°32'E) as required, clear of submarine cables (1.69). Other anchorage and berthing areas are given in the following paragraphs.
- 2 **Blakstadbukta** (59°50'N 10°30'E) an inlet on the W side of Oslofjorden at its N end, affords good anchorage close offshore at the head of the inlet clear of a pipeline (1.69). Also in Spirebukta, near the middle of the NW side of the inlet, in a depth of 13 m clear of a submarine cable close NE of the entrance to the bay.
The deepest approach and entry is from ENE.
- 3 **Leangbukta** (59°50'N 10°29'E) which extends 1¼ miles SW from the entrance to Holmenfjorden affords anchorage near its centre and in the SW corner, as shown on the chart, with mooring rings available. This inlet also contains a harbour with good repair facilities including a small floating dock.
A repair quay at the head of the harbour has a length of 29 m and depths from 3.2 to 4.6 m alongside.
- 4 **Langårsundet** (59°51'N 10°33'E), the sound between Brønnøya and Langåra, affords excellent anchorage and

contains a marina at its NE end; as also does Hesthagabukta, 6 cables ENE, on the SW side of Ostøya. Anchorage for larger craft is available midway between these marinas in depths of 19 m, clay, clear of a submarine cable, as shown on the chart.

OSLO HAVN

General information

Charts 3562, 3712 plan of Oslo Havn

Position

5.165

- 1 Oslo Havn (59°54'N 10°44'E) is situated in the heart of South Norway, 98 km inland, at the head of Oslofjorden. The berthing areas are quite close to the city centre.

Function

5.166

- 1 Oslo Havn is a well-sheltered major harbour serving a considerable industrial and commercial centre with a port which handles a large part of the country's foreign trade, both imports and exports.
- 2 Oslo is also an impressive residential city, as befits the capital of Norway and seat of government, parliament and the administrative centre of the country, making it a popular tourist attraction. This city forms one of the largest metropolises in the world, despite its small population of 508 726 (2001).

Topography

5.167

- 1 The city is backed by fir-clad hills which combine with the fjord to create magnificent panoramic scenery. The harbour is protected from S by a number of islands through which several channels lead towards the port area.

Harbour limits

5.168

- 1 From the mouth of Lysakerelva (59°54'7N 10°38'5E) the seaward limit of the harbour area extends SE for 4½ miles to the S point of Søndre Skjælholmen, thence to the mouth of Gjersjøelva, 1¼ miles farther SE; as shown on the chart and plans.

Approach and entry

5.169

- 1 **General remarks.** Oslo Havn is normally approached and entered through one of two routes as given below. The third (alternative) route is for special vessels only, and the middle channel, between Lindøya (59°53'5N 10°43'0E) and Gressholmen, 1½ cables SSE, is narrow and not recommended for use.
- 2 **Western Channel.** Oslo Havn can be approached from the N end of Oslofjorden by passing NW of Nesodden (59°52'N 10°39'E), then entered through Western Channel which passes between Dyna Light (59°53'7N 10°41'3E) and Koppnaglen Light, 1¼ cables SSE. This channel, which is the most direct, is open and clearly visible, and often considered to be the main channel into Western Harbour (5.187). However it is subject to depth limitations as given at 5.173.

5.170

- 1 **Southern Channel.** Oslo Havn can also be approached from the N end of Oslofjorden by passing close N of Nesodden. The harbour is then entered first through Southern Channel which passes between Nordre Langøya (59°52'5N 10°43'1E) and Rambergøya, 2½ cables N. Thence through Bleikøysundet (59°53'3N 10°44'7E) which

is the Eastern Channel into Eastern Harbour (5.187); or through Springereren (Springaren on Chart 3562) (59°53'4N 10°43'5E) into Western Harbour. These channels, which are open and well marked, afford the deeper routes into both harbours. However, see 5.184 for speed restriction in Bleikøysundet.

- 2 **Alternative approach to Springereren.** It is reported that, for deep-draught vessels with a high freeboard to enter the Western Harbour in any significant wind, the safer channel lies between Husbergøya (59°52'N 10°43'E) and Nordre Skjerholmen, 3½ cables SSE, thence through Springereren (above). This route avoids a sharp turn into Springereren and allows the track to be steadied.

Traffic

5.171

- 1 In 2004 the port was used by 3126 vessels with a total of 12 827 921 dwt.

Port Authority

5.172

- 1 **Address.** Oslo Port Authority, PO Box 230 Sentrum, N-0103 Oslo, Norway.
Website. www.ohv.oslo.no.
Email. postmottak@havnevesenet.oslo.kommune.no.

Limiting conditions

Controlling depths

5.173

- 1 **Western Channel** (5.169) has a least depth of 12 m by clearing Hukfluene (5.192) in its SW approach.
Southern Channel (5.169) and the continuation through both Bleikøysundet and Springereren have a least depth of 17 m.

Deepest and longest berths

5.174

- 1 The deepest and longest berth for commercial vessels is at Filipstadkaia, as described at 5.201.
The deepest and longest berth for tankers is at Ekeberg Oil Terminal, as described at 5.201.

Mean tidal levels

5.175

- 1 Mean spring range about 0.33 m; mean neap range about 0.19 m. HW and LW occur about 37 minutes later than at Nevlunghavn. For further information see *Admiralty Tide Tables Volume 2*.

Abnormal levels

5.176

- 1 Meteorological conditions have the greatest influence on the water level, as described at 5.6.
The highest and lowest water levels observed in Oslo Havn are +1.89 m and -1.05 m relative to MSL.

Density of water

5.177

- 1 Density. 1.025 g/cm³.

Maximum size of vessel handled

5.178

- 1 An aircraft carrier of 46 000 tonnes has been berthed in Western Harbour and tankers of 35 000 dwt are berthed at Ekeberg Oil Terminal.

Ice

5.179

- 1 Ice usually appears in Oslo Havn in mid-December and remains until the end of March. The harbour and its approaches are usually kept open by ice breakers, as given at 5.11.

Arrival information

Vessel traffic service

5.180

- 1 For details of Oslofjorden VTS see 5.9 and *Admiralty List of Radio Signals Volume 6 (2)*.

Notice of ETA required

5.181

- 1 To the Harbour Master 1 hour before arrival at the port or on passing Drøbak (59°40'N 10°38'E) (5.153).

Outer anchorages

5.182

- 1 Whenever an alongside berth or one of the harbour anchorages has not been allocated it is permissible for vessels to be anchored anywhere SW or S of a line joining the SW end of Filipstadkaia (59°54'4N 10°42'7E) to the SW point of Hovedøya, 1 mile SSE; thence through Dagerskjær (59°53'3N 10°44'0E) to the mainland near Knepe, 1 mile ESE.

Pilotage and tugs

5.183

- 1 **Pilots.** Sea pilotage is compulsory for Oslofjorden; see 5.8. Harbour pilotage is not available as a separate service. Sea pilots will usually conduct a vessel to and from the berth; they will usually know where each vessel should be berthed in Oslo Havn.
2 **Tugs.** An adequate tug assistance service is available at all times. The largest tugs are equipped for fire fighting.

Regulations concerning entry

5.184

- 1 **Entry times.** It is permitted for vessels to enter harbour at any time except for tankers with a draught of more than 9.1 m which may only enter during daylight.
Size. Tankers over 35 000 dwt are not permitted to enter harbour.
2 **Dangerous cargo.** The Masters of vessels carrying dangerous cargo must report to the Harbour Authority before arrival, giving nature of cargo, amount and degree of danger (IMO). Harbour Regulations set out clear limits on the amount of dangerous cargo that can be landed.
3 **Speed limitations.** Within the harbour area, power driven vessels must proceed at a speed not greater than is required for good seamanship and manoeuvrability, and under no circumstances so great as to cause a wash damaging or endangering other vessels or harbour installations.
4 A speed limit of 5 kn is in force within the entire Oslo Harbour District when less than ¾ cable from the shore. Within the area defined below, power driven vessels must proceed at slow speed, not exceeding 5 kn.
5 From Skurvegrunnen Light (59°54'0N 10°42'1E) to Kavringssanden Light, 7 cables ENE; thence to the Ferry Quay on the N side of Hovedøya (59°54'N 10°44'E).
From Sandtangen Light (59°53'7N 10°44'6E) to Bleikøya Light, 2¼ cables S.
6 From the beacons on the SE coast of Bleikøya, in position 59°53'4N 10°44'6E, SSE to the green

light off the NW head of Sjursøya Breakwater, 1¾ cables SSE; thence to Raudskjær, 8¼ cables farther SSE.

- 7 From Malmøyskjær (59°51'8N 10°45'8E) to the SE point of Ulvøya, 3½ cables NE; thence to the mainland, 3½ cables SE.

Quarantine

5.185

- 1 Quarantine is conducted in accordance with Health International Procedures; when there is suspected disease or fever on board mariners must inform the Harbour Master in advance.
- 2 Vessels arriving from a Norwegian port are automatically accepted as being clear. The quarantine anchorage lies to the S of Bleikøya (59°53'4N 10°44'4E), as shown on the plan of Oslo Havn.

Notice of medical requirements

5.186

- 1 Information is required prior to arrival if medical attendance is required on board.

Harbour

General layout of harbour

5.187

- 1 The port of Oslo is built around the mainland coast of the bay in the NE corner of Oslofjorden. The harbour, which fronts the port, is divided into western and eastern harbours by a group of islands lying close off the coast in the entrance to the bay. These harbours are joined by a wide channel.
- 2 Western Harbour (59°54'N 10°43'E), which consists of Frognerkilen to the NW and Pipervika to the NE, is entered through Western Channel (5.169) or through Springerren (59°53'4N 10°43'5E), as given at 5.170.
Eastern Harbour (59°54'N 10°45'E), which includes Bjørvika, a cove on its N side, is entered through Bleikøysundet (59°53'3N 10°44'7E) as given at 5.170.

Seaplane harbour

5.188

- 1 An area in Lysakerfjorden (59°54'N 10°39'E) is prohibited to ships and boats when seaplanes are operating, in accordance with 1.85. Regular service traffic within the harbour has been discontinued but the area defined below is still used by private aircraft:
N limit. A line extending E from Svarteskjær (59°54'4N 10°38'5E) to Killingflua Buoy (isolated danger), 5½ cables ESE.
- 2 E limit. A line extending S from Killingflua towards Nesodden Light (59°52'N 10°39'E) (5.145), as far S as the S limit.
S limit. A line extending ENE from Geitholmen (59°53'N 10°38'E) towards Dyna Light, 1¾ miles ENE, as far as the E limit.
- 3 W limit. A line extending N from Geitholmen on the alignment of Rolfsflua, 4 cables N, and Svarteskjær, 1 mile farther N.
Navigation is also prohibited within 1 cable of the shore between Svarteskjær and Rolfsflua.
Mariners passing W of Killingen (59°54'6N 10°39'6E) when flying is in progress must keep as close to Killingsflua as possible.

Natural conditions

5.189

- 1 **Flow** in Oslo Havn is very weak and barely significant to navigation; however, such movement as there is forms an anti-clockwise loop through the harbour. It is often noticeable as in-going past Nesoddtangen, thence NE towards the Eastern Harbour where it merges with the outflow from Askerelva, an underground river which discharges into Bjørvika. The combined stream then flows W, past Vippetangen (59°54'1N 10°44'5E), through the Western Harbour then out past Dyna Light.
- 2 **Ice.** Usually there are no problems caused by sea ice in the approach to Oslo Havn due to heavy traffic in the main channel of Oslofjorden. However, every three or four years there are heavy ice conditions in the port; generally these conditions pose no restrictions to navigation and the assistance of icebreakers is seldom needed.
- 3 **Climatic table.** See 1.229 and 1.236.

Directions

(continued from 5.142)

Principal marks

5.190

- 1 **Landmarks** (with positions relative to Søre Kavringdynga (59°54'0N 10°43'3E)):
Dyna Lighthouse (white lantern, 12 m in height) (1 mile WSW), situated on a rock on the N side of the Western Channel.
Søre Kavringdynga Light (white tower, red band, 13 m in height).
- 2 A small round stone tower (5¾ cables NE) which has a green conical roof and is built into the outer wall of the fort at Akershus.
Town hall (8 cables NNE) with two tall brick-coloured towers.
Vår Frelsers Church (1 mile NE) which has an open columnar tower with a tall weather vane rising above the trees.
- 3 Trefoldighets Church (1¼ miles NNE) which has at its centre a green dome, surmounted by a small thin steeple and, at its SW and NW corners, two shorter brick towers.
The Palace (1 mile N) which is a square building of a light stone colour with a dark roof, surmounted by a tall flagstaff in the centre.

Approach to Western Channel

5.191

- 1 From a position 3 cables NW of Nesodden Light (59°52'N 10°39'E), in the vicinity of Nesoddtangen Buoy (safe water), the alignment (050°) of Koppernaglen Light (lantern on framework structure, 7 m in height) (59°53'6N 10°41'4E) which stands on the NW edge of a shoal, midway between Dyna Lighthouse (5.190) and Nakkholm, the nearest island SE; with Trefoldighets Church, 2¼ miles NE, (5.190) leads NE towards the Western Channel, passing (with positions relative to Koppernaglen Light):
- 2 NW of Tanggrunnane (1¼ miles SW) a shoal which extends 4 cables NNE and lies partly within the white sector of Dyna Light, thence:
NW of Østre Tangflua (1¼ miles SSW) a rocky shoal which is marked at its S end by a spar buoy (port hand) and off its N end by a spar buoy (starboard hand).

Western Channel

5.192

- 1 When Koppernaglen Light is distant 5 cables the track is adjusted towards the NE for about 5 cables to a position in mid-channel between Koppernaglen Light and Dyna Light, passing (with positions relative to Koppernaglen Light):
 - NW of Nakkholmsteinen (2¼ cables SW) which is marked on its NW side by Nakkholmsteinen Light (lantern on column, 10 m in height), and:
- 2 SE of Hukfluene (2½ cables WSW), two rocks which have been dispersed by blasting and have a clear navigational depth of 11.25 m over them. These rocks, which lie within a white sector (040°–051°) of Dyna Light, extend 2 cables SE from Hukskjæra (3½ cables WNW) a group of rocks close off the S extremity of Bygdøy. Thence:
- 3 NW of the shoal on which Koppernaglen Light (5.191) is situated. This shoal, which is awash, is marked by a beacon (floodlit) at its S end. Thence: SE of a shallow ridge, near the centre of which stands Dyna Lighthouse (1¼ cables NNW) (5.190). This ridge, with a least depth of 4.3 m, extends up to 1½ cables WSW from the light and, with a least depth of 3.7 m, extends 1 cable NE from the light.

5.193

- 1 From a position in mid-channel between Dyna Lighthouse and Koppernaglen Light, the track leads ENE for about 7 cables, passing (with positions relative to Koppernaglen Light):
- 2 NNW of Sildeberget (1½ cables E), a narrow shoal which is marked by a spar buoy (isolated danger) over its least depth and lies within a white sector (063°–075°) of Søre Kavringdynga Light (5.190), thence:
- 3 NNW of a narrow shoal, with a least charted depth of 9.2 m (4¼ cables ENE) which is marked by a spar buoy (starboard hand). This shoal lies 1¼ cables NW of Galteskjæra (5 cables E), a chain of above and below-water rocks which extend up to 2 cables ENE from Galtern Light (lantern on cairn) and are marked by an iron perch near their NE end. And:
- 4 SSE of Lille Herbern Light (lantern on framework structure) (3¾ cables NE) which stands on a reef on the N side of the channel, thence: SSE of Skurvegrunnen Light (lantern on framework structure) (5 cables NE) which stands at the NE end of a reef.

Thence as required for berthing.

5.194

- 1 **Useful mark:**
Kavringsanden Light (59°54'2N 10°43'3E) (5.197).

Approach to Southern Channel

(continued from 5.142)

5.195

- 1 From a position 3 cables NW of Nesodden Light (59°52'N 10°39'E), in the vicinity of Nesoddtangen Buoy (safe water), a white sector (088°–092°) of Nordre Langøya Light (column, 4 m in height) (59°52'5N 10°43'2E) leads towards the Southern Channel, passing (with positions relative to Nesodden Light (59°52'N 10°39'E)):
- 2 N of the spit which, with a depth of 9 m over it, extends 1½ cables NW from Nesodden Light, thence:
S of Tangegrunnane (4 cables NNE) (5.191), thence:

N of Lagskjærflua (2¼ cables E), a reef awash in parts which is marked near its N end by a spar buoy (starboard hand) and at its S end by an iron perch, thence:

- 3 S of Østre Tangeflua (5 cables NE) (5.191), thence:
N of Nesskjærgrunnen (4½ cables E) which is marked at its NE end by a spar buoy (starboard hand), thence:
- 4 N of Østre Okstvalflua (9 cables ESE) a rocky shoal which is marked on its NE side by a spar buoy (starboard hand), thence:
S of Rambergskåflua (1½ miles ENE) a rocky shoal on which stands Rambergskåflua Light (lantern on column, 16 m in height).

5.196

1 Useful marks:

Raudsekkene Light (lantern on column, 4 m in height) (59°53'1N 10°41'9E).
Stangskjrabben Light (column, 7 m in height) (59°53'1N 10°42'3E).
Heggholmen Light (framework structure, 15 m in height) (59°53'2N 10°43'0E).

Southern Channel and entrances to harbour

5.197

- 1 **Southern Channel.** When clear of Rambergskåflua (above) the track leads ENE through Southern Channel (59°52'6N 10°43'3E) in clear water, passing NNW of Nordre Langøyrabben, a rocky spit which extends 2 cables ENE from the NE point of Nordre Langøya.

When clear of Rambergøya the track is adjusted as required to the NE towards Bleikøysundet (59°53'3N 10°44'7E), or to the N towards Springereren (59°53'4N 10°43'5E).

- 2 **Springereren.** This channel leads N then NNW for a distance of 1½ miles to Western Harbour, passing (with positions relative to Daggarskjægrunnen Light (59°53'3N 10°43'8E)):

E of Rambergøya (5 cables SW), thence:

- 3 W of Bleikøylaket (3 cables SE), a shoal marked on its SW side by a light (lantern on framework structure), thence:

E of Gressholmen (2 cables WSW), thence:

- 4 W of Bleikøya (2 cables E), from the W point of which extends a ridge marked at its seaward end by Daggarskjægrunnen Light (framework structure), thence:

ENE of Lindøya (4 cables NW), and:

WSW of Hovedøya (4 cables N), thence:

- 5 WSW of Kavringen (8 cables NNW), an islet standing on a shoal area which is marked SW and E by beacons (floodlit), and S by Søre Kavringdynga Light (5.190). The NE part of the shoal is marked by a light (lantern on column), and another shoal, Kavringsanden, 1½ cables N of the islet is also marked by a light (lantern on column).

- 6 **Bleikøysund.** From a position clear of Rambergøya, this channel to the Eastern Harbour leads 1 mile ENE, passing (with positions relative to Daggarskjægrunnen Light):

Either side of Bleikøylaket (3 cables SE), thence:

SSE of Bleikøya (2 cables E), thence:

- 7 NNW of Sjursøya (7 cables E) (5.201), and a buoy (starboard hand) moored close W of the W end of the terminal, thence:

SSE of Blindskjærboen Light (white lantern on framework structure) (5 cables ENE), standing on a

shoal at the end of a spit extending SE from the E part of Bleikøya, thence:

- 8 SE and E of Kalvodden (6 cables ENE), the extreme E point of Bleikøya, from which a light (lantern on post) is exhibited.

Alternative approach to Springerren

5.198

- 1 From a position off the W end of Nordre Skjælholm (59°51'5N 10°43'5E) the alternative track (5.170) used by HMS *Ark Royal* (46 000 tonnes) in 1972 led NE along the line of bearing, 046°, of the NW extremity of Ormøya (59°52'7N 10°45'7E) for about 8 cables; thence NNE for about 5 cables, passing between Nordre Malmøyflua (59°52'3N 10°44'7E) and Søre Langøyrabben, 4 cables W; thence NNW towards Springerren (Springaren on Chart 3562) passing ENE of Nordre Langøyrabben (59°52'6N 10°43'7E) (5.197).

Anchorage and berths

Anchorage

5.199

- 1 **Caution.** Submarine cables and pipelines (1.69) are laid across most of the channels separating the islands from each other and from the mainland. Their positions, which are best seen on the plans, are indicated by beacons onshore, some of which carry a light.
- 2 **Western Harbour.** The deepest anchorage, which is positioned 3½ cables WNW of Kavringen (59°54'0N 10°43'3E), has a maximum depth of 24 m, clear of Brannskjærskåret, 1 cable N of the anchorage.
- 3 The inner anchorage, in position 3 cables NE of Kavringen, has a depth of 22 m mud, clear of a pipeline, 1½ cables NNW of the anchorage. This is the usual anchorage for warships and tourist vessels. A good mark for this anchorage is the round tower in position 59°54'4N 10°44'2E, as described at 5.190.
- 4 **Eastern Harbour** contains an anchorage to the NE of the E end of Hovedøya (59°53'8N 10°44'5E) in a maximum depth of 20 m.

Moorings

5.200

- 1 Mooring buoys are moored in various parts of the harbour, as shown on the plan.

Alongside berths

5.201

- 1 In the following list, berth positions are given from Kavringen (59°54'0N 10°43'3E) and berth numbers are from the plan.
- 2 **Western Harbour:**
- Filipstadkaia (4) (4½ cables NNW), which is the largest quay with a length of 823 m, contains the deepest berth at its SW end with depths from 8.5 to 10 m alongside a length of 350 m.
- 3 Søndre Akershuskai (15) (5¼ cables NE) with a length of 199 m along its S part and depths from 5.5 to 10.2 m alongside, is the normal berth for tourist vessels and warships. This berth is near the city centre and the Harbour Office.
- There are 15 other berths including three Ro–Ro facilities and berths for bulk movement of grain.

Eastern Harbour:

Revierkaia (19) (8 cables ENE) is the longest and deepest berth, with a length of 362 m and depths from 9.3 to 10.8 m alongside.

Søregutstikkeren (28) (1 mile ENE) is the principal container berth, with Ro–Ro facilities on both sides.

There are 12 other berths including four Ro–Ro ramps and facilities for handling bulk cargoes.

Sjursøya:

Ekeberg Oil Terminal (36) (1½ miles SE), with a total berth length of 234 m on both sides and depths from 10.5 to 29.0 m on the E side, is the largest berth for tankers and can accommodate vessels up to 35 000 dwt. In 2002 work was in progress in the SW part of Sjursøya.

Port services

Repairs

5.202

- 1 There are a number of small slipways around the harbour. All types of machinery repairs can be carried out and there is a floating crane with 100 tonne lifting capacity.

Other facilities

5.203

- 1 Compass adjuster is available; deratting undertaken; two major hospitals; oily waste reception facilities available by road tanker.

Supplies

5.204

- 1 **Fuel** of all grades can be bunkered alongside at Søre Sjursøykai (Berth 35) (59°53'2N 10°45'2E) or by lighter at other berths. It is also possible to obtain fuel at Fagerstrand (59°44'N 10°35'E) (5.155) whilst enroute through Oslofjorden.
- 2 **Water** can be obtained by pipeline at all berths.
- Provisions** of all kinds are available through agents.
- Ship's stores** can be obtained through chandlers and charts through Chart Agents.

Communications

5.205

- 1 The maritime lines of domestic and foreign communications are very good, with direct routes to all major European ports and to South America. Fast ferries operate to Denmark and Germany.

Harbour regulations

5.206

- 1 A tug is required to stand-by whilst tankers over 6000 tonnes discharge oil at the terminal on Sjursøya (5.201).

Lysakerfjorden

General information

5.207

- 1 **Description.** Lysakerfjorden (59°54'N 10°39'E), which lies between two peninsulas to the N of Nesodden, is used in part as a seaplane harbour as described at 5.188. This fjord, which provides access to an oil depot at Lysaker (59°54'7N 10°38'6E) (5.209) and to another at Rolfstangen (59°53'5N 10°38'0E) (5.209), continues NE from its head into Bestumkilen, a shallow inlet which extends 5 cables ENE.

- 2 **Traffic regulation.** A speed limit of 15 kn is in force in Lysakerfjorden to the SW of the boundary of the harbour area of Oslo Havn, as described at 5.168. Speed regulations within the harbour area are given at 5.184.
- 3 **Prohibited area.** Anchoring and fishing are prohibited in an area centred on 59°54'·6N 10°38'·8E, as shown on the plan, to the E of the entrance to Lysakerelva, due to a number of submarine cables and pipelines (1.69) laid along the seabed. The E and W limits of the area are indicated by pairs of shore lights in line.
- 4 **Ice.** The inner part of Lysakerfjorden often freezes in the winter and becomes a popular place for ice skating.

Directions

(continued from 5.142)

5.208

- 1 From a position 4 cables N of Nesodden Light (59°52'N 10°39'E), the dividing line (171°) between the red and white sectors of Nesodden light, astern, leads through the fairway of Lysakerfjorden to a position off the mouth of Lysakerelva, passing (with positions relative to the S extremity of Killingen (59°54'·4N 10°39'·5E)):
- E of Geitegrunnen (1¾ miles SSW) (5.145), thence:
- 2 E of Geitholmen (1½ miles SSW) and the bank extending up to 1 cable from the islet, thence:
- E of Rolfslua (1 mile SSW), a bank extending 2 cables E from Rolfstangen, which dries in parts and is marked on its E edge by a spar buoy (port hand) and on the drying patch by an iron perch, thence:
- 3 W of Hukskjærgrunnen (8 cables SSE) which lies 1 cable W of the S extremity of Bygdøy and is marked by a spar buoy (starboard hand), thence:
- E of Grunne for gård (6½ cables SW) which is an unmarked rock, thence:
- 4 W of Killingflua (1¼ cables S) which extends 1¼ cables S from Killingen and is marked on its S side by a spar buoy (isolated danger), thence:
- W of a 6 m rock (2 cables WNW) which lies off the S extremity of a shoal extending S from the coast; the shoal is marked by a spar buoy (isolated danger) near its mid point. Thence:
- 5 Close E of a mooring buoy and W of Lysakerflu (4 cables WNW), a 4·8 m shoal in the middle of the entrance, marked by a buoy (starboard hand).

Alongside berths

5.209

- 1 **Rolfstangen.** The largest berth on the N side of

Rolfstangen (59°53'·5N 10°38'·0E), which has a length of 40 m and depths from 7·3 to 9·3 m alongside, is used to supply an oil depot for Oslo Airport.

- 2 **Lysaker.** The largest berth at Lysaker, on the W side of the river by an oil depot, has a length of 89 m and depths from 9·8 to 10·5 m alongside. It is reported that tankers up to 35 000 dwt can be accommodated.

There are four other berths at Lysaker.

Bunnefjorden

Charts 3562, 3712 plan of Oslo Havn

General information

5.210

- 1 **Description.** Bunnefjorden, which branches SSE from Nesoddtangen (59°52'N 10°39'E) for 9½ miles, varies greatly in depth but is generally deep with a clear fairway between the islets and shoals shown on the chart and plan. The only harbour is at Neset (59°44'N 10°44'E) (5.211).
- 2 **Traffic regulation.** There is a speed limit of 5 kn on the Nesodden side within 150 m of the shore.
- Vertical clearance.** An overhead cable with a vertical clearance of 34 m (see 1.9) crosses the fjord in latitude 59°44'·4N.
- 3 **Ice.** Bunnefjorden freezes in December, January and February almost up to latitude 59°50'N. The ice cover is relatively thick and navigation stops, but it is an area with little traffic.

Anchorage and harbours

5.211

- 1 **Berths.** Several small places on both sides of the fjord have berths with depths from 3 to 4 m alongside which allows daily communication by sea with Oslo.
- Neset** (59°44'N 10°44'E), 1 mile from the head of the fjord, contains a harbour and a quay with shallow depths. Anchorage can be obtained 3 cables SW of the village in a maximum depth of 16 m. Some services are available including fuel, water, engine repairs and repairs to plastic hulls.
- 2 **Anchorage** listed below have good holding ground over a bottom of mud:
- Blylagbukta (59°46'·7N 10°42'·7E), clear of a submarine cable (1.69) which crosses the fjord close N of the anchorage.
- Solbukta (59°46'N 10°43'E).
- Åsebukta (59°45'·4N 10°43'·0E).

DRAMMENSFJORDEN AND APPROACHES

GENERAL INFORMATION

Charts 3500, 3501

Area covered

5.212

- 1 This section covers the W branch of Oslofjorden which extends NW from the N end of Horten (59°27'N 10°30'E) through Breidangen (59°30'N 10°27'E) to Sandebukta (59°33'N 10°16'E) and Drammensfjorden (59°40'N 10°25'E), which extends 15 miles N from Breidangen. The section is arranged as follows:

- 2 Approach to Drammensfjorden including Holmestrandsfjorden and Sandebukta (5.214). Drammensfjorden (5.226). Drammen Havn (5.250).

Harbours

5.213

- 1 **Major harbour.** Drammen Havn (59°44'N 10°14'E) (5.250), at the N end of Drammensfjorden.
- Minor harbours:**
- Holmestrand (59°29'N 10°19'E) (5.223).
- Svelvik (59°37'N 10°25'E) (5.245).

APPROACH TO DRAMMENSFJORDEN INCLUDING HOLMESTRANDSFJORDEN AND SANDEBUKTA

General information

Charts 3500, 3501

Routes

5.214

- 1 On leaving Oslofjorden TSS in the vicinity of 59°27'N 10°34'E, the direct approach towards Drammensfjorden initially leads WNW along the same route as is given for an approach to Horten at 5.87. Thence from a position 1 mile N of the N entrance to Horten (59°27'N 10°29'E), in the middle of the principal entrance to Breidangen, the direct route to the entrance to Drammensfjorden (59°32'N 10°24'E) leads NW through Breidangen.
- 2 Holmestrandsfjorden (59°29'N 10°22'E), which continues W from Breidangen provides a channel between the mainland and the islands extending about 3 miles NW from Langøya (59°30'N 10°22'E). This channel leads into Sandebukta (59°33'N 10°16'E) at its NW end.

Traffic regulations

5.215

- 1 Traffic regulations for Oslofjorden are given at 5.10.

Measured distance

5.216

- 1 A measured distance is established to the N of Løvøya (59°27'N 10°27'E) as given at 5.82.

Flow

5.217

- 1 General information and water movement within the main channel of Oslofjorden central part is given at 5.54. Remarks on the likely flow to the N of Østøya (59°27'N 10°29'E) are given at 5.83. Remarks on the outflow from Drammensfjorden are given at 5.234.

Directions

(continued from 5.87)

Approach to Drammensfjorden

5.218

- 1 From the vicinity of 59°28'N 10°30'E the track towards the entrance to Drammensfjorden leads NW for about 5 miles, within a white sector (324°–004°) of Rødtangen Light (white lantern) (59°32'N 10°25'E) for the first 4 miles, passing (with positions relative to the light):
 - NE of Nøttekrakken (5 miles SSE), which lies in the N entrance to Horten as given at 5.88, thence:
- 2 SW of Mølen (3¾ miles SE) (5.87), which lies near the S extremity of a chain of shoals which extends 1½ miles NNE towards Østnestangen Light (3 miles E) (5.58) and obstructs the N part of the entrance to Breidangen. Langgrunnen, near the middle of this chain, is marked by a spar buoy (port hand) at its S end and by a spar buoy (starboard hand) at its N end. Thence:
- 3 SW of Kjørvikgrunnene (2½ miles ESE), which extends up to 4 cables S from the coast, thence: NE of Ellefsgrunnen (1¼ miles S), which is the least depth over a detached shoal which lies up to 8 cables NE of Langøya (5.222). Thence:
- 4 SW of Solfjellskjæret (6 cables SE), a rock awash marked by an iron perch, thence:

SW of Rødtangen Light (above), exhibited from the E entrance point of Drammensfjorden.

(Directions continue for Drammensfjorden at 5.239)

Approach to Holmestrandsfjorden

5.219

- 1 From the vicinity of 59°28'N 10°30'E a white sector (276°–287°) of Mulodden Light (white lantern on concrete base) (59°29'N 10°21'E), which stands on the N extremity of a peninsula named Mulåsen, leads WNW for about 4 miles, passing (with positions relative to the light):
 - NNE of the N entrance to Horten (4½ miles ESE) (5.88), thence:
- 2 NNE of Løvøya (3½ miles ESE), thence: SSW of Skaten (1½ miles E), a shoal, which with depths from 10 to 15 m over it, extends 3 cables S from the SE end of Langøya (5.222) into the white sector of the light; but a rock, with a charted depth of 8 m, lies N of the sector.
- 3 When clear of Skaten the track can be adjusted to pass NNE of Mulåsen peninsula and Mulodden Light; and SSW of Langøygrunnen, 8 cables N of the light, which has a depth of 2 m or less over its S end, marked by a spar buoy (S cardinal).

5.220

- 1 From a position 7 cables NNW of Mulodden Light (above) a white sector (151°–155¼°) of this light, astern, leads NNW through the fairway along the NE side of the channel, passing (with positions relative to the light):
- 2 WSW of Langøygrunnen (8 cables N), which is marked at its NW end by a spar buoy (starboard hand), thence: WSW of Solfjellhausen (1¼ miles N) which lies close N of Langøygrunnen and is unmarked, and:
- 3 ENE of the approach line to Holmestrand which is marked by leading lights as given at 5.224, thence: WSW of Sørvestnebbet (1¼ miles N), marked by a spar buoy (port hand) which lies at the SE end of Bjørkøyskjæret, a chain of shoals, some of which dry, extending 7 cables NNW, thence:
- 4 Close WSW of Kommersøygrunnen (2 miles NNW) which extends 2 cables S from the SE end of Kommersøya.

Charts 3500, 3501 plan of Sandebukta

Holmestrandsfjorden to Sandebukta

5.221

- 1 **Sandebukta Leading Lights:**
 - Front light (metal column) on Selvikblinda (59°33'·5N 10°16'·0E), a rock which dries. Selvikgrunnen Light (metal column), which stands on a shoal 120 m SSE of the front light, is almost on the leading line.
 - Rear light (post) on the mainland 658 m NNW of the front light.
- 2 From the position close WSW of Kommersøygrunnen (59°30'·8N 10°19'·5E) the alignment (332°) of these leading lights, which are private and shown when vessels are expected, leads NNW through the fairway along the NE side of the channel towards Selvikbukta, passing (with positions relative to the front light):
- 3 WSW of Kommersøya (2½ miles SSE), thence: ENE of Kattholmgrunnen (1¼ miles SSE) which is situated in mid-channel and marked by a spar buoy (isolated danger), thence: ENE of Saltskjæret (1 mile SSW) which dries, and:
- 4 WSW of Bekkeskjera (8 cables SE), two above-water rocks lying 1 cable offshore.

The harbour of Selvikbukta is then entered, by either passing between Selvikgrunnen (close SSE) and the mainland to the NE, or by passing SW of Selvikgrunnen and then by entering on the alignment (060½°) of Selvikbukta Leading Lights (59°33'·6N 10°16'·2E).

Minor harbours

Langøya

5.222

- 1 **Description.** Langøya (59°30'N 10°22'E), an elongated island between Breidangen and Holmestrandsfjorden, contains a dump for neutralised sulphuric acid and a limestone quarry.

Traffic. In 2002, Langøya was used by 29 vessels with a total of 44 000 dwt.

- 2 **Berths.** The largest of four berths on the SW side of the island has a length of 56 m with depths from 5·5 to 6·1 m alongside; and a loading capacity of 10 000 tonnes per hour. One berth has a Ro-Ro facility.

Holmestrand

5.223

- 1 **Position and function.** Holmestrand (59°29'N 10°19'E), which lies at the foot of a mountain, supports some light industry and exports paper pulp and aluminium goods. In 2002 the port was used by 139 vessels with a total of 430 000 dwt.

- 2 The centre of the town, with a population of 1400, stands close to the port; several other built-up areas along the sides of the coastal hills increase the population to 9500 (1993).

- 3 **Port Authority.** Holmestrand Havnevesen, Port Office, Postboks C, Holmestrand, N-3080. Local authority is vested in the Harbour Master.

Largest vessel handled had a length of 131 m.

- 4 **Ice.** Holmestrand is rarely affected by sea ice, not only because it is located in the broadest section, but also because the traffic in the area helps to keep the fairways open.

Pilotage. Harbour pilotage is not compulsory but Pilots can be obtained by arrangement through Horten Pilot Booking Centre, Oslofjorden.

Tug assistance can be arranged on request.

- 5 **Harbour.** The harbour consists of a number of anchorages which are spread along the coast as shown on the chart. The largest port is situated abreast the town; a smaller port extends from the coast 5 cables SE, and some quays are built directly on the coast.

5.224

- 1 **Directions.** Approach from the main channel of Oslofjorden is given at 5.219.

Leading lights:

Front light (post) (59°29'·5N 10°19'·0E).

Rear light (lantern on post) 250 m WSW of the front light.

- 2 From a position in the fairway 1 mile NNW of Mulodden Light, the alignment (238°) of the above lights leads WSW towards the entrance, passing close NNW of Hella, two rocks which, with depths of 2 m or less over them, lie 2 cables ENE of the front light, and at the N end of the shore reef. The N rock is marked by a spar buoy (N cardinal).

- 3 **Anchorage and berths.** If an anchorage or berth has not previously been allocated by the Harbour Authority it is permissible to anchor 4 cables N of the harbour leading

lights (above), as shown on the chart, clear of an outfall pipe and two submarine cables (1.69) in the vicinity.

- 4 The harbour has good facilities for laying up vessels of up to 450 000 tonnes.

The largest alongside berth in the town port has a length of 70 m and depths from 2·9 to 7·1 m alongside. There are four other berths.

- 5 **Repairs.** Minor repairs can be undertaken.

Other facility. There is a hospital in the town.

Supplies: fuel available in small quantities; fresh water is laid on at all quays; provisions and ship's stores can be obtained in the town.

Selvikbukta

5.225

- 1 Selvikbukta (59°34'N 10°16'E) contains a concrete quay with a length of 145 m and depths from 5·5 to 9·3 m alongside which serves the paper factory in Selvik, the town which stands around the head of the bay.

DRAMMENSFJORDEN

General information

Chart 3501

Description

5.226

- 1 Drammensfjorden (59°40'N 10°25'E) extends 15 miles inland from its entrance at Rødtangen (59°32'N 10°25'E) to Drammen (59°44'N 10°14'E) (5.250) at the head of the fjord and mouth of Drammenselva. Drammensfjorden is divided into outer and inner parts by a constriction at Svelvikstrømmen (59°37'N 10°25'E), where Ryggen, a peninsula which extends across the fjord, reduces the channel width to just 1 cable over a length of 6 cables. The channel here is well marked by leading lights and spar buoys, but it is reported that local knowledge is required.

Depths

5.227

- 1 The outer part of the fjord, S of Svelvikstrømmen, is comparatively shallow with shoals and rocks which confine vessels to a narrow channel. The inner part, however, is considerably deeper and clear in the fairway.

The controlling depth in the dredged channel of Svelvikstrømmen is 10 m over a width of 100 m.

- 2 In general it is safest to commence the passage through Drammensfjorden a little before HW (5.228) as this achieves the greatest depth and the least water movement.

Tidal levels

5.228

- 1 **Mean tidal levels.** High water and LW occur on average 37 minutes later than at Nevlungshavn. It is reported that the interval of time between the transit of the moon over the local meridian and the next HW is about 5 hours. Mean spring range is about 0·30 m. However, meteorological conditions have great influence on the water level, as given below. For further information see *Admiralty Tide Tables Volume 2*.

- 2 **Abnormal levels.** The effect of meteorological conditions on the water level in Oslofjorden is given at 5.6. Within Drammensfjorden low air pressure and a S wind cause the water level to rise; whilst winds from the N have the opposite effect. Under extreme conditions the range of the tide in Svelvikstrømmen may be increased to as much as 1·8 m.

Density of water**5.229**

- 1 In the outer part of the fjord the surface water is alternatively salt and brackish; whereas in the inner part the water is fresh to a depth of 12 to 15 m.

Ferry**5.230**

- 1 A ferry crosses Svelvikstrømmen from the N end of Verksøya (59°36'8N 10°24'8E) to the S end of Brenna, 2½ cables NNW. This ferry is fitted with VHF radio.

Traffic regulations**5.231**

- 1 **Communications.** Drammensfjorden is part of the area covered by Oslofjorden VTS (5.9). Additionally, mariners intending to transit Svelvikstrømmen shall, in good time, advise their intended time of passage, so that necessary precautions can be taken.
- 2 **Rule of the Road.** Mariners in smaller vessels have a duty to keep clear of the channel until deeper draught vessels have passed through. Otherwise *The International Regulations for Preventing Collisions at Sea (1972)* apply.
- 3 **Speed** within Svelvikstrømmen is restricted to a maximum of 7 kn within the following limits:
 - S end. A line drawn E/W through Svelvikrenna Søndre Light (59°35'8N 10°25'3E).
 - N end. A line drawn E from Blindeskjæra Light (59°37'4N 10°24'8E).

Submarine cables**5.232**

- 1 Submarine cables are laid in Drammensfjorden as follows:
 - Along the W side of the outer part of Drammensfjorden from its entrance to Kroksbukta and thence ESE across the channel.
 - In Dramstadbukta from Sleavika (59°37'6N 10°25'8E) to the E shore, 1 mile ESE.
- 2 In the N part of Drammensfjorden from Sleavika to Jordfallbukta, 3½ miles NNW, and thence in the middle of the fjord to Drammen, a farther 5¼ miles NW.
- 3 For further information on submarine cables see 1.69.

Vertical clearance**5.233**

- 1 An overhead cable, with a vertical clearance (1.9) of 46 m, spans Svelvikstrømmen near its N entrance.

Water movement in outer Drammensfjorden**5.234**

- 1 When, due to wind conditions (5.228), the water level in Oslofjorden rises above that in Drammensfjorden, an in-going movement of salt water will flow N in the navigable channel towards Svelvik. When, during the falling tide, this meets the fresh water flow from Drammenselva, there may be turbulence with strong swirls in the channel; or the salt water may set inwards in the form of a wedge with its point up-channel and the probability of swirls and turbulence along its edges, marking the line where fresh and salt water meet.

Water movement in Svelvikstrømmen**5.235**

- 1 **Under normal circumstances** the flow sets regularly, inward with the rising tide and outward with the falling

tide. The duration of the out-going flow is, however, usually longer than that of the in-going flow, with times as follows:

In-going flow begins about +0045 Bergen.

Out-going flow begins about -0600 Bergen.

- 2 The out-going flow can periodically reach a rate of about 5 kn and the highest in-going rate is between 2 and 3 kn.
 - The in-going flow is strongest on the E side of the channel. The out-going flow creates strong back eddies along the W side of the channel.
- 3 **Local weather conditions** greatly affect the normal flow as follows:
 - With strong winds from SW the flow often sets inwards for 24 hours or more; and the reverse during winds from N.
- 4 During flood periods in Drammenselva (1.182) (about mid-summer), or after long periods of rain, the out-going flow, according to older sources, has reached from 6 to 8 kn. Such rates, however, have not been observed in recent years, possibly because the navigational channel has been dredged and straightened.

Water movement in inner Drammensfjorden**5.236**

- 1 Under normal circumstances flow in the inner part of the fjord is barely perceptible on the seaward side of Nøstodden (59°43'N 10°16'E), about 1 mile from Drammen. Above this point a strong outflow must be expected, particularly when Drammenselva is in flood, as given above.

Ice**5.237**

- 1 **Ice coverage.** Due to the discharge of fresh water from Drammenselva, the inner part of Drammensfjorden, N of Svelvik, contains essentially fresh water, which makes it one of the areas of Oslofjorden where freezing is more likely. In cold winters there is plenty of ice formation in the fjord affecting the approach to the port; however navigation is not prevented. When needed, icebreakers are used and the port is open all year round.
- 2 Ice is not generally a problem in Drammen Havn itself because the relatively strong currents at the mouth of Drammenselva hamper ice formation. There is not much ice, either, in the outer part of the fjord, S of Svelvik, although extensive ice formation in this area has occurred in the past.
- 3 **Icebreaking service.** Requests for icebreaking assistance should be made to the Harbour Office at Drammen (59°44'N 10°14'E) (5.254) or direct to the icebreaker which is equipped with VHF radio. Requests should be made in good time and include the time at which assistance will be required; also name and size of vessel, plus port of registration. For further information see 1.95
- 4 **Signals.** The Harbour Authority icebreaker will, by day, display the national flag and the Harbour Authority pendant; and, at night, a blue all-round light at the forward masthead.
- 5 **Towage by icebreakers.** When the Harbour Authorities' icebreaker carries out towing service, navigation of the towed vessel is at the risk of the Master or Pilot. Otherwise the "negligence clause" contained in the Harbour Regulations applies.
 - Signals used by the Icebreaking Service (1.109) are contained in the *International Code of Signals*.

Local weather**5.238**

- 1 Troublesome seas can be created in the entrance to the fjord when onshore winds oppose the out-going flow.

Directions

(continued from 5.218)

Aid to navigation**5.239**

- 1 **Racon:**
Svelvikrenna Søndre Light (59°35'·8N 10°25'·3E).
For details see *Admiralty List of Radio Signals Volume 2*.

Drammensfjorden outer part**5.240**

- 1 From a position SW of Rødtangen (59°32'N 10°25'E), a white sector (358°–008°) of Kroksberget Light (white lantern) (59°34'N 10°25'E) exhibited from a point on the W side of the fjord, leads N into Drammensfjorden, keeping near to the E shore, which is steep-to, until 5 cables N of Rødtangen, passing (with positions relative to the light):
- 2 E of Hansken (2 miles SSW) a spit which extends 2 cables ESE from the W entrance point of Drammensfjorden, and:
W of Rødtangen (2 miles S) a popular holiday resort with a public quay. Rødtangen Light (5.218) is exhibited from the point. Thence:
- 3 E of rocks, with a depth of 5 m over them (1¾ miles S), which form an extension 2 cables ESE from Blindsand. The rocks are marked on their E side by a spar buoy (port hand).
- 4 When Kroksberget Light is distant 4 cables the track alters to the NNE for 2¼ miles passing through a position mid-way between Bjørneskjær Light (59°35'N 10°26'E) and Salteskjær, 5 cables W. This track remains in a white sector (023°–086°) of Bjørneskjær Light for 1¾ miles then continues within a white sector (195°–208°) of Kroksberget Light, astern, passing (with positions relative to Bjørneskjær Light):
- 5 WNW of Holmsbusteinane (1½ miles SSW), three above-water rocks on a spit which extends 2 cables WNW from the E shore and are marked at their W end by a spar buoy (starboard hand), and:
- 6 ESE of Krokåsen (1½ miles SSW), a salient point which is steep-to and on which stands Kroksberget Light, thence:
Clear of Furugrunnen (8 cables SSW), which lies in mid-channel, thence:
- 7 ESE of a rock, with a depth of 2·6 m over it, which lies 1 cable S of Salteskjær (5 cables WNW), a small islet on the W side of the fairway, and:
WNW of Bjørneskjær Light (lantern on tripod) which is exhibited from the N point of an islet close off the E shore.

5.241

- 1 **Clearing lines:**
The line of bearing, 008°, of the W extremity of Salteskjær (1½ miles NNE), just open E of the point on which Kroksberget Light stands, clears close E of Blindsand.
- 2 The line of bearing, 023°, of Bjørneskjær Light, where the sectors change from white to red, clears WNW of Holmsbusteinane.

Svelvikstrømmen and approach from south-south-east**5.242**

- 1 **Leading lights (astern):**
Front. Bjørneskjær Light (59°35'N 10°26'E).
Rear. Nedre Knivsvik Light (lantern on cairn) (329 m SSE of front light).
- Leading lights (ahead):**
Front. Svelvik Light (white lantern on tripod) (59°36'·8N 10°24'·6E).
Rear. Brenna Light (lantern on tripod) (311 m NNW of front light).
- 2 From a position 5 cables NNW of Bjørneskjær Light the alignment (156½°), astern, and (336½°) ahead, of the leading lights, leads NNW, within a white sector (156°–157°) of Bjørneskjær Light (astern) and a white sector (335½°–337°) of Svelvik Light (ahead), towards and into the dredged channel of Svelvikstrømmen which is marked by spar buoys (lateral), passing (with positions relative to Svelvikrenna Søndre Light (59°35'·8N 10°25'·3E)):
- 3 ENE of Flyndregrunnen (3½ cables SSW) which lies on the edge of the shore bank extending 2 cables ENE from Bokerøya, thence:
Between a charted depth of 9·7 m (2 cables SSE) which lie within the white sector of Svelvik Light given above, and another of 9·8 m, 150 m NE, thence:
- 4 ENE of Svelvikrenna Søndre Light (white lantern), thence:
ENE of Vesthaken (2 cables NNW), a drying bank which extends 3 cables E from the W shore and is marked close on its NE side by Svelvikrenna Nordre Light (3 cables NNW), and:
WSW of Østhaken (4 cables N), a drying spit which extends 4 cables SE from Verksøya, thence:
- 5 WSW of the S extremity of the mole extending 120 m S from Verksøya (6½ cables NNW). From this position, NNW for 1½ cables, the leading line passes inside the 10 m depth contour, close to charted depths of 9·0 and 9·5 m; deeper water will be found WSW of the leading line.

5.243

- 1 When Svelvik Light is distant 1 cable the track alters to 005° along the alignment (185°), astern, of leading lights:
Front. Batteriøya Light (lantern on tripod) (59°36'·5N 10°24'·6E) which stands on the N end of Batteriøya, an elongated islet on the W side of the S entrance to Svelvikstrømmen.
Rear. Tømmerås Nedre Light (lantern on tripod) (260 m from front light), situated on the mainland.
- 2 This track, which also leads 005° on Blindeskjæra Light (white lantern on tripod) (59°37'·4N 10°24'·8E), which stands on the W side of the N approach to the channel, continues through the fairway of Svelvikstrømmen and into the inner part of Drammensfjorden.
- 3 **Useful mark:**
Batteriøya East Light (59°36'·4N 10°24'·7E).

Drammensfjorden inner part**5.244**

- 1 From a position E of Blindeskjæra Light (59°37'·4N 10°24'·8E) the track through the inner part of Drammensfjorden leads NNW for 3½ miles, thence NW for 5½ miles, in deep water along the centre line, passing (with positions relative to Steinsbråten Light (59°41'N 10°22'E)):



Svelvik from SSE (5.245)

(Photograph – Fjellanger Widerøe AS)

- 2 WSW of Pampus (1½ miles ESE), an unmarked reef which extends 5 cables SSW from the coast and dries, thence:
NE of Steinsbråten Light (white lantern on cairn), thence:
- 3 SW of Gåsungen (1¼ miles NE), a drying reef which extends 1 cable from the NE shore of the fjord, thence:
SW of Lahelleholmen (2½ miles NW) an islet close off the NE shore.
(Directions continue for Drammen Havn at 5.270)

Svelvik

Chart 3501 plan of Svelvikstrømmen

General information

5.245

- 1 **Position and function.** Svelvik (59°37'N 10°25'E), on the W side of Svelvikstrømmen, has a population of 6500 (2002). Industrial installations include a cement works, armament factory and engineering industry. Sand and gravel is exported from Verket, situated on the S side of Ryggen (59°37'N 10°26'E) which contains a large quarry.

- 2 **Harbour limit.** The N limit of the harbour is defined by a line extending 076° across the fjord from the ballast mark at Rørvik, 4 cables N of Blindeskjæra Light (59°37'4N 10°24'8E).

Port Authority is the same as that for Drammen (5.250).

Regulations are given at 5.231.

Anchorage and berths

5.246

- 1 **Anchorage** suitable for medium sized vessels is available to the S of the harbour, between Salteskjær and Svelvikrenna Søndre Light, 1 mile N, in depths from 7.5 to 14 m, clay, clear of a submarine pipeline (1.69) which crosses the W side of the bay.
- 2 **Alongside berths.** The largest berth is Svelvik Industrikai with a length of 184 m and depths 3.5 to 4.2 m alongside; there are four other berths.
The largest berth at Verket has a length of 113 m with depths from 2.1 to 4.3 m alongside.

Supplies

5.247

- 1 Fuel oil can be delivered by road tanker; fresh water laid on to the berths; provisions and ship's stores obtainable.

Anchorage and minor harbours

Chart 3501

Anchorage

5.248

- 1 The outer part of Drammensfjorden affords good anchorage as the depths are shallow and the holding ground is generally good. These anchorages, as shown on the chart, have limited swinging room but it is generally possible to anchor farther off the coast. The most frequented anchorage lies N of Støflaket (59°33'N 10°25'E).
- 2 **Caution.** Submarine pipelines are laid on each side of the fjord; on the E side from Holmsbu (59°33'7N 10°25'7E) to the E part of Vollebukta, 2¼ miles N; on the W side from the N part of Krokåsen (5.240) to Bokerøya, 1¼ miles N, and from Bokerøya to a position N of Salteskjær, 3 cables SE. Their positions are shown on the chart.
- 3 The inner part of the fjord is much deeper and has few good anchorages.

Minor harbours

5.249

- 1 **Tørkopp**, 7 cables W of Skjæret (59°41'4N 10°20'8E), contains a quay with a berthing length of 59 m and depths from 10.3 to 17.5 m alongside. This quay is marked by a light.

Jonsbubukta (59°43'N 10°21'E) contains a quay with a length of 35 m and depths from 5.0 to 7.5 m alongside. Lights are exhibited from each corner of the quay.

- 2 **Solumbukta** (59°43'N 10°16'E) contains a pier with depths of 4.8 m alongside its head, which serves an oil and gas installation.

Engersandbukta (59°44'N 10°18'E) contains a quay with a length of 36 m and depths from 2.3 to 5.4 m alongside. There are two other berths.

- 3 **Gullaugbukta** (59°45'N 10°17'E) contains a quay with a length of 53 m and depths from 5.0 to 5.8 m alongside. Lights are exhibited from each corner of the quay.

Gilhusbukta (59°45'N 10°16'E) contains a quay with a length of 78 m and dredged depths from 3.8 to 6.3 m alongside. At 10 m off the quay depths are reduced by as much as 0.9 m; however, lights lead to the berth in a least depth of 6.2 m. A compressed air pipeline for the prevention of ice formation is laid up to 5 m off the quay.

DRAMMEN HAVN

General information

Charts 3501, 3712 plan of Drammen

Position and function

5.250

- 1 Drammen Havn (59°44'N 10°14'E), at the head of Drammensfjorden, encompasses the estuary of Drammenselva which flows into the fjord.



Drammen from W (5.250)

(Photograph – Fjellanger Widerøe AS)

2 The harbour, which has a total quay length of 3260 m and warehouses with about 46 000 m², supports Drammen as the largest importer of vehicles and fresh fruit in Norway and a major exporter of forest products. Regular communications by sea are maintained with most significant ports in Europe.

3 The town of Drammen, built along the banks of Drammenselva, has a population of 56 000 (2001) and is one of the largest commercial and industrial towns in Norway.

Port limits

5.251

1 The S limit of the harbour is the N limit of Svelvik Harbour (59°38'N 10°25'E).

Approach and entry

5.252

1 Drammen Havn is approached through Drammensfjorden (59°40'N 10°25'E) and entered through the estuary of Drammenselva.

Traffic

5.253

1 In 2004 this port was used by 453 vessels with a total of 1 913 590 dwt.

Port Authority

5.254

1 **Address.** Port of Drammen Authority, PO Box 636, N-3003 Drammen, Norway.

Website. www.drammenhavn.no.

Email. firmapost@drammenhavn.no.

Limiting conditions

Controlling depth

5.255

1 The controlling depth in the approach is given at 5.227. Within the harbour the controlling depth depends on the situation of the berth.

Vertical clearance

5.256

1 Drammen Havn is spanned by road and rail bridges, with a minimum vertical clearance of 5.5 m, which connect both banks of the river across the W end of Holmen. For further information on vertical clearances see 1.9.

Deepest and longest berths

5.257

1 The longest berth is Holmen Syd-kaia, on the SW side of Holmen, as given at 5.272.

The deepest berths are Kattgatkaia and Risgardenkaia, on the E side of Holmen, as given at 5.272.

Mean tidal levels

5.258

1 Tide in the harbour is barely noticeable. The height of HW and LW depend largely on the wind in Oslofjorden as described at 5.228.

Density of water

5.259

1 There is only fresh water in the harbour.

Maximum size of vessel handled

5.260

1 The largest vessel handled had a length of 225 m with a draught of 9.1 m. MV *Aida*, 51 000 dwt and draught of 7.62 m, carrying vehicles, has berthed alongside.

Ice

5.261

1 Details of the ice conditions in Drammensfjorden and information on the operation of ice-breakers are given at 5.237.

Arrival information

Port radio

5.262

1 Vessels are required to participate in Oslofjord VTS (5.9). Drammen Harbour Control is available on VHF between 0700 and 1600 from Monday to Friday.

For further information see *Admiralty List of Radio Signals Volume 6* (2).

Notice of ETA

5.263

1 To the Harbour Office at least 24 hours before arrival.

Pilotage and tugs

5.264

1 **Pilots.** Sea pilotage (5.8) is compulsory for Oslofjorden and Drammensfjorden.

2 **Tugs** are available but not normally required except for large vessels.

Regulations concerning entry

5.265

1 **Movement.** Vessels must not be moved within the harbour area without prior permission from the Harbour Authority.

Speed limit of 5 kn is in force within the harbour to the W of a line joining Tangen Church (59°43'8N 10°14'1E) to Tømmerterminalen, a point 1 mile NE.

2 **Dredging equipment** in the harbour must at all times be passed with caution.

Sound signals are not to be made on the siren or whistle within the harbour except when necessary to ensure safety when manoeuvring.

Quarantine

5.266

1 Vessels arriving under a quarantine flag or under orders to carry out quarantine shall be anchored in the outer harbour until the Health Authority has given an order or permission to move.

Harbour

General layout

5.267

1 Drammen Havn is built around the estuary of Drammenselva. The island of Holmen divides the mouth of Drammenselva into two parts; Tangenrenna, the channel S of the island, forms the main harbour as the channel to the N of the island is shallow and restricted.

2 Major berths are arranged along both sides of the main channel and along the E side of Holmen; and a floating quay is moored at Lierstranda.

Development

5.268

1 Construction work was in progress (2002) on the E side of Holmen, E of Kattgatkaia.

Natural conditions**5.269**

- 1 **Flow** is strongest out-going during the period April to July, and variable for the rest of the year.

Ice conditions and services in Drammensfjorden are given at 5.237.

Directions for entering harbour

(continued from 5.244)

5.270

- 1 **Remarks.** There are no specific directions for navigating within the harbour although the following leading lights may be of use in berthing:

The alignment (335°) of Lierstranda Leading Lights (metal columns) (59°44'·7N 10°15'·4E).

The alignment (289°) of Brakerøya Leading Lights (lantern on posts) (59°44'·7N 10°14'·5E).

Useful mark:

Risgarden Molehead Light (lantern on tripod) (59°44'·0N 10°14'·3E) exhibited from the SE extremity of Holmen.

Anchorage and berths**Anchorage****5.271**

- 1 Anchorages in Drammensfjorden are given at 5.246 and 5.248. Closer to Drammen, it is permissible to anchor a vessel at Ballasthavna, E of Holmen (59°44'N 10°14'E), if no other anchorage or berth has been allocated. The holding ground of sand and clay is good.

Alongside berths**5.272**

- 1 The berths given below are positioned from the Harbour Office (59°44'·0N 10°13'·3E) and given the berth number used on the plan.

Tangenrenna south side:

Largest berth is Langbrygga (2) (2½ cables ESE) with a length of 260 m and depth of 8 m alongside.

Tjømekrankaia (1) (3½ cables ESE) has a length of 165 m and a depth of 7 m alongside.

- 2 There are nine other berths including those in the shipyard (5.273).

Holmen:

The longest berth is Holmen Syd-kaia (6) (2 cables N) with a length of 486 m and a depth of 9 m alongside. A Ro-Ro ramp at its SE end has a width of 21 m and a depth of 9 m.

- 3 The deepest berth is Kattegatkaia (9) (4 cables NE) with a length of 168 m and a depth of 10 m alongside. This berth has a Ro-Ro ramp at its N end and facilities for handling containers.

There are seven other berths.

Lierstranda:

- 4 A floating quay and Ro-Ro ramp, about 90 m in length and 30 m wide extends SE from the shore at Brakerøya (59°44'·7N 10°14'·6E). The head of the quay is secured by three anchors, as shown on the chart. The least depth alongside the quay is 6·0 m.

Port services**Repairs****5.273**

- 1 Drammen Havn contains a major ship repair yard in which repairs of all kinds can be carried out. This yard contains a floating dock, which has a length of 175 m and width of 24 m, able to lift vessels up to 24 000 dwt; and two slipways. There is a total length of 535 m alongside berths with depths to a maximum of 6·8 m alongside.

The town contains several engineering workshops.

Other facilities**5.274**

- 1 Deratting can be carried out; hospitals; oily waste reception facilities available.

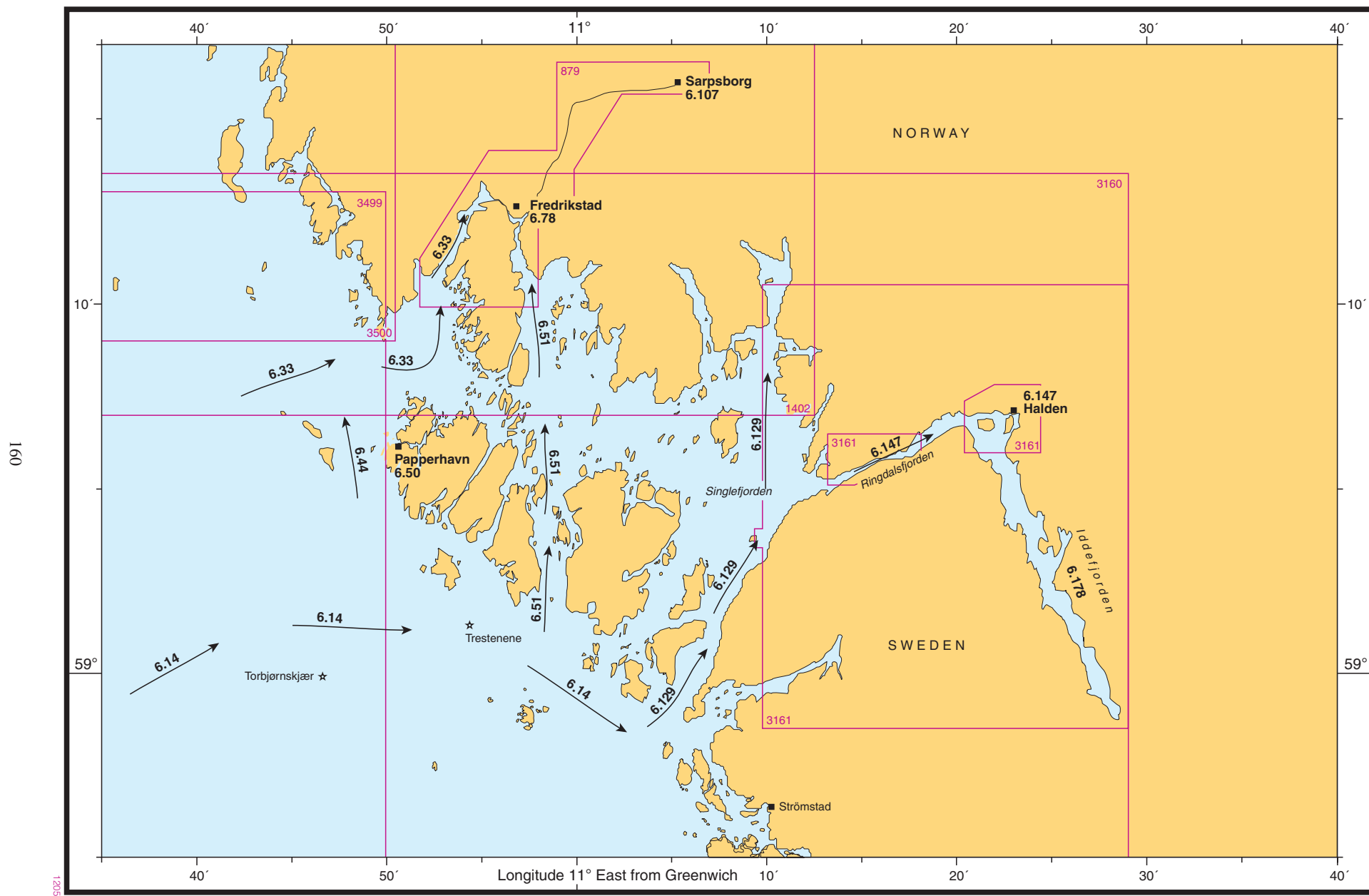
Supplies**5.275**

- 1 Fuel oil and marine diesel available at all berths, by barge or road tanker; water available at all public quays; provisions and ship's stores of all types, including charts, obtainable.

NOTES



Chapter 6 - Oslofjorden southern part - east side



CHAPTER 6

OSLOFJORDEN SOUTHERN PART — EAST SIDE

GENERAL INFORMATION

Chart 3160

Scope of the chapter**6.1**

- 1 This chapter, which covers the E side of Oslofjorden at its S end, incorporates the mainland E from Strømtangen (59°09'N 10°50'E) to the border with Sweden, 11 miles ESE (1.2). It also includes the adjacent islands which are collectively known as Hvaler (59°05'N 11°00'E) (6.5).
- 2 From the E end of the main area the chapter also includes Ringdalsfjorden (59°06'N 11°18'E) and Iddefjorden (59°05'N 11°23'E), which extend about 12 miles inland and are shared between Norway and Sweden.
- 3 The chapter is arranged as follows:
Inner coastal route SE of Hvaler (6.12).
Borg Harbour and approaches (6.29).
Halden and approaches (6.128).

Routes**6.2**

- 1 The preferred outer approach to the harbours on the inner side of Hvaler is the inner coastal route, through the channel N of Torbjørnshjær (59°00'N 10°47'E), as described at 6.14. This route provides access to the main approach channels for three major harbours as follows:
- 2 To Fredrikstad (59°12'N 10°57'E) and Sarpsborg, 6 miles NE (Chart 879); through Løperen (6.51), which is entered in position 59°02'N 10°59'E; thence through Østerelva (59°11'N 10°57'E) (6.51).
- 3 To Halden (59°07'N 11°23'E), through Sekken (6.129), which is entered in position 58°59'N 11°05'E, and thence through Ringdalsfjorden (59°06'N 11°18'E) (6.170).
- 4 An alternative approach route to Fredrikstad and Sarpsborg, which stems from Oslofjorden in the W, passes through Lera (59°09'N 10°52'E) (6.33) and thence through Vesterelva (59°11'N 10°53'E).

International boundary**6.3**

- 1 The international boundary between Norway and Sweden, as given at 1.2, passes through the foul ground extending SE from Torbjørnshjær (59°00'N 10°47'E). That part of the boundary which passes S and SE of Heia (58°58'N 10°52'E) is marked by four buoys (special) which span a distance of 3½ miles. The boundary is otherwise marked only by beacons on shore.

Harbours**6.4**

- 1 **Major harbours:**
Fredrikstad (59°12'N 10°57'E) (6.78) an important industrial town and part of Borg Harbour.
Sarpsborg (59°16'N 11°06'E) (6.107) (Chart 879), an inland port linked to Fredrikstad and forming a part of Borg Harbour.
Halden (59°07'N 11°23'E) (6.147) an important commercial harbour close to the border with Sweden.

Minor harbours:

- 2 Papperhavn (59°06'·3N 10°50'·6E) (6.50), a former fishing port.
Vikerhavn (59°02'·2N 10°57'·0E) (6.74), a fishing port.
- 3 Skipstadhavn (59°03'·7N 10°57'·5E) (6.75), a former ferry port.
Korshavn (59°04'·4N 10°59'·7E) (6.76), a former ferry port.
Utgårdskilen (59°04'·6N 10°52'·3E) (6.77), a fishing port.
- 4 Herfølrenna (59°00'·1N 11°03'·4E) (6.143), a ferry port.
Skjærhalden (59°01'·4N 11°02'·3E) (6.145), a ferry port.
Skjeberg (59°11'N 11°11'E) (6.146), an outer port for Sarpsborg.
- 5 Sponvika (59°05'·5N 11°13'·5E) (6.174), an outer port for Halden.

Topography**6.5**

- 1 The east side of Oslofjorden, at its S end, is protected by Hvaler, which is the common name for all the islands which lie S and SE of Kråkerøy (59°10'N 10°55'E). This group, which contains some 1200 islands, islets and skerries, extends E from a line joining Torbjørnshjær (59°00'N 10°47'E) to Søstrene, 6 miles N, and includes Vesterøy (59°06'N 10°53'E) (6.34) and Kirkøy, 4 miles SE.
- 2 The islands in this group are comparatively low and consist generally of light grey–yellow stone; the outer islets and skerries are bare whilst the larger islands are often wooded by dark coniferous trees. Bankerødkollen (59°06'N 10°54'E) and Skjelsbuveten, 4 cables SSE, which are the two highest points in Hvaler, are easily identified from SW by the gap between them.
- 3 No built-up areas can be seen from seaward although the district on the inner side of Hvaler is the most highly populated in Norway.

Hazards**6.6**

- 1 **Fishing.** A general description of fishing methods is given in *The Mariner's Handbook* and a summary of the methods used within the area covered by this volume is given at 1.19.
- 2 **Dangerous waves.** The area to seaward of this part of the coast contains some of the conditions which allow the formation of dangerous waves, as described at 1.192. Caution is necessary.

Vessel Traffic Service**6.7**

- 1 A VTS, mandatory for all vessels of 24 m or more in length, covers the Oslofjord area including the approaches to Fredrikstad (59°12'N 10°57'E), Sarpsborg (59°16'N 11°06'E) and Halden (59°07'N 11°23'E). The area covered by this chapter is operated by the Traffic Centre at Horten

(59°25'N 10°29'E). For full details see *Admiralty List of Radio Signals Volume 6* (2).

Traffic regulations

6.8

- 1 General traffic regulations are given at 1.69 and for tankers at 1.83.

All the fjords in this chapter lie within Norwegian internal waters as described in Appendix I, which also contains traffic regulations.

- 2 The approaches to ports within this chapter, as given in the appropriate directions, follow the specified leads or navigation routes given in Appendix I.

In addition, the approach to Halden (59°07'N 11°23'E) (6.147) lies partly within Swedish internal waters for which traffic regulations are given at 1.89.

Mean tidal levels

6.9

- 1 General information on sea level is given at 1.187. The tidal range in the harbours is very small and water levels are often dominated by meteorological conditions. Times of HW and LW are similar to those at Nevlunghavn (58°58'N

9°53'E) where the mean spring range is 0.3 m and the mean neap range is 0.15 m. See *Admiralty Tide Table Volume 2* for further information.

Flow

6.10

- 1 **Flow.** An explanation of the term flow, as used in this text, and general information on flow is given at 1.176.

Currents. General information on currents is given at 1.177.

- 2 In the outer approaches to Oslofjorden the current usually sets N along the coast of Sweden to the vicinity of Nord-Koster (58°54'N 11°00'E) where it turns NW; it then sets W across the entrance to the fjord, passing S of Færder (59°02'N 10°32'E). Outside the entrance to Oslofjorden the rate will only exceed 1 kn during gales from the E; whereas gales from the W may reverse the direction and set towards the E shore of the fjord.

Coast radio

6.11

- 1 A coast radio station covers the area of this chapter as given at 4.8.

INNER COASTAL ROUTE SOUTH-EAST OF HVALER

GENERAL INFORMATION

Chart 3160

Area covered

6.12

- 1 This section covers the inner coastal route along the SE side of Hvaler (59°05'N 11°00'E) from the principal entrance to Oslofjorden (58°59'N 10°34'E) (5.15) to Nord-Hällsö (58°58'N 11°05'E).

Access

6.13

- 1 This route provides access to the following:
 - S entrance to Løperen (6.51), in position 59°02'N 10°58'E, which is the principal channel in the approach to Fredrikstad (59°12'N 10°57'E) and Sarpsborg (59°16'N 11°06'E).
- 2 S entrance to Sekken (6.129), in position 58°59'N 11°04'E, which is the principal channel in the S approach to Halden (59°07'N 11°23'E).

LILLE FÆRDER TO NORD-HÄLLSÖ AND SEKKEN

General information

Chart 3160

Routes

6.14

- 1 **Inner coastal route.** From a position 3 miles SSE of Lille Færder (59°02'N 10°32'E) the inner coastal route towards Nord-Hällsö (58°58'N 11°05'E) leads ENE for about 5½ miles then generally E for about 5 miles, through the channel N of Torbjørnskjær (59°00'N 10°47'E); then ESE for about 6 miles, through confined waters, to a position 1 mile NW of Nord-Hällsö. This position is situated on the approximate boundary between Norway and Sweden, off the S entrance to Sekken (6.129) and the N entrance to Kosterfjorden (7.7).
- 2 **Hvaler.** A general description of the approach routes to the harbours on the inner side of Hvaler is given at 6.2.

Topography

6.15

- 1 The route described above is bordered along its N side by the Hvaler group of islands (6.5) which extends SSE to Sekken. On the SW side of the group the island of Akerøy (59°03'N 10°53'E) can be identified by its light grey-brown colour and blunt, bare peak which, from SE shows fairly well against the background. To the S of the route lie Torbjørnskjær (59°00'N 10°47'E) and Tisler (58°59'N 10°57'E), a group of low, bare, light grey islets which are difficult to identify from a distance as they merge with the background.

Depths

6.16

- 1 The least charted depth in the fairway of the inner coastal route is 20 m, within 6 cables of 59°01'5N 10°49'9E. To the SE of this route the waters are shallow and foul with numerous rocks extending across the gap between Torbjørnskjær and Nord-Koster, 8 miles SE. Navigation of the channels between them requires local knowledge.

Pilotage

6.17

- 1 Pilotage is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6* (2).

Pilots for Borg (Fredrikstad and Sarpsborg) board 1¼ miles ESE of Trestenene Light (59°01'5N 10°53'9E, in the vicinity of Vidgrunnen. Pilots for Halden board SE of Herføl in position 58°58'2N11°03'1E.

Traffic regulations

6.18

- 1 General regulations for traffic are given at 6.8. The inner coastal route remains close outside the seaward limit of Norwegian internal waters as described in Appendix I.

Rescue**6.19**

- 1 A lifeboat is stationed at Skjærhalden (59°01'4N 11°02'3E). A general description of the search and rescue organization is given at 1.128.

Natural conditions**6.20**

- 1 **Currents.** A general description of the currents in the entrance to Oslofjorden is given at 6.10.
Flow. In the vicinity of Tisler (58°59'N 10°57'E) the set depends on the wind for direction. The current rate can also be strong following prolonged periods of strong winds from similar directions.
- 2 **Ice.** In the winter months, especially January and February, a great portion of Oslofjorden is full of ice, but the channels to the most important harbours and anchorages are kept open by icebreakers. See 1.198 and *Admiralty List of Radio Signals Volume 6* (2) for details.
- 3 **Mean tidal level.** See 6.9.
Local weather. In rough conditions, the sea breaks over all the shallow ground between Torbjørniskjær and Heia, 3½ miles SE.
Climatic table. See 1.229 and 1.234.

Directions*(continued from 4.22)***Principal marks****6.21**

- 1 **Landmarks:**
Torbjørniskjær Lighthouse (59°00'N 10°47'E) (5.26).
Heia (58°57'5N 10°52'4E), a low, grey-brown islet on which stands a beacon tower, 6 m in height. A signal mast and refuge hut stand on the NE side of the islet.
- 2 Vikertangen (59°02'N 10°57'E), the S extremity of Asmaløy, which is the lightest part of Hvaler, is prominent and easy to identify. Rødshuet, 1½ miles E (6.58) resembles Vikertangen.
Botneveten (59°04'N 11°03'E) (6.134).
Halle-Vagnaren (59°02'N 11°09'E) (6.134).
Kosterbonden (58°54'N 11°01'E) (7.18) (Koster on Chart 879).

6.22

- 1 **Major light:**
Torbjørniskjær Light (59°00'N 10°47'E) (5.26).

Other aids to navigation**6.23**

- 1 **Racons:**
Færder Light (59°02'N 10°32'E).
Trestenene Light (59°01'5N 10°53'9E).
Klövningarna Light (58°56'N 10°59'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Lille Færder to Torbjørniskjær**6.24**

- 1 From the vicinity of 59°00'N 10°37'E, about 3 miles SE of Færder Light, the recommended approach to the inner coastal route leads ENE for about 4 miles, passing (with positions relative to Torbjørniskjær Light):
- 2 NNW of Medfjordgrunnen (4½ miles W), thence:
NNW of Skjærskrakkene, which extend up to 1 mile NW from Torbjørniskjær and are marked off their N end by a spar buoy (starboard hand).

3 Clearing marks:

The alignment (355°) of the E extremity of Søndre Missingen (59°10'N 10°43'E) with the E edge of Rauer, 4 miles N, clears W of Seihausen (1 mile SSW) and Skjærskrakkene.

4 Useful mark:

Søstrene (6 miles N) (5.29).

Torbjørniskjær to Trestenene**6.25**

- 1 From a position 2¾ miles NW of Torbjørniskjær Light, a white sector (094°–096°) of Homlungen Light (low tower on white wooden hut, 12 m in height) (59°01'N 11°01'E) leads E for about 5½ miles, within a white sector (090°–118½°) of Trestenene Light (59°01'5N 10°53'9E) for the first 3½ miles, passing (with positions relative to Trestenene Light):
- 2 N of Medfjordbåen (3½ miles W), an isolated patch which is marked on its N side by a spar buoy (starboard hand), and:
Over or S of a charted depth of 15 m (¾ miles W), thence:
- 3 N of Nygrunnene (2¾ miles WSW) and over shoals, with a least charted depth as given at 6.16, which span the light sector, thence:
S of Trestenene, a group of rocks from which Trestenene Light is exhibited.
- 4 **Useful mark:**
Beacon tower (black with white diagonal stripe on SW side) standing on Kuskjær (58°59'N 10°50'E), an underwater rock.
(Directions for the approach to Fredrikstad and Sarpsborg from S are given at 6.58)

Trestenene to Nord-Hällsö**6.26**

- 1 From a position 2 cables S of Trestenene Light, a white sector (115°–122°) of Nord-Hällsö Light (white shed) (58°58'N 11°05'E) standing on Nord-Hällsö (6.27), leads ESE in mid-channel. When 1 mile from Trestenene Light, a white sector (300½°–308½°) of that light, astern, also covers the track, which passes (with positions relative to Lille Angret (59°00'N 11°00'E)):
- 2 SSW of Vikertangflu, the foul ground which extends 3 cables SE from Vikertangen (2¾ miles NW) (6.21), which is marked near its S end by a spar buoy (port hand), thence:
SSW of a pilot boarding station (2½ miles WNW) (6.17), thence:
SSW of the S entrance to Løperen (2¼ miles NNW) (6.51), and:
- 3 NNE of the dangers extending ENE from Alne (2½ miles W), the NW of the Tisler group of islands (6.15). A beacon tower (white) stands on Alne. Thence:
NNE of the foul ground surrounding Båen (1¾ miles W) which is the N of the Tisler group, and:
SSW of Kyrre (1¼ miles NW), an isolated shoal, thence:
- 4 Over or S of Bergholen (1 mile W), which has a least charted depth of 21 m, thence:
SSW of the dangers surrounding Lille Angret and Store Angret, 4 cables ESE, which are low, brown-grey islets. A beacon tower (black) stands on Store Angret. And:
- 5 NNE of Hatten (9 cables SSW), which is marked on its N side by a spar buoy (starboard hand), thence:

NNE of Skreia (1¼ miles S), which is marked on its E side by a spar buoy (starboard hand), thence: SSW of Lassekrakken (9 cables SE), which is marked on its SW side by a spar buoy (port hand), thence: SSW of the dangers surrounding Sekkefluene Light (1¼ miles ESE) (6.135).

6.27

Useful marks:

- 1 Klövningarna Light (58°56'·0N 10°59'·3E) (7.31).
Linnekleppen Beacon (black tower with two white bands, elevation 30 m) (1¼ miles ESE), standing on the S part of Herføl.
- 2 Nord-Hällsö (2¾ miles SE), which can be identified by its reddish-yellow colour, its two hummocks, and a large white square mark with a black border,

painted on a steep slope on the N part of the island.

(Directions continue, for Sekken and Halden at 6.134 and for the inner coastal route through Kosterfjorden at 7.28)

Anchorage

Tisler

6.28

- 1 The Tisler group of islands provide a fair weather harbour at Tislerkilen (58°59'N 10°57'E), on the W side of the main island, and also off the N and NE sides of the island, with anchorage on mud, shell and sand; and with mooring rings. These areas are protected from most wind conditions; however, heavy seas cause a swell.

BORG HARBOUR AND APPROACHES

GENERAL INFORMATION

Chart 3160

Area covered

6.29

- 1 This section covers Borg Harbour, the administrative organization which combines Fredrikstad Harbour (59°12'N 10°57'E) and Sarpsborg Harbour, 6 miles NE (Chart 879), along with their approaches.
- 2 The section is arranged as follows:
Approach to Fredrikstad and Sarpsborg from W (6.33).
Approach to Fredrikstad and Sarpsborg from S (6.51).
Fredrikstad (6.78).
Sarpsborg and approach from S (6.107).

Traffic

6.30

- 1 In 2004 Borg Harbour was used by 1454 vessels with a total of 6 045 730 dwt.

Port Authority

6.31

- 1 **General remarks.** The inter-municipal harbours of Fredrikstad and Sarpsborg co-operate under the name of Borg Havn IKS. Local authority in each harbour is vested in the Port Captain.
Address. Borg Havn IKS, Øraveien 27, PO Box 1205 1631 Gamle, Fredrikstad.
- 2 **Website.** www.borg-havn.no.
Email. firmapost@borg-havn.no.

Ice

6.32

- 1 The harbours of Borg Havn can be considered ice-free and operate all year round. When ice occurs it is mostly in the form of open drift which does not cause problems for navigation.
The Hvaler Archipelago rarely has ice. This happens, however, when strong S winds bring ice from the Kattegat along the Swedish coast and the ice accumulates around the islands.

APPROACH TO FREDRIKSTAD AND SARPSBORG FROM WEST

General information

Charts 3160, 879 plan of Fredrikstad and Sarpsborg

Routes

6.33

- 1 **Approach from west.** From the pilot boarding area off Store Færder (59°05'N 10°34'E) (5.8) the recommended approach to Fredrikstad and Sarpsborg from W leads ENE to pass N of Struten (59°07'N 10°44'E), thence E between Strømtangen (59°09'N 10°50'E) and Vesterøy, 1½ miles SSE (6.34), thence N through Lera, a bay extending 1½ miles E from Strømtangen.
- 2 This route continues N towards the S end of Vesterelva where the main entrance for larger vessels lies W of Kråka (59°10'·7N 10°52'·6E), an islet near mid-channel. Thence the route leads NNE along the W side of Vesterelva, which separates the N part of Kråkerøy from the mainland. This is the main approach route from W.
- 3 **Initial approach from south,** passing E of Søstrene, is given at 6.44. This route joins the route from W in a position S of Strømtangen.
Link with Østerelva. A minor channel which connects Lera with Kjøkøysundet (59°08'·7N 10°56'·6E) and thence to Østerelva is mentioned at 6.71.

Topography

6.34

- 1 **Vesterøy** (59°06'N 10°53'E), the highest island in the Hvaler Group (6.5), rises to a peak in Bankerødkollen situated to the NE of centre. The shoreline consists of light grey stone rising to trees in the upper parts of the island.
Lera. The islets along the E side of Lera are brown, low and fairly bare. Kråkerøy (59°10'N 10°55'E) (6.51) forms the background.

Controlling depth

6.35

- 1 The controlling depth in Vesterelva is 5·4 m at mean water, in a position 2½ cables NNE of Huthholmen (59°12'·3N 10°54'·1E).

Pilotage

6.36

- 1 Pilotage is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory

and other details see *Admiralty List of Radio Signals Volume 6* (2).

Pilots are embarked at the Færder Pilot Station (59°04'·5N 10°34'·5E) (5.8) for the W approach to Borg (59°12'N 10°57'E).

Traffic regulations

6.37

- 1 General regulations are given at 6.8. Speed is limited in Vesterelva; for regulations concerning entry into Fredrikstad see 6.97.

Natural conditions

6.38

- 1 **Flow.** The flow in Lera usually accords with the wind but is liable to be turned SW and W by the outflow from Vesterelva for reasons given at 6.57. Slack water may occasionally occur in Vesterelva.

6.39

- 1 **Overfalls.** Turbulence which frequently occurs off Strømtangen (59°09'N 10°50'E) is caused partly by the strong out-going flow from Vesterelva which sets round the islet; and partly by the strong backwash from the steep coast. Discoloured water always extends E from the islet and also W of it during winds from the S and E.
- 2 These conditions make navigation difficult and caution is necessary, especially during the summer when there is an increase in traffic around the point.

Directions for approaching Fredrikstad from west

Approach to Lera

6.40

- 1 From the vicinity of 59°06'·5N 10°40'·0E, a white sector (061°–067°) of Strømtangen Light (lantern on column, 8 m in height) (59°09'N 10°50'E) leads ENE for 4¼ miles, passing (with positions relative to the light):
- 2 NNW of Strutsrevet (¾ miles WSW) (5.29), marked by a buoy (N cardinal), thence:
SSE of Søre Strutskrakkene (2½ miles WSW), the S of two shoals on the same bank, which is marked off its S end by a spar buoy (port hand), thence:
- 3 SSE of Skårekrakk (1 mile W), a shoal at the W end of a chain of rocks extending 1 mile W from Strømtangen. This shoal is marked on its SW side by a spar buoy (starboard hand).
- 4 **Clearing line.** The line of bearing, 061°, of Holtevarde (59°11'N 10°56'E), a hill 67 m high on Kråkerøy, seen over Strømsund (3½ miles SW), the narrow channel on the NW side of Strømtangen, clears NNW of Strutsrevet and SSE of Søre Strutskrakkene.

6.41

- 1 When Strømtangen Light is distant 1 mile, a white sector (095°–106°) of Tenneskjær Light (white lantern on tripod) (59°08'N 10°54'E), standing on Tenneskjær, a rock at the SE end of Lera, leads ESE for 1¾ miles, passing (with positions relative to Strømtangen Light):
- 2 SSW of a shoal and foul ground extending up to 8 cables W and WSW from Strømtangen, an islet close to the mainland on which stands Strømtangen Light. Brotta Beacon (black tower) stands at the NW end of the shoal and a spar buoy (port hand) marks the E end of the shoal. Thence:
- 3 NNE of Hummerkrakk (1¼ miles S) which is marked at its N end by a spar buoy (starboard hand), thence:

NNE of Pilleren (1¼ miles SE), a rock which has shoal patches of 10 m and 12 m up to 1½ cables E and W of it.

4 Useful mark:

Stangeskjær Light (lantern on cairn, 8 m in height) (2 miles ESE). The cairn, which stands on an above-water rock, is white with a black stripe on its W side and a black band on its E side.

Lera

6.42

- 1 When Tenneskjær Light is distant 1½ miles, a white sector (359½°–019°) of Gåsungene Light (59°10'·8N 10°52'·3E) (white lantern on tripod, 5 m in height), situated close offshore on the W side of the entrance to Vesterelva, leads generally N for about 2¼ miles, passing (with positions relative to the light):
- 2 W of Stangeskjærbåen (2¼ miles S), which lies 4 cables W of Stangeskjær Light (6.41) and is marked on its S side by a spar buoy (port hand), thence:
E of Torgautgrunnen (2 miles SSW), which is marked on its SE side by a spar buoy (isolated danger), and:
- 3 Over or clear of some shoal patches (2 miles S), with a least depth of 9 m over them, which lie within the white sector, thence:
W of Råholmflu (1¼ miles SSE), which dries and is marked by an iron perch, thence:
W of Måkekollflu (1 mile SSE), which dries and is marked by an iron perch, and:
- 4 E of Lille Marnet (9 cables SSW), an islet at the S end of foul ground, thence:
E of Marnetbåen (6½ cables SSW), a rock which is marked on its NW side by a spar buoy (starboard hand), and:
W of an isolated rock (5½ cables SSE), with a depth of 5 m over it, thence:
- 5 Between a detached rock (2 cables SSW), with a depth of 5·2 m over it, and Søre Kråkebåen (2 cables S), which is marked on its W side by a light-buoy (W cardinal).

Vesterelva

6.43

- 1 When clear of Søre Kråkebåen the track alters gradually NNE to remain in the fairway of the channel which lies close to the NW shore. This track passes between Gåsungene Light and Nordre Kråkebåen, ¾ cable E, which is marked by a spar buoy (starboard hand). The track then leads NE for 1¼ miles within the white sector (214½°–217°), astern, of Gåsungene Light, passing (with positions relative to the light):
- 2 NW of the bank extending NW from Sturødgrunn (6 cables NE), which is marked by three spar buoys (starboard hand), thence:
Through the narrows between Krossnesfjellet Light (lantern on post) (1¼ miles NE) and Jyteskjgrunn, ½ cable E, which is marked by a spar buoy (starboard hand). A submarine pipeline (1.69) crosses the channel at this point.
- 3 After passing Krossnesfjellet Light the fairway follows the buoyed channel noting that the channel W of Hutholmen (59°12'·3N 10°54'·1E), known as Kjerringholmsund, is dredged to a depth of 7 m over a width of about 120 m.
- 4 Five cables NE of Hutholmen, a sharp alteration into Gyterenna then leads along the alignment (078°) of

Korsepynten Leading Lights (lanterns on posts), ahead, or the alignment (260°), astern, of Gressvik Leading Lights (lanterns on posts). These tracks must be observed as the dredged channel is narrow and the marker buoys may be off station.

5 **Useful mark:**

Huthholmen Light (lantern on post) (59°12'3N 10°54'2E).

Channel east of Søstrene

Route

6.44

- 1 The channel E of Søstrene (59°06'N 10°46'E) can be approached from SE as part of a coastal passage off the SW coast of Vesterøy (59°06'N 10°53'E) (6.34).

Alternatively an approach can be made from SW in Oslofjorden, passing either side of Seikrakk (59°05'N 10°47'E), to join the coastal passage (above).

Flow

6.45

- 1 The out-going flow between Søstrene and Vesterøy is stronger than the in-going flow and may be very strong with turbulence in the channel when the rivers at Fredrikstad are in flood (6.57).

Directions

6.46

- 1 From a position SE of Søndre Søster, the line of bearing, 349°, within a white sector (340°–002°), of Garnholmen Light (59°11'5N 10°45'9E) (5.36), leads NNW through the channel, passing (with positions relative to Papperhavn Light (59°06'5N 10°50'0E) (5.36)):

WSW of Bliagrunnene (2½ miles S), thence:

- 2 ENE of Seikrakk (2¼ miles SW), a detached shoal which is marked by a spar buoy (S cardinal), thence:

ENE of Gjyren (1½ miles WSW), which is awash and marked by an iron perch, and is the E of foul ground extending 3 cables E from the S end of Søndre Søster, thence:

- 3 WSW of Skorstenene (1 mile W), a group of shoals, with a least depth of 2 m over them, which lie from 6 to 10 cables W of Papperhavn Light and are marked at their W end by a spar buoy (starboard hand) and, at the E end, by a spar buoy (E cardinal), thence:

WSW of Osgrunnen (1 mile NNW), which is awash and marked by an iron perch.

6.47

- 1 **Clearing marks:**

Søndre Missingen (59°10'N 10°43'E) (5.31) bearing 333° and just concealed behind Søndre Søster, 5 miles SSE, clears WSW of Bliagrunnene.

Anchorage and harbour

Quarantine

6.48

- 1 A quarantine anchorage for Fredrikstad and Sarpsborg is established in Lera, to the E and SE of Lille Marnet (59°10'N 10°51'E). The anchorage near the middle of Lera is suitable for medium sized vessels.

Other anchorages

6.49

- 1 **Anchorage** is shown on the chart 3 cables S of Kråka (59°10'7N 10°52'6E), in a depth of 13 m.

Inner anchorage can be obtained off the W side of Huthholmen (59°12'3N 10°54'1E) (6.43) on the edge of the dredged channel.

Papperhavn

6.50

- 1 **Description.** Papperhavn (59°06'3N 10°50'6E) consists of outer and inner harbours which are restricted and subject to a heavy swell. The inner harbour, approached through a narrow entrance, is dredged to a depth of 2.7 m; it is safe in all weathers, but is only suitable for small craft.

- 2 **Anchorage.** The outer harbour affords anchorage 3 cables SE of Papperhavn Light, as shown on the chart, in a depth of 13 m, sand and soft clay; mooring rings are available and recommended for use.

Berth. A quay in the outer harbour has a length of 27 m with depths from 2.5 to 7.4 m alongside.

- 3 **Supplies.** Fresh water is available.

APPROACH TO FREDRIKSTAD AND SARPSBORG FROM SOUTH

General information

Charts 3160, 879 plan of Fredrikstad and Sarpsborg

Route

6.51

- 1 **Approach.** The principal approach route to Fredrikstad (59°12'N 10°57'E) (6.78) and Sarpsborg (59°16'N 11°06'E) (6.107) is from the S through Løperen (59°04'N 10°58'E), thence through Østerelva (59°10'0N 10°57'3E). These channels, though narrow in places, are well marked with leading lights and spar buoys.

- 2 **Løperen**, entered E of Vidgrunnen (59°01'6N 10°57'6E), extends about 6 miles N between the W side of Kirkøy (6.130) and the E side of Asmaløy (6.52), to its junction with Østerelva.

- 3 **Østerelva**, entered E of Belgen Light (59°08'N 10°58'E) (6.66), extends 4 miles N, between the E side of Kråkerøy, a wooded island, and the mainland, through a narrow channel named Røsvikrenna, to its junction with Vesterelva and Glåma, in position 59°12'N 10°57'E, within Fredrikstad Harbour.

Topography

6.52

- 1 The islands mentioned below are all part of the Hvaler group which is described at 6.5.

The S part of Asmaløy consists of light grey stone and the shoreline along both sides of Løperen consists of grey or grey-brown stone. Both Asmaløy and Kirkøy (6.130) are wooded with conifers, those on Asmaløy being more dense.

- 2 The E side of Spjærøy is more luxuriant throughout its length than Asmaløy and falls more steeply to the sea, with settlements scattered along its coast.

Controlling depth

6.53

- 1 The controlling depth in the approach from S lies in Røsvikrenna (59°10'5N 10°57'3E) where the official depth is 11 m at MLW. However, it should be noted that some charted depths are less to the N of Røsvikrenna and that a 9.8 m depth (59°11'5N 10°56'9E) lies on the W boundary of the white sector leading through the channel.

Hazards**6.54**

- 1 **Navigation.** The flow and changing position of the shallows in Røsvikrenna may make navigation difficult for long vessels. Use of a Pilot and tugs is essential.

- 2 **Dredgers** and diving floats operate in Østerelva; these show the following signals:

By day a red ball, and at night two red lights, disposed horizontally one on either side, with a white light below the red light, to indicate the side on which vessels should pass.

- 3 By day a red flag, and at night a red light over a green light on either side, to indicate that vessels should not pass.

If divers are down, or if the circumstances demand that special care is necessary when passing, a red and blue flag, divided diagonally, will be displayed.

Pilotage**6.55**

- 1 Pilotage is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*.

- 2 Pilots for Borg (Fredrikstad and Sarpsborg) board 1¼ miles ESE of Trestenene Light (59°01'5N 10°53'9E), in the vicinity of Vidgrunnen.

Traffic regulations**6.56**

- 1 Speed is limited above Alshus; for regulations concerning entry into Fredrikstad see 6.97.

Flow**6.57**

- 1 **Direction.** The flow (1.176) in both channels is usually S-going and contains an upper layer of fresh water which varies in thickness and rate with the water level in the rivers at Fredrikstad. The effect in the channels is as follows:

Løperen. When the water discharged is discoloured the rate may attain 1 kn in Løperen.

- 2 **Østerelva.** The freshwater layer is about 12 m thick and sets in the middle of the channel at about 2 kn. If the volume of river water increases, the fresh water layer expands until it displaces the salt water completely. After this occurs the rate, which previously remained constant, increases with the volume of water and 4 kn has been recorded during storm flood conditions.

Directions**Principal marks****6.58**

- 1 **Landmarks:**

Vikertangen (59°02'N 10°57'E) (6.21).

Rødshuet (59°02'N 10°59'E), the SW extremity of Kirkøy, is lighter than the surrounding landscape and resembles Vikertangen but does not stand out as clearly, and is not such a good mark.

Entrance to Løperen from south**6.59**

- 1 From a position 3 cables SE of Vidgrunnen Light (59°01'6N 10°57'6E), clear of Duken, an isolated shoal 5 cables SE of the light, a white sector (003½°–017¾°) of Kvernskjærgrunnen Light (lantern on column, 15 m in height) (59°02'3N 10°58'3E) leads generally N for about 8 cables into Løperen, passing (with positions relative to the light):

- 2 E of Vidgrunnen Light (lantern on post, 11 m in height) (8 cables SSW), which stands on a rock with a depth of 2 m or less over it, thence:

E of an 11 m patch (6 cables SSW) which lies on the W edge of the white sector, and:

- 3 W of Galtene (7 cables SSE), a group of above and below-water rocks which lie close off Rødshuet (6.58); they are marked at their S end by an iron perch. Thence:

W of Kvernskjær (3 cables SSE), an islet in the middle of the entrance that is foul to the S and E, thence:

- 4 E of Fugleskjær (2 cables SSW), a rock near the E edge of a spit extending 2 cables SSE from Fugletangen, the SW extremity of Asmaløy. Fugletangskær Light (lantern on tripod, 6 m in height) is exhibited from the rock.

- 5 **Clearing bearing.** The line of bearing, 008°, of the W extremity of Brattholmene (2 miles NNE) (6.62), open E of Fugletangen, clears close E of Vidgrunnen.

6.60

- 1 When within 2 cables of Kvernskjærgrunnen Light the track is altered to pass W of the light-structure which stands on the W side of a shoal with a least charted depth of 2.6 m over it.

Løperen southern part**6.61**

- 1 When clear of Kvernskjærgrunnen Light, a white sector (357½°–359½°) of Lubbegrunnen Light (column, 18 m in height) (59°04'N 10°58'E) leads N for about 7 cables into a white sector (171½°–174°), astern, of Kvernskjærgrunnen Light, which continues generally N for a farther 1¼ miles, passing (with positions relative to Lubbegrunnen Light):

- 2 W of Hestrompa (1¼ miles SSE), a rock awash marked on its SW side by an iron perch, and: E of Håbutangen Light (lantern on metal column, 7 m in height) (1¼ miles S) exhibited from the E coast of Asmaløy, thence:

- 3 W of Kråka (8 cables SSE), a small islet near the middle of the channel, and of the rocks awash which extend 2 cables N and 1½ cables S from the islet, both of which are marked by an iron perch, thence:

- 4 Between Lubbegrunnen, a shoal with a least depth of 6 m over it, on which stands Lubbegrunnen Light; and Døvikpynten Light (white lantern, 3 m in height) (2 cables W) which stands on the E coast of Asmaløy.

Løperen central part**6.62**

- 1 From a position midway between Døvikpynten and Lubbegrunnen Lights, a white sector (011°–014°) of Løperungen Light (white lantern, 3 m in height) (59°05'2N 10°58'5E) leads NNE for about 1 mile, passing (with positions relative to the light):

WNW of the reef extending 1 cable W from Kirkeskjær (1 mile S), the W extremity of which is marked by a spar buoy (starboard hand), thence:

- 2 Very close ESE of Kuskjærbåen (7 cables SSW), an above-water rock, the S extremity of which is marked by a spar buoy (port hand) and on which stands Kuskær Light (lantern on post, 5 m in height). A white sector (191°–197°), astern, of Lubbegrunnen Light (1¼ miles SSW) (6.61), passes Kuskjærbåen with a wider margin. And:
- 3 WNW of Brattholmene (7 cables S), on the NW side of which Brattholmen Light (white lantern, 3 m in height) is exhibited, thence:
ESE of Løperhuet Light (white lantern, 3 m in height) (3½ cables SSW), exhibited from the E side of Løperhuet, an islet close off the NE end of Asmaløy.

6.63

- 1 From a position E of Løperhuet Light the track leads generally N for about 6 cables, passing (with positions relative to Løperungen Light):
E of the NE side of Løperhuet, on which stands a beacon distinguished by a white mark on a hillock (1½ cables WNW), and:
- 2 W of Løperungen, an islet on which stands Løperungen Light. Løperungbåen, also marked by a light (lantern on column, 8 m in height), lies 1 cable N of the islet.

Løperen northern part

6.64

- 1 When clear, a white sector (183°–187°), astern, of Løperhuet Light (6.62) leads N for 4 cables into a white sector (169°–180°) of Løperungen Light (6.62) which, astern, leads onto the alignment (176°) of Løperungen Light with Brattholmen Light, 7 cables S (6.62). This alignment, astern, leads N for about 8 cables, passing (with positions relative to Vestre Fugleskjærgrunnen Light (59°06'8N 10°58'3E)):
- 2 W of Søre Møkkalassgrunnen (1¼ miles S), a rock marked by a spar buoy (starboard hand) and of a rock, 1½ cables S, marked by a light-buoy (isolated danger), thence:
E of Mørengrunnen (1 mile S), a rock awash which is marked by an iron perch, thence:
- 3 W of Møkkalassa (9 cables SSE), the S of two above-water rocks which is marked by a beacon tower (black) near its E side and by an iron perch on its SW side. The N rock is marked on its W side by a spar buoy (starboard hand) (6 cables S). Thence:
- 4 E of Tjeldholmgrunnen Light (column, 15 m in height) (5 cables S) which stands off the NE side of a shoal extending 2 cables E from Tjeldholmen. Rocks lie up to 1 cable S of the light.

6.65

- 1 After passing Tjeldholmgrunnen Light the track continues N but lies W of the leading line (above) so as to pass (with positions relative to Tjeldholmgrunnen Light):
W of Søre Fugleskjærgrunnen (3½ cables NNE), which has a depth of 5.0 m over it and is marked at its S end by a spar buoy (starboard hand), thence:
- 2 W of Vestre Fugleskjærgrunnen (5 cables NNE); a light (column, 16 m in height) is exhibited from near the SW end of Vestre Fugleskjærgrunnen. This rock lies 3½ cables W of Fugleskjæra, a pair

of islets situated at the W end of the channel connecting Singlefjorden with Østerelva, as given at 6.142.

6.66

- 1 After passing Vestre Fugleskjærgrunnen Light the track once more rejoins the leading line (176°) astern, as given at 6.64, passing (with positions relative to Belgen Light (59°08'N 10°58'E)):
W of Fugleskjærgrunnen (1 mile SE), which has depths of 2 m or less over it and is marked at its S and N ends by spar buoys (S cardinal and N cardinal respectively), thence:
- 2 E of Risholmrunnen (8 cables S), a rock awash marked by an iron perch, thence:
Close E of Belgebåen (5 cables S), which is marked on its E side by a spar buoy (port hand), and:
W of Alfegrunnen (1 mile SE), which is marked at its S and N ends by spar buoys (S cardinal and N cardinal respectively), thence:
- 3 W of the rock, with a depth of 2.5 m over it, which lies 1¼ cables SW of Store Fritt (5 cables ENE) and is marked by a spar buoy (starboard hand), and:
E of Belgen, an islet in the middle of the entrance to Østerelva, from which Belgen Light (white lantern, concrete base, 4 m in height) is exhibited.
- 4 **Useful marks:**
Ramsøy W-side Light (white lantern on concrete column, 3 m in height) (1¼ miles SE).
Beacon (black with white band), standing on Børresen (1½ miles ESE).

Østerelva southern part

6.67

- 1 When Kalkegrunnen Light (59°08'6N 10°58'1E) is distant 2½ cables, the middle of the white sector (340°–344¼°) of Flyndregrunnen Light (lantern on column, 15 m in height) (59°09'4N 10°57'4E) leads NNW for about 9 cables, passing (with positions relative to Kalkegrunnen Light):
- 2 ENE of a 6 m shoal (3 cables SSW), thence:
WSW of Kalkegrunnen, a rock on which stands Kalkegrunnen Light (lantern on post, 5 m in height), thence:
- 3 ENE of Kjøkøygrunnen (6 cables NW), a reef which extends 2½ cables N from Kjøkøya and is marked by a spar buoy (E cardinal) on its NE side and by two spar buoys (starboard hand) on its W side and N extremity.

6.68

- 1 When Flyndregrunnen Light is distant 2½ cables the alignment (352°) of Kallera Light (white lantern, 5 m in height) (59°11'N 10°57'E) with Kirketårnet Light (tower of Vestsidens Church, lantern on framework structure), 1¼ miles N, leads N for about 9 cables to the S entrance to Røsvikrenna, passing (with positions relative to Flyndregrunnen Light):
- 2 E of Flyndregrunnen, a shoal lying in mid-channel which is marked at its S end by a spar buoy (port hand) and at the N end of which stands Flyndregrunnen Light, and:
- 3 W of a shallow bank extending 3 cables W from Grøtholmen (5 cables ESE) which is marked on its W edge by a spar buoy (starboard hand).
The track then leads between spar buoys (port hand and starboard hand) (about 3 cables N), marking the edges of the channel, to the beginning of the Vaterland leading line.

4 **Useful mark:**

A beacon (3½ cables NNW) consisting of a white mark on a hillside on the E side of Kråkerøy.

Røsvikrenna**6.69**1 **Vaterland Leading Lights:**

Front light (lantern on post) (59°11'1N 10°57'2E), exhibited from the SW corner of Ørakaien.

Rear light (white tower with stripe) (440 m N of front light).

2 The alignment (355½°) of these lights leads N through Røsvikrenna, a narrow channel marked by spar buoys (lateral), passing W of Søre Tuppegrunn, which is marked by a light (lantern on post, 11 m in height) (59°10'0N 10°57'4E), to a position close E of Kallera Light (59°11'N 10°57'E) (6.68).

3 The track then leads N, NNE and NE, as required for berthing in Fredrikstad (6.78), keeping in the deepest part of the channel past Vaterland.

(Directions for Sarpsborg continue at 6.121)

Secondary channels in the approach from south

Chart 3160

Asmalsundet**6.70**

1 **Description.** Asmalsundet (59°05'N 10°56'E), a narrow channel between Asmaløy (6.52) and Spjørøy (6.52), which is shallow and fairly foul at both ends, is also crossed by a bridge near the centre. Local knowledge is required.

Controlling depth. There is a least depth of 3.9 m at the S end.

Vertical clearance. There is a vertical clearance of 10 m under the bridge; for further information see 1.9.

Skjelsbusundet**6.71**

1 Skjelsbusundet (59°05'N 10°54'E), a very narrow channel between Spjørøy (6.52) and Vesterøy (6.34), is foul in its S and N approaches and is crossed by a bridge near its N end and by two overhead cables. The sound itself presents no navigational difficulties and is reported to be suitable for vessels with a draught of 4.3 m and vertical clearance of less than 17 m. Local knowledge is essential.

2 From the N end of this channel Østerelva can be reached through Kjøkøysundet (59°08'6N 10°56'6E), on the SE side of Kråkerøy, passing under a bridge with a vertical clearance (1.9) of 10 m. This channel can also be approached from Lera (59°09'N 10°52'E) by a narrow and tortuous channel (59°08'N 10°55'E) which is suitable for vessels with a draught of 5.5 m and a vertical clearance of 28 m. Local knowledge is essential.

Anchorage**Quarantine****6.72**

1 The quarantine anchorage for Fredrikstad and Sarpsborg is at Frittflaket, 6 cables SE of Belgen Light (59°08'N 10°58'E). This is a safe anchorage for medium-sized vessels and is clear of submarine cables and pipelines.

Caution when anchoring**6.73**

1 When anchoring in the S approach to Fredrikstad mariners must avoid the many submarine cables (1.69)

which cross the main channels and extend to islands and navigation lights, as shown on the chart. Pipelines (1.69) are also laid along the full length of some inner channels such as Asmalsundet (59°05'N 10°56'E) (6.70) and Skjelsbusundet (59°05'N 10°54'E) (6.71).

Minor harbours**Vikerhavn****6.74**

1 Vikerhavn (59°02'2N 10°57'0E) is a fishing port on the SE side of Asmaløy which, although exposed to winds from the S and E, affords good shelter, protected by two moles. It has depths of 5 m in the entrance which reduces to 3 m within the harbour. The visitors quay, which is on the inside of the S mole, has a length of 80 m with depths of 4 m alongside.

Skipstadhavn**6.75**

1 Skipstadhavn (59°03'7N 10°57'5E), a former ferry port on the E side of Asmaløy, has a berth with a length of 49 m and depths from 5.1 to 6.3 m alongside. There are several other smaller berths and a restricted harbour for small craft.

Korshavn**6.76**

1 Korshavn (59°04'4N 10°59'7E), a former ferry port on the W side of Kirkøy, has a berth with a length of 48 m and depths from 4.4 to 7.6 m alongside.

Utgårdskilen**6.77**

1 Utgårdskilen (59°04'6N 10°52'3E), a fishing port in an inlet on the S side of Vesterøy, provides good shelter, protected by two moles. There are depths of over 3 m through the entrance and within an inner dredged channel.

The approach is narrow but well lit and ice is seldom a problem as the way is usually kept open by the regular passage of fishing vessels.

2 Anchorage is available within the harbour with good holding in sand and clay; and quays extend along both sides with depths of over 3 m alongside the major berths.

An inner harbour for small craft has a number of berths at the head of the inlet.

FREDRIKSTAD**General information**

Charts 879, plan of Fredrikstad and Sarpsborg, 3160

Position**6.78**

1 Fredrikstad stands on both banks of the river Glåma where it bifurcates at Isegran (59°12'N 10°57'E), 6 miles below Sarpsborg.

The modern part of the town and the business area lie on the W side of the river.

Function**6.79**

1 Fredrikstad is an important industrial town with a population of 51 550 in 1997 and number of processing plants handling fat, oil, plastics and porcelain. The harbour area, which forms part of Borg Harbour (6.29), sustains a thriving shipping industry with good communications, both domestic and foreign.

Harbour limits**6.80**

- 1 Harbour limits for Fredrikstad, as shown on the plan, are as follows:

S limit in Østerelva, by a line extending NE across the channel from Alshus (59°10'N 10°57'E).

S limit in Vesterelva, by a line extending E and W from Tenskjær (59°10'2N 10°53'2E).

N limit in Vesterelva in the vicinity of 59°13'3N 10°54'9E.

Approach and entry**6.81**

- 1 The main approach to Fredrikstad and Sarpsborg from S is through Løperen (59°04'N 10°58'E), with entry through Østerelva (59°10'N 10°57'E) (6.51).

The main approach from W is through Lera (59°09'N 10°52'E) (6.33), with entry through Vesterelva (59°11'N 10°53'E).

Traffic**6.82**

- 1 Traffic for Borg Harbour is given at 6.30.

Port Authority**6.83**

- 1 The Port Authority for Borg Harbour is given at 6.31. In Fredrikstad the Port Captain's office is located in position 59°11'1N 10°57'5E, on the E side of Østerelva, at the S end of Ørakaiaen.

Limiting conditions**Controlling depths****6.84**

- 1 Depths in the approach from south, through Østerelva, are given at 6.53; and in the approach from W, through Vesterelva, at 6.35.

Caution. Depths may change from those charted due to siltation from the river.

Vertical clearance**6.85**

- 1 Vertical clearance (see 1.9) under the high bridge across Glåma (59°12'6N 10°57'6E) (6.86) is 39.5 m above MSL under the green signal lights and 40 m under the centre of the bridge.

Bridges**6.86**

- 1 A **high bridge** spans the main river, 5½ cables NE of Isegran. It is marked by four green lights, two on each side, which indicate the fairway under the bridge; the distance between the pairs of lights is about 60 m.
- 2 **Kråkerøy Bridge**, 3 cables NNW of Isegran, is a two-armed bascule bridge with a vertical clearance of 9 m when closed but no restriction when lifted. The navigable width under this bridge is 46.5 m.
- 3 This bridge has four red limiting lights, two on each side, which are mounted on the machine houses, about 50 cm from the outer edge. They also indicate a submarine cable area (1.69). Opening regulations are given at 6.97.

Deepest and longest berths**6.87**

- 1 The deepest and longest berths in Frederikstad are alongside Ørakaiaen (6.103).

Water levels**6.88**

- 1 Mean spring range is about 30 cm and mean neap range is about 15 cm. HW and LW occur at about the same time as Nevlunghavn, as given in *Admiralty Tide Tables Volume 2*. However, meteorological conditions (1.187) and the water level in the river Glåma are dominant features in determining water levels. During persistent W winds in the Skagerrak water piles up in the Glåma and occasionally floods the quays.

Density of water**6.89**

- 1 The water is brackish and close to being fresh.

Maximum size of vessel handled**6.90**

- 1 Largest vessel handled had a length overall of 200 m, width of 28 m and draught of 10.35 m.

Ice**6.91**

- 1 When necessary the harbours are kept open by icebreakers, making navigation possible all year round except under extraordinary conditions.

Local weather**6.92**

- 1 For flood conditions see 6.116.

Arrival information**Port radio****6.93**

- 1 There is a port radio station at Fredrikstad which is manned by Borg Port Control during working hours. For further information see *Admiralty List of Radio Signals Volume 6 (2)*.

Anchorage**6.94**

- 1 **Approach from south.** Off Fuglevik (59°11'8N 10°56'7E) in Østerelva.
- Approach from west.** Off Huthholmen (59°12'3N 10°54'1E) in Vesterelva.

Pilotage**6.95**

- 1 See 6.36 and 6.55.

Tugs**6.96**

- 1 Small tugs are available at all times and will meet vessels off Belgen Light when required. Larger tugs can be arranged.

Regulations concerning entry**6.97**

- 1 **Speed.** Slow speed is obligatory within the harbour district. It is reported that the limit is 5 kn.
- Ferry berth.** When passing the ferry berth (59°12'4N 10°57'2E) (6.100) mariners must proceed at minimum speed, and, on approaching the berth, sound one long whistle blast, repeated just before the berth is reached.
- 2 **Junction of Østerelva and Vesterelva.** Mariners entering Østerelva from Vesterelva must keep to the starboard side of the fairway and comply with the *International Regulations for Preventing Collisions at Sea (1972)*. Breaches of these regulations will be reported to the police.

- 3 **Krårerøy Bridge** (59°12'5N 10°56'4E). Sound signals to request opening of the bridge should be made as follows:

Østerelva, approach from S, at Isegranbukta (close S of Isegran (59°12'2N 10°56'8E) repeated abeam of the mast on Isegran (see below), one long blast followed by one short blast.

- 4 Østerelva, approach from N, at Jernbanebrygga (under the high bridge), 5½ cables NE of Isegran, repeated before passing the signal mast on Isegran, one long blast followed by one short blast.

Vesterelva, to be made in plenty of time before the required opening, one long blast followed by two short blasts.

- 5 Bridge control signals, which are displayed from a mast on the E side of the bridge and another on the E side of Isegran, indicate the following:

Red light. Bridge closed.

Yellow light. Sound signal received and bridge clear to be opened.

- 6 Green light. Bridge open, clear to proceed.
Two red lights vertically disposed. Emergency closure.

This signal will be accompanied by a series of short blasts (at least 5) from the bridge.

Regulations:

- 7 All mariners wishing to pass the bridge are required to sail at the least possible speed and pay careful attention to the statutory light and sound signals when navigating in the shipping channel.

Mariners approaching with the current have navigational priority and also priority for requests to pass the bridge.

Quarantine

6.98

- 1 **Approach from south.** The anchorage is at Frittflaket, (59°07'8N 10°58'8E) (6.72).

Approach from west. The anchorage is at Lera (59°10'N 10°52'E) (6.48).

Harbour

General layout

6.99

- 1 Fredrikstad has a harbour in two parts with berths along the banks of the Glåma (6.121), a river which divides into two outlets called Østerelva (East River) and Vesterelva (West River) at the NE end of Isegran (59°12'2N 10°56'8E).

Hazards

6.100

- 1 Hazards in Østerelva are given at 6.54. Ferry crossings of the Glåma, as shown on the plan, are as follows:
2 cables above Isegran.
2 miles above Isegran.
- 2 Regulations for passing the ferry crossings are given at 6.97.

Measured distance

6.101

- 1 There is a measured distance in Skjebergkilen (59°09'N 11°09'E) (6.132).

Local weather

6.102

- 1 Winds blow mainly from between S and W in summer; N to SE in winter.

Basins and berths

Alongside berths

6.103

- 1 **Østerelva.** The largest berth in this part of the harbour is Ørakaen (59°11'5N 10°57'3E), with depths from 9.8 to 10.6 m alongside Ørakaen South, with a length of 88 m; and depths from 8.4 to 10 m alongside Ørakaen North, with a length of 780 m. Ørakaen South has a Ro-Ro ramp at its S end with a width of 29 m and depths from 9.5 to 11.2 m. Ørakaen North handles containers.

A tanker terminal is situated on Denofa-Lilleborg Quay which is immediately N of Ørakaen North.

- 2 **Vesterelva.** The largest berth in this part of the harbour lies along the N side of the large basin at Hølen (59°12'7N 10°55'0E) with depths from 4.1 to 6.0 m along a length of 375 m.

A tanker terminal has two installations at Krossnes (59°12'N 10°54'E).

- 3 **Other berths.** There are a total of six public quays and 42 other berths, excluding facilities for small craft.

Port services

Repairs

6.104

- 1 The harbour has two slipways suitable for vessels of up to 20 m in length and 2.5 m draught, and facilities for extensive repairs to small craft.

A dry dock used for shipbuilding has length 287 m, breadth 39.2 m, and can accommodate vessels of up to 130 000 dwt.

Other facilities

6.105

- 1 Compass adjustment can be carried out; Deratting Exemption Certificates issued; hospital and clinic available in the town; oily waste reception facilities available using tanker trucks and barrel.

Supplies

6.106

- 1 Various grades of fuel available from barge or pipeline at Ørakaen Oil Terminal; water available alongside most quays or from barge; provisions and stores, including charts, can be obtained.

SARPSBORG AND APPROACH FROM SOUTH

General information

Chart 879 plan of Fredrikstad and Sarpsborg

Position

6.107

- 1 Sarpsborg (59°16'N 11°06'E) is situated about 6 miles NE of the centre of Fredrikstad. The harbour area is at Sandesund on the N bank of the Glåma, close E of a sharp bend in the river.

Function

6.108

- 1 Sarpsborg, an important industrial town with a population of 39 747 (1997), is the centre of a large

agricultural district. The harbour area, which forms part of Borg Harbour (6.29), in conjunction with several other industrial complexes along the Glåma, supports many factories producing processed goods such as paper, ferro-silicon and electrical equipment. Exports include cargo in transit from Sweden.

Approach and entry

6.109

- 1 Sarpsborg is approached through Fredrikstad and entered through the Glåma.

Traffic

6.110

- 1 Traffic for Borg Harbour is given at 6.30.

Port Authority

6.111

- 1 The Port Authority for Borg Harbour is given at 6.31. Sandesund Harbour Office is situated at Tolbod Brygga, close W of the high bridge crossing the Glåma.

Limiting conditions

Controlling depths

6.112

- 1 For the continuation beyond Fredrikstad the limitations are as follows:
 - To berths at Greåker, 2 miles WSW of Sarpsborg, a maximum draught of 8.2 m.
 - Berths at Alvim, on the W side of Sarpsborg, can be reached by vessels with a draught of 6.4 m.
- 2 Berths at Melløs, within the harbour area of Sandesund, can be reached by vessels with a draught of 6.1 m.

Vertical clearance

6.113

- 1 The vertical clearance (1.9) is 30 m under the bridge at Hustangen (59°16'2N 11°05'8E), which spans the river close W of Sandesund).

Deepest and longest berth

6.114

- 1 The deepest and longest berth is Alvimkaien (59°16'1N 11°05'0E) (6.124).

Natural conditions

6.115

- 1 **Water levels:** See 6.88.
Density of water: See 6.89.
Ice. See 6.91.

Current

6.116

- 1 Generally the current does not affect navigation but in flood conditions it can be troublesome in Glåma in the approaches to Sandesund. Tugs must then be used and, during the strongest flood, Alvim Quay, 6 cables W, is the recommended limit.

Arrival information

Port radio

6.117

- 1 Sarpsborg is included under Borg Port Control (6.93).

Pilots

6.118

- 1 See 6.36 and 6.55.

Tugs

6.119

- 1 For general use see 6.96. In addition a small harbour tug is available in Sandesund.

Quarantine

6.120

- 1 Quarantine anchorage areas are listed at 6.98.

Directions

(continued from 6.69)

General remarks

6.121

- 1 Glåma, the river connecting Fredrikstad with Sarpsborg, is dredged, well marked and navigable right up to Melløs, on the E side of Sandesund, within the limits given at 6.112. The banks of the river are generally steep-to and lined in places by the wharves and quays of the many factories built along both sides where loading and discharge is mostly via lighters and barges.

Fredrikstad to Sarpsborg

6.122

- 1 **Caution.** Eddies occur along the shores of the Glåma so that the current along the quays in Sandesund (59°16'N 11°06'E) sets SE.
Track. There are no specific directions but the following lights are of particular significance:
 - 2 Visterflo Light (lantern on column) (59°15'7N 11°01'5E) which marks the mouth of the river Vister and, with Renudtangen Light (lantern on post), 1 cable S, marks the first significant bend in the river above Fredrikstad.
 - 3 Helleskjæret Light (lantern on post) (59°16'0N 11°04'2E) marks the end of the 10 m depth contour in the fairway and the start of wide shallow banks extending from both sides of the river and continuing along the S side for about 5 cables and up to 1 cable from the shore. This side is marked by Kjelsegrunnen Light (lantern on column), 1 cable ESE of Helleskjæret Light.

Anchorage and berths

Anchorage

6.123

- 1 Vessels can be anchored almost anywhere in the river, clear of several submarine cables and pipelines (1.69) which are laid across the lower part of the river.
If awaiting a Pilot or allocation of berth vessels should be anchored off Vestenodden (59°16'N 11°04'E).

Alongside berths

6.124

- 1 **Greåker.** The berth at Greåker (59°15'8N 11°02'2E) can accommodate vessels with a draught of up to 8.2 m.
Alvim. Alvimkaien (59°16'1N 11°05'0E) has a total length of 467 m. The lower part (Nedre Alvimkai) with a length of 144 m, has depths from 7.1 to 8.5 m alongside. A Ro-Ro ramp at its W end, with a width of 20 m, can handle vessels of 6000 grt. The upper part (Øvre Alvimkai) with a length of 323 m, and depths from 6.4 to 8.9 m alongside, is fitted for handling bulk grain.
- 2 **Sandesund.** The quay at Melløs (59°16'2N 11°06'0E) has a straight length of 280 m and depths from 6.2 to 7.3 m alongside.
There are a further 25 commercial quays and one other Ro-Ro terminal which is situated on the E bank in position 59°15'3N 11°01'2E.

Port services

Repairs

6.125

- 1 Deck and engine repairs can be carried out.

Other facilities

6.126

- 1 Deratting Exemption Certificates issued; hospital and

clinic in town; oily waste reception facilities available for small quantities.

Supplies

6.127

- 1 Fuel is available from road tankers; fresh water can be obtained at Alvim Quay and also from a barge; provisions of all types and stores, including charts, are available.

HALDEN AND APPROACHES

GENERAL INFORMATION

Charts 3160, 3161

Area covered

6.128

- 1 This section covers Halden (59°07'N 11°23'E) and its approaches through Sekken and Ringdalsfjorden. It is arranged as follows:
Skekken and Singlefjorden (6.129).
Halden and inner approaches (6.147).

SEKKEN AND SINGLEFJORDEN

General information

Charts 3160, 3161

Route

6.129

- 1 **Sekken**, named Säckén in Swedish, entered SE of Herføl (59°00'N 11°03'E), extends 7 miles NNE between Søndre Sandøy and Nordre Sandøy, to the W, and the mainland E, to Singlefjorden at its N end. This channel is reasonably straight and almost free from dangers.
- 2 **Singlefjorden** (59°06'N 11°10'E), which continues N to include Skjebergkilen (59°10'N 11°10'E), is quite deep in mid-channel but foul on both sides.

Topography

6.130

- 1 **Mainland hills.** Halle–Vagnaren (59°02'N 11°09'E) (6.134) is the summit of a ridge close within the E shore of Sekken. Björnerödpyggen, a hill 8 miles E, has a gradual slope on its N and S sides and is visible from seaward. Dragonkullen (59°06'N 11°18'E) is a hill on the S side of Ringdalsfjorden (6.170), and Hjelmekollen, 8 cables WNW, is a lower hill on the N side of the fjord.
- 2 **Kirkøy** (59°03'N 11°02'E), which is part of the Hvaler Group (6.5) and generally low, attains an elevation of 69 m NNW of the island's centre.

International boundary

6.131

- 1 The international boundary between Norway and Sweden passes through the centreline of Sekken, as shown on the chart. This boundary is marked at various places on the shore by beacons, which are not intended for navigational use.

Measured distance

6.132

- 1 In Skjebergkilen, between Ørnekuppa (59°08'·8N 11°09'·4E) and Kjerringholmen, 2 miles N, there is a measured distance in two sections, the limits of which are

marked by two beacons (white posts with triangular topmarks).

- 2 South limit marks on Ørnekuppa.
Middle marks on Stortangen, 1 mile N.
North limit marks on Kjerringholmen.
Distance: each section 1852 m.
Running track: 007° — 187°.

Natural conditions

6.133

- 1 **Flow** in Sekken and in Singlefjorden is usually out-going, but never strong enough to cause problems.
Ice obstructs the channel in winter but the fairway is kept open by ice breakers. See 1.198 and *Admiralty List of Radio Signals Volume 6 (2)* for details.
Local weather. Winds from the SW usually set up an awkward, choppy sea in Singlefjorden.

Directions

(continued from 6.27)

Principal marks

6.134

Landmarks:

- 1 Botneveten (59°04'N 11°03'E), a wooded hill which is one of the highest points on Kirkøy.
Halle–Vagnaren (59°02'N 11°09'E), a gentle hill on the Swedish side of Sekken, which can be seen from the E side of Oslofjorden.

Sekken — southern part

6.135

- 1 From a position 6 cables NNW of Nord–Hällsö (58°58'N 11°05'E) (6.27), NE of the pilot boarding area (6.17), the line of bearing, 035°, of Halle–Vagnaren leads NE in mid-channel for 2½ miles. For the first 1¼ miles this track lies within a white sector (018°–028°) of Reiertangen Light (white lantern, 3 m in height) (59°01'N 11°07'E), passing (with positions relative to the light):
2 SE of Sekkefluene (2½ miles SW), a group of rocks on which stands Sekkefluene Light (lantern on tripod, 9 m in height). This group lies 1½ cables S of Gylteholmen, an islet off the SE coast of Herføl (6.27), on which stands a beacon tower (black and white stripes). Thence:
NW of Tjurholmsknappen (2½ miles S), a rock from which a light (white tower, 4 m in height) is exhibited, thence:
3 NW of the foul ground extending up to 1 cable from the W side and 2 cables from the N side of Tjurholmen (2 miles S), a small islet with two small white beacons at its NW end which, in line, indicate the international boundary (6.131). A white tower (disused lighthouse) stands at the NE end of the islet. A spar buoy (starboard hand),

1½ cables N of the islet, is moored E of the foul ground mentioned above. And:

- 4 SE of Fisbuskjæra (2 miles SW) on which stands a beacon-tower (black with white band). This beacon stands 2 cables SE of Glan, an islet in the S entrance of the channel between Herføl and Søndre Sandøy; a light (tripod, 6 m in height) is exhibited from Glan. Thence:

SE of the foul ground extending 1 cable SW and 1½ cables NE from Stuevikskjærne (1 mile SSW).

6.136

1 Clearing marks:

The alignment (061°) of the beacon tower and white patch on Ledsundberget (1¼ miles S) with the beacon tower on Bredberget, 1½ miles ENE, clears close SSE of Sekkefluene (6.135). These beacons also mark part of the international boundary (6.131).

2 Useful marks:

Beacon tower (58°59'·5N 11°03'·0E) standing on Linnekleppen (6.27).

Two beacons on the E side of Sekken (6½ cables SE and SSE). In line bearing 042° they indicate the international boundary.

Sekken — central part

6.137

- 1 From a position 3 cables SE of Reiertangen Light, the alignment (016°) of Haslauflu Light (cairn) (59°06'·5N 11°10'·2E) with Hykkelen Light, 1 mile NNE, leads NNE in mid-channel for about 1 mile, within a white sector (023°–026½°) of Kattholmen Light (white lantern) (59°04'N 11°09'E), passing over a submarine cable area (1.69) which covers the channel for much of this track.

2 Useful mark:

Kuskjær Light (tripod, 6 m in height) (59°01'·5N 11°06'·0E), exhibited from a rock close off the S shore of Gravningsundet which leads between Søndre Sandøy and Nordre Sandøy into Sekken.

Sekken — northern part

6.138

- 1 From a position 8½ cables NNE of Reiertangen Light, a white sector (209½°–212¼°) of this light, astern, leads NNE for about 3½ miles to the W entrance to Svinesund, keeping near to the Swedish coast which is steep-to and free from dangers, passing (with positions relative to Kattholmen Light):

- 2 ESE of Rødskjær (1 mile SW), a low, grey-brown islet which lies near the middle of the channel; a reef which extends 1½ cables N is marked at its NW end by an iron perch. Thence:

- 3 ESE of Kattholmen, an islet in the channel, on the SE extremity of which stands Kattholmen Light. Detached dangers which lie on a bank extending 5 cables N and NNE from the islet include Lofot, the N of two small above-water rocks.

(Directions continue for Halden at 6.169)

Singlefjorden

6.139

- 1 When clear of Kattholmen, the track through Singlefjorden leads NNW for about 1½ miles, then generally N in mid-channel for about 6 miles, passing (with positions relative to Haslauflu (59°06'·5N 11°10'·2E)):

ENE of Lofot (2½ miles SSW) (6.138), thence:

- 2 ENE of Bjørneskjær (2 miles SW), a small islet on which stands a beacon-tower (black). A rock awash close NE is marked by an iron beacon. Thence:

E of Singløykvalven (1 mile SW), thence:

- 3 W of Jongsgrunnen (4 cables SSW), thence:

W of Haslau, an islet 1½ cables N of the rock from which Haslauflu Light (6.137) is exhibited, thence:

E of Lilleknubben (1¾ miles NNW) which is marked by an iron perch.

4 Useful marks:

Terneskjæra Light (tripod, 6 m in height) (2½ miles WSW) which stands on a rock.

Lauvskjær Light (tripod, 6 m in height) (2 miles W).

Hykkelen Light (1 mile NNE).

Side channels

Principal marks

6.140

1 Landmarks:

Botneveten (59°04'N 11°03'E) (6.134).

Halle-Vagnaren (59°02'N 11°09'E) (6.134).

Approach to Sekken from SSW

6.141

- 1 Approach to Sekken from SSW can also be made through Sandholmene (59°02'N 11°05'E), the channel separating Søndre Sandøy and Nordre Sandøy from Kirkøy, 7 cables NW. This channel can be entered at its S end through Angretrenna (59°00'N 11°01'E) or from the W through Lauersvelgen (59°01'N 11°01'E).

- 2 However, Sandholmene and both of its entrances are encumbered with islets and rocks, not all of which are marked, making this channel suitable only for small vessels. Local knowledge is required; directions are not given for this channel.

Singlefjorden to Østerelva

6.142

- 1 Singlefjorden is connected to the S end of Østerelva (59°08'N 10°58'E) (6.51) by two channels which are separated by islets and rocks, to the N of Kirkøy. Both channels are entered S of Singløy (59°06'N 11°08'E) and are well marked; however, they are suitable only for small vessels. Directions are not given for these channels as the main approach to Østerelva is through Løperen (59°03'N 10°58'E) (6.51).

- 2 Local knowledge is required.

Minor harbours

Herfølrenna

6.143

- 1 Herfølrenna (59°00'·1N 11°03'·4E), a small harbour on the E side of Herføl, contains a ferry berth, a public quay with depths from 3·5 to 3·8 m alongside, and a marina with four quays.

Approach can be made from N or S through a marked channel which is dredged to at least 4 m, in which the current usually sets S.

- 2 **Directions from south.** From Sekken the usual entrance is between Hollendergrunnen (58°59'·4N 11°04'·0E), marked on its E side by a spar buoy (port hand), and Fisbuskjæra (6.135), 2 cables NE.

The track then leads NNW, passing WSW of Glan, 3 cables N of Hollendergrunnen and thence N in the marked channel.

3 **Useful mark:**

Herføllrenna Light (lantern on post, 7 m in height)
close NE of the harbour.

6.144

- 1 **Anchorage**, with restricted swinging room, is available in several places in Herføllrenna, in depths from 4 to 6 m, over a bottom of mud, with good shelter in most weather conditions. Keep clear of a submarine pipeline (1.69) which enters the port from N, and the submarine cables which cross the N part of the area.

- 2 Anchorage, which is less restricted, is available in Herføllflaket, to the N of Glan Light, in depths from 7 to 10 m, over a bottom of mud, sand and clay.

Skjærhalden**6.145**

- 1 **Description.** Skjærhalden (59°01'4N 11°02'3E) with a population of about 450 (1992), supports a small harbour on the SE side of Kirkøy. Approach can be made from S or E but local knowledge is required.

Berths. The harbour has a ferry berth with depths from 3.6 to 4.3 m alongside and seven other quays suitable for small craft.

- 2 **Rescue.** A lifeboat (6.19) is based in the harbour.

Skjeberg**6.146**

- 1 **Description.** Skjeberg (Høysand) (59°11'5N 11°11'0E) at the N end of Skjebergkilen lies within the Sarpsborg Harbour District (6.107). The Sarpsborg Harbour Authority has a 60 m quay in Skjeberg with depths from 3.4 to 5.5 m alongside. There is also one jetty, suitable for small craft only. Supporting facilities, including a crane, are available.

- 2 **Repairs.** Major repairs to small craft can be carried out at Valberg on the W side of the creek, opposite Skjeberg.

HALDEN AND INNER APPROACHES**General information**

Chart 3161

Position**6.147**

- 1 Halden (59°07'N 11°23'E) stands along both sides of the mouth of Tistedalselva, at the junction of Ringdalsfjorden and Iddefjorden.

Function**6.148**

- 1 Halden Havn, which is the central harbour for Southern Østfold, has good rail and shipping connections domestically and abroad and is an outlet for Swedish exports.

The town, with a population of about 20 694 (1997), contains considerable industry based on timber, chemicals and fertilisers.

Topography**6.149**

- 1 Svinesund (59°06'N 11°16'E) in the approach to Halden, has sides which slope steeply to the shore from hills which are wooded with scattered conifers.

Halden is built within gentle slopes on both sides of the river mouth with rocky outcrops visible close inland.

Port limits**6.150**

- 1 The harbour area includes all Norwegian waters in the following sounds: Svinesund (6.169) to the E of Sponvikskansen, its NW entrance point; Ringdalsfjorden (59°07'N 11°19'E) (6.170); and Iddefjorden (59°05'N 11°23'E) (6.178).

Approach and entry**6.151**

- 1 The outer approach route to Halden from S is through Sekken (59°00'N 11°06'E) (6.129). The inner approach is through Svinesund, Ringdalsfjorden and Iddefjorden.

International boundary**6.152**

- 1 The international boundary through Sekken is given at 6.131. Through the inner approach, it lies near the centre of the channel and fjords, except at Knivsøyholmen (59°07'N 11°20'E) (6.170), which is in Norwegian waters. This boundary is marked at various places by beacons, which are not intended for navigational use.

Traffic**6.153**

- 1 In 2004 the port was used by 315 vessels with a total of 1 449 162 dwt.

Port Authority**6.154**

- 1 **Address.** Halden Havnevesen, PO Box 184, Langbrygga 3, N-1750 Halden; with authority vested in the Harbour Master.

Email. post@haldenhavn.no.

Limiting conditions**Controlling depths****6.155**

- 1 The maximum safe draught in the approach to Halden is 7.6 m in Svinesund (6.169). The least depth in the approach to the Inner Harbour (6.166) is 6.6 m in Sauøysundet (59°06'7N 11°22'9E) (6.172).

Vertical clearances**6.156**

- 1 The following bridges span Svinesund and Tistedalselva: Between Bjällvarpet (59°05'6N 11°15'2E) and Rørbekk at the SW end of Svinesund; the bridge has a vertical clearance of 55 m.
Svinesundsbrua (59°06'N 11°16'E), spanning the E end of Svinesund. There is a vertical clearance of 58 m under the fairway indication lights, on both sides, and 60 m under the centre of the bridge.
- 2 The vertical clearance under the bridge crossing Tistedalselva (6.147), 1½ cables from its mouth, is 2.5 m.

For further information on vertical clearances see 1.9.

Deepest and longest berths**6.157**

- 1 The deepest and longest berth is at Ytre Mølbrygga (6.174).

Mean tidal and abnormal levels**6.158**

- 1 Mean spring range is about 30 cm but the effect of meteorological conditions is very noticeable, as given in 1.187. During prolonged W winds in the Skagerrak the water piles-up in Iddefjorden.

Maximum size of vessel handled**6.159**

- 1 Tankers of 20 000 dwt and other vessels of 170 m in length, 21 m in width and 7 m draught.

Ice**6.160**

- 1 There is often ice in Halden Havn during the winter but normally icebreakers are not required.

Arrival information**Port radio****6.161**

- 1 There is a port radio. VHF facilities for the coast radio service are located in Halden; for further information see *Admiralty List of Radio Signals Volume 1 (1)*.

Pilotage**6.162**

- 1 **Norwegian waters.** Pilotage is arranged through Horten Pilot Booking Centre, Oslofjorden, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*.

Pilots for Halden board SE of Herføl in position 58°58'2N 11°03'1E.

- 2 **Swedish waters.** General information on pilotage is given at 1.57. A Swedish pilot from Nord-Koster (7.14) will meet out-going vessels from Iddefjorden (6.178) in Svinesund (6.169) by arrangement.

Tugs**6.163**

- 1 The harbour contains one small tug; larger tugs can be arranged.

Regulations concerning entry**6.164**

- 1 General traffic regulations are given at 6.8. In Svinesund, from Sponvikskansen Light (59°05'N 11°13'E) to Svinesundsbrua, 1½ miles ENE, the speed limit is 7 kn.

Quarantine**6.165**

- 1 Anchorage area lies between Brattøya (59°07'N 11°22'E) and Kuskjær, 1¾ cables SE.

Harbour**General layout****6.166**

- 1 Halden Havn consists of an outer harbour, which lies between Brattøya and Sauøya, and an inner harbour, which lies between Sauøya and the mainland. There are depths from 13 to 18 m in the outer harbour and from 6 to 8 m in the inner harbour.

- 2 The N end of Sauøya is joined to the mainland by a short causeway.

Measured distance**6.167**

- 1 A measured distance is established in Skjebergkilen (59°10'N 11°10'E) as given at 6.132.

Flow**6.168**

- 1 In Svinesundet the flow changes with the tide, with the in-going flow beginning at LW and the out-going at HW. However this is also dependent on wind conditions and can

attain rates up to 3 kn in both directions, making navigation difficult.

In Iddefjorden there is little flow in the S part.

Directions for entering harbour

(continued from 6.138)

Approaches**6.169**

- 1 **Svinesund** (59°06'N 11°16'E) is a narrow channel which connects Sekken (6.129) with Ringdalsfjorden, 2½ miles ENE. The least depth in the sound is 8.5 m at Bjällvarpodden, 7 cables WSW of the bridge. Mooring rings and bolts along the length of the sound were formerly used for warping vessels.

- 2 From a position 1½ miles WSW of Sponvikskansen Light (column, 4 m in height) (59°05'3N 11°13'5E), with the light bearing 064° and just within the white sector (063¼°–091¼°) of the light, the line of bearing, 065°, of the white houses in the village of Svinesund (59°05'9N 11°16'2E), just open NNW of the S shore, leads ENE into the narrow entrance, passing (with positions relative to the light):

- 3 NNW of Hummerholmen (1 cable SSW), an islet on the S side of the entrance to Svinesund, thence: Between Sponvikskansen Light and Hummerholmgrunnen (½ cable S), which has a depth of 5.5 m over it and is marked on its NW side by a spar buoy (starboard hand).

- 4 The track then continues NE in mid-channel, passing (with positions relative to Sponvikskansen Light):

SE of Tangen (2 cables NE), thence:

SE of Mölodden Light (lantern on post, 5 m in height) (7½ cables NE), thence:

- 5 NW of Bjällvarp Light (white lantern on shed, floodlit) (8 cables NE), thence:

Under a bridge (8½ cables NE) spanning the channel between Otersteinane and Bjällvarpet. The bridge is marked by lights and Rørbekk Light (lantern on post, 5 m in height) is exhibited from the N shore close W of the bridge.

- 6 The track then leads generally ENE towards Svinesundsbrua. The fairway along the last 400 m towards Svinesundsbrua (6.156) is indicated by channel limiting lights (green to starboard, red to port), on both sides of the bridge and 50 m apart, for vessels approaching from both directions. Two spar buoys (port hand) mark the edge of a shoal which extends from the N shore, close W of the bridge.

- 7 ENE of the bridge the fairway continues in mid-channel and is marked by lights on the N shore at Blåsoppynnten (lantern on post, 5 m in height), 2½ cables ENE of the bridge, and at Kråkenebbet (lantern on post, 4 m in height), 6 cables ENE of the bridge.

6.170

- 1 **Ringdalsfjorden** (59°07'N 11°19'E) is a relatively clear channel which connects Svinesund with Iddefjorden, 1½ miles ENE. After passing Kråkenebbet Light, which marks the N side of the entrance to Ringdalsfjorden, a white sector (057°–065°) of Knivøyholmen Light (white lantern, 3 m in height) (59°06'7N 11°19'6E) leads ENE through the fjord, passing (with positions relative to the light):

- 2 SSE of an above-water rock (1 mile WSW), which lies 1 cable offshore to the ESE of Danmarks skjær, thence:

Over or NNW of a charted depth of 8 m (4½ cables WSW) on the edge of the coastal bank.

- 3 When clear, the track alters to pass between Knivsøyholmen Light, which is situated on the SE extremity of the S and largest islet of Knivsøyholmene, and Svarte Jan Light (lantern on white shed, floodlit), $\frac{1}{2}$ cable S, on the S shore of the fjord. A 5.5 m patch, marked by a spar buoy (starboard hand), lies 25 m NW of Svarte Jan Light.

Entrance channels

6.171

- 1 **To Halden Outer Harbour passing south of Brattøya.** When clear of the narrows, a white sector (253° – $259\frac{1}{2}^{\circ}$) astern of Knivsøyholmen Light (6.170) leads ENE for 5 cables into the N end of Iddefjorden (6.178).
- 2 When clear of the S shore, a white sector ($127\frac{1}{2}^{\circ}$ – $132\frac{1}{2}^{\circ}$) of Skysskafferen Light (white lantern, 3 m in height) ($59^{\circ}06'N$ $11^{\circ}23'E$) leads SE for about 1 mile, passing (with positions relative to the light):
- 3 SW of Brattøya (1 mile NNW), thence:
SW of Kuskjær (6 cables WNW), which is the larger of two islets, thence:
NE of a rock (5 cables WNW), with a depth of 7.4 m over it.
- 4 When clear of Kuskjær the track leads NE for about $2\frac{1}{2}$ cables, then N/NNW within a white sector ($165\frac{1}{4}^{\circ}$ – $170\frac{3}{4}^{\circ}$) of Skysskafferen Light, astern, passing between Kuskjær and the W side of Sauøya into the Outer Harbour.
- 5 **Useful mark:**
Hollenderen Light (lantern on post, 4 m in height) ($59^{\circ}07'1N$ $11^{\circ}21'7E$) exhibited from the N shore of a channel passing N of Brattøya.

Approach to Halden Inner Harbour

6.172

- 1 **Sauøysundet.** From a position $1\frac{1}{2}$ cables S of Sauøya, the alignment ($024\frac{1}{2}^{\circ}$) of leading lights (front on the W side of the roof of the Customs House; rear on the roof of the Police Station) leads through Sauøysundet between spar buoys (lateral).

Basins and berths

Anchorage and moorings

6.173

- 1 Both the outer and inner harbours afford good anchorage on mud, clear of the fairways.
The ENE side of Brattøya is fitted with mooring rings.

Alongside berths

6.174

- 1 **Outer harbour.** The largest berth is Ytre Mølbrygga, with a length of 264 m and depths alongside of 6.5 to 8.7 m. There are five other berths, including terminals for containers and kaolin.
- 2 **Inner harbour.** The largest berth is Indre Langbrygga, with a length of 124 m and depths alongside of 4.2 to

5.3 m, except at the NE end where there are depths of 1.5 m. There are six other berths.

- 3 **Sponvika** ($59^{\circ}05'6N$ $11^{\circ}13'6E$) is situated at the entrance to Svinesundet. This town, with a population of 600, is part of Halden. The harbour affords anchorage in depths from 17 to 28 m, over a bottom of mud, and has berths with depths from 2.0 to 2.9 m alongside. There are specialised facilities for fishing vessels, good repair facilities and a tug.

Port services

Repairs

6.175

- 1 Minor repairs can be carried out.

Other facilities

6.176

- 1 Deratting Exemption Certificates only can be issued; there are two hospitals in the town; oily waste reception facilities are not available; a salvage tug is stationed at Sponvika ($59^{\circ}05'6N$ $11^{\circ}13'6E$) (6.174).

Supplies

6.177

- 1 Fuel is available at Indre Langbrygga (6.174); at other berths fuel can be supplied from road tankers. Water can be supplied alongside on request to the fire brigade and provisions are available.

Iddefjorden

General information

6.178

- 1 **Description.** Iddefjorden ($59^{\circ}05'N$ $11^{\circ}23'E$), from its N entrance off Ringdalsfjorden, extends 9 miles SSE to its head which is shallow. This fjord was formerly used for the export of granite from a number of small ports but trade has decreased and now passes through Halden, in the NE corner.
- 2 The shores of the fjord are wooded and most of the bays are now heavily overgrown by weed. A submarine cable (1.69) is laid along the centre-line throughout its length.

Skriverøybukta

6.179

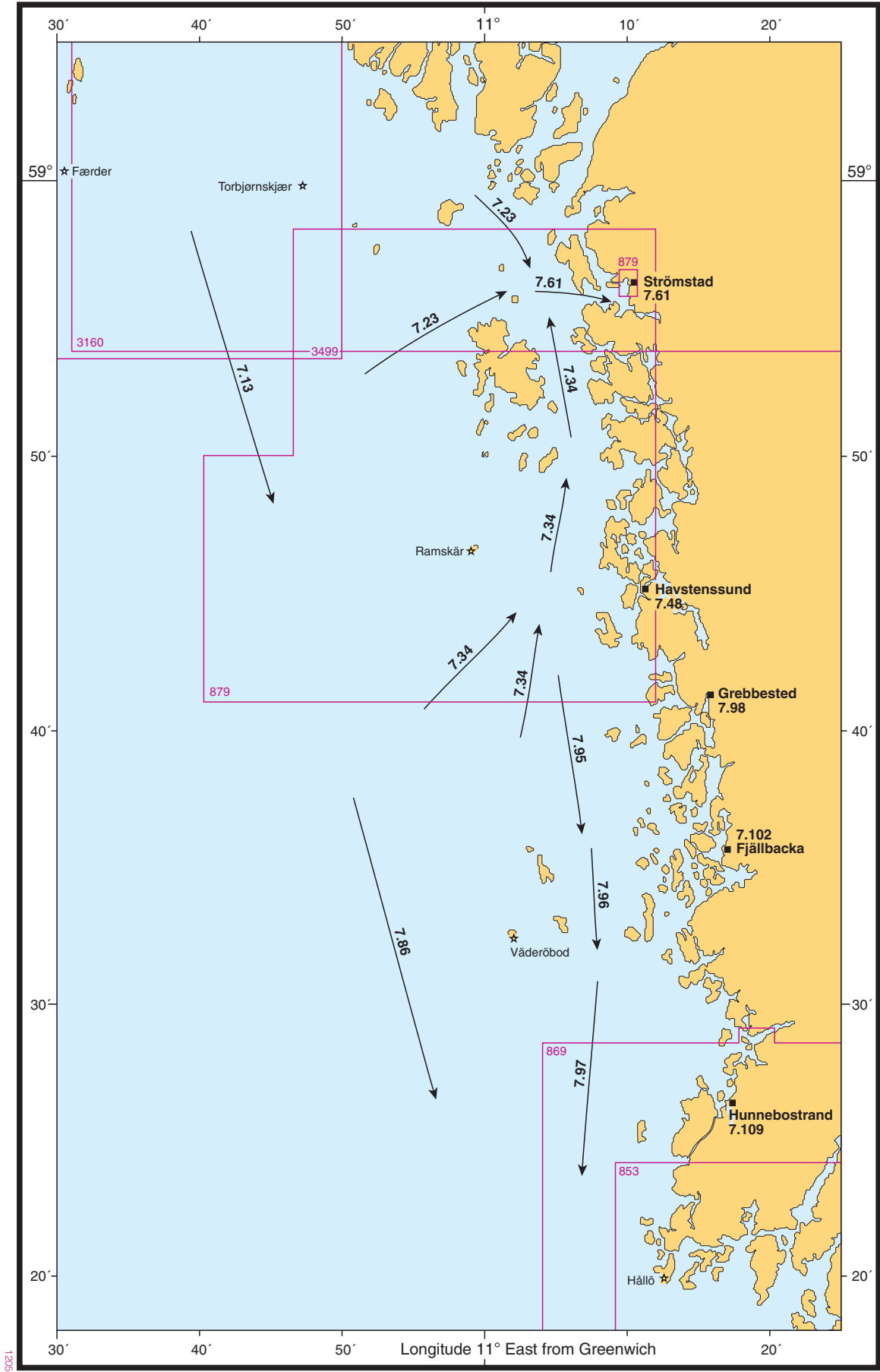
- 1 Skriverøybukta ($59^{\circ}03'4N$ $11^{\circ}25'0E$) contains a sand loading berth, with depths from 4.6 to 7 m alongside; in 1994 the berth was reported to be in a poor condition.

Ystehedkilen

6.180

- 1 Ystehedkilen ($59^{\circ}04'N$ $11^{\circ}26'E$) affords good anchorage in 10 to 15 m, over a bottom of mud. Strong winds from SW can be troublesome and this inlet is usually frozen for 3 months each winter.

Chapter 7 - Swedish coast from Oslofjorden to Hållö



CHAPTER 7

SWEDISH COAST FROM OSLOFJORDEN TO HÅLLÖ

GENERAL INFORMATION

Chart 1402

Scope of the chapter

7.1

- 1 This chapter covers the W coast of Sweden and offshore islands from the international boundary between Sweden and Norway, as given at 7.6, to Hållö (58°20'N 11°13'E), 39 miles S. The coastal waters include the area from the S end of Oslofjorden, 5½ miles NNW of the international boundary, to a position off Hållö Light.

- 2 Harbours include Strömstad (58°56'N 11°10'E) and a number of minor harbours as given at 7.12. The chapter is arranged as follows:

Oslofjorden to Ramskär with Strömstad and approaches (7.10).

Ramskär to Hållö (7.85).

Channel draught

7.2

- 1 Many channels within Swedish waters have an established channel draught. This is the largest draught a vessel can have when assisted by a Pilot and proceeding in the channel at mean sea level. These figures are the "aimed-for" values and do not hold any guarantee that a vessel with a draught lying near the channel draught can safely proceed in the channel under all conditions.

Coastal passage and route

7.3

- 1 **Coastal passage.** From the vicinity of 59°00'N 10°37'E, in the S entrance to Oslofjorden (5.1), the coastal passage leads SSE for 43 miles in deep water, as given at 7.13 and 7.86.

- 2 **Inner coastal route.** This route, which passes inside the outer skerries and shoals, leads generally S from the N end of Kosterfjorden (58°51'N 11°06'E) to Hållö, 35 miles S. The route is a continuation S of the inner coastal route from Oslofjorden to Nord-Hällsö, as given at 6.2. At its N end it also forms part of the approaches to Strömstad, as given at 7.11; thus directions through Kosterfjorden are given from S to N, against the direction of buoyage, for much of its length.

- 3 From the S end of Kosterfjorden the inner coastal route continues S, passing through Väderöfjorden (58°33'N 11°07'E) (7.86), with directions given from N to S. When clear of Väderöfjorden the track is adjusted to rejoin the coastal passage off Hållö Light.

Charts 1402, 879, 869 (see 1.29)

Archipelago Channel

7.4

- 1 A continuous and well-sheltered inner channel (1.12), with a channel draught (7.2) of 4 m, extends from the S end of Kosterfjorden (58°51'N 11°06'E) to Kungshamn (58°23'N 11°15'E). This channel, which is shown on the largest scale charts and included in this text where it leads to an anchorage or harbour, connects the following ports and waterways:

- 2 Bisserännan (58°49'5N 11°07'0E), at the S end of Kosterfjorden, through Havstensund (58°45'N 11°11'E), as given at 7.52.

Thence towards and past Grebbestad (58°41'N 11°15'E) (7.98) and on to pass Fjällbacka (58°36'N 11°17'E) (7.102) and through the channel E of Gåsön (58°34'N 11°14'E).

7.5

- 1 Thence through Hamburgsund (58°33'N 11°16'E) (7.115) and through Hornö Ränna (58°31'3N 11°15'5E); then S to cross the entrance to Bottnefjorden (58°29'N 11°20'E) (7.116).

Thence through Ösöfjorden, 1½ miles NNW of Hunnebostrand (58°26'N 11°18'E) (7.109), passing W of Söö (7.111) in the harbour entrance.

- 2 Thence into Ramsviksfjorden, close S of Söö, and on through Sotenkanalen (58°25'N 11°16'E) (7.114). From the S end of the canal the Archipelago Channel leads E then S into Hasselösund (58°22'0N 11°14'6E) (8.25) and on to Kungshamn (8.17).

International boundary

7.6

- 1 The international boundary between Sweden and Norway, passes through the foul ground close N of Grisbådarna (58°55'N 10°50'E) and continues some 8 miles ENE to a position NE of Nord-Hällsö (58°58'N 11°05'E). That part of the boundary which passes S and SE of Heia (58°58'N 10°52'E) is marked by four buoys (special) which span a distance of 3½ miles.

Topography

7.7

- 1 Between Nord-Hällsö (58°58'N 11°05'E), 3½ miles NW of Strömstad, and Hållö, 38 miles S, the coast of Sweden is fronted by many islands, islets and shoals which extend up to 10 miles seaward.

- 2 The largest of the outer groups is Kosteröarna (58°53'N 11°00'E) (7.14), separated from the numerous islands fringing the mainland by Kosterfjorden. This is a broad, N/S channel with good depths which gives access to the inner approaches to Strömstad.

- 3 A second group of islands, Väderöarna (7.87), lie about 20 miles S of Kosteröarna.

Coastal descriptions are given at 7.14 and at 7.87.

Depths

7.8

- 1 As the outer dangers are steep-to, sounding is of little assistance when approaching this coast.

Vessel traffic service

7.9

- 1 The area covered by this chapter lies within VTS Strömstad. Participation in the VTS is compulsory for the following vessels:

All vessels of 45 m or more in length.

All vessels of 300 grt or greater.

All tows of 45 m or more in length.

- 2 For details and a list of reporting points see *Admiralty List of Radio Signals Volume 6* (2).

OSLOFJORDEN TO RAMSKÄR WITH STRÖMSTAD AND APPROACHES

GENERAL INFORMATION

Charts 879, 3160, 1402

Area covered

7.10

- 1 This section covers the coastal passage from the S end of Oslofjorden, in position 59°00'N 10°37'E, to a position SW of Ramskär Light (58°45'N 11°00'E) along with Strömstad (58°56'N 11°10'E) and its approaches. The section is arranged as follows:
- 2 Coastal passage – Færder to Ramskär (7.13).
Approach to Strömstad from N and from WSW (7.23).
Approach to Strömstad from SSW and from S (7.34).
Strömstad and inner approaches (7.61).

Outer approaches to Strömstad

7.11

- 1 **Outer approach from north** (7.23). This is a continuation S of the inner coastal route from Oslofjorden to Nord-Hällsö (58°58'N 11°05'E) as given at 6.2 and 6.14. The route then either continues S for a short distance, in deep water, to a position W of the inner approach channel to Strömstad from W, or leads SSE through Långörännan (58°58'N 11°07'E) which is restricted, as given at 7.63.
- 2 **Outer approach from west-south-west** (7.23). This route uses the channel NW of Nord-Koster (58°54'N 11°00'E), as shown on Chart 879, thence leads to a position W of the inner approach channels from W.
- 3 **Outer approach from south** (7.34). This approach uses either of the routes SE or E of Ramskär (58°45'N 11°00'E), as shown on Chart 879, thence through Kosterfjorden (58°51'N 11°06'E) to a position W of the inner approach channels from W.

Harbours

7.12

- 1 **Major harbour:**
Strömstad (58°56'N 11°10'E) (7.61), a commercial harbour and fishing port.
- Minor harbours:**
Kungsvikshamn (59°00'N 11°08'E) (7.33), a fishing harbour.
- 2 Havstensund (58°45'N 11°11'E) (7.48), a fishing harbour.
Resö (58°48'N 11°10'E) (7.54), a fishing harbour.
Korshamn (Ekenäs) (58°54'N 11°03'E) (7.59), a ferry port and large fishing harbour.
- 3 Nord-Koster, Västra bryggan (58°54'N 11°01'E) (7.60), a ferry port and fishing harbour.

COASTAL PASSAGE — FÆRDER TO RAMSKÄR

General information

Charts 1402, 3160, 879

Coastal passage

7.13

- 1 From a position about 3 miles SE of Færder Light (59°02'N 10°32'E) (4.17), at the S end of Oslofjorden, the coastal passage leads SSE for about 20 miles, in deep water outside the 50 m depth contour, to a position about 8 miles SW of Ramskär Light (59°45'N 11°00'E).

Topography

7.14

- 1 For general remarks on the coastal topography see 7.7. Nord-Koster (58°54'N 11°00'E) and Syd-Koster, close SE, are the largest islands of Kosteröarna and form good landmarks. In haze they are visible at a greater distance than the hills on the islands to the N.
- 2 Being dark in colour, they stand out clearly against the mainland even at quite large distances.

Pilotage

7.15

- 1 General information on pilotage in Swedish waters is given at 1.57.

Rescue

7.16

- 1 General information on SAR is given at 1.132. A coastal station is operational at Strömstad (58°56'N 11°10'E) and a rescue vessel is available at Nord-Koster (58°54'N 11°00'E). For further details see *Admiralty List of Radio Signals Volume 5*.

Natural conditions

7.17

- 1 **Current.** A current frequently sets NW, sometimes with considerable strength, passing S of Ursholmen (58°50'N 11°00'E).

Ice. General information on ice is given at 1.198.

Directions

(continued from 4.22)

Principal marks

7.18

- 1 **Landmarks:**
Torbjørniskjær Lighthouse (59°00'N 10°47'E) (5.26).
Beacon on Heia (58°57'4N 10°52'3E) (6.21).
Koster (58°54'N 11°01'E), which is the summit of Nord-Koster. It can be identified by Nord-Koster Lighthouse (white tower, 9 m in height) along with the ruins of an old lighthouse, close S.
- 2 Ursholmen (58°50'N 11°00'E), a dark coloured islet which can be identified by its light-tower (white round tower, black band, 13 m in height), standing on the W side of the islet, close SE of another tower.

7.19

- 1 **Major lights:**
Torbjørniskjær Light (5.26).
Ursholmen Light — as above.

Other aids to navigation

7.20

- 1 **Racons:**
Færder Light (59°02'N 10°31'E).
Trestenene Light (59°02'N 10°54'E).
Ramskär Light (58°46'N 11°00'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Færder to Ramskär

7.21

- 1 From the vicinity of 59°00'N 10°37'E, about 3 miles SE of Færder Light, the coastal passage leads SSE, passing (with positions relative to Ursholmen Light):
WSW of the shoal which extends up to 1 mile W from Torbjørniskjær Light (12 miles NNW) and

clear of Medfjordgrunnen, a rock with a charted depth of 48 m, 4½ miles W of the light, thence:

- 2 WSW of Midtre Skjøttegrunnen (8 miles NW), a 7 m patch marked on its W side by a spar buoy (starboard hand), thence:
- 3 WSW of Grisbådarna (6½ miles NW) (7.31). These shoals lie on the NW side of the W approach channel to Strömstad. Thence:
- 4 WSW of Bredgrunden (1¼ miles WNW), a rock awash which lies off the W side of Kosteröarna and is marked on its W side by a spar buoy (W cardinal), thence:
- WSW of Eriksklacken, a detached shoal with a least depth of 7 m over it (1¼ miles WSW), thence:
- WSW of Persgrunden (9 miles SSW) a group of dangerous shoals which have a least depth of 2.4 m over them. The shoals are marked on their N side by a spar buoy (N cardinal); a 7.4 m patch, at the SW extremity of the shoals, is marked on its S side by Persgrunden Light-buoy (S cardinal).

Useful marks

7.22

- 1 Klövingarna Light (58°56'N 10°59'E) (7.31).
Ramskär Light (white tower, black band, 19 m in height) (58°46'N 11°00'E), standing on Ramskär, a skerry 4½ miles S of Ursholmen.
Stora Huvudet (58°43'·5N 11°10'·3E), a dark hill near the coast which is easy to identify.
(Directions continue for the coastal passage at 7.90)
Directions for the approaches to Strömstad from SSW are given at 7.42, and from WSW at 7.31)

APPROACH TO STRÖMSTAD FROM NORTH AND FROM WEST-SOUTH-WEST

General information

Charts 879, 3160

Routes

7.23

- 1 **Approach from north.** From a position 1 mile WNW of Nord-Hällsö Light (58°58'N 11°05'E) (6.26), the approach to Strömstad from N continues generally S for about 3 miles, along the recommended track shown on the chart, to a position off the deepest of the inner approaches to Strömstad.
- 2 **Approach from west-south-west.** From a position 6¾ miles WSW of Klövingarna Light (58°56'N 10°59'E), the approach from WSW leads ENE for about 9 miles, to the N of Kosteröarna, along the recommended track shown on the chart, to a position off the deepest of the inner approaches to Strömstad.

Limiting conditions

7.24

- 1 **The approach from north** passes through deep water but a channel draught (7.2) of only 10 m is given for the track as shown on the chart.
- 2 **The approach from west-south-west** passes close to and over many shallow patches. The channel draught (7.2) is 8 m along the track shown on the chart and vessels of 12 000 tonnes can be navigated along this channel when under pilotage. However, this channel should not be attempted in a heavy seaway or reduced visibility.

Pilotage

7.25

- 1 See 7.72.

Traffic regulations

7.26

- 1 Anchoring is prohibited in the area between the W side of Nord-Koster (58°54'N 11°00'E) and Grisbådarna, 3½ miles W, as this is a fishing ground.

Rescue

7.27

- 1 See 7.16.

Directions for the approach to Strömstad from north

(continued from 6.27)

Principal mark

7.28

- 1 **Landmark:**
Koster (58°54'N 11°00'E) (7.18).

Other aids to navigation

7.29

- 1 **Racons:**
Trestenene Light (59°02'N 10°54'E).
Klövningarna Light (58°56'N 10°59'E).
Ramskär Light (58°46'N 11°00'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Track

7.30

- 1 From the vicinity of 58°58'·2N 11°03'·0E the approach to Strömstad from N continues generally S for about 3 miles, passing (with positions relative to Nord-Hällsö Light (58°58'N 11°05'E)):
W of Nord-Hällsö (6.27), and:
- 2 E of Hörnsten (1½ miles WSW), which lies 5½ cables ENE of Stenbrottet and is marked by a spar buoy (E cardinal), thence:
E of Kostersten (2 miles SW), a dark-coloured above-water rock.
(Directions continue for entering Strömstad Harbour by the deepest channel at 7.77)

Directions for the approach to Strömstad from west-south-west

Outer approach

7.31

- 1 **Leading lights:**
Front light. Klövingarna Light (white tower, 6 m in height) (58°56'N 10°59'E) exhibited from the E of two above-water rocks at the N end of Kosteröarna (7.14).
- 2 Rear light. Nord-Hällsö Light (58°58'N 11°05'E) (6.26), 3½ miles NE.
From the vicinity of 58°52'·0N 10°49'·3E the alignment (053°) of these lights leads NE for 5½ miles, passing (with positions relative to the front light):
- 3 SE of Grisbådarna (4½ miles WSW), a group of shoals over which rough seas break. The least depth over this group is 2.4 m at Östra Brottet (3¾ miles WSW) marked on its S side by a spar buoy (E cardinal). The remainder of the group is marked on its SW side by a light-buoy (S cardinal) (5 miles WSW) and on its W side by a spar buoy (W cardinal) (5½ miles W). Thence:

- 4 NW of Hållviksgrund (3¼ miles SW), which has a least depth of 6 m over it and is marked on its N side by a spar buoy (N cardinal), and:
Close SE of Det grunda (3¼ miles WSW), which has a least depth of 7.4 m over it; Det grunda is marked on its SE side by a spar buoy (S cardinal).
Thence:
Between two shoals with depths of 9.4 m over them (2¼ miles SW), thence:
- 5 Very close NW of a small patch (1¼ miles SW), with a charted depth of 10 m, thence:
SE of the shoal extending 3 cables S from Stora Drammen (1 mile W), an above-water rock on the N end of which stands a beacon (white). The shoal, which has a depth of 2.6 m near its S end, is marked by a spar buoy (port hand).

Inner approach

7.32

- 1 When Klövingarna Light is distant 1 mile, the track diverts from the leading line and continues generally ENE for about 2½ miles, along the recommended track shown on the chart and into a white sector (242°–255½°), astern, of Klövingarna Light, passing (with positions relative to the light):
- 2 NW of a 10.4 m shoal (8 cables SW) which lies close NW of the shoal extending 2 cables NNE from Små Drammarna, two small above-water rocks which are marked on their N edge by a light-buoy (starboard hand), thence:
- 3 Between Klövingarna and Klövningsgrundet, 2½ cables SE, which is marked on its NE side by a light-buoy (starboard hand), and over a submarine power cable (1.69) which crosses the track, thence:
- 4 Over a 15 m patch (4½ cables ENE) and SSE of the rocks and shoals extending 3½ cables SE from Rödkär (6 cables NNE), an islet which is brick red in colour and has a high rounded summit, thence:
SSE of Kostersten (1¼ miles NE) (7.30), and:
- 5 NNW of Axelbrottet (1¼ miles E), a rock awash which is marked by a beacon (pole with a cylindrical topmark).
(Directions continue for entering Strömstad harbour by the deepest channel at 7.77)

Minor port

Kungsvikshamn

7.33

- 1 **Description.** Kungsvikshamn (59°00'N 11°08'E), which lies on the N side of the entrance to Dynekilen, is a fishing harbour with facilities for small craft. Kungsvikshamn has a population of about 55.
- 2 This harbour is approached from W through a channel S of Ledsundholmen (58°59'.6N 11°06'.7E) which has a channel draught (7.2) of 3.0 m.
- Regulations concerning entry.** Anchoring is prohibited in the bay NE of the harbour entrance. There is a speed limit of 5 kn inside the harbour.
- 3 **Berth.** The harbour, which is protected by a breakwater and a small islet, is dredged to 3.5 m and contains a quay with a length of 60 m.
- Supplies.** Provisions are available.

APPROACH TO STRÖMSTAD FROM SOUTH-SOUTH-WEST AND FROM SOUTH

General information

Charts 879, 1402

Routes

7.34

- 1 **Approach from south-south-west.** From a position 5½ miles SW of Ramskär Light (58°45'N 11°00'E) the approach from SSW leads NE for about 8 miles, along the recommended track shown on Chart 879, to join the approach from S, given below.
- 2 **Approach from south.** From a position 4 miles SSE of Ramskär Light the approach from S leads generally E of N for about 9 miles into Kosterfjorden (58°51'N 11°06'E), along the recommended track shown on Chart 879, then continues generally W of N for about 5 miles, along the recommended track shown on the chart, to a position off the deepest inner approach to Strömstad.

Topography

7.35

- 1 General topography for this part of the coast is given at 7.14. Stora Huvudet (58°43'.5N 11°10'.3E) is described at 7.22. Stora Hjälmen (58°44'.4N 11°06'.4E) is an islet and very easy to distinguish. Stora Torgrimmen (58°45'N 11°07'E) is a high islet that is easily identified by its light reddish colour.

Depths

7.36

- 1 The approach from S and SSW is mostly deep and free from dangers in the fairway. The channel draught (7.2) is 10 m along the length of the recommended tracks for both approaches, as shown on Chart 879.

Buoyage

7.37

- 1 The general direction of buoyage (1.35) in Kosterfjorden is from N to S, as shown on Chart 879.

Pilotage

7.38

- 1 See 7.72.

Traffic regulations

7.39

- 1 Anchoring is prohibited within 100 m of submarine power cables laid across Kosterfjorden (58°51'N 11°06'E), as given at 7.46.

Rescue

7.40

- 1 See 7.16.

Current

7.41

- 1 For details of the current at the S end of Kosterfjorden see 7.17.

Directions

Principal marks

7.42

- 1 **Landmarks:**

Valtjället (58°53'N 11°01'E), surmounted by a small beacon; a chapel stands close NE.
Ramnefjäll, 1¼ miles SSE of Valtjället; it is the highest point on Syd-Koster.

2 Major light:

Svängen Light (white lantern) (58°48'N 11°07'E) exhibited from near the N end of Stora Svängen, a small islet on the E side of the fairway.

Other aids to navigation**7.43****1 Racons:**

Klövningarna Light (58°56'N 10°59'E).

Ramskär Light (58°46'N 11°00'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Approach from south–south–west**7.44**

- 1 From the vicinity of 58°41'N 10°54'E, a white sector (042°–047°) of Svängen Light (above) leads NE along the recommended track shown on Chart 879, passing (with positions relative to Ramskär Light (58°46'N 11°00'E) (7.22)):

SE of Persgrunden (5 miles SW) (7.21), thence:

- 2 NW of a 12 m patch (1¼ miles SSE), which is marked on its N side by a spar buoy (N cardinal) and lies 3 cables N of Spiran, which has two shallow heads (N and S), and:

SE of a 14 m patch (9 cables S), which is marked on its S side by a spar buoy (S cardinal), thence:

- 3 SE of Långebåden (1½ miles NE), which lies 1¼ miles E of Stora Segelskär, the largest of a group of dark, low-lying skerries.

Thence from vicinity of 58°46'N 11°04'3E the track is altered towards the N along the route for the approach from S given at 7.34.

*Chart 879***Approach from south****7.45**

- 1 From the vicinity of 58°42'N 11°03'E, a white sector (007°–013°) of Vattenholmen Light (white lantern, red roof) (58°52'5N 11°06'4E), which has a range of only 8 miles, leads generally N along the recommended track shown on the chart, as given at 7.34, passing (with positions relative to Svängen Light (58°48'N 11°07'E)):

- 2 E of Spiran (5½ miles SW) (7.44), thence:

Over or W of a 13 m patch (4¼ miles SSW), which lies inside the white sector, 3 cables W of Tjärten, thence:

- 3 W of the shoal extending 2½ cables W from Hjalmebåden (3½ miles SSW), the W of the above-water rocks on the E side of the channel, thence:

W of Bredgrund (1¾ miles SSW), a rock awash which is marked on its SW side by a spar buoy (W cardinal).

- 4 Thence from the vicinity of 58°46'N 11°04'3E, the recommended track shown on the chart for the combined routes continues generally N for 4¾ miles, passing (with positions relative to Svängen Light):

E of Vitlingbrottet (2½ miles WSW), which is the E of the dangers extending NE from Stora Segelskär (4¼ miles WSW) (7.44), thence:

W of Stora Svängen (7.42), thence:

- 5 E of Berggylteskär (2 miles NNW), two skerries, with a rock awash close N of them, which lie 3 cables E of Ramsö, thence:

W of Gulsjärssyggen (3¼ miles N), which is marked on its N side by a spar buoy (starboard hand).

6 Useful marks:

Beacon (7 cables S), 3 m in height, standing on Ålekråkan, an above-water rock.

Tjärnö Church (white structure, red roof) (58°52'5N 11°09'3E), which is fairly prominent from the offing between the bearings of 022° and 034°.

7.46

- 1 When Vattenholmen Light is distant 1½ miles the recommended track shown on the chart alters to NNW, within a white sector (167½°–169½°) of Svängen Light, astern, passing (with positions relative to Vattenholmen Light):

ENE of Tegelskär (1 mile SW), a small reef, partly above-water. A 6.9 m patch lies 4 cables S of Tegelskär and there are several shoals between them and the E side of Stora Brattskär. Thence:

- 2 WSW of Vattenholmen, an islet from which Vattenholmen Light (7.45) is exhibited, and:

ENE of an 11 m stony patch (7 cables W) which is unmarked, thence:

Over a submarine power cable (1.69) which crosses the fjord as shown on the chart and is indicated by beacons (white triangular daymarks with red borders) on Filjholmen (1½ miles W) in line bearing 271°. This area is subject to the regulations given at 7.39. Thence:

- 3 WSW of a spar buoy (4 cables N) which marks the end of a submarine pipeline (1.69), thence:

WSW of a 3 m shoal (8 cables NNW) which lies 1½ cables S of Krugglö and of a 4.4 m shoal (1¼ miles NNW) which lies 2 cables NNW of the islet, thence:

- 4 ENE of the shoal extending 1¼ cables E from Sneholm (1½ miles NW) on the E side of which stands Sneholm Light (white tower with a black band, 11 m in height), and:

Over a submarine power cable (1½ miles NNW) (1.69) which crosses the fjord from a position close S of Sneholm and is subject to the regulations given at 7.39, thence:

- 5 WSW of an 11 m shoal (1¼ miles NNW) which lies 3 cables SW of Svartskär Beacon (white with black bands) which stands on a small reef, and:

ENE of the Kosterfjorden pilot boarding station (2¼ miles NW) (7.72), thence:

WSW of Käbblingarna (2½ miles NNW), a group of islets lying in the mouth of the S of the entrance channels leading to Strömstad. Käbblingarna Light (white shed, red roof) is exhibited from the E extremity of the S islet. Thence:

- 6 WSW of Bredgrund (3 miles NNW) which is marked on its W side by a spar buoy (W cardinal), and:

ENE of Kalkgrund (3½ miles NNW), a rock awash marked by a beacon which lies at the E extremity of a large foul ground extending 1½ miles NNE from Nord-Koster, thence:

WSW of the shoal extending 5 cables NW from Lerskär (3¼ miles N) (7.77), marked by a buoy (N cardinal).

(Directions continue for entering Strömstad Harbour by the deepest channel at 7.77)

Side channel**Channel to Styrsö Hamn****7.47**

- 1 A small craft channel, with a maximum authorised draught of 5.0 m, leads ENE from Kosterfjorden between

several islands to Styrsö Hamn, in the SW part of Nord Öddö, as shown on the chart.

Havstenssund and approaches

General information

7.48

- 1 **Position and function.** Havstenssund (58°45'N 11°11'E) is a fishing harbour on the E side of a narrow channel which separates Trossö and Hällsö from the mainland. The population is about 175.

- 2 **Approach and entry.** Havstenssund can be approached from S and from SW which then combine in a common approach from SSW; and also from N. All approaches, which are described below, pass through narrow channels which can accommodate vessels with a draught of 4 m.

- 3 The approach from SW should not be attempted during W gales as the sea then breaks heavily over dangers in this approach, many of which are unmarked.

Limiting condition

7.49

- 1 **Ice.** During January and February ice occasionally obstructs navigation.

Arrival information

7.50

- 1 **Pilotage** is available, as given at 7.72.

Regulation. There is a speed limit of 5 kn within the harbour and for 5 cables in the approach from both N and S.

Directions

7.51

- 1 **Approach from south-west.** From the vicinity of 58°42'2N 11°04'2E, a white sector (071°–085½°) of Väckar Light (white tower, red roof, black band, on grey conical base, 13 m in height) (58°43'N 11°10'E) leads along the recommended track shown on the chart to within 1½ cables of the light.

- 2 **Approach from south.** From the vicinity of 58°41'1N 11°08'8E a white sector (016°–019°) of Väckar Light (above) leads along the recommended track shown on the chart to a distance of 7 cables from the light.

- 3 **Combined approach from south-south-west.** The tracks from SW and from S (above) are altered as required towards the N and continue NNE for about 2¼ miles along the alignment (013°) of Havstenssund Leading Lights (white sheds, red roofs):

- 4 Front light (58°45'2N 11°10'6E).

Rear light, 6½ cables NNE, which can be identified by a large white mark on the hill N of the light.

7.52

- 1 **Approach from north-west.** From the vicinity of 58°50'0N 11°06'5E, at the S end of Kosterfjorden, a white sector (140°–143°) of Bissen Light (white shed, red roof, 7 m in height) which stands on the SW end of Bissen (58°48'2N 11°09'5E) leads SE through Bisserännan for about 2 miles to within 1½ cables of the light. In addition, leading beacons stand on the SW part of Bissen, close N of the light:

- 2 Front beacon: white tower.

Rear beacon: white rectangular concrete daymark.

The alignment (138°) of these beacons leads within the same white sector to within 7 cables of the light. However, these beacons have been reported difficult to identify from a distance, especially the front beacon.

- 3 After passing Bissen Light, a white sector (328°–330°) of the light, astern, leads along the recommended track shown on the chart for about 1¾ miles to the vicinity of 58°46'7N 11°11'1E.

From the above position a white sector (187°–189°) of Havstenssund Front Leading Light (58°45'2N 11°10'7E) (7.51) leads generally S for about 1½ miles, along the recommended track shown on the chart, passing very close to the land on the E side of the channel.

Harbour

7.53

- 1 The harbour, which extends along the E side of the fjord, contains a quay with a length of 84 m and a depth of 4.5 m alongside. There are two other berths.

Supplies: fuel oil; fresh water; provisions available.

Anchorage and harbours

Resö

7.54

- 1 **Description.** Resö (58°48'N 11°10'E), which lies between the SW side of the island of Resö and a small islet off the coast, is a fishing harbour, with a population of about 134.

- 2 **Approach.** The harbour is approached from NW through Bisserännan (58°49'7N 11°07'0E), as given at 7.52, which can accommodate vessels with a channel draught (7.2) of 5.5 m to the entrance of Resö Harbour. The channel which leads to the quay then permits a draught of only 3.5 m. Local knowledge is required.

- 3 **The harbour,** which is sheltered from the N by a breakwater, contains a quay with a length of 70 m and a depth of 4.5 m alongside.

Supplies. Fuel, water and provisions are available.

Ramsö

7.55

- 1 Ramsö (58°50'N 11°04'E), a small harbour on the NW side of Ramsö, can be approached through a channel with a channel draught (7.2) of 3.8 m. The inner basin, which is protected by breakwaters, contains a quay with a length of 100 m and depths of 3 m alongside.

Flo

7.56

- 1 Flo (58°52'N 11°09'E), a bay between the NW side of Råssö and the island of Saltö, 1 mile NW, affords anchorage for coasters in 12 to 13 m, sand and clay. This anchorage is entered through a narrow channel, with a channel draught (7.2) of 5 m, which passes between Stora Flatskär (58°51'5N 11°08'4E) and a white beacon, 1 cable NW, as shown on the chart. Local knowledge is required.

Brevik

7.57

- 1 Brevik (58°52'4N 11°01'8E), a small harbour on the SW side of Syd-Koster, can be entered by craft with a draught of 2.7 m. The harbour, which is protected by a breakwater, contains a berth with a depth of 3.5 m alongside.

Kosterhamnen

7.58

- 1 Kosterhamnen (58°53'N 11°04'E), a bay on the E coast of Syd-Koster, affords anchorage for coasters in depths from 15 to 25 m, clay. Ice does not obstruct this bay but anchoring is prohibited within 1 cable of the shore. Vessels should also avoid a submarine pipeline laid from the NE shore of the bay, in a SE direction for 3½ cables, to the 10 m depth contour.

Korshamn (Ekenäs)**7.59**

1 **Description.** Korshamn (Ekenäs) (58°54'N 11°03'E), the largest fishing harbour within the Koster Islands, lies in a narrow channel between the NE coast of Syd-Koster and the islet of Hamneholmen.

2 **Approach.** The harbour can be approached from both N and S through short channels which have a channel draught (7.2) of 3.6 m. The fairway is buoyed in both channels and the approach and entrance from N is marked by leading lights. However, local knowledge is required.

3 **Regulation concerning entry.** There is a speed limit of 5 kn in the harbour.

Berths. The harbour, which is sheltered from the N by a breakwater, contains a quay with a length of 70 m and a depth of 4 m alongside.

Communications. There is a ferry service to Strömstad (7.61).

Nord-Koster**7.60**

1 **Description.** A quay, known as Västra bryggan, which lies on the NW side of a harbour in Kstersundet (58°54'N 11°01'E), accommodates fishing vessels and a ferry service.

2 **Approach.** This harbour can be approached from both ends of Kstersundet, a narrow channel between Nord-Koster and Syd-Koster. The channel from SW can accommodate vessels with a draught of 2.7 m. The channel from NE, out of Kosterfjorden, has a channel draught (7.2) of 4.5 m, and the fairway is marked by leading lights and spar buoys. However local knowledge is required.

Regulation concerning entry. There is a speed limit of 5 kn in Kstersundet.

3 **Berth.** The main berth has a length of 80 m and there is a depth of 4.5 m in the harbour.

only for the inner approach from W, which has the deepest channel draught (7.2).

7.63

1 **Inner approach from north-north-west.** This route passes through Långörännan (58°57'5N 11°07'0E), a narrow channel between Långöarna and the mainland. The channel, which is approached between Tjurholmsknappen (58°58'5N 11°05'8E) (Chart 3160) (6.135) and Nord-Hällsö (6.27), 6 cables SW, is entered 1 mile E of Nord-Hällsö Light.

2 The channel draught (7.2) is 6 m and the route, which follows the recommended track shown on the chart, is marked by leading lights (58°56'N 11°08'E). However, the channel width is reduced to only 45 m where it passes between two shoals at its S end and local knowledge is required.

7.64

1 **Inner approach from west.** This approach leads through a channel known as Stora Inloppet (Bulthålan), which passes N of Flatskär (58°56'0N 11°06'7E). The route, which leads from the N end of Kosterfjorden through a winding but well-marked channel, along the recommended track shown on the chart and on the plan, is described in directions at 7.77. The channel draught (7.2) is 9 m which makes this the deepest of the entrance channels; see 7.67 for limitations.

7.65

1 **Inner approach from west-south-west.** The route passes through a narrow channel known as Södra Inloppet which is entered S or N of Käbblingarna (58°55'N 11°05'E) (7.46). This channel, which leads generally ENE for about 2 miles along the recommended track shown on the chart, has a channel draught (7.2) of 6 m. Local knowledge is required.

Port Authority**7.66**

1 **Address.** Strömstad Port Authority, Miljokontoret, 452 80 Strömstad, Sweden.

Email. rolf.massleberg@stromstad.se.

STRÖMSTAD AND INNER APPROACHES**General information**

Chart 879 with plan of Strömstad

Position and function**7.61**

1 Strömstad (58°56'N 11°10'E) is situated on the mainland off the E side of Kosterfjorden, 2½ miles from the fjord and about 10 miles from the open sea.

2 The harbour (7.76), which is well sheltered and seldom obstructed by ice, contains a commercial port, handling coastal traffic, a ferry terminal with connections to ports in Norway and a fishing harbour. Main exports are timber and stone with imports of fish and oil.

3 The town, with a population of 11 373 (2004), is a popular summer resort.

Approach and entry**7.62**

1 **Outer approach channels** are summarised at 7.11 which contains a cross reference to each channel.

Inner approach channels. Strömstad can be approached through separate channels from NNW, W and WSW, as given in the following paragraphs. Directions are given

Limiting conditions**Controlling depth****7.67**

1 The combination of an outer approach from N (7.23) or from SSW (58°44'N 11°00'E) (7.34) with the inner approach from W (58°56'0N 11°06'7E) (7.64) and passing S of Furholmen (7.79) affords the deepest approach to Strömstad with a channel draught (7.2) of 9 m to Södra Hamnen and Oljekajen (7.81).

Deepest and longest berths**7.68**

1 The deepest berth is the tanker quay at Oljekajen and the longest berth is in Södra Hamnen, as given at 7.81.

Density of water**7.69**

1 Density. 1.000 g/cm³.

Maximum size of vessel handled**7.70**

1 By using the deepest approach, as given at 7.67, the tanker berth (7.81) can accommodate vessels of 40 000 dwt and draught of 8.0 m by day; and 20 000 dwt and draught of 7.6 m at night.

It is possible, by day, to accommodate vessels with a draught of 11.5 m but only with the use of additional channel marking, obtained by special request.

Local weather

7.71

- 1 The prevailing wind is from W to SW.
With strong winds from the W, especially during the autumn, troublesome seas often occur in combination with HW in the harbour.

Arrival information

Pilotage

7.72

- 1 Pilotage is arranged either by telephone or through the Swedish Maritime Administration homepage www.sjofartsverket.se, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*. The pilot boarding positions are as follows:
 - 2 58°58'2N 11°03'3E – near Nord-Hällsö (Chart 3160).
 - 58°54'4N 11°03'8E – in Kosterfjorden.
 - 58°44'0N 10°59'7E – S of Ramskär.

Tugs

7.73

- 1 Tugs are available.

Local knowledge

7.74

- 1 The inner approach channels to Strömstad are intricate, with many dangers. If a Pilot is not used then local knowledge is required for approaching the harbour.

Regulations concerning entry

7.75

- 1 **Speed restrictions** are in force as follows:
 - Långörännan: 5 kn from 1 June to 31 August; 7 kn at other times.
 - Outer harbour: 10 kn from 1 June to 31 August.
- 2 Inner harbour: 5 kn at all times to the NE of a line drawn SSE from a position 2¼ cables NE of Strömstad Light (58°56'2N 11°09'4E), passing about 80 m WSW of Skurve. Warning notice boards, painted yellow and inscribed "HÖGSTA FART 5 KNOP" indicate the limits within which the restriction applies. A buoy (special), moored WSW of Röseborg, marks the edge of the area in the S part of the harbour.
- 3 **Anchoring** is prohibited within 100 m of the pipelines (1.69) shown on the chart and plan. Also within 50 m of the submarine power cable laid between Strömstad Light and Laholmen, 3½ cables ENE.

Harbour

General layout

7.76

- 1 Strömstad Harbour consists of three separate areas, from N to S as follows:
 - Norra Hamnen (58°56'4N 11°10'1E) which is used for ferry and coastal traffic.

2

Södra Hamnen, separated from Norra Hamnen by Laholmen, a small peninsula. Södra Hamnen contains the fishing harbour and extensive small craft facilities, and is sheltered from S by a breakwater joining the islet of Skurve (58°56'1N 11°09'9E) to the mainland, 200 m E, and from W by two breakwaters, respectively 60 m long extending N from Skurve, and 170 m long extending S from Laholmen. A Ro-Ro berth is situated 2 cables S of the breakwater.

3

Röseberg vicinity (58°55'6N 11°10'2E), not shown on the plan, which contains the tanker berth.

Directions for entering harbour

(continued from 7.30, 7.32 and 7.46)

Inner approach from west

7.77

- 1 From the vicinity of 58°56'3N 11°04'4E, the track leads generally E within a white sector (096°–100°) of Kristhällan Light (lantern on white shed) (58°56'N 11°08'E), along the recommended track shown on the chart, passing (with positions relative to Kristhällan Light):
 - 2 N of the shoal extending 5 cables NNW from Lerskär (1¼ miles WSW) with a charted depth of 4 m near its N end, and marked at its NW extent by a buoy (N cardinal). Hösefluna, a group of rocks, lie on this shoal. Thence:
 - 3 S of a shoal extending 1 cable S from Holmengrå (7 cables WNW), on which there is a 3-6 m patch; the shoal is marked on its S side by Bulthålan Light-buoy (port hand). And:
 - 4 N of rocks, with depths of 2 m or less over them, which lie up to 1 cable WNW of Flatskär (6 cables W), an islet on the N end of which stands a beacon, thence:
 - 5 S of a shoal, with a depth of 5-4 m over it, which lies close S of a rock awash (4½ cables WNW) which itself lies off the SE end of Holmengrå and is marked by a beacon with a cylindrical topmark, thence:
 - 6 N of Dyngan (2¼ cables W), a reef, partly awash, which is marked at its N end by a beacon with a cylindrical topmark; and, on its NE side by a light-buoy (starboard hand).

7.78

- 1 When Kristhällan Light is distant 2 cables the recommended track leads generally SE for about 5 cables, passing (with positions relative to Strömstad Light (58°56'2N 11°09'4E)):
 - Close SW of the SW extremity of Syd Långön (8 cables WSW) from which Kristhällan Light is exhibited, thence:
 - 2 Close NE of an unmarked 11.2 m shoal (8 cables WSW), noting that a spar buoy (starboard hand) is situated 1 cable SSE of this shoal, marking a 4 m patch, thence:
 - SW of Daniel (6 cables WSW), marked by a beacon. This shoal is also marked off its SW side by a spar buoy (port hand).
 - 3 **Useful marks:**
 - Beacon (1¼ miles SW), standing on an islet close N of the N side of Nord Öddö.
 - Halsörholmen Light (white lantern on cairn) (1 mile WSW) exhibited from a rock close off the E end of Halsörholmen.

Entering harbour**7.79**

- 1 **Main route.** From a position S of Daniel, the recommended track continues E then NE, through a channel well marked by beacons and light-buoys to a position $2\frac{3}{4}$ cables SE of Strömstad Light (white lantern) ($58^{\circ}56'2N$ $11^{\circ}09'4E$), passing SE of Furholmen (2 cables S). Thence the track leads NNE towards Norra Hamnen and Södra Hamnen, E to the Ro-Ro berth, and SE to Röseberg.
- 2 **Alternative 6.0 m route.** From a position S of Daniel, a route, authorised for a draught of 6.0 m, leads NE within a white sector (051° – 053°) of Strömstad Light to within 2 cables of the light, passing (positioned from the light): SE of Daniel (7.78), and:
 - 3 NW of a reef (5 cables SW) which extends about $2\frac{1}{2}$ cables WSW from Furholmen and is marked on its SW side by a beacon and off its S side by a spar light-buoy (port hand), thence: Close SE of a 5.5 m patch (4 cables SW).
 - 4 Thence from a position $\frac{1}{2}$ cable SE of Strömstad Light, recommended tracks lead NE or E into Norra Hamnen or Södra Hamnen, within white sectors, astern, of the light, passing respectively N or S of Rastegrund, marked by buoys (lateral); or SSE to Röseberg.

Anchorage and berths**Anchorage****7.80**

- 1 Permitted anchorage within the harbour is very restricted, and must be well clear of the submarine pipelines and power cables shown on the plan.

Alongside berths**7.81**

- 1 **Norra Hamnen:**

The longest berth has a length of 100 m and depths from 4.0 to 2.5 m alongside.

The deepest berth is alongside the pierhead which has a depth of 6.0 m.

There are four other berths.
 - 2 **Södra Hamnen:**

The longest berth has a length of 200 m with depths from 8.0 to 4.0 m alongside.

The deepest berth has a length of 80 m with depths from 9.0 to 6.0 m alongside.
 - 3 **Ro-Ro berth** ($58^{\circ}56'0N$ $11^{\circ}10'3E$). The berth consists of a 60 m quay with depths of 7.0 m. A dolphin at its end extends the length to 75 m.
- Tanker quay** at Oljekajen ($58^{\circ}55'6N$ $11^{\circ}10'3E$) has a length of 80 m with a depth of 13.5 m alongside. Tankers with a draught of 11.5 m can use this berth, but see 7.70.

Port services**Repairs****7.82**

- 1 Minor repairs can be undertaken.

Other facilities**7.83**

- 1 Hospital in town; limited facilities for the reception of oily waste.

Supplies**7.84**

- 1 Fuel for bunkers can be obtained at the tanker quay; fresh water is available alongside; provisions obtainable.

RAMSKÄR TO HÅLLÖ**GENERAL INFORMATION**

Charts 869, 1402 (see 1.29)

Area covered**7.85**

- 1 **Waterways.** This section covers the coastal passage to seaward of Väderöarna ($58^{\circ}33'N$ $11^{\circ}03'E$). It also covers the inner coastal route between Väderöarna and the coastal islands. Parts of the Archipelago Channel, outlined at 7.4, are included in this section, as is Sotenkanalen ($58^{\circ}25'N$ $11^{\circ}16'E$) (7.114).
- 2 **Harbours.** There are no major harbours within this section. Minor harbours, with approaches where appropriate, are given as follows:

Grebbestad ($58^{\circ}41'N$ $11^{\circ}15'E$) (7.98), a small commercial port.

Fjällbacka ($58^{\circ}36'N$ $11^{\circ}17'E$) (7.102), a small commercial port.
- 3

Hamburgsund ($58^{\circ}33'N$ $11^{\circ}16'E$) (7.115), a small fishing harbour.

Bovallstrand ($58^{\circ}29'N$ $11^{\circ}20'E$) (7.116), a stone loading place.

Hunnebostrand ($58^{\circ}26'N$ $11^{\circ}18'E$) (7.109), a fishing harbour and loading place for stone and timber.

COASTAL AND INNER PASSAGES**General information**

Charts 869, 1402 (see 1.29)

Routes**7.86**

- 1 **Coastal passage.** From a position 8 miles SW of Ramskär Light ($58^{\circ}45'N$ $11^{\circ}00'E$) the coastal passage continues SSE for about 25 miles, in deep water outside the 50 m depth contour, to a position 6 miles WSW of Hållö Light ($58^{\circ}20'N$ $11^{\circ}13'E$).
- 2 **Inner coastal route.** From a position 4 miles SSE of Ramskär Light the inner coastal route leads SSE for about 6 miles to a position $1\frac{1}{2}$ miles E of Bot ($58^{\circ}35'6N$ $11^{\circ}03'0E$), then generally S through Väderöfjorden for about $5\frac{1}{2}$ miles. Then from the vicinity of $58^{\circ}30'N$ $11^{\circ}05'E$ the route leads SSW for about 10 miles to join the coastal passage given above.
- 3 Väderöfjorden ($58^{\circ}33'N$ $11^{\circ}07'E$) is the channel between the E side of Väderöarna and the islands in the approaches to Fjällbacka. This channel, which has few dangers in the fairway, has a channel draught (7.2) of 10 m.
- 4 Sotefjorden ($58^{\circ}29'N$ $11^{\circ}10'E$), lying SE of Väderöfjorden, extends S from Långholmen ($58^{\circ}32'N$ $11^{\circ}14'E$) for $6\frac{1}{2}$ miles to Soteskär (7.87). This channel has

irregular depths and many above-water and submerged rocks. The sea breaks heavily over the shoals during SW and W gales.

Topography

7.87

- 1 The following features are found along this part of the coast (positioned from Väderöbod Light (58°33'N 11°02'E):
Morö (8 miles NNE), an islet 6 cables NNW of Brämskär Light, which is yellowish red in colour with heaps of stones on the summit; it stands out from the rest of the archipelago.
- 2 Otterön (9 miles NE), situated 2 miles E of Morö, a high, dark island with a hilly ridge which also stands out from the rest of the archipelago.
Valö Sadlar, 1 mile W of Fjällbacka (8½ miles ENE), which is the summit of the high island of Valön, has two small peaks separated by a cleft which can be clearly seen from seaward.
- 3 Väderöarna, a group of reddish brown islands extending up to 4 miles N from Väderöbod; it cannot be distinguished from the rest of the coastal archipelago outside a distance of 4 miles. However, Storö (2½ miles NE), the highest and largest of the islands, has a disused pilot's lookout tower near its S end. Väderöbod, a high and rocky islet, the highest part of which resembles a shed or barn, is the first of Väderöarna to be distinguished when approaching from SW. Väderöbod Light (7.92) is exhibited from the islet.
- 4 Öneskymta (12 miles ENE), three hills which are visible at long range and easy to identify from a position N or W of Väderöarna.
Stora Håskär (4¼ miles E), a high and rocky islet which is yellowish-red in colour and clearly visible from seaward.
Lilla Hamburgö (6¼ miles E), which is also high and rocky with a noticeable white mark on its W side.
- 5 Sparödklåvan (58°29'N 11°21'E), a cleft between two summits which is visible from the offing. The opening of Bottnefjorden, 1 mile W of Sparödklåvan, known as Bottneklova, can be seen from W as a fairly prominent depression between the hills.
- 6 Soteskär (58°25'5N 11°11'0E), a high islet of light colour which is easily seen from seaward. Sote Bonde, situated on the coast 1½ miles ESE of Soteskär, is a pointed hill of lightish brown colour which is best seen from SW.

Rescue

7.88

- 1 General information on search and rescue is given at 1.132. Two rescue boats are maintained at Fjällbacka (58°37'N 11°17'E). For further details see *Admiralty List of Radio Signals Volume 5*.

Natural conditions

7.89

- 1 **Currents** between the islets of Väderöarna are often strong and variable in direction.
Sea state. During W gales the sea breaks with great violence for a considerable distance seaward of Väderöarna due to the strong currents.
The sea also breaks heavily over shoals to the E of Svaberget (58°22'N 11°05'E) during gales.

Directions for coastal passage

(continued from 7.22)

Principal mark

7.90

1 Major light:

Hällö Light (white round stone tower, red top, 20 m in height, floodlit) (58°20'N 11°13'E).

Other aids to navigation

7.91

1 Racons:

Ramskär Light (58°46'N 11°00'E).
Väderöbod Light (58°33'N 11°02'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Ramskär to Hällö

7.92

- 1 From the vicinity of 58°40'N 10°48'E the coastal passage continues SSE, passing (with positions relative to Väderöbod Light (red tower, 19 m in height) (58°32'5N 11°02'0E)):
WSW of Kilen (4 miles NNW), which is the least depth over an extensive group of shoals, marked on its W side by a spar buoy (W cardinal), thence:
- 2 WSW of Väderöarna (7.87), thence:
WSW of Böckern (1¾ miles S) which, with a least charted depth of 9 m, is the SW danger of Väderöarna, thence:
WSW of Svaberget (11 miles S) and of a 16 m patch which lies 6 cables S of this shoal; see also 7.89. Thence:
- 3 WSW of a shoal which, with charted depths of less than 20 m, extends 1¾ miles W from Sejebåden (12 miles SSE), a shallow patch which is marked on its W side by a light-buoy (W cardinal), thence:
WSW of Hällö (13½ miles SSE), a small islet from which Hällö Light (7.90) is exhibited.

(Directions continue for the coastal passage at 8.13)

Directions for inner coastal route

Principal mark

7.93

1 Major light:

Hällö Light (58°20'N 11°13'E) (7.90).

Other aids to navigation

7.94

1 Racons:

Ramskär Light (58°46'N 11°00'E).
Väderöbod Light (58°33'N 11°02'E).

- 2 For details see the relevant *Admiralty List of Radio Signals Volume 2*.

Approach to Väderöfjorden from north

7.95

- 1 From the vicinity of 58°42'N 11°03'E, a white sector (341°–349°) of Ursholmen Light (58°50'N 11°00'E) (7.18), astern, leads SSE for about 6 miles, passing (with positions relative to Väderö Light (58°43'N 11°10'E)):
WSW of Västra Grenen (1 mile WSW), a shoal marked by a spar buoy (W cardinal). This shoal lies 3 cables SW of Kistan, an above-water rock. Thence:

- 2 WSW of Södra Grenen (1¼ miles SSW) which is marked on its E side by a spar buoy (E cardinal). This shoal lies 2 cables WNW of Knutsgrund, a shoal which is marked on its W side by a spar buoy (W cardinal). Thence:
- 3 ENE of an extensive shoal (5 miles WSW), with a least charted depth of 16 m over it, thence:
- WSW of Vesslegrund (2¾ miles SSW), a detached shoal with a depth of 9.2 m over it which lies 7 cables NW of Morö (7.87), thence:
- 4 WSW of Brämskär Light (white lantern on red concrete base) (3½ miles S) which stands on the islet of Brämskär, thence:
- ENE of Kilen (8 miles SW) (7.92), thence:
- ENE of Lilla Knappen (7½ miles SSW) which is the N of the Väderöarna group of islands (7.87), and:
- 5 WSW of a detached shoal (6 miles S) with a charted depth of 8.8 m.

Useful mark:

Sadlen (1¼ miles S), a prominent high rock with a dark base.

Väderöfjorden**7.96**

- 1 From the vicinity of 58°35'8N 11°06'4E, 1½ miles E of Bot, a white sector (184°–187°) of Skälholmen Light (white tower, 9 m in height) (58°33'N 11°06'E) leads generally S for 2¾ miles, passing (with positions relative to the light):
- 2 W of Stora Ryggen (2¾ miles NNE) a shoal with the least depth of 4.2 m on its W side; it is marked by a spar buoy (isolated danger). Thence:
- W of Bockarna (2½ miles NNE), and:
- E of Arholm (2 miles NNW) which lies close SE of Storö (7.87), thence:
- 3 W of Striet (1¾ miles NNE) which should be given a wide berth in a heavy sea, thence:
- E of Grötskärsflacken (1¼ miles NNW) and of a shoal, with a least charted depth of 9.2 m over it, which lies 3 cables E.

Useful marks:

Södra Syster Light (white tower, black base, 9 m in height) (3½ miles NNE), exhibited from Södra Syster, an above-water rock.

Plogjärnet Beacon (2 miles NNW), standing on an islet 1½ cables SE of the S point of Storö.

South of Väderöfjorden**7.97**

- 1 When Skälholmen Light is distant 5 cables the recommended track shown on the chart deviates to pass E of the light then rejoins a S track, in a white sector (002½°–008°) of the light, astern, passing (with positions relative to the light):
- 2 E of Stora Rågstuten (9 cables SSW) and of the 4.5 m patch, 2 cables NNE, thence:
- E of Skälgrund (1¾ miles SW) which is marked off its S side by a spar buoy (S cardinal).
- 3 This track then continues S in clear water to join the coastal passage given at 7.92.

Useful mark:

Mjölskär Light (black tower, white top on a grey conical base, 14 m in height) (58°25'N 11°12'E) exhibited from the NE end of Mjölskär.

Grebbestad and approaches

Chart 1402 (see 1.29)

General information**7.98**

- 1 **Description.** Grebbestad (58°41'N 11°15'E) is a small commercial port at the N end of Grebbestadkilen, an inlet which is more than 2 miles from the open sea. Timber, grain and stone are shipped from the port and herring are landed.

Grebbestad has a population of about 1257.

- 2 **Approach and entry.** The main approach channel is from SW, between the SE side of Pinnö (58°40'N 11°13'E) and Otterön, close SE, which has a channel draught (7.2) of 4.5 m. Local knowledge is required.

Grebbestad can also be approached from N and from S through the Archipelago Channel (7.4), which is unlit, with a channel draught of 4 m from N and 5 m from S.

- 3 **Port Authority.** There is a harbour office in Grebbestad.

Pilotage. See 7.72.

Regulations. There is a speed limit of 5 kn within the harbour and within the approaches from N and S.

- 4 **Ice** generally occurs during January and February.

Directions for south–west approach**7.99**

- 1 From a position W of Brämskär Light (58°39'N 11°10'E) (7.95), a white sector (067½°–097°) of the light leads in clear water to a position 7 cables from the light. From this position the course is shaped to pass 1 cable S of Brämskär, along the recommended track shown on the chart, into a white sector (255½°–258°) of Brämskär Light, astern.
- 2 This sector leads through the fairway S of Stångeskär, 1¼ miles ENE, into the white sector (087°–093°) of Otterö Light (white lantern) (58°39'6N 11°13'0E), which leads between Håskär, 1½ cables WNW of Otterö Light, and the dangers close S. Håskär resembles a rounded hillock and has a noticeable white mark on its SW side. There is also a painted patch on the hill behind Otterö Light.
- 3 When within 1 cable of Otterö Light the alignment (042°) of Svinnäs Leading Lights leads NE through the fairway to within 3 cables of the front light:
- Front light (white square daymark and lantern on shed) (58°40'5N 11°14'5E).
- Rear light (white square daymark and lantern on shed) 250 m from front light.
- 4 Thence along the recommended track and into the white sector (239°–243°) of the front leading light, astern.
- From a position 4 cables ENE of Svinnäs Front Leading Light, the alignment (010½°) of Grebbestad Leading Lights leads into harbour:
- Front light (white triangular daymark, apex up, and lantern on pedestal) (58°41'3N 11°15'4E).
- Rear light (white triangular daymark, apex down, and lantern on pedestal) (105 m from front light).
- 5 **Useful marks:**
- Djupskär Light (white tower, black band, 6 m in height) (58°38'2N 11°11'8E) exhibited from an above-water rock.
- Stångeskär Light (white tower, black base, 7 m in height) exhibited from the NE point of Stångeskär.

Berths**7.100**

- 1 The harbour, which extends along the E side of the inlet, contains a quay (Södra bryggen) with a length of

80 m and a depth of 5 m alongside. There are two other commercial berths.

Port services

7.101

- 1 **Facilities.** There is a doctor in the town.
Supplies: fuel can be obtained alongside the main berth; water and provisions are available.

Fjällbacka and approaches

General information

7.102

- 1 **Description.** Fjällbacka (58°36'N 11°17'E), a small commercial port on the E side of Fjällbackafjorden, is a loading place for finished timber, fish, preserves and grain. Fjällbacka has a population of about 927.
- 2 **Approach and entry.** The deepest approach channel, with a channel draught (7.2) of 7.3 m to the anchorage, is from W through Syster Inloppet, to the N of Södra Syster (58°35'5N 11°09'2E). This channel, which is marked by lights throughout its length, is narrow and winding. It is described at 7.104 but local knowledge is required. The other approach channels are given below.
- 3 **Port Authority.** The harbour office is in Grebbestad (7.98).
Pilotage. See 7.72.
Regulations. There is a speed limit of 5 kn within the harbour and of 7 kn within the approaches. The discharge of refuse or ballast is prohibited within the approach channels.
- 4 **Ice** generally occurs between January and March.
Current. A strong current often sets through the channels leading to Fjällbacka.

Directions for north–west approach

7.103

- 1 The NW approach to Fjällbacka, from a position NW of Djupskär Light (58°38'2N 11°11'8E), leads generally SSE for about 2½ miles, with a channel draught (7.2) of 6 m, to join the approach from W in a position close N of Testholmen Light (58°35'8N 11°13'7E).

Directions for west approach

7.104

- 1 From a position W of Södra Syster Light (58°35'5N 11°09'2E) (7.96), a white sector (093°–097°) of Brände Holmen Light (white lantern) (58°35'6N 11°11'9E) leads along the recommended track, close N of Södra Syster, to within 2 cables of the light.
- 2 Then along the recommended track passing S of the light and into a white sector (267½°–273°) of the same light, astern, which leads E for 3 cables into and along a white sector (063°–072°) of Trybergsholmen Light (white lantern) (58°35'6N 11°13'0E) for a short distance. Then through the narrow passage to the N of this light.
- 3 After passing Trybergsholmen Light, a white sector (225°–228°) of the light, astern, leads NE for 9 cables and is joined at its mid-point, close N of Testholmen Light (white lantern), by the approach routes from NW and SW.
- 4 From a position 6½ cables W of Lilla Köttö Light (white lantern) (58°36'3N 11°15'6E), a white sector (086½°–092°) of the light leads E for 5 cables. Thence in mid-channel for 4 cables to enter the white sector (318½°–328°) of the light, astern, which leads into Fjällbackafjorden.

Directions for south–west approach

7.105

- 1 The SW approach to Fjällbacka, from a position 3 miles SW of Sotens Svartskär Light (white tower, 6 m in height) (58°33'N 11°13'E), leads generally NE then N along the recommended track for about 6½ miles, with a channel draught (7.2) of 6 m, to join the approach from W in a position close N of Testholmen Light.

Anchorage

7.106

- 1 **Outer.** An outer anchorage (58°37'N 11°15'E), 3 cables SSE of Musön, with depths of 18 m, clay, can accommodate small vessels.
Inner. An inner anchorage, in Fjällbackafjorden, which is well sheltered with depths from 8 to 10 m on good holding ground, is suitable for coasters, clear of submarine cables (1.69).

Berths

7.107

- 1 The largest berth, Samhällskajen, has a length of 95 m with depths from 4.8 to 5 m alongside. There is one other quay and five pontoon jetties with depths from 3 to 5 m alongside.

Port services

7.108

- 1 **Facilities.** There is a doctor in the town.
Supplies. Water and provisions are available.

Hunnebostrand and approaches

Chart 869

General information

7.109

- 1 **Position and function.** Hunnebostrand (58°26'N 11°18'E), a well sheltered fishing harbour on the E side of Ösöfjorden with a population of about 1842, is also a loading place for stone and timber.
- 2 **Approach and entry.** The deepest approach is from SW, from a position NW of Soteskär (58°25'5N 11°11'0E). The only approach which is lit for night passage is from WNW, from position 58°27'7N 11°12'3E, which crosses the approach from SW and can form a combined approach into the harbour with a channel draught (7.2) of 4 m to the berth.
- 3 **Port Authority.** There is a harbour office in Hunnebostrand.

Arrival information

7.110

- 1 **Local knowledge** is required.
Regulation. There is a speed limit of 5 kn within the harbour.

Directions

7.111

- 1 **Outer approach from south–west.** From the vicinity of 58°25'6N 11°10'0E the approach leads NE for 2¾ miles along the recommended track shown on the chart, between marked and unmarked shoals to position 58°27'2N 11°14'2E where it crosses the approach from WNW.
- 2 **Outer approach from west–north–west.** From position 58°27'7N 11°12'3E, the alignment (115½°) of Söo Leading Lights leads ESE for about 1 mile to a position 9 cables from the front light:
Front light (lantern on white shed) (58°26'8N 11°15'5E).

Rear light (white tower, red roof, 6 m in height) (5 cables from front light).

3 Useful marks:

Skägga Beacon (conical, 5 m in height) (58°27'N 11°11'E), standing on an above-water rock.

Uggenabben Beacon (white with a black band), 1½ miles ENE of Skägga, standing on the largest of several islets.

4 **Combined approach.** From the vicinity of 58°27'2N 11°14'2E the combined track continues ESE along the alignment of Söo Leading Lights for 7 cables.

5 When Söo Front Leading Light is distant 2 cables the recommended track shown on the chart passes N of the light and into a red sector (118°–122°) of Söo Rear Leading Light. This sector leads through the fairway for 5 cables to within ½ cable of the light. From this position the recommended track leads S then E and NE through the channel to the S of the island on which stands Söo Rear Leading Light, towards the harbour.

Berths

7.112

1 The deepest berth is Södra Kajen, with a length of 75 m and depths from 4.5 to 5 m alongside.

The longest berth is Ångbåtsbryggan, with a length of 120 m and depths from 4.0 to 4.5 m alongside.

There are four other berths.

Port services

7.113

1 **Repairs.** There is an engineering workshop with a slip which can accommodate vessels of 30 m LOA, 11 m width and 5 m draught.

Facilities. There is a doctor in the town.

Supplies. Fuel oil, water and provisions are available.

Sotenkanalen

General information

7.114

1 **Description.** Sotenkanalen (58°25'N 11°16'E), with a length of about 3 miles, least bottom width of 15 m and a channel draught (7.2) of 4 m, connects Hunnebostrand (58°26'N 11°18'E) (7.109) with Kungshamn, 5 miles SSW (8.17), through the archipelago route (7.4).

2 A swing bridge, which spans the middle of the canal, has a vertical clearance (1.9) of 7 m when closed.

Channel. The fairway is marked by dolphins, spar buoys and beacons, with the main direction from N to S. There is a speed limit of 5 kn in the channel and anchoring is prohibited except in emergency. Passage under sail is also prohibited.

3 **Sound signals** to be used by mariners transiting the canal are as follows:

- · Attention and reply signal for N-bound vessels
- – Attention and reply signal for S-bound vessels
- I am proceeding
- – I am stopped
- – · Request bridge opening for N-bound vessel
- – · Request bridge opening for S-bound vessel
- – – Mooring to the quay S of the bridge

4 **Note.** The bridge opening signal should be made when 5 cables from the bridge.

Light signals at the bridge:

Fixed red light. Bridge closed or not clear for transit.

Fixed green light. Bridge open and clear for transit.

Regulations. Copies of the canal regulations are available at the bridge.

Minor harbours

Chart 1402 (see 1.29)

Hamburgsund

7.115

1 **Description.** Hamburgsund (58°33'N 11°16'E), which lies on the E side of Hamburgsund, a narrow channel between Hamburgö and the mainland, is a fishing harbour, with a population of about 745.

2 Approach can be made from N or S through Hamburgsund which has a channel draught (7.2) of 4 m and a speed limit of 5 kn. The main entrance is from N, close E of the N end of Hamburgö.

Berths. The harbour contains a quay with a length of 40 m and depth of 5 m alongside. There are two other berths.

Chart 869

Bovallstrand

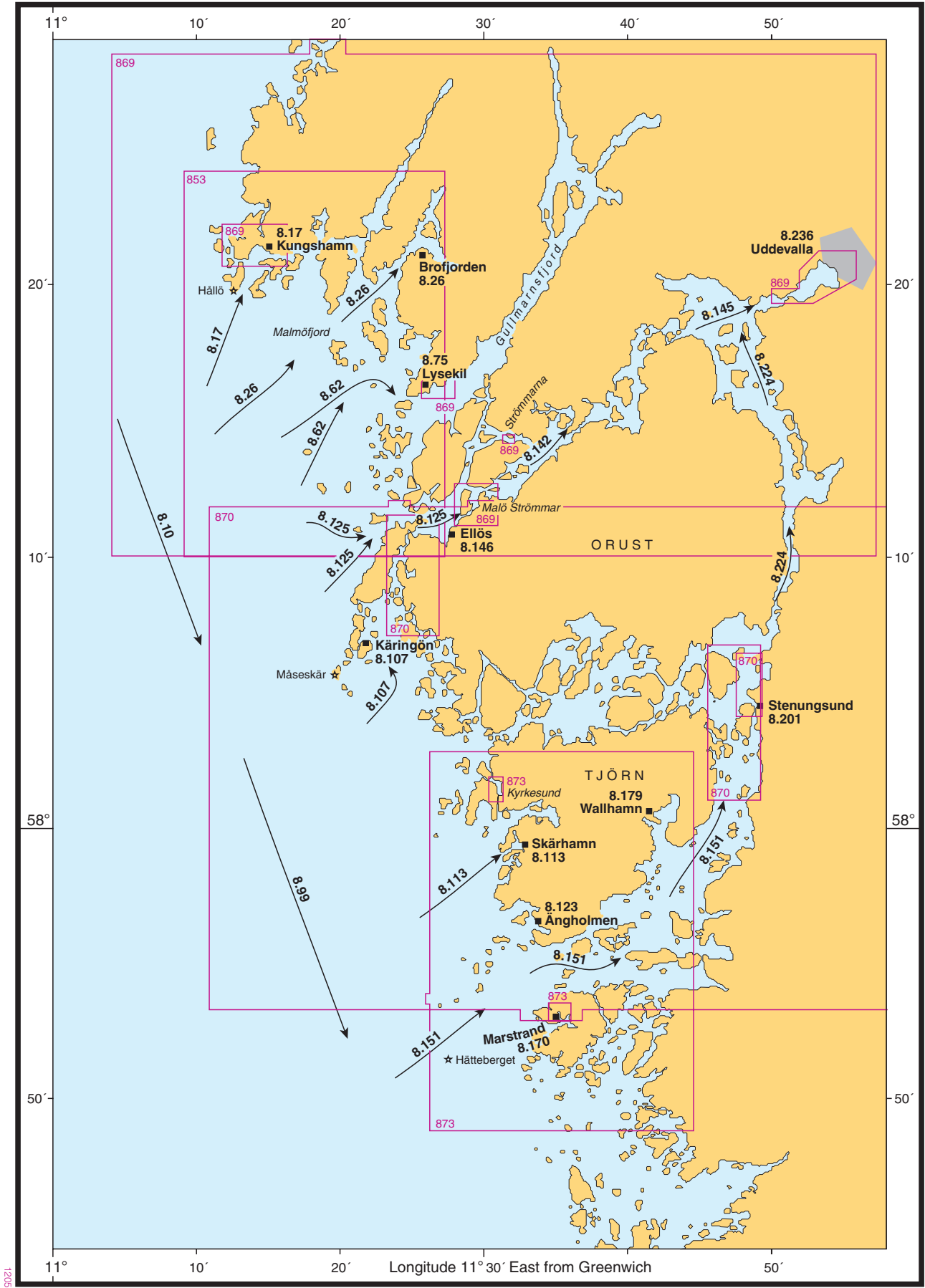
7.116

1 **Description.** Bovallstrand (58°29'N 11°20'E) on the S side of Bottnefjorden, is a loading place for stone, with a population of about 486. There is a speed limit of 5 kn in the harbour.

Directions. Approach is made from SW, as given at 7.111, or from NNW along the recommended tracks shown on the chart, with entry through Bottnefjorden, which has a channel draught (7.2) of 8 m.

2 **Berths.** The harbour contains a mole with a length of 48 m and depths of 4 m along both sides. There are two other berths.

Chapter 8 - Swedish coast from Hällö to Hätteberget



CHAPTER 8

SWEDISH COAST FROM HÅLLÖ TO HÄTTEBERGET

GENERAL INFORMATION

*Chart 1402***Scope of the chapter****8.1**

- 1 This chapter covers the W coast of Sweden and the offshore islands from Hållö (58°20'N 11°13'E) to Hätteberget (57°52'N 11°28'E), 30 miles SSE. It also includes five major harbours and the approaches to them, as given at 8.6 and 8.91. The chapter is arranged as follows:

- 2 Hållö to Måseskär (8.6).
Uddevalla and approaches (8.88).

Coastal passage**8.2**

- 1 From the vicinity of 58°18'N 11°03'E, about 6 miles WSW of Hållö, the coastal passage leads SSE for about 30 miles, in deep water outside the 50 m depth contour, as given at 8.10 and 8.99. Continuation of this passage SSE is given in *Baltic Pilot Volume 1*.

Inshore routes**8.3**

- 1 **Approach routes.** This chapter includes approach routes to the five major harbours (above) each of which is situated inside the outer chain of islands, or, in the case of Uddevalla (58°21'N 11°55'E), at the head of a succession of fjords. These routes, which can accommodate vessels with minimum draughts of 10 m, are lengthy and often intricate with strict limiting conditions. The outer approaches to Uddevalla, which cover a distance of some 35 miles, are described at 8.89.

- 2 **Archipelago channel.** An inner channel which is the continuation S of the Archipelago Channel (1.12), given at 7.4, is described at 8.7 and 8.92. This channel provides a continuous and well sheltered route inside the outer islands for most of its length.

- 3 **Inner coastal route.** To the S of Marstrand (57°53'N 11°35'E) an inner coastal route, which continues SSE for about 3½ miles to the S limit of this volume, is given at 8.94.

Topography**8.4**

- 1 The coast between Hållö and Hätteberget is much indented and fronted by innumerable islands, islets and rocks. The largest of these islands are Orust (58°10'N 11°40'E) and Tjörn, close S.
- 2 The principal fjords are Gullmarn (8.85), entered close S of Lysekil (58°16'N 11°26'E); and the approaches to Uddevalla through North Channel and South Channel, each of which is a chain of fjords between the largest islands fronting the coast and the mainland.

Vessel traffic service**8.5**

- 1 The area covered by this chapter lies within VTS Lysekil and VTS Marstrand. Participation in the VTSs is compulsory for the following vessels:
All vessels of 45 m or more in length.
All vessels of 300 grt or greater.
All tows of 45 m or more in length.
- 2 For details and a list of reporting points see *Admiralty List of Radio Signals Volume (6) 2*.

HÅLLÖ TO MÅSESKÄR

GENERAL INFORMATION

Introduction*Charts 869, 870***Area covered****8.6**

- 1 This section covers the coastal passage from Hållö (58°20'N 11°13'E) to Måseskär, 15 miles SSE, along a deeply indented section of the coast. It also includes an outline of the Archipelago Channel, as given at 8.7, and the approaches to the following harbours:
- 2 Brofjorden (58°21'N 11°25'E) (8.26), a tanker port for ULCC and VLCC which serves a large refinery.
Lysekil (58°16'N 11°26'E) (8.75), a commercial and fishing port.
Kungshamn (58°21'6N 11°15'0E) (8.17) a large fishing port.
- 3 The section is arranged as follows:
Coastal passage – Hållö to Måseskär (8.10).
Brofjorden and approaches (8.26).
Lysekil and approaches including Gullmarn (8.62).

Archipelago channel**Ferry crossing****8.7**

- 1 A line ferry crosses the channel at Torsvik (58°21'8N 11°20'8E). When ice build-up N of Malmö is appreciable, the steel lines on which the ferry runs are required to lie on the ice. When this occurs the channel is closed to other traffic, and local navigational warnings are issued.

Directions**8.8**

- 1 A continuous and well-sheltered inner channel (1.12), with a channel draught (7.2) of 6 m, extends from a position N of Hållö to a position 5 cables SW of Islandsberg Light (58°12'1N 11°24'3E). Local knowledge is required. This channel, which is shown on the largest scale charts and included in this text where it leads to an anchorage or harbour, connects the following ports and waterways:

- 2 From the S entrance to Kungshamn (58°21'6N 11°15'0E) (8.17), E along the channel close S of the mainland coast to a position SSE of Flåttarna Light (white lantern) (58°21'4N 11°17'4E).
- 3 Thence ENE across the entrance to Örnefjorden (8.27) and through the channel N of Malmö to a position S of Breviksudde Leading Lights (front light: white lantern; rear light: lantern on white pedestal) (58°21'8N 11°21'3E).
- 4 Thence S through the channel E of Malmö, clear of the Brofjorden designated anchorages (8.56), continuing SE towards, then through, the channel NE of Lilla Kornö (58°18'5N, 11°22'0E) (8.27) and Stora Kornö, close SE. This channel forms part of the approach to Lysekil from NW (8.62).
- 5 From a position close WSW of Hängdyn Light (red lantern on pedestal, on base) (58°17'5N 11°24'2E), the route continues SSE towards Stångholmen Light, 1½ miles SSE; then across the entrance to Gullmarn and the inner approach to Lysekil.
- 6 Thence SSW through the channel separating Gåsö (58°14'N 11°25'E) from Skaftölandet to a position E of Grötö Light (white lantern) (58°13'0N 11°24'3E) off the entrance to Grundsund (8.83); then S passing Islandsberg Light (red tower, 7 m in height), 9 cables S.

(Directions for the Archipelago Channel SE continue at 8.92)

8.9

- 1 If leaving the Archipelago Channel, continue SW through Hätterännan (8.136), passing Hättan Light (58°10'5N 11°22'4E) (8.135), thence into open waters.

COASTAL PASSAGE — HÅLLÖ TO MÅSESKÄR

General information

Charts 869, 870

Route

8.10

- 1 From a position 6 miles WSW of Hållö Light (58°20'N 11°13'E), the coastal passage continues SSE for about 15 miles, in deep water outside the 50 m depth contour, to a position 4 miles WSW of Måseskär Light (58°06'N 11°20'E).

Rescue

8.11

- 1 General information on search and rescue is given at 1.132. A coastal and liaison centre is established at Kungshamn (58°21'6N 11°15'0E) and rescue boats are available at Fjällbacka (58°36'N 11°17'E).

For further details see *Admiralty List of Radio Signals Volume 5*.

Natural conditions

8.12

- 1 **Currents.** The current usually sets N along the coast; however, the direction of flow is subject to meteorological conditions. A strong N-going current is created in the vicinity of Hållö when the wind blows from the S.
During strong winds or severe pressure changes, very strong currents can occur, especially in narrow passages.
- 2 **Climatic table.** See 1.229 and 1.237.

Directions (continued from 7.92)

Principal marks

8.13

Landmarks:

- 1 The two highest chimneys of Scanraff Oil Refinery (58°21'N 11°25'E), each with an elevation of 165 m, marked by red obstruction lights and surrounded by chimneys with burning flares, are visible from far out to sea.
The pilot lookout station at Fiskebäcksvik Light (58°20'3N 11°24'6E) (8.47) is easily identified.
- 2 Måseskär Light—tower (red rectangular boards on a white GRP tower, 13 m in height) (58°06'N 11°20'E) which stands SW of the old lighthouse (red and white chequered tower, 22 m in height) on the summit of Måseskär. Both are prominent.
- 3 **Major lights:**
Hållö Light (58°20'N 11°13'E) (7.90).
Dynabrott Light (58°17'8N 11°18'6E) and Brandskärsflak Light, close SE, (8.47).
Måseskär Light — as above.

Other aids to navigation

8.14

Racons:

- 1 Brofjordens angöring Light—buoy (58°15'0N 11°13'3E).
Brandskärsflak Light (58°18'N 11°19'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Hållö to Måseskär

8.15

- 1 From the vicinity of 58°18'N 11°03'E the coastal passage continues SSE, passing (with positions relative to Måseskär Light (58°06'N 11°20'E)):
WSW of Sörgrundsberget (12¾ miles NNW), which is marked 4 cables SSW by a light—buoy (S cardinal), thence:
- 2 WSW of Brofjordens angöring Light—buoy (safe water) (10¼ miles NNW), thence:
WSW of a designated anchorage area (7½ miles NW) (8.41) for ULCC and VLCC tankers, which is centred 4½ miles WSW of Bonden (8.74), thence:
- 3 WSW of the shoal, with depths of less than 20 m over it, which surrounds Skrämja (5½ miles N), a rock awash which is marked on its NW side by a spar buoy (W cardinal), thence:
WSW of Måseskär, from which Måseskär Light (8.13) is exhibited.

Useful marks

8.16

- 1 Radio mast (58°21'4N 11°15'1E), 75 m in height and marked by red obstruction lights.
Härmanö Huvud, on the SW extremity of Härmanö (58°10'N 11°23'E), which is a small, steep hill, 31 m high, prominent when bearing more than 045°.
(Directions continue for the coastal passage from Måseskär to Hätteberget at 8.103)
(Directions for the approach to Brofjorden are given at 8.47 and for the approach to Lysekil at 8.70)

Kungshamn and approaches

Chart 853

General information

8.17

- 1 **Position and function.** Kungshamn (58°21'·6N 11°15'·0E) is a large fishing harbour which includes Gravarne, on the W side of the peninsula of Sotenäs, and Fisketången (58°21'·4N 11°16'·0E), on its E side. It has a population of about 3144.
- 2 **Approach and entry.** The main approach to Gravarne, with a channel draught (7.2) of 8 m, is from SSW as shown on the chart. This port can also be approached from W through the N approach to Smögen (8.24); also from N as given at 8.25.
- 3 Fisketången can be approached from W, from the entrance to Gravarne; or from SSE, from the approach to Brofjorden. The channel into Fisketången has a channel draught (7.2) of 3 m and local knowledge is required.
- 4 **Traffic.** In 2004 the port was used by one vessel of 2652 dwt.

Arrival information

8.18

- 1 **Vessel traffic service.** VTS Lysekil (8.5) covers the approaches to Kungshamn.
Anchorage. In Åbyfjorden, about 4 miles E of Kungshamn, there are two charted anchorages in depths from 17 to 26 m, clay.
Pilots. See 8.42.
- 2 **Regulations.** There is a speed limit of 5 kn within the harbours, as indicated by warning notice boards, painted yellow and inscribed "HÖGSTA FART 5 KNOP".
Anchoring is prohibited within 25 m of the pipelines (1.69) and submarine cables laid across the harbour.
- 3 **Current.** A strong current is experienced off Kungshamn during winds from the S.
Ice does not usually obstruct navigation in the approach channel.

Harbour

8.19

- 1 **General layout.** Gravarne consists of an outer harbour known as Gulskärshamnen at its S end, and an inner harbour known as North Harbour, which are joined by fish-handling quays.
Fisketången consists of a small basin protected by a breakwater, situated on the SW side of an inlet, 7 cables E of Gravarne.

Directions

8.20

- 1 From the vicinity of 58°16'·7N 11°11'·0E, the alignment (023½°) of Gravarne Leading Lights (red lanterns) (58°21'·4N 11°14'·8E), situated to the S of Kungshamn, leads NNE for about 5 miles, through the fairway of the SW approach, passing (with positions relative to Hållö Light (58°20'N 11°13'E)):
- 2 ESE of Sörgrundsberget (3 miles SSW) (8.15), thence: WNW of Södra Åstabrott (1½ miles SSE) (8.55) and of Norra Åstabrott, 2½ cables NNW, thence: WNW of Fluna (1 mile SSE), an above-water rock, thence:
WNW of the shoal, with depths of less than 10 m, which extends 1½ cables W from Åsta (8 cables

SSE), a small islet at the S end of foul ground, thence:

- 3 ESE of Hamnebåden (4 cables S), which is marked 1 cable S by a spar buoy (E cardinal) which also marks the rocks extending 3 cables S from Hållö, and:
WNW of a shoal (6½ cables SE), with a charted depth of 3·8 m, which lies 1½ cables W of the islet of Mellanskär, thence:
WNW of the foul ground extending 1½ cables WSW from the islet of Stenskär (6 cables E), and:
- 4 ESE of the rocks which extend 1 cable E from Hamnskär (2 cables SSE), close to the SE side of Hållö, on which stands a white beacon, thence:
Close ESE of the foul ground surrounding Skäret i gapet (7 cables NE) on which stands a pole (4 m in height, radar reflector), thence:
WNW of the shoal surrounding Dödholmarna (1 mile NE), a group of islets and rocks, and:
- 5 ESE of Nissebåden (1 mile NE), a rock awash marked by a beacon with a ball topmark. This rock lies 3 cables E of Hatteflu Light (white pedestal, black base) which stands on a rock. Thence:
- 6 ESE of a 5·4 m patch (11½ cables NE), which is marked by a spar buoy (N cardinal), thence:
WNW of Gräsbåden (1¼ miles NE), a shoal with a least depth of 2·6 m over it, which is marked by a spar buoy (starboard hand).
- 7 When Gravarne Front Light is distant 3½ cables, the alignment (349½°) of leading lights (white triangles on posts, front light point up, rear light point down) (58°21'·5N 11°14'·3E) leads NNW for 3½ cables, passing ENE of the shoal surrounding Byttelocket Light (white structure on black cairn), 3½ cables S of the front light.
When the front leading light is distant 1 cable, course is altered to follow the recommended track shown on the chart which leads into Gravarne harbour.

8.21

- 1 **Useful marks** (positioned from Hållö Light):
Beacon (white square mark with a black centre), standing in the middle of Sälö (4 cables WNW). Sälö Fishing Cairn (white pedestal) stands 1 cable W of the beacon.
- 2 Pilot lookout tower on Smögen (1¼ miles N), which consists of a platform supported by posts, 7 m in height, surmounted by a pointed roof and flagstaff; best seen between 101° and 169°. Also the water tower, 2 cables NNE, which is white, funnel-shaped and visible at long range.
- 3 Kalebådan Light (white pedestal on black and white base) (1½ miles NE).

Berths

8.22

- 1 Gravarne:
Gulskärshamnen. The largest berth has a length of 130 m with a depth of 8 m alongside.
Fish handling berths. The largest has a length of 144 m with a depth of 5 m alongside.
North Harbour. The largest berth has a length of 58 m with depths from 5 to 5·5 m alongside.
There are 14 other berths.
- 2 Fisketången. The largest berth has a length of 135 m with a depth of 3·4 m alongside. There are three other berths.

Port services**8.23**

- 1 **Repairs.** Gravarne contains an engineering workshop, motor workshop and two slipways. The largest of the slipways can handle vessels of 400 dwt with a length of 70 m, width of 12 m and draught of 6 m.

Other facilities. Doctor and chemist in Kungshamn.

Supplies. Fuel, fresh water, ice and provisions are available.

Minor harbours**Smögen****8.24**

- 1 **Description.** The port of Smögen (58°21'N 11°14'E), which extends around the S and SE sides of the island of Smögen, consists of two harbours:

Gamla Hamnen in the sound between Smögen and Kleven, close S, which is shared between fishing vessels and small craft.

Nya Hamnen, an enclosed harbour NE of the town, which is exclusively for fishing vessels.

Smögen has a population of about 1604.

- 2 **Approach and entry.** This harbour can be approached from N, with a channel draught (7.2) of 6 m, by a channel entered close W of Bredberget (58°23'0N 11°12'2E), marked by a spar buoy (W cardinal), along the recommended track shown on the chart; or from S through the approach channel to Kungshamn (Gravarne) as given at 8.17.

- 3 **Local knowledge** is required for the approach from N.

Berths. The combined harbours contain over 1000 m of berthing space with depths from 3 to 7 m alongside.

Repairs can be carried out by an engineering workshop.

Hasselösund**8.25**

- 1 **Description.** Hasselösund (58°22'N 11°14'E), a fishing port on the NE side of Hasselön, can be approached from N or from S.

The approach from N is through a narrow, winding channel which is well marked and connects with the S end of Sotenkanalen (58°24'N 11°15'E) (7.114).

- 2 The approach from S is a continuation N of the approach to Kungshamn (Gravarne) (8.17) with a channel draught (7.2) of 4 m and a vertical clearance (1.9) of 26 m under Smögenbron, the bridge close N of Gravarne, which connects the island of Smögen with the mainland.

- 3 **Berths.** The harbour, which is well protected, contains a quay with a length of 75 m and a depth of 3 m alongside; and also a pier, with a length of 40 m along its head, with depths from 3.6 to 4.5 m alongside.

BROFJORDEN AND APPROACHES**General information**

Chart 853

Position and function**8.26**

- 1 Brofjorden, entered SE of Grötö (58°20'N 11°23'E), extends 4 miles NE. Scanraff Oil Refinery, which is served by Brofjorden Oljehamn (Oil Harbour), is situated on the SE side of the entrance to Brofjorden, near the entrance to Trommekilen. The harbour imports crude oil and exports refined oil products.

Topography**8.27**

- 1 Malmöfjord, the extensive fjord which fronts Brofjorden, lies SW and S of the S point of Malmö (58°20'N 11°20'E) and forms the outer approaches to Örnefjorden (58°23'N 11°19'E) and Åbyfjorden (58°23'N 11°24'E) as well as Brofjorden. Lilla Kornö, 1½ miles SE of the S point of Malmö, has a high, light-coloured summit.

Port limits**8.28**

- 1 The area of the port extends from the oil berths (58°20'8N 11°24'4E) to the island of Ryxö, 1¼ miles NNE.

Approach and entry**8.29**

- 1 Brofjorden is approached from seaward through Malmöfjord by one of two channels:

Main channel, from SW, which passes SE of Bondebrotten (58°18'N 11°17'E). This is the deepest and widest channel.

Secondary channel, from W, which passes N of Bondebrotten, with a channel draught (7.2) of 8 m.

- 2 The entrance channel is from SW, passing between Lindholmen (58°19'4N 11°23'0E) and Kåvra, 5 cables WNW.

Traffic**8.30**

- 1 In 2004 the port was used by 1465 vessels with a total of 22 522 345 dwt.

Port Authority**8.31**

- 1 **Address.** Skandinaviska Raffinaderi AB, Scanraff, S-543 81 Lysekil, Sweden.

Website. www.lysekil.se.

Email. mats.eggars@scanraff.se

Limiting conditions**Controlling depths****8.32**

- 1 Least channel draught (7.2) in the approach to the anchorages and berths are as follows:

Main channel from SW (8.29) to Råoljehamnen (8.45) – 25.0 m.

Continuation channel to Produkthamnen (8.45) – 14.4 m.

- 2 Main channel to anchorage E of Malmö (8.56) – 20.0 m.

Main channel to anchorage in Trommekilen (8.56) – 12.0 m.

Horizontal clearance**8.33**

- 1 The main channel in the approach to Brofjorden has a least width of 290 m, along a stretch of about 700 m between Dynabrott Light (58°17'8N 11°18'6E) and Brandskärsflak, 2¼ cables SSE.

Deepest and longest berth**8.34**

- 1 The deepest and longest berth is Råoljehamnen (8.57).

Density of water**8.35**

- 1 Density. 1.000 g/cm³.

Maximum size of vessels handled**8.36**

- 1 Crude oil tankers of 500 000 dwt with a draught of 25 m and product carriers of 60 000 dwt with a draught of 14.4 m.

Ice**8.37**

- 1 The harbour is kept open throughout the year. When necessary icebreaker tugs assist in the channel. For further information see 1.95.

Local weather**8.38**

- 1 Berthing of a VLCC alongside the crude oil berth (8.57) is restricted when any one of the following conditions prevail:

Visibility under 4 miles.

Wind force is more than 12 m/sec.

Current exceeds 1 kn at the outer buoys.

Arrival information**Vessel traffic service****8.39**

- 1 Brofjorden and its approaches lie within the area of VTS Lysekil as given at 8.5.

Notice of ETA**8.40**

- 1 ETA for VLCCs should be sent 72 hours in advance with amendments at 48 and 24 hours.
ETA for product tankers should be sent 48 hours in advance with amendments at 24 hours.

Outer anchorages**8.41**

- 1 An anchorage for ULCCs and VLCCs is established within 8 cables of position 58°11'N 11°11'E, as shown on the chart, in depths of more than 50 m.

Pilotage**8.42**

- 1 Pilotage is arranged either by telephone or through the Swedish Maritime Administration homepage www.sjofartsverket.se, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*. The pilot boarding positions are as follows:
- 2 Three miles SW of Brofjordens angöring Light-buoy (58°15'0N 11°13'3E) for tankers.
1½ miles WNW of Brofjordens angöring Light-buoy for other vessels.

Tugs**8.43**

- 1 There are two tugs, one of which is always available. When vessels larger than 60 000 dwt lie at the crude oil berth, two tugs are made available.
Under normal conditions six tugs are used to berth a VLCC. Additional tugs can be ordered.

Traffic regulations**8.44**

- 1 **Tug escort.** All loaded and ballasted crude oil tankers and all loaded product tankers of more than 20 000 dwt bound for Brofjorden are required to be escorted by tugs in the channel from the pilot boarding position (58°13'3N 11°08'7E).

- 2 **Prohibited areas.** Anchoring, fishing and diving are prohibited in the vicinity of Råoljehamnen (58°20'8N 11°20'6E) and Produkthamnen (58°21'2N 11°26'1E). The limits of the prohibited areas are shown on the chart.

Harbour**General layout****8.45**

- 1 Brofjorden Oljehamn consists of five major oil berths, of which the largest is situated at Råoljehamnen (58°20'8N 11°24'4E), on the W side of Scanraff. The other four are at Produkthamnen (58°21'2N 11°26'1E), a jetty which extends NE from the NE side of Scanraff.

Natural conditions**8.46**

- 1 **Current.** In general, a rather weak N current prevails in the approach area. However, the direction can vary in keeping with meteorological factors and, in certain conditions, the current can become strong and troublesome.
Wind. The prevailing wind blows from the W and SW.

Directions for the main channel**Principal marks****8.47**

- 1 **Landmarks:**

Chimneys at Scanraff Oil Refinery (58°21'N 11°25'E) (8.13).

Fiskebäcksvik pilot look-out tower (58°20'3N 11°24'6E).

Major lights:

- 2 Dynabrott Light (white concrete tower, red band, grey base, 26 m in height, floodlit and surmounted by a helicopter platform) (58°17'8N 11°18'6E).
Brandskärsflak Light (white tower, green band, grey base, 26 m in height, floodlit and surmounted by a helicopter platform) (58°17'6N 11°18'7E).
- 3 Lindholmen Mellersta Light (red tower, 13 m in height) (58°19'4N 11°22'6E).
Lindholmen Västra Light (red tower, 15 m in height) (58°19'5N 11°22'6E).
Lindholmen Östra Light (red tower, 3 m in height) (58°19'4N 11°22'7E).
- 4 Fiskebäcksvik Light (orange pilot lookout tower, 8 m in height) (58°20'3E 11°24'6E).
Stretudden nedre Light (white topmark on white tower, 4 m in height) (58°20'6N 11°24'3E).
Stretudden övre Light (white topmark on white tower, black top, 16 m in height) (58°21'2N 11°25'6E).

Other aids to navigation**8.48**

- 1 **Racons:**

Brofjordens angöring Light-buoy (58°15'0N 11°13'3E).

Brandskärsflak Light (58°18'N 11°19'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Outer approach from south-west**8.49**

- 1 **Leading lights:**

Front light. Lindholmen Mellersta Light (58°19'4N 11°22'6E) (8.47), the centre of three red towers which stand on the W part of Lindholmen, an islet on the SE side of the fairway. The other two towers form part of the clearing marks for this channel, as given at 8.50.

Rear light. Fiskebäcksvik Light (8.47) which stands on the mainland, 1½ miles from the front light.

- 2 From the vicinity of 58°14'N 11°10'E, close NE of the pilot boarding station for VLCCs (8.42), the alignment (050½°) of these lights leads NE for about 6 miles, through the fairway of the outer part of the main approach channel, passing (with positions relative to Dynabrott Light (58°17'·8N 11°18'·6E)):

NW of Brofjordens angöring Light-buoy (safe water) (4 miles SW), and:

- 3 Between No 1 Light-buoy (port hand) (2 miles SW), moored close S of a charted depth of 30 m, and No 2 Light-buoy (starboard hand), 5 cables SE of No 1 Light-buoy, moored 1 cable NW of a charted depth of 18·4 m, thence:
- 4 SE of the shoal extending 3½ cables SE from Djupstabåden (1½ miles WSW), thence:
Between No 3 Light-buoy (port hand) (8 cables SW) and No 4 Light-buoy (starboard hand), thence:
- 5 SE of the shoal (3 cables SW), with a charted depth of 8 m, which lies parallel to the track to the SW and NE of Dynabrott, the SE rock of Bondebrotten, a group of above-water and submerged rocks which extend 1 mile NW. Dynabrott Light (8.47) is exhibited from Dynabrott. And:
- 6 NW of a shoal from which Brandskärsflak Light (8.47) is exhibited.

8.50

1 Channel limit marks:

- 1 Lights in line (051½°) of Lindholmen Västra Light (58°19'·5N 11°22'·6E) (8.47), standing close N of Brofjorden front leading light (Lindholmen Mellersta Light), with the rear leading light (Fiskebäcksvik), indicates the NW limit of the channel from its entrance to a position S of Dynabrott.
- 2 Lights in line (049½°) of Lindholmen Östra Light (58°19'·4N 11°22'·7E) (8.47), standing close SE of Brofjorden front leading light (above), with the rear leading light (above), indicates the SE limit of the channel from its entrance to a position W of Brandskärsflak.
- 3 The white sector (226½°–052¾°) of Dynabrott Light indicates the NW limit of the channel between its entrance and Kåvra, 2¼ miles NE of the light. The white sector (045¾°–226½°) of Brandskärsflak Light indicates the SE limit of the channel between its entrance and Långholmen, 2½ miles NE of the light.

Inner approach from south-west

8.51

1 Leading lights:

Front light: Stretudden nedre Light (58°20'·6N 11°24'·3E) (8.47), exhibited from near the coast on the E side of Brofjorden.

Rear light: Stretudden övre Light (9 cables from front light) (8.47).

- 2 From a position 1 cable SE of Dynabrott Light (58°17'·8N 11°18'·6E) the alignment (046°) of these lights continues to lead NE through the fairway of the inner part of the channel for 2¾ miles, passing (with positions relative to Svensholmen Light (58°18'·7N 11°21'·9E)):
- 3 NW of the shoal surrounding Tån (1½ miles SW), the NW islet of Västingskären, a group of islets and

rocks which extend 8 cables S. Tån Light (floodlit white tower, 8 m in height) is exhibited from the NW end of the islet. Thence:

- NW of Store både (7 cables SW), a shoal which is marked by spar buoys (E and W cardinal), thence:
- 4 SE of Hästebåden (8 cables WNW), the SE edge of a shoal which is marked by a light-buoy (port hand) and:
NW of Kornögrundet, a detached shoal, with a charted depth of 17·2 m, marked by a light-buoy (starboard hand), which lies 3 cables W of Svensholmen Light (white tower, 7 m in height), thence:
- 5 SE of Kåvra Light (white tower, black base, 11 m in height, floodlit) (8 cables N) which stands 1½ cables S of the islet Kåvra, thence:
NW of Lindholmen (8 cables NNE) (8.49), thence:
SE of a 2·8 m patch (1 mile N) which is marked on its S side by a spar buoy (port hand), and on its E side by Lumpan Light-buoy (port hand).

6 Useful mark:

Tinnholmen Light (white tower, 8 m in height) (1¼ miles NE) exhibited from Tinnholmen, a small islet close off the mainland. Windmotors (43 m and 46 m in height, red lights) stand at the N and S ends, respectively, of Basteviksholmen, 6 cables S of the light.

Entering harbour

8.52

- 1 When Stretudden nedre Light is distant 1¼ miles, the course is altered to follow the recommended track shown on the chart which leads into harbour, passing (with positions relative to Stretudden nedre Light):
- 2 NW of Holmsundsådan Light-buoy (starboard hand) (6½ cables SW) which is moored 1 cable NW of a shoal with a least depth of 5·7 m over it, and:
SE of Grötö Light-buoy (S cardinal) (7½ cables SW), moored 3 cables E of the island of that name, thence:
SE of Karlsvik Light-buoy (port hand) (6 cables WSW) which is moored 1 cable SE of a detached patch with a charted depth of 1·5 m over it, thence:
- 3 NW of the spit which extends 2 cables SW from Stretudden and is marked on its W side by a light-buoy (starboard hand), thence:
As required for berthing.

Directions for the secondary channel

Principal marks

8.53

1 Landmarks:

Chimneys at Scanraff Oil Refinery (58°21'N 11°25'E) (8.13).
Fiskebäcksvik pilot look-out tower (58°20'·3N 11°24'·6E) (8.47).

Other aids to navigation

8.54

1 Racons:

Brofjordens angöring Light-buoy (58°15'·0N 11°13'·3E).
Brandskärsflak Light (58°18'N 11°19'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Outer approach from west

8.55

1 Leading marks:

Front mark. Svensholmen Light (58°18'·7N 11°21'·9E) (8.51).

Rear mark. Ramsvik Beacon (white board, 7 m in height and 3 m wide), standing on the mainland 1¼ miles from the front light.

2 From the vicinity of 58°18'·5N 11°13'·0E the alignment (087°) of these marks leads E for 4 miles through the fairway of the secondary approach channel (8.29), within a white sector (085½°–088½°) of Svensholmen Light, passing (with positions relative to Dynabrott Light (58°17'·8N 11°18'·6E)):

3 S of Södra Åstabrott (2¾ miles WNW), the S of a chain of shoals which is marked on its S side by a spar buoy (S cardinal), thence:

Close S of an unmarked shoal (2¼ miles WNW), with a depth of 9·8 m over it, lying on the N limit of the white sector, thence:

4 N of the N edge of the shoal surrounding Bondebrotten (9 cables NW) which is marked by a spar buoy (starboard hand), and:

S of the S edge of the shoal surrounding Malmöbrotten (1 mile NNW), a small group of rocks, marked on its S side by a spar buoy (port hand).

5 When Svensholmen Light is distant 7 cables the track is altered NE to follow the directions given at 8.51.

Anchorage berths and minor harbours

Anchorage

8.56

1 Outer anchorage for VLCCs and ULCCs is given at 8.41.

East of Malmö. Four anchorages, designated A to D, are established to the E of Malmö (58°20'N 11°20'E), as shown on the chart. These anchorages have good holding in 30 m, clay, and can be used for vessels up to 60 000 dwt.

2 South-east of the fairway. Designated anchorages E to H lie within 7 cables SE of the approach channel to Brofjorden. In area G, 2½ cables NW of Tinnholmen (58°19'·5N 11°23'·8E), the anchorage is in depths of about 30 m, clay, clear of submarine power cables (1.69) shown on the chart.

Trommekilen. Vessels up to 10 000 dwt can be anchored in area I, in Trommekilen (58°21'·3N 11°26'·7E), as shown on the chart, in 19 m, clay. This anchorage is sheltered but has limited space and the holding is not particularly good.

Alongside berths

8.57

1 Råöljehamnen (58°20'·8N 11°24'·4E), the crude oil berth, which has a length of 135 m with depths of 28 m alongside, can accommodate tankers up to 500 000 dwt. Vessels are normally berthed port side alongside.

See 8.38 for berthing limitations.

2 Produkthamnen (58°21'·2N 11°26'·1E), the terminal for refined products, which extends 380 m NE from the S shore of Trommekilen, contains four berths. The outer berths (2 and 3), which have a length of 80 m with a depth of 16 m alongside, can accommodate vessels of 60 000 dwt, with a maximum length of 230 m.

3 Other berths. There are three other minor berths within the harbour area.

Minor harbours

8.58

1 Stora Kornö (58°18'·2N 11°22'·6E) contains a small fishing harbour which is protected by a breakwater and has a depth of 2·5 m alongside two small jetties.

Lilla Kornö (58°18'·5N 11°22'·1E) contains a small fishing harbour on its NE side which is protected by a breakwater and has a depth of 3 m alongside two jetties.

Fuel oil, water and provisions can be supplied.

2 Basteviksholmen (58°19'·0N 11°23'·7E). At the N end of Basteviksholmen there is an 18 m long quay with a depth of 9 m alongside. It was reported in 2004 that the berth is used to handle Ro–Ro and general cargo.

Malmö Fishing Harbour (58°21'·0N 11°20'·6E) contains moorings for 50 small vessels in depths from 3 to 4 m. This harbour also contains a small boat–yard.

Fuel oil, water and provisions can be supplied.

Port services

Repairs

8.59

1 Repair facilities are available in Lysekil (8.75).

Other facilities

8.60

1 Deratting can be carried out; Deratting and Exemption Certificates can be issued; reception facilities for dirty ballast and tank washings are available.

Supplies

8.61

1 Fuel oil and fresh water can be supplied alongside; provisions and ship's stores are available from Lysekil (8.75).

LYSEKIL AND APPROACHES INCLUDING GULLMARN

General information

Charts 869, 8531

Routes

8.62

1 Deep–water approach. The deep–water approach to Lysekil (8.75), from a position 5 cables SE of Brofjorden angöring Light–buoy (58°15'·0N 11°13'·3E), leads ENE to a position 1 mile ENE of Gäven Light (58°16'N 11°21'E); then generally SE for 1¼ miles to a position ¼ cables NW of Flatholmen light (58°15'·7N 11°24'·8E); then E towards the harbour.

2 Other approaches. Lysekil can also be approached as follows:

From NW. From a position N of Svensholmen Light (58°18'·7N 11°21'·9E), generally SE along the recommended track shown on the chart, with a channel draught (7.2) of 8 m. This route forms part of the Archipelago Channel (8.7).

3 From W. From position 58°16'N 11°18'E, generally E along the recommended track shown on the chart, with a channel draught (7.2) of 8 m. This track should only be used in calm winds and with good visibility.

- 4 From SW. From a position 5 cables NW of Bonden (58°12'6N 11°18'8E), NE along the recommended track shown on the chart, with a channel draught (7.2) of 8 m. This approach joins the deep-water approach and also the approach from W, in a position 4 cables SSW of Gäven Light. In haze this route has the advantage of a recommended anchorage (8.82) to the E of Bonden.
- 5 From S. From a position close SW of Hättan (58°10'5N 11°22'4E), generally NNE along the recommended track shown on the chart, with a channel draught (7.2) of 8 m. This route also forms part of the Archipelago Channel (8.7).
- 6 **Directions** are given for the deep-water approach; and also for the approach from SW with a continuation along the approach from W.

Topography

8.63

- 1 The archipelago fronting the approach to Lysekil and Gullmarn is rocky, and of varying heights. Islandsberg, near the SW end of the island of Skaftölandet (58°12'N 11°25'E), is a dark hill that is difficult to distinguish from seaward.

Controlling depth

8.64

- 1 The deep-water approach, as described at 8.62, has a channel draught (7.2) of 10 m to the anchorage S of Lysekil (8.75).

Pilotage

8.65

- 1 Pilotage is arranged either by telephone or through the Swedish Maritime Administration homepage www.sjofartsverket.se, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6* (2). The pilot boarding positions are as follows:
- 2 Three cables NW of Brofjordens angöring Light-buoy (58°15'0N 11°13'3E).
Within the archipelago to the S of Lysekil.

Vessel traffic service

8.66

- 1 Lysekil and its approaches lie within the area of VTS Lysekil which is mandatory for certain vessels and is described in *Admiralty List of Radio Signals Volume 6* (2).

Traffic regulations

8.67

- 1 **Speed limits** are established as follows:
15 kn in the entrance to Gullmarn (58°15'5N 11°26'5E).
5 kn within the area between Blåbergsholmen (58°15'N 11°26'E) and the coast of Skaftölandet, close SE, in the vicinity of a research station.
- 2 **Restricted areas.** There are restricted areas in the approaches, in which anchoring, trawling and seabed operations are prohibited, as follows:
Between the parallels of 58°10'5N and 58°13'5N and the meridians of 11°13'5E and 11°17'9E.
- 3 In a small area bounded N by Flatholmen (58°15'6N 11°24'4E), SW by Usholmen, SE by Gråskären and NE by Spättan.

Submarine cable and pipeline

8.68

- 1 Anchoring is prohibited within the vicinity of a submarine cable which extends SSE, and of a pipeline (1.69) which extends SE across the entrance to Gullmarn from the coast in position 58°16'1N 11°26'0E, as shown on the chart. The line of the cable (163°) is indicated by two beacons on shore.

Ferry

8.69

- 1 A passenger ferry plies between Lysekil and Fiskebäckskil, 1½ miles SSE.

Directions

Principal marks

8.70

- 1 **Landmarks:**
Valboröset (58°17'1N 11°26'3E), a light-coloured hill with a cairn and mast on its summit, which slopes gradually on its N and S sides.
Lysekil Church spire, 8 cables S, which is 90 m in height and prominent from seaward.
- 2 **Major lights:**
Dynabrott Light (58°17'8N 11°18'6E) (8.47).
Brandskärsflak Light (58°17'6N 11°18'7E) (8.47).

Other aids to navigation

8.71

- 1 **Racons:**
Brofjordens angöring Light-buoy (58°15'0N 11°13'3E).
Brandskärsflak Light (58°18'N 11°19'E).
For details see *Admiralty List of Radio Signals Volume 2*.

Deep-water approach

8.72

- 1 **Leading marks:**
Front mark. N extremity of the islet Berggylteskär (58°16'3N 11°22'4E).
Rear mark. Valboröset (8.70), 2¼ miles ENE.
- 2 From the vicinity of 58°14'7N 11°14'2E, 5½ cables SE of Brofjordens angöring Light-buoy, the alignment (069°) of these marks leads ENE for about 4 miles, within a white sector (053½°–088°) of Gäven Light (red lantern on a white tower, black band, 9 m in height) (58°16'N 11°21'E) for the first ¾ miles, passing (with positions relative to Gäven Light):
- 3 NNW of a wreck, with a charted depth of 11 m, which lies within the white sector, 4 cables WNW of Tovas ungar (¾ miles SW), a group of rocks awash which are marked on their W side by a light-buoy (W cardinal), thence:
SSE of a shoal, with a least charted depth of 16 m (2½ miles WSW), which lies within the white sector of the light, thence:
- 4 SSE of Trillingesand (6 cables WSW), which lies 2 cables SSW of Trillingarna, a group of islets and rocks, and is marked at its SE end by a spar buoy (port hand), thence:
NNW of the shoal surrounding (5½ cables SSW) which has two heads with depths of 8.5 m over them, thence:
- 5 SSE of Gäven, a small islet on which stands Gäven Light and, on its SW extremity, a white beacon.
After passing Gäven Light the track is adjusted to follow the recommended track shown on the chart, within a white sector (056½°–059½°) of Gulsören Light (white tower,

- 6 m in height) (58°16'8N 11°23'4E) for about 1 mile, passing (with positions relative to the light):
- 6 NNW of a detached 8.5 m patch (1¼ miles SW), thence:
SSE of a shoal (1 mile WSW), with a least depth of 5.2 m over it, which is marked on its SE side by a spar buoy (port hand), thence:
 - 7 NNW, distant 1 cable from Berggylteskär (7 cables SW) and the bank extending 2½ cables SW from it, and:
SSE of a detached 8.5 m patch (7 cables WSW).

8.73

- 1 When Gulsören Light is distant 4½ cables, the recommended track shown on the chart alters gently towards the SE, then continues SE for 8 cables within a white sector (129°–138½°) of Flatholmen Light (white lantern) (58°15'7N 11°24'8E), passing (with positions relative to Gulsören Light):
SSW of a 4.7 m patch (1½ cables S) which lies off the foul ground extending 1 cable S from the S islet of Gulsören, thence:
- 2 Close NE of an 11.9 m rocky patch (4 cables S) which lies 2½ cables NNE of the N islet of Jämningarna and is within the white sector of Flatholmen Light. A spar buoy (starboard hand) (5½ cables S) marks the edge of the shoal extending N from the islet; this buoy is moored 1 cable S of the 11.9 m rock. Thence:
- 3 SW of the foul ground fringing Skällholmen (6½ cables SE), thence:
NE of the shoal extending 2½ cables NE from the S islet of Jämningarna (8 cables S), which is marked at its NE end by a spar buoy (starboard hand). A beacon (white with a black band) stands on the islet. Thence:
- 4 SW of Stångebådan (8½ cables SE), which is marked on its E extremity by a spar buoy (starboard hand), thence:
SW of the shoal extending 1 cable SW from Stångholmen (1 mile SE) on the E end of which stands Stångholmen Light (white lantern).
- 5 When Flatholmen Light is distant 1½ cables the recommended track shown on the chart leads E into Gullmarn (8.85) to a position S of Släggabåden Light (white tower, grey base, 8 m in height, floodlit) (58°16'0N 11°26'3E) which stands on a reef on the S side of the entrance to Södra hamnen. A rock, with a depth of 2 m or less over it, lies 1½ cables N of the light and is marked on its E side by spar buoy (port hand).

*(Directions continue for Lysekil at 8.79
and for Gullmarn at 8.86)*

Approach from south–west**8.74**

- 1 From the vicinity of 58°11'N 11°16'E, the line of bearing, 027°, of Gäven Light (58°16'3N 11°21'0E), within a white sector (024°–030°) of the light, leads NNE along the recommended track shown on the chart for 5½ miles, passing (with positions relative to the light):
Through a charted area (5 miles SW) (8.67) in which it is dangerous to anchor, fish or dive, and:
- 2 WNW of Bonden (4 miles SSW), a high islet with gradual sloping sides which can be identified against the mainland background by its almost black appearance. A beacon (white, with a staff and red ball topmark, 8 m in height) stands in the middle of the island. Thence:

- 3 ESE of SV Flak (3½ miles SW) and of SÖ Flak (3 miles SW) which lie 3 cables SSW and SE of Tova, a small dark rock, most easily distinguished from SW, which lies on a reef amidst shoals which extend up to 5 cables from it, and:
- 4 WNW of Bredbåden (2¾ miles SSW), thence:
WNW of Mellankastberget (2¼ miles SSW), thence:
Over the shoal, with charted depths of less than 20 m, which surrounds Sands bådar (6 cables SSW).
When Gäven Light is distant 5 cables the track is altered gently to ENE, along the recommended track shown on the chart for the deep water route given at 8.72.
- 5 From the same position an alternative track, with a channel draught (7.2) of 8 m, leads E within the approach to Lysekil from W (8.62). To follow this approach, the line of bearing, 095°, of Flatholmen Light (58°15'7N 11°24'8E) (8.73) leads E for 1½ miles along the recommended track shown on the chart, within a white sector (094½°–096°) of the light, passing (with positions relative to the light):
- 6 Close N of the N head of Sands bådar (2 miles W), marked by a spar buoy (starboard hand, thence:
S of an 8.5 m patch (1¾ miles W), marked by a spar buoy (port hand), thence:
N of Harpöbådar (1½ miles W) which is marked at its N end by a spar buoy (starboard hand), thence:
- 7 Close S of a detached shoal (1¼ miles W), with a charted depth of 9.6 m, thence:
N of the shoal surrounding Byxeskären (1 mile W), two small islets on the E—most of which stands Byxeskären Light (white concrete tower, 5 m in height) and a beacon (white with a green band), and:
- 8 Very close S of Jämningsbåde (9 cables W), which lies on the N edge of the white sector and is marked on its W side by a spar buoy (port hand), thence:
S of the foul ground extending ½ cable S from the S islet of Jämningarna (7½ cables WNW) (8.73).
- 9 When Flatholmen light is distant 6 cables the recommended track shown on the chart alters to the N of E, within a white sector (083°–085°) of Släggabåden Light (58°16'0N 11°26'3E) (8.73) for 6 cables, then continues along the track of the deep–water route (8.73).
*(Directions continue for Lysekil at 8.79
and for Gullmarn at 8.86)*

Lysekil

Chart 869 plan of Lysekil

General information**8.75**

- 1 **Position.** Lysekil (58°16'N 11°26'E) is situated about midway between Gothenburg and the Norway–Sweden border. It is located on the NW side of the entrance to Gullmarn (Gullmarnsfjorden).
- Function.** This is a commercial and fishing harbour with a population of 14 767 (2004). It handles paper, pulp, sawn wood, container, bulk and general cargoes. There are several marinas in and around the town.
- 2 **Traffic.** In 2004 the port was used by 269 vessels with a total of 801 054 dwt.
- Port Authority:**
- Address.** Lysekils Hamnförvaltning, Gullmarskajen, Hamnkontoret S–453 80 Lysekil, Sweden.
- Website.** www.lysekil.se.
- 3 **Email.** olle.samuelsson@lysekil.se.



Lysekil from SE (8.75)

(Photograph – Port of Lysekil)

Limiting conditions

8.76

- 1 **Controlling depth.** The channel draught (7.2) is 9.1 m into Södra Hamnen and the main commercial berths.

Deepest and longest berth. The deepest and longest berth is Grötörevkajen, the container berth (8.80).

Density of water. About 1.025 g/cm³.

- 2 **Maximum size of vessel handled.** The maximum size of vessel handled was 50 000 dwt.

Ice. The port is seldom ice-bound.

Local weather. In poor visibility it is advisable to make for the temporary anchorage (8.82) to the E of Bonden (58°12'6N 11°18'8E).

Arrival information

8.77

- 1 **Vessel traffic service.** Lysekil and its approaches lie within the area of VTS Lysekil which is mandatory for certain vessels and is described in *Admiralty List of Radio Signals Volume 6* (2).

Outer anchorage. See 8.82.

Pilotage. See 8.65.

- 2 **Tugs** are available, given 12 hours notice.

Restricted area. There is a restricted area between Grötö (58°16'4N 11°27'0E) and Tova Island, 2½ cables S.

Speed limits. Vessels are limited to a speed of 5 kn in Södra Hamnen, the inner harbour and Norra Hamnen.

Harbour

8.78

- 1 **General layout.** The container berth, Grötörevkajen, is situated on the E side of the Grötö peninsula (58°16'4N 11°27'2E), and the other commercial berths are located on the N side of Grötö, between the peninsula and the town. Berths for local traffic, the fishing harbour and a marina are located in Södra Hamnen (58°16'3N 11°26'5E), on the SW side of the town.

- 2 **Degaussing range.** A degaussing range, which is established 1 cable off the S side of Grötö (58°16'4N 11°27'0E), consists of seven dolphins in a line 1 cable in length. Two fixed red lights are displayed on the E and W dolphins. Anchoring and fishing are prohibited near the range, as shown on the chart.

- 3 **Currents** are weak in the vicinity of Lysekil. The prevailing wind is from SW to W.

Directions

(continued from 8.73 and 8.74)

8.79

- 1 From the position S of Släggabåden Light (58°16'0N 11°26'3E) the recommended track into Södra Hamnen, as shown on the chart, leads N between Släggabåden and

Lysekil Redd Light (white pedestal), 5 cables ENE, exhibited from Tova, an above-water rock.

Basins and berths

8.80

- 1 **Anchorage.** The inner anchorage lies in Lysekil Redd, in the immediate vicinity of the harbour, to the S of Tova Island (58°16'1N 11°27'2E) or E of Grötörev, in depths from 25 to 30 m.
- 2 **Alongside berths.** The longest and deepest berth, Grötörevkajen, on the E side of Grötö, has a length of 190 m with a depth of 11.5 m alongside. This is the container berth. Grötökajen, on the N side of the peninsula, has a length of 160 m with a depth of 7.0 m alongside.
- 3 Gullmarskajen, N of Grötökajen, has a length of 170 m with a depth alongside of 9.5 m.

Södrahamnen, comprising the berths for local traffic and the fishing harbour, has depths from 3.0 to 7.0 m.

Port services

8.81

- 1 **Repairs.** Small repairs can be carried out in an engineering workshop and yard at Lysekil.
Other facilities: authorised compass adjuster available from Göteborg; degaussing facility (8.78); deratting can be carried out and Deratting and Exemption Certificates issued; hospital in Lysekil; there are limited facilities for the reception of oily waste.
- 2 **Supplies.** Fuel oil, diesel and fresh water are available. Provisions can be obtained.

Anchorage and minor harbours

Outer anchorage

8.82

- 1 Temporary anchorage, which is sheltered from W and SW winds, can be obtained 3 cables ENE of Bonden Beacon (58°12'5N 11°18'8E), in depths from 13 to 20 m, sand and mud, as shown on the chart. An 8 m patch lies 4½ cables NE of the beacon.

Grundsund

8.83

- 1 **Description.** Grundsund (58°13'N 11°25'E), a well-sheltered fishing and small craft harbour, protected by a breakwater, contains 50 berths for small vessels in depths from 3.5 to 4.7 m. The S entrance channel for Grundsund has a limiting depth of 2 m. A speed limit of 3 kn is in force within the harbour.
- 2 **Supplies.** Fuel is available.

Fiskebäckskil

8.84

- 1 **Description.** Fiskebäckskil (58°15'N 11°28'E), with a population of about 483, is a fishing station situated in the

SE corner of a bay on the SE side of the entrance to Gullmarn.

- 2 **A biological station** is situated on the E side of the entrance to the bay and a zoological station is situated 5 cables W of the port. Both of these stations are connected to Lysekil, 1¼ miles NW, by a water pipeline, as shown on the chart and marked by beacons on shore. Anchoring is prohibited within 150 m of the pipeline.
- 3 **Alongside berths.** The largest berth has a length of 45 m with a depth of 4 m alongside. There is one other berth.

Supplies. Fuel oil, water and provisions can be supplied.

Gullmarn

General information

8.85

- 1 **Description.** Gullmarn, or Gullmarsfjord, extends 10 miles NE from Lysekil (58°16'N 11°26'E) to Tungenäse Nabb, where it divides into two arms; from this point, Färlevfjorden branches N for 5 miles and Saltkällefjorden continues NE to Munkedals Havn (58°26'N 11°40'E).
 - 2 **Prohibited area.** A prohibited area exists 2 cables S of the N entrance point of Gullmarsvik (58°23'N 11°39'E). When occasionally closed to navigation the area may be marked by a light-buoy and buoys with flags may be moored in the area.
 - 3 **Submarine cables.** Many submarine cables have been laid across Gullmarn; their positions are shown on the chart.
- Ferry.** A ferry service operates across the fjord from Finnsbo (58°18'N 11°30'E).

Directions

(continued from 8.73 and 8.74)

8.86

- 1 From the position S of Släggabåden Light (58°16'0N 11°26'3E) the track leads generally NNE in mid-channel through Gullmarn, the chart being sufficient guide. The fjord is almost free of dangers.

Anchorage

8.87

- 1 Good anchorage can be obtained by vessels of moderate size off Munkedals Havn in depths up to 20 m over a bottom of mud. Vessels may also anchor in a cove off Saltkällan, 1 mile E of Munkedals Havn, in depths of 13 m over a bottom of mud.
- 2 Care is necessary at both anchorages to avoid the S edge of the shallow bank which extends from the mouth of Örekilsälven.

UDDEVALLA AND APPROACHES

GENERAL INFORMATION

Charts 869, 870, 873

Area covered

8.88

- 1 This section covers the port of Uddevalla (58°21'N 11°55'E) (8.236) with its widespread and lengthy approaches from seaward, which, on the seaward side, extends from Måseskär (58°06'N 11°20'E) to Hätteberget, 15 miles SSE. Within these approaches there are two other

major ports, many minor ports and a large number of harbours suitable for small craft.

- 2 The section is arranged as follows:
Coastal passage – Måseskär to Hätteberget (8.99).
North channel to Uddevalla (8.125).
South channel to Uddevalla – S part (8.151).
Wallhamn (8.179).
Stenungsund (8.201).
South channel to Uddevalla – N part (8.224).
Uddevalla (8.236).

Outer approaches to Uddevalla

8.89

- 1 **North outer approach.** This approach leads through the North Channel to Uddevalla which leads NE between the NW side of Orust (58°12'N 11°40'E) and the mainland, as given at 8.125. For limiting conditions see 8.126.
- 2 **South outer approach.** This approach leads through the South Channel to Uddevalla which is given in two parts. The combination of these parts provide the deepest and widest route with the most headroom.
- 3 The S part of the channel leads generally N between the SE and E sides of Tjörn (58°00'N 11°40'E) and the mainland, as given at 8.151. For limiting conditions see 8.152. The N part of this channel continues N between Orust and the mainland, as given at 8.224. For limiting conditions see 8.225.
- 4 **West outer approach.** This approach, which leads through an intricate channel between the N side of Tjörn and the S side of Orust, has a channel draught (7.2) of 3.2 m and a vertical clearance as given for Skåpesund, below. As it is suitable only for coasters in which local knowledge is available, full directions are not given in this text. The recommended track leads as follows:
 - 5 From Kråkefjord (58°03'N 11°30'E), which forms part of the Archipelago Channel (8.92), generally NE through Strömsund, close E, using the channel NW of Vannholmen, which is spanned by an overhead cable with a vertical clearance (1.9) of 32 m; into the SW end of Hästeskärsfjorden (58°03'5N 11°31'5E). There is usually a W-going current in Strömsund.
 - 6 Thence ENE for 1¾ miles through Hästeskärsfjorden, using the channel N of Kråkholmen, and on into Stigfjorden.
 - 7 From the SW end of Stigfjorden (58°04'N 11°35'E) the track leads generally NE for about 3 miles to the NW end of Skåpesund (58°05'6N 11°42'2E), which connects the E end of Stigfjorden with a channel leading into Askeröfjorden, 2 miles SE, passing under a bridge with a vertical clearance (1.9) of 21 m. The speed limit is 5 kn.

Vessel traffic service

8.90

- 1 The North Channel leading to Uddevalla lies within VTS Lysekil; all other approaches to Uddevalla lie within VTS Marstrand. For further information see 8.5.
Mariners intending to pass through Malö Strömmar (58°12'N 11°30'E) should additionally report in accordance with 8.127 on reaching reporting point No 9 (inward bound) or No 8 (outward bound).

Harbours

8.91

- 1 **Major harbours,** given in order inwards from the entrance to the South Channel to Uddevalla:
 - Wallhamn (58°01'N 11°42'E) (8.179), the principal vehicle handling port in Sweden.
 - Stenungsund (58°05'N 11°49'E) (8.201), a major petro-chemical port.
 - 2 Uddevalla (58°21'N 11°55'E) (8.236), which contains several major ports for handling various natural and commercial products.
- Minor harbours:**
- Käringön (58°07'N 11°22'E) (8.107), a large fishing harbour.

- 3 Skärhamn (57°59'5N 11°32'6E) (8.113), a commercial harbour and oil port.
- Ängholmen (57°57'N 11°34'E) (8.123), an industrial harbour.
- Ellös (58°11'N 11°28'E) (8.146), an industrial harbour.
- 4 Marstrand (57°53'N 11°35'E) (8.170), a small commercial harbour and fishing port.

Archipelago Channel from Gullholmen to Marstrand

(continued from 8.8)

8.92

- 1 A continuous and well-sheltered inner channel (1.12), with a channel draught (7.2) of 4.5 m, continues generally SSE for about 20 miles from a position 5 cables SW of Islandsberg Light (58°12'1N 11°24'3E) (8.8) to Marstrandsfjorden (57°55'N 11°32'E) (8.170). Local knowledge is required. This channel, which is shown on the largest scale charts and included in this text where it leads to an anchorage or harbour, connects the following ports and waterways:
 - 2 From the initial position, above, the channel leads ESE towards Fredagsholmen Light (58°11'2N 11°25'3E) (8.138) for 5 cables then SW for 6 cables with the light astern.
From position 58°10'8N 11°24'5E the channel continues generally S for 2½ miles along the recommended track shown on the chart, as for the N approach to Käringön (8.107), to a position 2 cables NW of Järnskar Light (white lantern) (58°08'0N 11°24'1E).
 - 3 Thence E along the alignment (093½°) of Koljebergskil Leading Lights (black huts with white gables and a red band) (58°08'0N 11°25'1E), for 5 cables; thence SSE for 7 cables to pass close SW of Porsnäsudde Light (red lantern) (58°07'4N 11°25'4E); thence SSE for about 1¼ miles within a white sector (326½°–329°) of this light, astern, to pass 1½ cables NE of Kråksundsgap Norra Light (lantern on white pedestal) (58°06'2N 11°26'5E).
 - 4 Thence SW for 4 cables through Kråksundsgap, passing between the lights. When clear, the track alters to the SE for about 3 cables within a white sector (132°–137°) of Brätö Light (red lantern) (58°05'7N 11°26'7E); then alters to pass close SW of the light and continues E of S for 9 cables, along the centreline of a white sector (350°–355°) of the same light, astern.
 - 5 From a position 6 cables NW of Mollösund Light (red lantern) (58°04'4N 11°27'9E), the track leads SE for 5 cables within a white sector (119½°–127½°) of the light, then past the light and Mollösund Harbour (8.120), continuing SE for 5 cables in a white sector (314°–319½°) of the light, astern; then ENE for 6 cables to round Otterholmen Light (white pedestal) (58°04'1N 11°29'5E).
 - 6 From a position close E of Otterholmen Light the track leads SSW for 9 cables, within a white sector (009½°–014½°) of Lyr Light (red lantern) (58°04'2N 11°29'8E), astern, into Kråkefjord (8.89).
 - 7 When Lyr Light is distant 1 mile, astern, the track alters towards the SSE, along the alignment (154½°) of Norra Kyrkesund Leading Lights: front light (white pedestal, black base) (58°01'6N

11°30'·7E); rear light (lantern on white pedestal), 5½ cables from the front light. This track continues for 1½ miles, passing very close ENE of the E edge of Svartskär, a shoal ¼ miles NNW of the front light.

- 8 When Gåsskär Light (white lantern), close NNE of the front leading light (above), is distant 1 cable, the track is adjusted to pass between these two lights then along a narrow channel, SSE for 2½ cables then S for about 1½ miles through Kyrkesund (58°01'N 11°31'E), which separates the E side of Härön from Tjörn.
- 9 When clear of Kyrkesund the route continues generally S for about ¾ miles, across the W end of Krossefjorden, then along the E side of Hjärteröfjord, using the E of two channels shown on the chart. This track passes W of Sankt Olovs nedre Light (red tower, 7 m in height) (57°59'·9N 11°30'·9E); thence E of the spar buoy (starboard hand) marking Utterskären, 5 cables S of the light. After passing Utterskären, the alignment (006½°), astern, of Sankt Olovs Leading Lights: front light, (above), rear light (red lantern), 9 cables from the front light, leads along the remainder of this part of the track.

8.93

- 1 From a position 4 cables WNW of Eggskär Light (57°56'·8N 11°31'·0E) (8.162), the route continues generally S then SE for a total of 2 miles, through Pater Noster Skären, passing (with positions relative to the light):
- 2 W of the spar buoy (port hand) marking the NW extremity of the shoal extending 1½ cables WNW from Bratten (2 cables NNW), thence:
E of Åren (4 cables W), a reef partly awash, thence:
W of a spar buoy (port hand) which marks the W extremity of the shoal extending 4 cables WSW from Eggskär Light, thence:
- 3 W of Ytre Vannholmen (7½ cables SSW) on the W extremity of which stands a beacon (white with two black diagonal stripes), thence:
Close either side of a rock awash in mid-channel (1 mile SSW) on which stands a beacon (painted board), thence:
NE of Skäreläje (1¾ miles S) (8.161).
- 4 Thence SSE for 2½ miles across Marstrandsfjorden (8.151) towards the main approach to Marstrand as given at 8.170 or along the continuation of an inner route, as given below.

Inner coastal route from Marstrand to Lekskär 8.94

- 1 From Marstrandsfjorden, an inner coastal route (1.12), with a channel draught (7.2) of 4·5 m leads generally SSE for about ¾ miles to the S limit of this volume. This route demands particularly careful navigation.
- 2 From position 57°52'·5N 11°31'·8E, in the approach to Marstrand, a recommended track shown on the chart leads SSE for ¼ miles, within a white sector (147°–150½°) of Lönnbäcken Light (57°51'·3N 11°33'·2E) (8.162), into Stora Stillesund, a narrow buoyed channel between Ramholmen, close N of the light, and Bussholmen, close SW of the light. Stora Stillesund Light (black and white tower, 5 m in height) is exhibited from the SW extremity of Ramholmen and a beacon stands in the centre of Bussholmen.

3

When Lönnbäcken Light is distant 1 cable the track is adjusted to pass N of the light and to join the alignment (312½°), astern, of Ramholmen Leading Lights: front light (white square on a white pedestal) (57°51'·5N 11°33'·3E); rear light (black square on a white pedestal), 350 m NW of the front light. This alignment leads SE for ¾ miles, along the recommended track shown on the chart, which is marked by spar buoys (port hand) along its NE side, to a position 1 cable SW of Lekskär Light (white lantern) (57°50'·5N 11°35'·6E).

4

The track then passes between Lekskär, an islet, from the SE end of which Lekskär Light is exhibited with a beacon (black and white quarters, 13 m in height) close NE, and Ytre Lekskär, an islet 1½ cables SSW of the light. It then continues SE, passing very close NE of a 4·3 m patch, 1½ cables S of the light, which is marked by a spar buoy (starboard hand). After passing this patch the track is altered to SSE, within a white sector (322°–332½°), astern, of Lekskär Light (above), passing WSW of a 3·9 m patch marked by a spar buoy (port hand), 6 cables SE of the light, then continues SSE into the area covered by *Baltic Pilot Volume 1*.

Chart 1402

Mined areas 8.95

- 1 Areas in which there is a residual danger from buried mines (1.14), within which it is dangerous to anchor, trawl or conduct any seabed operations, and in which these activities are prohibited, exist in the approaches to Uddevalla as follows:
An area of 5 cables radius centred on position 57°57'N 11°18'E.
An area of 5 cables radius centred on position 57°54'·0N 11°13'·5E.
An area extending 4 miles W from the beacon on Sör Kråkan (57°51'N 11°31'E) (8.162) and S beyond the S limit of this volume; see *Baltic Pilot Volume 1*.

Charts 869, 870, 873

Navigation 8.96

- 1 **Local conditions.** On autumn and winter nights, the high shores of some fjords cast heavy, misleading shadows. Navigation can also be made difficult by local banks of mist.

Pilotage 8.97

- 1 Pilotage is arranged either by telephone or through the Swedish Maritime Administration homepage www.sjofartsverket.se, and is available throughout 24 hours. For categories of vessels for which pilotage is compulsory and other details see *Admiralty List of Radio Signals Volume 6 (2)*. The pilot boarding positions are as follows:
- 2 WSW of Hätteberget, distant 1¼ miles, for vessels arriving from seaward.
NE of Hätteberget, distant 2¼ miles, for vessels using the inner channels.

Submarine cables and pipelines

8.98

- 1 Many submarine cables, including power cables, and pipelines (1.69) are laid across the channels in the approaches to Uddevalla. These obstructions are shown on the chart and many are marked by beacons or notice boards onshore. Anchoring is prohibited within 50 m of cables and pipelines.

COASTAL PASSAGE — MÅSESKÄR TO HÄTTEBERGET

General information

Chart 870, 1402

Route

8.99

- 1 From a position 4 miles WSW of Måseskär Light (58°06'N 11°20'E), the coastal passage continues SSE for about 14 miles, in deep water outside the 50 m depth contour, to a position 4 miles SW of Hätteberget Light (57°52'N 11°28'E).

Topography

8.100

- 1 General topography along this section of the coast is given at 8.4. Some of the distinctive features along the coast are described below, from N to S as follows:
 - Boxvikevett (58°07'4N 11°29'6E), 5½ miles ENE of Måseskär (8.13), is the highest hill in the SW part of Orust (8.4); and Stora Glippan, 5½ cables WNW, has a rocky peak and is precipitous on its S side. Orust Sadel, 5 cables SE of Boxvikevett, with three peaks forming the shape of a saddle, is a good landmark when viewed from W.
- 2 Stigberget (58°03'6N 11°33'3E), at the NW end of Tjörn (8.4), slopes gradually and evenly on all sides. Tranerös, 4 cables S, is a much steeper hill. Sankt Olofs valar (58°01'N 11°31'E) is a dark-coloured hill, topped by four hummocks, of which only three can usually be distinguished. Three beacons stand on its summit and a radio mast, 75 m in height with red obstruction lights, stands close S.
- 3 Vetteberget (57°57'6N 11°36'5E), the highest summit in the S part of Tjörn, slopes gently on its S side. Tjörne huvud (57°56'N 11°35'E) which rises in the S part of Tjörn, has a conical peak and is quite steep on all sides. A radio mast, 75 m in height with an elevation of 130 m, stands 7 cables N of the hill.
- 4 Blåkullen (57°55'2N 11°44'4E), the summit of Brattön, is a high hill which is clearly visible from the waters W and S of Marstrand. It has a bluish colour when seen from a distance

Rescue

8.101

- 1 General information on search and rescue is given at 1.132. A coastal station is established at Skärhamn (57°59'5N 11°32'6E) and rescue boats are stationed at Käringsön (58°07'N 11°22'E).
- 2 For further details see *Admiralty List of Radio Signals Volume 5*.

Natural conditions

8.102

- 1 **Current and flow.** The current usually sets N along the coast; however, the direction of the flow is subject to meteorological conditions.

During strong winds or severe pressure changes, very strong currents can occur, especially in narrow passages.

- 2 **Climatic table.** See 1.229 and 1.237.

Directions

(continued from 8.16)

Principal marks

8.103

Landmarks:

- 1 Carlstens Fort (57°53'N 11°35'E), standing on the E end of Marstrandsön (8.170). It can be seen at a distance of 24 miles; when first seen above the horizon the tower resembles a large square sail.
- 2 Hätteberget Light (black concrete tower with red bands and grey base, 26 m in height, surmounted by a helicopter platform) (57°52'N 11°28'E), which stands on a shoal of the same name in the SW approach to Marstrandsfjorden (8.151).

Major light:

Hätteberget Light — as above.

Other aid to navigation

8.104

Racon:

Hätteberget Light (57°52'N 11°28'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Måseskär to Hätteberget

8.105

- 1 From the vicinity of 58°04'N 11°13'E the coastal passage continues SSE, passing (with positions relative to Hätteberget Light):
 - WSW of Makrillbåden (12 miles NNW), the S extremity of the shoal extending 3 miles S from Måseskär, thence:
- 2 WSW of a group of shoals (8 miles NNW), with a least depth of 8.4 m over them which lie at the outer end of a chain of shoals extending 1 mile WSW from Orskär, a light-coloured islet, thence: Close WSW of an area (7 miles NW) in which there is a residual danger from buried mines (8.95), thence:
- 3 WSW of Bredbåden (6 miles N) which is marked on its S side by a light-buoy (S cardinal), thence: ENE of another area (8 miles WNW) in which there is a residual danger from buried mines (8.95), thence:
- 4 WSW of Dynan (2 miles NNW), a small above-water rock which is the outermost danger at the SW end of Pater Noster Skären, a chain of many low-lying islets and rocks which extends 5 miles SW from the SW end of Tjörn. This chain, which is not easily distinguished from a distance of 2 or 3 miles, is best seen from NW; also see useful marks, below. Thence:
- 5 WSW of Hätteberget Light.

Useful marks

8.106

- 1 Beacon (white stone cairn) standing on Altarholmen (58°01'N 11°27'E), the largest islet of the Grönskären Group, ¼ miles SW of Råbbehuvud Light (white tower, lower part black, 9 m in height) (58°01'8N 11°28'9E).

- 2 Pater Noster disused light-tower (red metal framework on base, 32 m in height) (57°54'N 11°28'E), which stands on Hamneskär (8.161).
(*Directions continue, for the coastal passage SSE in Baltic Pilot Volume I, and for the S approach channel to Uddevalla at 8.159*)

Käringön and approaches

General information

8.107

- 1 **Käringön** (58°07'N 11°22'E), a fishing harbour on the N side of the island of Käringön, lies 1½ miles NE of Måseskär (8.13). This harbour, which is protected by two breakwaters, has an entrance width of 25 m and depths from 3·6 to 4·0 m. Käringön has a population of about 126.
- 2 **Approach and entry.** Käringön can be approached from both N and from S. The approach from N is through the Archipelago Channel (8.92) between Härmano (58°10'N 11°23'E), to the W, and Lavö and Råön, to the E.
- 3 The deepest and best approach in strong winds is from S, through Käringöfjorden (58°05'N 11°24'E) for which directions are given below. This route has the following limiting conditions:

The outer anchorage (8.110) is accessible to vessels with a draught of 7·3 m.

The channel into the harbour berths has a channel draught (7.2) of 3 m.

- 4 **Regulations.** There is speed limit of 5 kn between June 1 and August 15.

Current. In the seaward approach to Käringön the strongest current occurs between Måseskär and Bonden, 4 cables SE. Farther SE, in the S part of Käringöfjorden, the current is weak.

Ice seldom obstructs the anchorages off Käringön or the harbour itself.

Directions for the approach to Käringön from south

8.108

- 1 From the vicinity of 58°02'·3N 11°18'·7E, the line of bearing, 047°, of Kråksundsgap Södra Light (white tower on black conical base, 13 m in height) (58°06'·1N 11°26'·5E) exhibited from the W extremity of Brätö, leads NE for about 3½ miles, along the recommended track shown on the chart, and within a white sector (045°–050°) of the light, passing (with positions relative to Måseskär Light):

SE of Alnebåden (1¼ miles SE), which is marked off its SE side by a spar buoy (S cardinal).

- 2 **Clearing line.** The line of bearing, 050°, of Boxvikevette (5½ miles ENE) (8.100) open SE of Kråksundsgap Södra Light, clears SE of Alnebåden.

- 3 **Useful mark:**

Käringön Church (1½ miles NE), which stands in the middle of the island. It is small and white with a pointed black steeple that is prominent from some distance to seaward.

8.109

- 1 When Kråksundsgap Södra Light is distant 2 miles, the recommended track shown on the chart alters to the NNW for 2¼ miles, along the line of bearing, 344°, of Oxskär Light (white lantern) (58°07'·1N 11°22'·6E) and within a white sector (341°–348°) of the light, passing (with positions relative to Måseskär Light):

- 2 W of Havskusebåden (2½ miles ESE), which lies at the SW end of islets and shoals extending 1½ miles SW from Brätö, thence:
- 3 ENE of Buskärs Berg (1½ miles ESE), which has a least depth of 3·2 m over it and is marked off its E side by a spar buoy (E cardinal), thence:
- WSW of Ugnen (2¼ miles ENE), which has a least depth of 0·7 m over it and is marked at its N end by a spar buoy (starboard hand), and:
- 4 ENE of Buskärsfluna (1¼ miles E), charted as rocks awash, thence:
- ENE of Buskären (1½ miles ENE), charted as above-water rocks and foul ground, and:
- WSW of Kopparnaglarna (2 miles ENE), a reef awash which is marked on its SW and W sides by two buoys (port hand), the NW of which has a square topmark, thence:
- 5 ENE of a spit which extends 1½ cables ESE from the E point of Käringön (1¼ miles NE), which is marked on its E side by a buoy (E cardinal). Käringö Kummel Light (white tower, black band, 7 m in height) is exhibited from the point.
- 6 When Oxskär Light is distant 2 cables the track is altered as required for the anchorage or the harbour entrance.

Anchorage

8.110

- 1 Anchoring is prohibited in the harbour basin, due to the presence of submarine pipelines; and within 100 m of all submarine power cables (1.69).

Anchorage can be obtained 4 cables NNE of Käringö Kummel Light (58°06'·7N 11°22'·4E) in depths from 13 to 15 m mud, with rock in places, clear of an 8·7 m shoal, 2½ cables N of the light.

Alongside berths

8.111

- 1 The largest berth has a length of 125 m with depths from 3·6 to 4·0 m alongside. There is one other berth.

Supplies

8.112

- 1 Fuel oil, water and provisions can be supplied in small quantities.

Skärhamn and approaches

Chart 873

General information

8.113

- 1 **Position and function.** Skärhamn (57°59'·5N 11°32'·6E), situated on the W side of Tjörn, consists of a commercial and oil harbour, known as Malago Oil Harbour, at the N end of an open bay, with a fishing port and marina at the S end of the bay. It has a population of about 3147.
- 2 **Traffic.** In 2004 the port was used by one vessel of 2554 dwt.

Limiting conditions

8.114

- 1 **Sea state.** Hard weather and strong currents create troublesome crossing seas over the Systrarna Shoal (8.116), 1 mile off the entrance.

Arrival information

8.115

- 1 **Regulation concerning entry.** There is a speed limit of 5 kn in the harbour.

Directions**8.116****1 Skärhamn Leading Lights:**

Front light (white lantern, blue band, on black hut), exhibited from the islet of Skär (57°59'·6N 11°32'·1E).

Rear light (white square on metal framework tower, 9 m in height), exhibited from Tjalltangen Hill, 500 m NE of the front light.

- 2 From a position close SE of the light-buoy marking Bredbåden Shoal (57°58'N 11°28'E) the alignment (050°) of these lights leads NE for 2½ miles along the recommended track shown on the chart, passing (with positions relative to the front light):

NW of Backstuten (1¼ miles SW), which is awash and marked off its NW end by a spar buoy (N cardinal), thence:

- 3 Between Inre Syster (8 cables SW), an above-water rock on which stands a beacon (black cylinder, 4 m in height), and Systrarna Shoal, a 4·6 m patch, 1 cable SSE, which is marked on its W side by a spar buoy (N cardinal), thence:

- 4 Between the islands bordering the channel for 6 cables seaward of the harbour entrance.

Berths**8.117**

- 1 **Anchorage.** Restricted anchorage can be obtained in the entrance to the bay fronting the harbour, in depths from 9 to 12 m, mud. This anchorage is exposed to winds from the SW which create a considerable sea in the anchorage.

- 2 **Alongside berths.** The largest berth in the oil harbour, which has a length of 135 m with a swept depth of 6·2 m alongside, is the oil berth. There are three other berths.

The largest berth in the fishing port has a length of 130 m with depths of 4·5 m alongside. There are four other berths.

Port services**8.118**

- 1 **Repairs** can be carried out.

Supplies. Fuel oil, water and provisions can be supplied.

Minor harbours*Chart 870***Edshultshall****8.119**

- 1 Edshultshall (58°06'·5N 11°27'·9E), situated on the NE side of Käringsfjorden, contains a jetty with a length of 90 m and depths from 3·0 to 4·5 m alongside. Fresh water and provisions can be supplied.

Möllösund**8.120**

- 1 **Description.** Möllösund (58°04'N 11°28'E), a fishing port on the NE side of a narrow channel between the islands of Möllön and Orust, can be approached through the Archipelago Channel (8.92). The harbour has a 20 m wide entrance.

- 2 **Regulations concerning entry.** The speed limit is 5 kn in the harbour and anchoring is prohibited.

Berths. One quay with a length of 300 m and a depth of 4 m alongside. There is also one other berth and a basin for small craft with a depth of 2 m in it.

- 3 **Supplies.** Fuel oil, water, provisions and boat stores can be supplied.

*Chart 873***Klädesholmen****8.121**

- 1 Klädesholmen (57°57'N 11°32'E) is a fishing port within the islet of Klädesholmen, which is connected to Koholmen, close NE, by a bridge.

- 2 The approach channel has a channel draught (7.2) of 6 m and the largest berth has a length of 60 m with a depth of 5 m alongside its S end.

Mossholmen**8.122**

- 1 **Description.** Mossholmen (57°57'·1N 11°33'·7E), situated close W of Bockholmen, consists of an oil quay which can accommodate vessels up to 3000 dwt.

Maximum speed in the harbour is 5 kn.

- 2 **Approach and entry.** From the vicinity of No 5 reporting point (57°57'·5N 11°30'·0E) (8.5) the recommended track shown on the chart leads E for 1¼ miles, through Bäckeröfjord then SE to the quay with a channel draught (7.2) of 4·5 m.

- 3 The route S from Mossholmen is restricted by a fixed bridge, with a vertical clearance (1.9) of 10 m, which connects Koholmen with Bockholmen.

Berth. The largest berth, which is the oil quay, has a length of 42 m with depths from 5·2 to 6·0 m alongside. There are no other major berths.

Ängholmen**8.123**

- 1 **Description.** Ängholmen (57°57'N 11°34'E), situated on the NE side of the peninsula of Ängholmen, is a single purpose industrial harbour which serves a fish meal factory.

Pilots. See 8.97.

- 2 **Directions.** Approach is from SW, from the Archipelago Channel (8.92), through an approach which has a channel draught (7.2) of 6 m to the anchorage and 5 m to the harbour. Leading lights (posts), which stand on the N side of the harbour, indicate the alignment (101°) of the approach to the quay.

- 3 **Anchorage.** Good anchorage, in depths from 16 to 18 m clay, is available 3½ cables W of the front leading light, as shown on the chart, clear of submarine cables and a pipeline (1.69). Mooring rings are established on some of the islets nearby. This anchorage is often used during gales from the W and S.

- 4 **Berths.** The deepest berth has a length of 55 m with depths of 5·5 m alongside. The longest berth has a length of 130 m with depths from 3·0 to 5·5 m alongside. There are two other berths.

Rönnäng**8.124**

- 1 **Description.** Rönnäng (57°56'·5N 11°34'·8E) consists of a large fishing port with an industrial quay at Stansvik; and a smaller harbour 4 cables SSW.

The approach channel has a channel draught (7.2) of 5·5 m.

- 2 **Berths.** The largest berth is the industrial quay which has a length of 79 m with depths of 6 m alongside but depths of only 4 m about 8 m off the quay. This quay contains a Ro-Ro ramp off its E end.

There are two other berths at Stansvik and three in the smaller harbour.

- 3 **Repairs.** A slipway, which can accommodate vessels with a draught of 4 m, and two ramps are situated in the large harbour which also contains a workshop with engine repair facilities.

NORTH CHANNEL TO UDDEVALLA

General information

Chart 869 with plan of Malö Strömmar

Routes

8.125

- 1 **Description.** The North Channel to Uddevalla, which lies between the NW side of Orust (58°10'N 11°40'E) and the mainland, consists of a chain of fjords, in order from SW to NE: Koljöfjord (58°14'N 11°35'E); Borgilefjorden (58°15'N 11°38'E); Kalvöfjord (58°17'N 11°40'E); and Nötesund (58°18'4N 11°42'0E).

- 2 From the NE end of Nötesund, the North Channel leads into Havstensfjord (58°19'N 11°45'E) where it joins the N end of South Channel (8.89), close W of the entrance channel to Uddevalla. North Channel can be entered from W or SW through either Gullmarn (8.85) or from the Archipelago Channel (8.92).

- 3 **From Gullmarn.** This route passes NE of Lindholmen (58°16'N 11°30'E) (8.49); thence S for 1½ miles; thence ESE for 2 miles passing NNE of Bassholmen (58°14'5N 11°30'0E), and through Strömmarna, between Flatön and the mainland, to position 58°14'0N 11°33'5E, on the NW side of Koljöfjord.

- 4 This is a narrow and intricate channel which has a channel draught (7.2) of 3.3 m and a vertical clearance (1.9) of 16.8 m under a bridge at Källviken (58°15'3N 11°30'1E). As this is a secondary route for which local knowledge is essential, directions are not given in this text.

- 5 **From the Archipelago Channel.** From a position 5 cables SSW of Islandsberg Light (58°12'N 11°25'E) (8.8), the route passes between the SW end of Skaftölandet and the NE end of Härmanö, into and through Ellösefjorden (58°11'N 11°27'E); thence through Malö Strömmar (58°11'8N 11°29'4E) and Björnsundskanalen (58°12'5N 11°30'3E) into Koljöfjord.

- 6 This channel, for which directions are given at 8.138, is the deepest and the main approach to North Channel. For limiting conditions see 8.126.

- 7 The Archipelago Channel can also be approached from seaward as follows:

From WNW, passing 8 cables SW of Bonden (58°12'5N 11°18'8E) (8.74), towards Hättan Light (58°10'4N 11°22'4E); thence NE for about 1 mile.

From SW, through Hätterännan (58°10'0N 11°21'5E), thence as above.

See 8.133 for the effects of local weather conditions.

Controlling draught, width and length

8.126

- 1 **Channel draught.** A channel draught (7.2) of 5 m can be maintained throughout the length of the North Channel and its approach through Ellösefjorden and Malö Strömmar as given above.

Width. Along the stretch between Ellösefjorden and Havstensfjord the bottom width is at least 40 m in both the dredged and the blasted channels.

- 2 **Length of vessel.** The maximum allowable length for vessels using the North Channel is 90 m.

Ferry

8.127

- 1 A large line-driven ferry crosses Malö Strömmar near Hallen (58°11'7N 11°29'5E). When it lies on the Malö side, the greatest wire depth is 5 m.

- 2 When underway at night this ferry displays three red lights disposed vertically. In reduced visibility it sounds one long blast followed by two short blasts.

Warning notice boards, placed W and E of the crossing route, indicate the position at which one long blast must be given from approaching vessels.

- 3 Vessels of more than 300 grt and/or draught of 4 m must be reported to the ferry "MALÖ STRÖMMAR" on VHF channel 12, as given in *Admiralty List of Radio Signals Volume 6* (2). See also 8.90.

- 4 When ice build-up in Malö Strömmar is appreciable, the steel lines on which the ferry runs are required to lie on the ice. When this occurs the channel is closed to other traffic, and local navigational warnings are issued.

Pilotage

8.128

- 1 Details of pilotage are given at 8.97. The strength of the current and of the tidal streams in the narrows of Malö Strömmar and Björnsundskanalen, as given at 8.133, can make navigation difficult in these channels and it is recommended that a Pilot should be embarked.

Vessel traffic service

8.129

- 1 See 8.5.

Traffic regulations

8.130

- 1 **Customs.** Mariners arriving from abroad, bound for Uddevalla through Malö Strömmar, should embark a Customs Officer at Gullholmen (58°11'N 11°24'E) (8.150). The customs house is in Uddevalla.

Speed limit. Vessels are restricted to a speed of 5 kn exists in both approaches to Nötesundsbron (58°18'3N 11°41'9E).

Submarine cables and pipelines

8.131

- 1 Submarine cables and pipelines are laid across and along the SW end of Malö Strömmar. For further information see 1.69.

Vertical clearance

8.132

- 1 Nötesundsbron (58°18'3N 11°41'9E), a fixed arch bridge spanning Nötesund, has a vertical clearance of 25 m, over a width of 50 m in the middle of the centre span which has a width of 102 m.

Natural conditions

8.133

- 1 **Tidal streams** in Malö Strömmar and Björnsundskanalen, which are often very strong, turn at local HW and LW. In Björnsundskanalen the stream can attain a rate of 3½ kn; however, the in-going mean rate is 1¾ kn, and the out-going mean rate is 2½ kn. The in-going stream is strongest about 3½ hours before HW and the out-going stream is strongest about 3½ hours after HW in the channel.

- 2 **Current.** The current flows predominantly to the SW in Hätterännan (58°10'0N 11°21'5E) (8.136).

Ice usually obstructs navigation in Ellösefjorden from 15 January to 1 March.

- 3 **Local weather.** Approach to the Archipelago Channel from seaward, as given at 8.125, should not be attempted during W gales as the sea rebounds from the W coast of Härmanö.

Directions

Navigational aids

8.134

- 1 The fairway in Malö Strömmar and Björnsundskanalen is marked by beacons, perches and buoys. In other parts of the channel some dangers near the track are also buoyed. All beacons and perches, and certain buoys, are floodlit.

Outer approach to the Archipelago Channel from west–north–west

8.135

- 1 From the vicinity of 58°12'0N 11°17'5E, the line of bearing, 120°, of Hättan Light (white tower, black band, 9 m in height) (58°10'4N 11°22'4E) leads ESE for about 3 miles, along the recommended track shown on the chart, and within a white sector (116°–124°) of the light, passing (with positions relative to the light):
- 2 SSW of Bondedraget (2½ miles NW), a shallow patch near the SE end of the shoal extending 3½ cables SE from Bonden (8.74), thence:
NNE of the shoal surrounding Skrämja (1½ miles WNW) (8.15), thence:
- 3 SSW of Järnskär (1 mile NW) and Låge, 1 cable E, which are islets on a connecting reef, thence:
NNE of the shoal surrounding Knapp (7 cables WNW), an islet, thence:
NNE of Jörn (4 cables WNW), a shoal.
- 4 When Hättan Light is distant 3½ cables, the recommended track shown on the chart alters gently towards the NE to join the approach from SW, as given at 8.137.

Chart 870

Outer approach to the Archipelago Channel from south–west

8.136

- 1 From the vicinity of 58°08'9N 11°20'0E, the line of bearing, 038°, of Hättan Light (58°10'4N 11°22'4E) (8.135), leads NE for 1¾ miles through Hätterännan, along a track that is close to the recommended track shown on the chart, and within a white sector (036°–051½°) of the light, passing (with positions relative to the light):
- 2 SE of Blålandsbåden (8 cables WSW), which is an unmarked shoal. A 12 m patch, 1 cable SE of Blålandsbåden, lies within the white sector of the light.
When Hättan Light is distant 4 cables the track is adjusted to follow the recommended track shown on the chart, passing (with positions relative to the light):
- 3 SE of the shoal extending 3 cables SSE from Jörn (4 cables W) which has a depth of 8.9 m over its S end, and:
NW, distant 1 cable, from the shoals extending 2½ cables SSW and 2 cables NE from Hättan Light.

8.137

- 1 When clear to the N of Hättan Light, a white sector (031½°–034°) of Islandsberg Light (58°12'1N 11°24'3E) (8.8), which stands close SW of Islandsberg, a high, dark hill, leads NNE for 1 mile, along the recommended track shown on the chart, passing (with positions relative to the light):
- 2 Close ESE of Skarvesät (1 mile SW) which lies 1 cable S of the E islet of Gräsholmarna and is marked by a buoy (E cardinal), and:

WNW of an unmarked 3.2 m patch (1 mile SSW) which lies on the bank extending N from Härmanö, thence:

WNW of the shoal surrounding Silleskär (9 cables SSW), a dark-coloured islet, thence:

- 3 Through No 9 reporting point (7 cables SSW) (8.5), and:

ESE of Norman (7 cables SW) which is a rock awash.

Chart 869

Approach to North channel from the Archipelago Channel

8.138

- 1 When Islandsberg Light is distant 5 cables the recommended track into Ellösefjorden leads generally ESE for 1½ miles, as shown on the chart. The outer part of this track leads within a white sector (114½°–121½°) of Fredagsholmen Light (red lantern) (58°11'2N 11°25'3E). The inner part leads within a white sector (294°–300½°) of the same light, astern, passing (with positions relative to the light):
- 2 NNE of a 1.2 m shoal (6½ cables W), which is marked by a spar buoy (starboard hand), thence:
NNE of Dynan (5 cables W), a rock awash on which stands a beacon (black and red with a topmark), and:
- 3 SSW of the foul ground (4 cables WNW), with a charted depth of 2.5 m near its outer end, which extends 2½ cables SSW from Jonsborg, thence:
NNE of the shoal fringing Högholmen (2½ cables W) which is marked at its NE extremity by a beacon with a topmark. There is a white diamond-shaped patch on this islet. Thence:
- 4 Between Fredagholmen and Stora Risholmen, close SW, thence:
NNE of a spar buoy (starboard hand) (4½ cables SE) which marks the N edge of the shoal extending N from Lavö.

Chart 869 with plan of Malö Strömmar

Malö Strömmar

8.139

- 1 When Fredagholmen Light is distant 7 cables, astern, the alignment (059°) of Örnekullen Leading Lights leads towards and into Malö Strömmar:
Front light (white square on a white mast) (58°11'9N 11°29'8E).
- 2 Rear light (black and white square on a white pedestal) (255 m from the front light).
This track leads ENE for 1½ miles along the recommended track shown on the chart, passing (with positions relative to the front light):
- 3 Into the marked channel at the SW end of Malö Strömmar and under an overhead cable (7½ cables SW), with a clear height above mean water level of 30 m, thence:
Across the route of the cable ferry (3½ cables SW) (8.127).
- 4 When Örnekullen Front Leading Light is distant 3½ cables the recommended track alters to NNE, along the alignment (194°), astern, of Hallen Leading Lights:
Front light (white pedestal) (58°11'7N 11°29'3E).
Rear light (white pedestal) (210 m from the front light).
- 5 This track leads along a marked channel through the E part of Malö Strömmar. Malön Light–buoy (port hand),

$\frac{3}{4}$ cable NW of the front light, is the S buoy on the W side of the channel; the remainder of the channel marks are unlit.

Björnsundskanalen **8.140**

- 1 When Hallen Front Leading Light is distant $5\frac{1}{2}$ cables, astern, the recommended track alters to ENE for 8 cables, along the alignment ($239\frac{1}{2}^\circ$), astern, of Tärneskär Leading Lights:
- 2 Front light (white pedestal) ($58^\circ 12' 3N$ $11^\circ 29' 6E$), exhibited from an islet on the NW side of the channel.
Rear light (white triangle, point down on a pedestal) (80 m from the front light).
This track leads along a marked channel and through a narrow channel into Björnsundsfjorden.

Björnsundsfjorden **8.141**

- 1 When Tärneskär Front Leading Light is distant 8 cables, astern, the recommended track alters to the SE for 5 cables, within a white sector ($299\frac{1}{2}^\circ$ – 310°), astern, of Flatö Light (lantern on white pedestal) ($58^\circ 12' 9N$ $11^\circ 30' 7E$), passing (with positions relative to the light):
- 2 NE of the bank fringing Stora Björnholmen, which is marked by a buoy (starboard hand) (3 cables SSE), thence:
Close SW of a 6.2 m patch ($5\frac{1}{2}$ cables ESE), marked by a buoy (port hand).

Koljöfjord **8.142**

- 1 When Flatö Light is distant 7 cables, astern, the recommended track alters to the NE for $4\frac{1}{2}$ miles, along the alignment (047°) of Rävsnäsdde Leading Lights:
Front light (white square on white pedestal) ($58^\circ 15' 6N$ $11^\circ 38' 3E$).
Rear light (similar structure) (920 m from the front light).
- 2 This track leads within the white sector (225° – 228°) of Morlanda Light (white pedestal) ($58^\circ 12' 3N$ $11^\circ 31' 5E$), astern, passing (with positions relative to Morlanda Light):
SE of Fjordbåden (5 cables NNE), a rock awash which is marked on its SE side by a spar buoy (port hand), thence:
- 3 NW of a 1.3 m patch (6 cables ENE), which is marked on its N side by a spar buoy (starboard hand), thence:
SW of Löpskären Beacon (2 miles NE), which stands off the SE end of Strömmarna (8.125) at the SE end of the secondary route from Gullmarn, thence:
- 4 NW of the entrance to Kungsviken ($2\frac{1}{4}$ miles NE), which contains a minor boat harbour with few facilities, and:
Through No 8 reporting point ($2\frac{1}{2}$ miles NE) (8.5).

Borgilefjorden and Kalvöfjord **8.143**

- 1 When Rävsnäsdde Front Leading Light is distant $4\frac{1}{2}$ cables, the recommended track alters to N of E for $3\frac{1}{2}$ cables, through Borgilefjorden, along the alignment (261°), astern, of Hjältö Leading Marks (white cairns) on the SE side of Hjältön ($58^\circ 15' 3N$ $11^\circ 37' 1E$).
- 2 When Hjältö Front Leading Mark is distant 7 cables, the principal route alters to the ENE for 4 cables, along the

recommended track, passing (with positions relative to Rävsnäsdde Front Leading Light):

- 3 SSE of the SE extremity of Rävsnäsdde ($1\frac{1}{2}$ cables SE), from which Rävsnas Light (white post, 2 m in height) is exhibited, and:
NNW of a bank, with a depth of 3 m which extends 1 cable SW from Göden (4 cables E), on the N side of which a light (white post, green band, 2 m in height) is exhibited.
- 4 After passing Göden the recommended track alters to the SE for 4 cables, passing N of Göden and SW of the S extremity of Kalvön, from which Kalvön Light (white post, red band, 2 m in height) is exhibited, 4 cables E of Göden.
- 5 After passing Kalvön Light, the recommended track alters gently towards the N, passing NNE of Nöteviks både, 4 cables SE, which is marked by a spar buoy (W cardinal). On completion of the alteration, a white sector ($175\frac{1}{2}^\circ$ – 179°), astern, of Säten Light (white lantern) ($58^\circ 15' 6N$ $11^\circ 40' 6E$) leads N for about 2 miles through Kalvöfjord, passing (with positions relative to the light):
- 6 Over or W of a 9 m patch ($1\frac{1}{4}$ miles N), which extends W from Södgravsudden and lies within the E edge of the white sector.
When Säten Light is distant $2\frac{1}{4}$ miles, astern, the recommended track alters towards the NE within the white sectors (042° – $056\frac{1}{2}^\circ$), ahead, then (230° – 236°), astern, of Högholmen Light (white tower) ($58^\circ 18' 2N$ $11^\circ 41' 3E$), passing (with positions relative to the light):
- 7 Over or NW of a rock (4 cables SW), with a least depth of 8.5 m over it, which lies within the SE part of the white sector, near the centre–line, thence:
Close SE of Högholmen, which is steep–to on its SE side, thence:
- 8 NW of a spit (2 cables ENE) which extends 1 cable NW from Vindön and is marked on its NW edge by a spar buoy (starboard hand).

Nötesund and bay to the east **8.144**

- 1 When Högholmen Light is distant 2 cables, astern, the recommended track alters to the E, within a white sector ($089\frac{1}{2}^\circ$ – $092\frac{1}{2}^\circ$) of Mattholm Light (white pedestal) ($58^\circ 18' 3N$ $11^\circ 43' 3E$). This track leads E for 7 cables through the centre span of Nötesundsbron, 8 cables W of the light. The bridge is floodlit at night and the middle of the centre span over the fairway is marked by a fixed white light.
- 2 When Mattholm Light is distant 2 cables, the recommended track alters to ESE for about 3 cables within a white sector (116° – 119°) of Sandvikskullen Light (white lantern) ($58^\circ 18' N$ $11^\circ 44' E$), passing (with positions relative to the light):
- 3 NNE of Ösö Light (white pedestal) (4 cables WNW) exhibited from the N end of a bank extending N from Lilla Ösö, a small islet, and:
SSW of the bank fringing the SW side of Mattholm ($2\frac{1}{2}$ cables NW).

Havstensfjord **8.145**

- 1 When Sandvikskullen Light is distant 2 cables, the recommended track alters to ENE, and leads across Havstensfjord for about $1\frac{3}{4}$ miles, within a white sector ($246\frac{1}{2}^\circ$ – $249\frac{1}{2}^\circ$), astern, of Sandvikskullen Light. This track, which has a channel draught (7.2) of 5 m, leads

towards the inner approach to Uddevalla, passing (with positions relative to the light):

- 2 Through No 7 reporting position (1 mile ENE) (8.5), thence:
NNW of Brattön (1½ miles E) (8.234), thence:
Across the N end of the South Channel (2 miles ENE).
(Directions continue for Uddevalla at 8.252)

Ellös

General information

8.146

- 1 **Description.** Ellös (58°11'N 11°28'E), an industrial harbour on the SE side of Ellösefjorden, also contains a vehicle ferry berth and a marina. It has a population of about 1045.

Approach and entry. The harbour can be approached as follows:

- 2 From W, as given at 8.125, which allows a channel draught (7.2) of 7.5 m to the anchorage.
From N, using the channel S from Gullmarn, as given at 8.125.
From NE, using the North Channel to Uddevalla, which allows a channel draught (7.2) of 5 m.

Anchorage

8.147

- 1 Ellösefjorden affords well-sheltered anchorage, in depths from 8 to 15 m, mud, clear of submarine cables and a pipeline (1.69) which cross the fjord.
An anchorage, 5 cables SW of Ellös, as shown on the chart, has a depth of 11 m over a bottom of clay. Attention is drawn to a wreck lying 1 cable SSE of the anchorage.

Berth

8.148

- 1 The harbour contains three floating stages, a quay and berthing areas alongside the insides of the breakwaters. The deepest berth is Traverskajen, with a length of 50 m and a depth of 4.0 m alongside.

Port services

8.149

- 1 **Repairs.** A large boat builder, with alongside berths, is established in the bay S of Ellös.
Medical facilities. A doctor and chemist are available.
Supplies. Fuel oil, fresh water and provisions can be obtained.

Minor harbour

Gullholmen

8.150

- 1 **Description.** Gullholmen (58°11'N 11°24'E), a small fishing harbour on the E side of Härmanö is protected by a breakwater. This harbour contains 50 berths for small vessels in depths from 1.2 to 3.3 m.
Supplies. Fuel oil, fresh water and provisions are available.

SOUTH CHANNEL TO UDDEVALLA — SOUTHERN PART

General information

Charts 870, 873

Route

8.151

- 1 **Description.** The S part of the South Channel to Uddevalla lies between Tjörn (58°00'N 11°40'E) and the mainland to the E. This part of the channel, which is entered in the vicinity of Hätteberget (57°52'N 11°28'E) (8.103), leads generally NE, along the recommended track shown on the chart, for about 5 miles through Marstrandsfjorden; then E for 2½ miles through Älgöfjorden (57°55'N 11°40'E); then NE for about 10 miles through Hakefjorden (57°58'N 11°44'E), passing the entrance channel to Wallhamn (58°01'N 11°42'E) (8.179); then NNE through Askeröfjorden to a position off Stenungsund (58°05'N 11°49'E) (8.201).

- 2 From seaward, the recommended tracks for each of three approach routes to Marstrandsfjorden, as shown on the chart, are as follows:

Northern route, from W, passes between Pynten (57°53'5N 11°26'6E), above-water rocks at the SW end of Pater Noster Skären, and close NE of which lies a dangerous wreck; and Storebåden, 1 mile S. This track leads on Skallen Light (57°53'4N 11°33'5E) (8.161) for about 2½ miles then joins the central route.

- 3 **Central route,** from SW, which passes between Hätteberget and Storebåden, 6 cables NW, leads on Åstol Light (57°55'3N 11°35'1E). Directions for the deep water track along this route are given at 8.159.

Southern route, from SSW, passes between Hätteberget and Kråkebåden, 1¼ miles ESE, which has a depth of 3.2 m over it and is marked 4 cables NNW by spar light-buoy (N cardinal). This track then continues NNE for 1¼ miles to join the central route. A 12 m shoal lies 1¼ cables SE of Hätteberget.

Limiting conditions

8.152

- 1 **Channel draughts** (7.2) in the S part of the South Channel are as follows:

Hätteberget to Älgöfjorden: 15 m.

Älgöfjorden to Askeröfjorden (58°05'N 11°48'E): 13.5 m.

Channel draughts for the N part of South Channel are given at 8.225.

- 2 **Vertical clearance.** Tjörnbron, with 44.6 m clear height above mean water level (43 m clear passage height) over a width of 110 m spans the channel at Almösund (58°03'6N 11°46'9E) (8.169).

Maximum length. At night the maximum allowable length for navigating the South Channel is 200 m.

Topography

8.153

- 1 Coastal topography in the approach to Marstrandsfjorden is given at 8.100.

Hazards

8.154

- 1 A hazard from on-coming vessels exists in the vicinity of Tjörnbron (58°03'6N 11°46'9E) (8.169) as the channel under this bridge is in the form of an S bend which obstructs visibility. Caution is necessary, as there is no speed limit and vessels, some without Pilots, may be met with little warning.

Pilotage**8.155**

- 1 Pilotage, which is compulsory for certain vessels, is described at 8.97.

Vessel traffic service**8.156**

- 1 See 8.5.

Traffic regulations**8.157**

- 1 **Restricted area.** A military protected area (1.91) is established between Älgöfjorden and Hakefjorden within limits as follows:

From the W end of Älgön (57°55'5N 11°39'8E), around the W end of the island to Älgö Light, 2½ cables NE.

- 2 Thence NE for 6½ cables to position 57°56'N 11°41'E.

Thence ESE for 4 cables, NE for 1½ cables and NNW for 3 cables to position 57°56'3N 11°41'5E. This line is such that it excludes the charted anchorage in position 57°56'0N 11°41'7E.

- 3 Thence NE for 1 mile to the NW extremity of Lövön and around the N and E coasts of this island to its SE extremity (57°56'1N 11°44'3E).

Thence SSW for 9 cables to the E extremity of Älgön.

- 4 Thence SW for 8 cables to the E coast of Stora Trefoten and on round the S coast of this islet. Thence WNW for 7 cables to the SE extremity of Lammholmen and along the S coast of this islet. Thence NW for 6 cables to the W extremity of Älgön, passing through Klövja.

- 5 **Customs.** Vessels arriving from abroad are boarded by Customs Officers at Hättan (57°56'N 11°40'E). The customs house is in Uddevalla.

Rescue**8.158**

- 1 General information on search and rescue is given at 1.132.

Directions

(continued from 8.106)

Principal marks**8.159**

- 1 **Landmarks:**

Hätteberget Light (57°52'N 11°28'E) (8.103).

Carlstens Fort (57°53'N 11°35'E) (8.103).

Major light:

Hätteberget Light (57°52'N 11°28'E) (8.103).

Other aid to navigation**8.160**

- 1 **Racon:**

Hätteberget Light (57°52'N 11°28'E).

For details see *Admiralty List of Radio Signals Volume 2*.

Chart 873

Sea to Marstrandsfjorden**8.161**

- 1 From the vicinity of 57°51'N 11°25'E, near the outer pilot boarding station (8.97), the line of bearing, 052°, of Åstol Light (red lantern, floodlit) (57°55'3N 11°35'1E), seen to the SE of Åstol village (8.176), leads NE for 6½ miles along the recommended track shown on the chart

and within a white sector (042°–062½°) of the light, passing (with positions relative to Skallen Light (57°53'4N 11°33'5E)):

- 2 NW of Hätteberget (3½ miles WSW) (8.103), and: SE of Storebåden (3¾ miles WSW), a shoal which is marked off its SW end by a light-buoy (S cardinal) and off its N side by a spar buoy (N cardinal). This shoal lies within the white sector of Åstol Light. Thence:

- 3 Through No 1 reporting point (8.5), close SW of Hätteberget, thence:

SE of Hamneskär (3 miles W), a small islet near the SW end of Pater Noster Skären (8.105), from which Hamneskär Light (lattice mast, 8 m in height) is exhibited. Pater Noster disused light-tower (8.106) also stands on the islet. Thence:

- 4 SE of a charted depth of 11 m (1½ miles NW), which lies 4 cables E of Tjuderhalsbåden, and:

NW of Skallen Light (white tower, 6 m in height) exhibited from the NW extremity of Marstrandsön (8.170), thence:

SE of a 10 m patch (1½ miles NNW), which lies 7 cables SE of Skäreläje, an above-water rock on which stands a conical beacon (black with a white band, 3 m in height), thence:

- 5 NW of a 12 m patch (1 mile NNE), which is marked on its W side by a light-buoy (W cardinal), thence:

SE of the shoal extending 2½ cables SE from Truskären (1¾ miles NNW), a group of above-water rocks on which stands a small, square beacon (red over white). Truskärsbåden, 2½ cables ENE, is marked by a spar buoy (starboard hand).

8.162

- 1 **Useful marks:**

Beacon (white pole with a red band and topmark of white triangle point down), standing on Sör Kråkan (57°51'N 11°31'E).

- 2 Beacon (white with orange top and a radar reflector), standing on Nord Kråkan, 8 cables N.

Lönnbäcken Light (white tower with a black band on a grey concrete base, 12 m in height) (57°51'3N 11°33'2E), exhibited from close N of the NE extremity of Bussholmen.

- 3 Marstrand Light (white lantern) (57°53'5N 11°34'5E).

Eggskär Light (white tower, 7 m in height) (57°56'8N 11°31'0E), exhibited from the E extremity of the islet. A beacon (white with a black band, 3 m in height) stands on the N side of the islet.

- 4 Klädesholmen Church (57°56'8N 11°32'5E), which stands on Koholmen (8.121); it is fairly prominent from seaward.

Marstrandsfjorden to Älgöfjorden**8.163**

- 1 When Åstol Light is distant 5 cables the recommended track shown on the chart leads ENE along the line of bearing, 077°, of Södra Mehölm (Mehölm on Chart 870) Light (lantern on white pedestal) (57°55'3N 11°37'4E) exhibited from the W end of a small islet, passing (with positions relative to the light):

- 2 SSE of Åstol, thence:

NNW of an 8.9 m patch (9½ cables WSW) which is marked by a light-buoy (starboard hand). This

shoal lies 2 cables NE of Skottholmen Beacon (white with a black band and square topmark).

When Södra Meholmen Light is distant 9 cables the recommended track shown on the chart divides.

- 3 The N track, with a channel draught (7.2) of 13.5 m, continues ENE passing between Södra Meholmen and Norra Meholmen (Meholm on Chart 870), 2½ cables NE; thence between Stenskär, 7½ cables E of Södra Meholmen, and a 10.6 m patch, marked by a light-buoy (port hand), 1½ cables NNW. Thence ENE for 6 cables to rejoin the deep water track (below). This is the more direct track and is better lit for night passage.

- 4 The S and deep water track, with a channel draught (7.2) of 15 m, leads ESE for 1 mile, within a white sector (281½°–294°) of Åstol Light, astern, passing (with positions relative to Backebådan Light (57°55′.0N 11°37′.5E));

NNE of Södra Åstol (8 cables W), thence:

- 5 SSW of Hundén (3 cables WNW), a reef partly awash which is marked on its SW end by a beacon (white with an orange top and radar reflector), thence:

SSW of Backebådan Light (red hut, white roof, 3 m in height, floodlit) exhibited from an unpainted foundation on a shoal.

8.164

- 1 After passing Backebådan Light, the recommended track alters gently to NE, keeping at least 1 cable N of Nordholmarna Light (white hut, green base, 3 m in height, floodlit) (57°54′.6N 11°37′.8E). It then leads NE for about 1½ miles, passing (with positions relative to Älgö Light (57°55′.6N 11°40′.1E));

- 2 SE of the shoal extending E from Stenskär (7 cables WSW) on the N point of which stands a beacon (white with an orange top and radar reflector). A light-buoy (port hand) is moored close SE of the shoal. Thence:

- 3 NW of Lorten (4 cables SW), an above-water rock which lies 1¼ cables off the W end of Älgön, an island, from the NW side of which Älgö Light (white lantern) is exhibited.

- 4 **Useful mark:**

Disused pilots' lookout tower on Hättan (5 cables WNW), clearly visible to seaward.

Hakefjord southern part

8.165

- 1 From a position 2½ cables NE of Älgö Light, the combined route, with a channel draught (7.2) of 13.5 m, leads NE for 2½ miles, along the recommended track shown on the chart. This track leads within a white sector (036½°–040½°) of Mitholmarna Light (white lantern) (57°58′N 11°44′E), situated on the NW side of the N islet of Mitholmarna, passing (with positions relative to Älgö Light):

- 2 SE of a 5.4 m shoal (5 cables NNE) which is marked on its E side by Krokhölmarna Light-buoy (port hand), thence:

- 3 Close NW of a 12.6 m patch (1¼ miles NE) which lies on the SE edge of the white sector and is marked by a spar buoy (starboard hand). A 15.0 m patch, which lies 1¾ cables W of the above patch, is within the white sector. The recommended track passes between these two shoals. Thence:

- 4 SE of Katten (1½ miles NNE), thence:

NW of the shoal extending 1½ cables W from Lövön (2 miles NE).

(Directions continue for Wallhamn at 8.194)

Chart 870

Hakefjord to Askeröfjorden

8.166

- 1 When Mitholmarna Light is distant 5 cables the recommended track follows a curved path for 2¼ miles, which trends NE, passing (with positions relative to Mitholmarna Light):

WNW of the shoal which extends 3 cables SW from the light, thence:

- 2 Through No 2 reporting point (2½ cables W) (8.5), and:

ESE of Flåholmen (6 cables W), a 1.8 m shoal which is marked on its NE side by a spar light-buoy (port hand), thence:

- 3 WNW of Mitholmarna, thence:

ESE of a shoal (4 cables NNW), with a least depth of 8.9 m over it, which is marked on its SE end by a spar buoy (port hand) and on its NW end by a spar buoy (W cardinal), thence:

- 4 Close ESE of a light-buoy (isolated danger) (9 cables NE) which is moored off the S side of a 10.5 m patch.

8.167

- 1 From a position 2 miles NE of Mitholmarna Light, the recommended track continues NNE for 3 miles, within a white sector (017½°–027½°) of Snöholmarna Light (white lantern) (58°02′.7N 11°47′.8E), passing (with positions relative to the light):

- 2 Close ESE of a Krommeröd (1½ miles SSW) which is marked on its E side by a light-buoy (port hand), thence:

WNW of a shoal (1¼ miles SSW), with a depth of 1.2 m over it, which is marked off its W side by a spar buoy (starboard hand), thence:

- 3 ESE of the islets lying close SW of Vinterholmen (9 cables SSW), from the SE end of which Vinterholmen Light (metal framework tower) is exhibited.

8.168

- 1 When Snöholmarna Light is distant 5 cables, the recommended track, with a channel draught (7.2) of 13.5 m and the greatest clear passage height as given at 8.152, alters gently N for about 5 cables then NNW for about 7 cables within a white sector (137°–143½°) of Snöholmarna Light, astern. This curved track, which is subject to the caution at 8.154, passes (with positions relative to the light):

- 2 E of Brattöbåden (4½ cables WSW), a shoal marked off its E side by a light-buoy (port hand), thence:

W of Snöholmarna Lysboj (1½ cables SW), a light-buoy (starboard hand), which marks the E side of the fairway, thence:

- 3 NE of the bank fringing the NE side of Lilla Brattön (5 cables NW), which is marked on its NE edge by a light-buoy (port hand), thence:

NE of Brattögrundet Light (lantern on white pedestal, grey base) (8 cables NW), which is exhibited from near the N extremity of a spit extending 1 cable N from Lilla Brattön.

8.169

- 1 On passing Brattögrundet Light the recommended track alters to NNE for 2½ miles through Askeröfjorden, within a white sector (013½°–015½°) of Galterön Light (white

lantern, floodlit) (58°06'·3N 11°48'·2E) exhibited from Galterön, a point on the mainland, passing (with positions relative to Brattögrundet Light):

- W of the bank (1½ cables NE) fringing the SW end of Källön, which is marked on its SW side by Källögrundet Light—buoy (starboard hand), thence:
 - 2 Through Almösund and under the centre span of Tjörnbron (3½ cables NNE), a suspension bridge connecting Källön with Almön, 1¼ cables W. This bridge has a clear passage height as given at 8.152, the limits of which are indicated in both directions by a red light on the W side and a green light on the E side of the bridge; and by white square daymarks. Thence:
 - 3 Very close WNW of an unmarked 14·2 m patch (1 mile NNE) which lies on the E edge of the white sector, thence:
 - WNW of the main berths (1¾ miles NNE) at Stenungsund (8.201).
- (Directions continue for the N part of South Channel at 8.230)*
(Directions for approaching the berths in Stenungsund are given at 8.218)

Marstrand and approaches

Chart 873 with plan of Marstrand

General information

8.170

- 1 **Position and function.** Marstrand (57°53'N 11°35'E) contains a small commercial harbour and a fishing port which are landlocked in the channel between the islands of Marstrandsön, Kläverön and Koön. A disused shipyard connects the two parts of the harbour which also contains a main pilot station (8.97).
- Marstrand has a population of about 1337.
- 2 **Approach and entry.** Approach to Marstrandsfjorden is given at 8.151. From within Marstrandsfjorden the main approach to Marstrands Hamn is from the WSW, through a channel S of Marstrandsön, which has a channel draught (7.2) of 7 m to the anchorage, and for which directions are given below. A secondary approach channel, from the N, with a channel draught (7.2) of 4 m, passes N of Marstrandsön, as shown on the chart.

Limiting conditions

8.171

- 1 **Ice.** The harbour freezes in very hard winters but is more ice-free than any other port on this coast. The N entrance remains clear of ice longer than the S entrance.

Arrival information

8.172

- 1 **Regulations concerning entry.** A vessel traffic service is described at 8.5. There is a speed limit of 5 kn in the harbour area.

Directions

8.173

- 1 **Principal mark:**
The town is easily identified by Carlstens Fort (57°53'N 11°35'E) (8.103).
- Track.** From a position 1½ miles SW of Skallen Light (57°53'·4N 11°33'·5E) (8.161), the recommended track leads ENE for 2 miles, passing (with positions relative to the tower on Carlstens Fort):
- 2 SSE of Tollskären (8 cables WSW), thence:

NNW of the shoal extending 1 cable N from the N coast of Ärholmen (7 cables SW), which is marked by a spar buoy (starboard hand), and:

- 3 SSE of a spit extending 1½ cables SW from Marstrandsön which, with a depth of 2·9 m at its S end (5 cables WSW), is marked by a spar buoy (port hand), thence:
- 4 NNW of a spar buoy (starboard hand) (4½ cables SSW), which marks the N end of a shallow spit extending 3½ cables NE from Ärholmen, thence:
- NNW of Gråberget Light (white tower on black base, 6 m in height) (4½ cables SSE), exhibited from the NW side of Kläverön.
- 5 After passing Gråberget Light the track divides as follows:
NE into the fishing harbour.
N then NNW into the commercial harbour.
- 6 **Useful mark:**
Light—tower (red lattice building, 3 m in height) (57°53'·2N 11°35'·6E), a replica of the former Pater Noster Lighthouse (8.106), standing 1½ cables NE of the disused shipyard.

Berths

8.174

- 1 **Anchorage.** A restricted anchorage, in depths from 10 to 12 m clay, is charted in the SE entrance to the harbour, clear of submarine pipelines and cables (1.69). This anchorage is protected against gales from the W but is exposed to the swell.
- 2 **Alongside berths.** The largest berth in the commercial harbour, which lies on the E side of Marstrandsön, has a length of 150 m with depths from 3 to 4 m alongside.
The largest berth in the disused shipyard has a length of 153 m with depths from 4·1 to 4·8 m alongside.

Port services

8.175

- 1 **Facilities.** There is a chemist and doctor in the town.

Anchorage and harbours

Åstol

8.176

- 1 **Description.** Åstol (57°55'·4N 11°35'·2E), a fishing harbour situated at the NE end of the islet of Åstol, is approached through Marstrandsfjorden and entered through a channel which is buoyed and marked by leading lights.
- 2 **Regulation concerning entry.** There is a speed limit of 5 kn in the harbour.
- Berths.** The largest berth has a length of 150 m with depths from 4 to 5 m alongside.
- Supplies.** Fuel oil, water and provisions can be supplied.

Älgöfjorden

8.177

- 1 Älgöfjorden (57°55'N 11°40'E) affords anchorage in depths of 25 m, clay, to the N of Koön and Instön, as shown on the chart, clear of submarine cables and a pipeline (1.69) which have been laid in several directions from Stora Dyrön.

Stora Dyrön

8.178

- 1 **Description.** Stora Dyrön (57°56'N 11°37'E), an island at the NE end of Marstrandsfjorden, contains two fishing harbours, the largest of which, Sydhamnen, is situated on the SE coast. This harbour is sometimes subject to a heavy wash from passing traffic.

- 2 **Berths.** The largest berth in Sydhavnen has a length of 48 m with depths of 4.5 m alongside. There are four other berths.

Supplies. Fuel oil, water and provisions can be supplied.

WALLHAMN

General information

Chart 873

Position

8.179

- 1 Wallhamn (58°01'N 11°42'E) is situated on the SE coast of Tjörn, about 20 miles N of Göteborg. It lies at the head of Svanvikskile, an inlet which extends 2¾ miles N from Hakefjord, in the S part of South Channel to Uddevalla.

Function

8.180

- 1 Wallhamn, which is the largest of the privately operated ports in Scandinavia, can handle all types of container and dry cargo vessels. Through this port pass most of Sweden's imports and exports of motor vehicles, for which there are extensive parking and processing areas.

Approach and entry

8.181

- 1 Wallhamn is approached through South Channel to Uddevalla as given at 8.151. It is entered through a dredged channel which connects the port area with South Channel.

Traffic

8.182

- 1 In 2004 the port was used by 125 vessels with a total of 1 324 633 dwt.

Port Authority

8.183

- 1 **Address.** Wallhamn Terminal AB, S-440 60 Skarhamn, Sweden.

Website. www.wallhamn.se.

Limiting conditions

Controlling depth

8.184

- 1 Limiting conditions in the approach through South Channel are given at 8.152.

The channel draught (7.2) is 10 m to the deepest berths.

- 2 The entrance channel (8.194) has a swept depth of 11 m. Within the harbour basin there is a swept depth of 10.8 m to the E of the channel and of 8.5 m to the W of the channel.

Deepest and longest berths

8.185

- 1 The deepest berth is No 2 and the longest berth is No 5, as given at 8.197.

Mean tidal levels

8.186

- 1 The tidal variation is nil.

Density of water

8.187

- 1 The density ranges from 1.005 to 1.020 g/cm³.

Arrival information

Port radio

8.188

- 1 The port radio station guards VHF channel 16. For details see *Admiralty List of Radio Signals Volume 6 (2)*.

Vessel traffic service

8.189

- 1 Wallhamn and its approaches lie within the area of Marstrand VTS as given at 8.5.

Outer anchorage

8.190

- 1 Anchorage can be obtained in Älgöfjorden (57°55'N 11°40'E), as given at 8.177.

Pilots

8.191

- 1 See 8.97.

Tugs

8.192

- 1 Tugs, which are obtained from Göteborg, meet vessels at the S end of the entrance channel.

Harbour

General layout of harbour

8.193

- 1 The harbour consists of a single basin near the N end of an inlet with berths along the N side of the basin. A turning area to the S of the berths has a diameter of about 250 m, with depths of 10.8 m.

Directions for entering harbour

(continued from 8.165)

Entrance channel

8.194

- 1 From Hakefjord, a dredged channel, with a width of 100 m, leads 352½° for 2¾ miles through Svanvikskile into Wallhamn harbour. The limits of this channel are indicated on both sides by lights (framework towers) in line bearing 352½°, as shown on the chart. The front lights are positioned in latitude 58°00'·7N with longitudes of 11°42'·1E and 11°42'·2E; the rear lights are positioned 520 m from the front lights. Red lights (day) mark the W limit whilst green lights (day) mark the E limit.

Track

8.195

- 1 From the vicinity of 57°58'N 11°43'E the channel leads W of N, passing (with positions relative to Svälte (57°59'N 11°42'E)):

E of Flåholmen (1 mile S), the E shoal of Flåholmarna, which is marked by a light-buoy (port hand), thence:

- 2 W of a shoal (8½ cables SSE), with a depth of 8.9 m over it, which is marked as given at 8.166, thence:
E of a 5.6 m patch (5 cables S), which lies 1½ cables SSE of Lyngnholmarna and is marked off its E side by a spar buoy (port hand), thence:
Close E of a depth of 10 m (1¼ cables SE), which lies near the W limit of the channel and is marked close SSE by Lyngnholmarna Röda Light-buoy (port hand), thence:

- 3 Close E of the shoal surrounding Svälte, an islet on the W side of the channel. The NE extremity of this shoal, with a charted depth of 7.6 m, lies close

to the W limit of the channel where it is marked by Svälte Light-buoy (port hand) ($\frac{3}{4}$ cable NE). Thence:

- 4 W of Bökeviksskär (4 cables NNE), an islet on the E side of the channel which is marked off its W side by a light-buoy (starboard hand), thence:
Between spar buoys, some of which exhibit lights, marking the edge of the remainder of the channel and the harbour basin.

Berths

Anchorage

8.196

- 1 Temporary anchorage is permitted in the harbour basin, which has a clay bottom.

Alongside berths

8.197

- 1 The deepest berth, designated No 2, has a length of 180 m with a depth of 10.8 m alongside and a fixed Ro-Ro ramp, with a width of 21 m, at its W end.
The longest berth, designated No 5, has a length of 239 m with a depth of 8.5 m alongside and a fixed Ro-Ro ramp, with a width of 16 m, at its W end.
2 There are four other berths and three more Ro-Ro ramps.

Port services

Repairs

8.198

- 1 Limited repairs can be undertaken. A small shipyard at Djupvik, 1 mile S of Wallhamn, has depths of 3.5 m in the channel to a slipway for vessels of 300 dwt, with a maximum length of 40 m, width of 9 m and draught of 3.5 m. There is one other slipway.

Other facilities

8.199

- 1 The nearest hospital is distant 35 km but a doctor, dentist and chemist are available locally; oily waste disposal facilities; deratting can be carried out and Deratting and Exemption Certificates issued.

Supplies

8.200

- 1 Fuel oil can be supplied by barge and fresh water is available alongside; provisions obtainable.

STENUNGSUND

General information

Chart 870

Position and function

8.201

- 1 Stenungsund (58°05'N 11°49'E), which lies on the E side of Askeröfjorden, about 23 miles N of Göteborg, is an industrial town with a strong petrochemical industry. The population was 22 742 in 2004.

Approach and entry

8.202

- 1 Stenungsund is approached through South Channel to Uddevalla as given at 8.151. From the main track through Askeröfjorden, berths are approached through separate dredged channels as given at 8.218.

Traffic

8.203

- 1 In 2004 the port was used by 686 vessels with a total of 5 356 028 dwt.

Port Authority

8.204

- 1 **Address.** Stenungsunds Hamntjänst AB, Talludden 1, SE-444 31, Stenungsund, Sweden.
Website. www.hamntjanst.se.
Email. kontoret@hamntjanst.se.

Limiting conditions

Controlling depth

8.205

- 1 Limiting conditions in the approach through South Channel are given at 8.152.
Channel draught (7.2) in the approach to the main berths at Stenungsund, as positioned at 8.217, are as follows:
2 Talludden: 5.5 m.
Hydrokajen (Saltkajen): 9.0 m.
Havdens oljepir: 13.5 m.
Kraftverkshamnen (Vattenfall) N side: 11.5 m.

Deepest and longest berths

8.206

- 1 The deepest berth is Havdens oljepir (8.220).
The longest berth is Kraftverkshamnen (Vattenfall) (8.220).

Mean tidal levels

8.207

- 1 There is little tidal variation.

Density of water

8.208

- 1 The density ranges from 1.005 to 1.020 g/cm³.

Maximum size of vessel handled

8.209

- 1 A vessel of 60 000 dwt, with an LOA of 250 m, has been berthed starboard side-to on the N side of Kraftverkshamnen (Vattenfall) (8.220).

Local conditions

8.210

- 1 **Currents** in Askeröfjorden are unpredictable but generally set across the line of Kraftverkshamnen (Vattenfall) (8.217) and caution is required when approaching this berth.

Wind. The prevailing wind is from SW. Approach to the oil berth (8.220) is difficult during strong winds from between S and SW.

Arrival information

Port radio

8.211

- 1 The port radio station guards VHF channel 16; for details see *Admiralty List of Radio Signals Volume 6* (2).

Vessel traffic service

8.212

- 1 Stenungsund and its approaches lie within the area of Marstrand VTS as given at 8.5.

Outer anchorage

8.213

- 1 Anchorage can be obtained in Älgöfjorden (57°55'N 11°40'E), as given at 8.177.

Pilots**8.214**

- 1 See 8.97.

Tugs**8.215**

- 1 Tugs, which are obtained from Göteborg, meet vessels off Vinterholmen (58°02'N 11°47'E) and make fast prior to passage through Almönsund (8.169). Five hours notice is required. Three tugs are used for tankers of 50 000 dwt. See also 8.216.

Regulations concerning entry**8.216**

- 1 Larger vessels are only permitted to approach Stenungsund by day.
There is a speed limit of 5 kn in Stenungsundet (58°04'·0N 11°48'·8E), the narrow channel between Stenungsön and Stenungsund.
- 2 It is mandatory for all tankers and gas tankers of more than 20 000 dwt loaded or in ballast, to have a tug escort to and from Skallen Lighthouse (57°53'·4N 11°33'·5E) to the berth or inner anchorage.

Harbour**General layout****8.217**

- 1 There are four separate and distinct berths at Stenungsund; the S two lie within Stenungsundet (8.216) and the N pair front Askeröfjorden, to the N of Stenungsund. These berths, which have separate approach channels, are situated as follows (positioned from Lerskiten islet (58°04'·8N 11°48'·1E)):
- 2 Talludden (8.220) (4½ cables ESE) on the NE side of Stenungsundet.
Hydrokajen (Saltkajen) (8.220) (1 cable N) on the SE side of the island of Tröskeln, at the N entrance to Stenungsundet.
- 3 Havdens oljepir (8.220) (3½ cables NNE) on the N side of Havden peninsula.
Kraftverkshamnen (Vattenfall) (8.220) (7 cables NE) which extends from the mainland coast.

Directions for entering harbour

(continued from 8.169)

Approach channels**8.218**

- 1 **Talludden** can be approached from S or from NW through Stenungsundet. The approach from S is restricted by a bridge which spans the S end of the channel and has a vertical clearance (1.9) of 13 m over a width of 30 m. The approach from NW uses the same entrance channel as that for Hydrokajen, below, then follows the channel SE.
- 2 **Hydrokajen** is approached through a dredged channel, with a width of 50 m and a dredged depth of 9·5 m, which leads 059° for 4 cables from the main track through Askeröfjorden. The limits of this channel are indicated on both sides by lights in line bearing 059°.
- 3 Front lights (yellow triangles with a black border, points up) (58°05'·0N 11°48'·2E).
Rear lights (yellow triangles with a black border, points down) (52 or 80 m from the front lights).
Red lights, on request, mark the NW limit and green lights the SE limit of the channel.

- 4 **Havdens oljepir** is approached along the alignment (102½°) of Stenung Leading Lights:
Front light (white triangle with black border, point up, on post) (58°05'·1N 11°48'·7E).
Rear light (white triangle with black border, point down, on post) (112 m from the front light).
- 5 **Kraftverkshamnen** deep-water berth (N side) is approached through a channel with a width of 80 m and a swept depth of 12·6 m, which leads ESE for 6½ cables from the main track through Askeröfjorden. The limits of this channel are indicated on both sides by lights in line bearing 101¼° (S limit) and 102° (N limit):
- 6 Front lights (yellow triangles, points up, on masts), S light (58°05'·3N 11°49'·2E).
Rear lights (yellow triangles, points down, on masts) (90 m and 75 m from front lights).
- 7 Red lights, on request, mark the N limit of the deep-water channel and green lights mark the line of the pier along its N face which is the S limit of the deep-water channel.
- 8 The approach channel to the S side of the jetty has a swept depth of 10·6 m; the N limit is marked by the S limit marks (green lights) of the channel above, and the S limit by the alignment (102°) of beacons (90 m apart) standing on the shore.

Berths**Anchorage****8.219**

- 1 Anchoring is permitted as follows:
On the W side of the channel in position 1 mile SW of Lerskiten islet (58°04'·8N 11°48'·1E), in a depth of 12 m with good holding in clay.
- 2 To the NW of Kraftverkshamnen (whilst waiting to berth).
Vessels should anchor clear of the fairway through Askeröfjorden and of the submarine pipelines (1.69) and cables shown on the chart.

Alongside berths**8.220**

- 1 **Talludden**, a wharf with a length of 100 m and depths of 6 m alongside, which is used for loading stone.
Hydrokajen (Saltkajen), also known as Norsk Hydro Terminal, a quay which has a length of 100 m, with a berthing dolphin 35 m in extension, and depths of 9·5 m alongside the quay and 8·8 m alongside the dolphin. This berth is used for moving salt and chemicals.
- 2 **Havdens oljepir**, also known as Statoil Terminal Havden, is a quay which has a length of 60 m with berthing dolphins in extension 35 m to the E and to the W, and a swept depth of 14 m alongside. This berth is used for unloading oil and gaseous products. A submarine cable is laid close N of the berth, as shown on the chart.
- 3 **Kraftverkshamnen** (Vattenfall), also known as the Powerboard Terminal, is a jetty with a length of 110 m and depths of 12·0 m along its N side and of 10·5 m along its S side. These berths are used for the movement of oil, chemicals and gaseous petroleum products. Two mooring buoys are laid off the head of the pier for use during strong winds from the S. However, use of a line to the SW buoy obstructs passage to the S side of the jetty.

Port services

Repairs

8.221

- 1 Limited repairs can be undertaken through a local engineering workshop.

Large repairs may be undertaken by a workforce from the Göteborg shipyards.

Other facilities

8.222

- 1 Deratting can be carried out; Deratting and Exemption Certificates issued; nearest hospital is in Uddevalla but doctors are available at short notice; oily waste reception facilities.

Supplies

8.223

- 1 Fuel oil can be supplied alongside the oil berths and by barge; fresh water available alongside; provisions obtainable.

SOUTH CHANNEL TO UDDEVALLA — NORTHERN PART

General information

Charts 869, 870

Route

8.224

- 1 The N part of the South Channel to Uddevalla lies between the island of Orust and the mainland to the E. This part of the channel, which is entered off Stenungsund (58°05'N 11°49'E), at the N end of Askeröfjorden, leads generally N for about 14 miles, along the recommended track, through Halsefjorden and Svanesund (58°08'5N 11°50'0E), Björningarna (58°16'N 11°50'E) and Havstensfjord (58°19'N 11°47'E), to a position off the entrance to Uddevalla (58°21'N 11°55'E).

Controlling depth

8.225

- 1 Channel draught (7.2) between Askeröfjorden and Havstensfjord, off the entrance to Uddevalla, is 11 m.

Vertical clearance

8.226

- 1 The channel is spanned at Grötåholme (58°09'5N 11°51'5E) by an overhead power cable with a vertical clearance of 58 m above mean water level.

Vessel traffic service

8.227

- 1 See 8.5.

Traffic regulations

8.228

Ferry. The vehicle ferry which crosses Svanesund (58°08'5N 11°50'2E) is obliged to give way to vessels transiting the sound. Masters of such vessels must make a long blast on the whistle or siren when approaching the ferry crossing; as indicated by warning notice boards on the SW point of Sundholmen (58°08'0N 11°50'3E) (8.231) and on Äspetången, 8 cables NNE.

Currents

8.229

- 1 In Svanesund (58°08'5N 11°50'2E) the current is S-going and can achieve a rate of up to 3 kn.

Directions

(continued from 8.169)

Chart 870

Askeröfjorden to Halsefjorden

8.230

- 1 When Galterön Light (58°06'3N 11°48'2E) (8.169) is distant 4 cables, the recommended track alters gently towards the N then NE, passing (with positions relative to the light):
- 2 Between Galterön, on which stands the light, and Stora Farholmen, an islet 1¼ cables WNW of the light, thence:
SE of a 5-6 m shoal (2 cables NNW), which is marked on its SE side by a light-buoy (port hand).
- 3 When Galterön Light is distant 3 cables, astern, a white sector (217°–223°) of this light, astern, leads NE for about 1¼ miles with a channel draught (7.2) of 11 m. An alternative track through deeper water follows a curved path to the SE of the white sector, as shown on the chart. Both tracks lead across the E part of Halsefjorden, passing (with positions relative to the light):
- 4 NW of a spar buoy (starboard hand) (6 cables NE), which marks the SE side of the fairway, and:
Through No 3 reporting position (6 cables NNE) (8.5), thence:
- 5 SE of a light-buoy (port hand) (1 mile NE), which marks the NW side of the fairway, thence:
SE of Halse Nabb Light (white hut, red roof and base, 3 m in height, floodlit) (1¼ miles NNE).

Svanesund

8.231

- 1 When Galterön Light is distant 1½ miles astern, the recommended track shown on the chart alters to the N for about 7 cables, within a white sector (351°–008°) of Svanesund Light (red tower, 6 m in height) (58°08'4N 11°50'0E), passing (with positions relative to the light):
- 2 E of Svanesundsgrundet, and a spar buoy (port hand) (4 cables S), which marks the N side of a 12 m shoal which lies within the white sector, thence:
W of a light-buoy (starboard hand), which marks the edge of the bank fringing the W side of Sundholmen (3½ cables SSE), a small islet on the NW extremity of which stands Sundholmen Light (lantern on white pedestal, floodlit).
- 3 When Svanesund Light is distant 2 cables the recommended track alters to NNE for 3½ cables, then continues NNE for about 1 mile, within a white sector (202°–208°) of Svanesund Light, astern, tending towards the E limit of the sector with progress N, passing (with positions relative to the light):
- 4 Across the route of a vehicle ferry (1½ cables S) (8.228) and close ESE of Svanesund Light, thence:
WNW of a 3 m shoal (4 cables NNE), which is marked on its NW side by a Äspetången Light-buoy (starboard hand), thence:
- 5 ESE of Djurnäsudde Light (lantern on white pedestal) (1¼ miles NNE), exhibited from the SE extremity of a point extending SE from Orust, and:
Under an overhead power cable (8.226), thence:

WNW of Grötå Holme Light (lantern on white pedestal) (1¼ miles NNE), exhibited from the NW point of the islet.

Chart 869

Svanesund to Björningarna

8.232

- 1 After passing Grötå Holme Light the recommended track alters to W of N for 2 miles, as shown on the chart, within a white sector (352°–356°) of Strandanäs Light (red lantern) (58°12'N 11°51'E), passing (with positions relative to the light):
- 2 W of Tovebåden (1¼ miles SSE), which is marked on its W side by a light-buoy (starboard hand).
When Strandanäs Light is distant 7 cables, the recommended track alters to the N for 2¾ miles, as shown on the chart, the N part of which lies within a white sector (178°–185½°) of Strandanäs Light, astern, passing (with positions relative to the light):
- 3 E of Strandanäs Light, exhibited from the E coast of Orust, thence:
Through No 4 reporting point (2½ cables NE) (8.5), thence:
W of Ljungskile (1 mile NE), thence:
- 4 E of a 9.5 m shoal (2 miles N), which is marked on its E side by a spar buoy (port hand).

Björningarna

8.233

- 1 When Strandanäs Light is distant 2 miles, astern, the recommended track alters to NNW for 7 cables, as shown on the chart, within a white sector (331½°–336½°) of Björningarna Light (red lantern) (58°15'6N 11°49'6E), exhibited from the E side of a small islet.
- 2 When Björningarna Light is distant 1 mile, the recommended deep water track alters to the NW for 6 cables, passing (with positions relative to Aspholmen Light (58°15'N 11°50'E)):
- 3 NE of rocks awash (1 cable SE), which are marked on their NE side by a spar buoy (port hand), thence:
NE of Aspholmen Light (white lantern on red concrete base), thence:
SW of the reef fringing the SW side of Långeskär (3 cables N), which is marked on its SW side by Långeskär Södra Light-buoy (starboard hand).
- 4 When Aspholmen Light is distant 3 cables, astern, the recommended track alters to NNW for about 1 mile, within a white sector (333°–336°) of Småholmarna Light (white lantern on red concrete base) (58°16'6N 11°48'2E), passing (with positions relative to the light):
- 5 ENE of a shoal (1¼ miles SSE), with a least charted depth of 4 m, which is marked on its E side by Långeskär Västra Light-buoy (port hand), thence:
WSW of the shoal fringing the W side of Björningarna, a group of rocks (1 mile SE), thence:
ENE of a 4.3 m shoal (4 cables S), which is marked on its E side by a spar buoy (port hand).

Havstensfjord

8.234

- 1 When Småholmarna Light is distant 4½ cables the recommended deep water track alters to the N for about 1 mile, as shown on the chart, passing (with positions relative to the light):
- 2 W of the reef fringing the SW side of Kollholm (3½ cables SE), which is marked on its SW side by Kollholms Västra Light-buoy (starboard hand).

Kollholm Light (white tower, 7 m in height) is exhibited from the NE extremity of Kollholm. Thence:

- 3 E of Småholmarna, thence:
W of a 6 m patch (6 cables NE), which is marked on its W side by a spar buoy (starboard hand).
When Småholmarna Light is distant 7 cables, to the S, the recommended deep water track alters to the NNW for 1½ miles, within a white sector (157½°–161°), astern, of Björningarna Light (8.233), passing (with positions relative to Stora Deje Light (58°18'1N 11°48'3E)):
- 4 WSW of the shoal fringing the W side of Deje, on the NE end of which stands Stora Deje Light (lantern on white pedestal), thence:
WSW of the reef fringing Korstensholmen (1 cable NNW), an elongated islet which is marked 1½ cables off its NW end by a light-buoy (starboard hand), and:
- 5 ENE of Brattön (1 mile NW), an island that is steep-to around its NE end.

8.235

- 1 When Stora Deje is distant 8 cables, the recommended track alters to ENE, towards Uddevalla.

(Directions continue for Uddevalla at 8.252)

UDDEVALLA

General information

Chart 869 with plan of Uddevalla

Position and function

8.236

- 1 Uddevalla (58°21'N 11°55'E), an industrial town with a population of 50 068 (2004), stands along the banks of the river Båveån (8.255) at its junction with the head of Byfjorden. This town has a well sheltered harbour which can handle a variety of products in bulk, container or Ro-Ro form.
- 2 Frölandshamnen, a discharge port for iron ore, lies on the NW side of Byfjorden, about 1½ miles WSW of Uddevalla.

Approach and entry

8.237

- 1 Uddevalla is usually approached through either South Channel or North Channel, as given at 8.89, and entered through Sunningesund (58°19'5N 11°50'6E) which leads into Byfjorden, close NE, at the head of which stands Uddevalla.

Traffic

8.238

- 1 In 2004 the port was used by 263 vessels with a total of 2 121 163 dwt.

Port Authority

8.239

- 1 **Address.** Uddevalla Hamn-Terminal, A/B PO Box 543, S-451 21, Uddevalla.

Website. www.uddevalla-hamn.se.

Email. info@uddevalla-hamn.se.

Limiting conditions

Controlling depth

8.240

- 1 From sea to Byfjorden, using the best route, the overall limitations are a channel draught (7.2) of 11 m and a clear passage height of 43 m. In Sunningesund the swept draught is 13.0 m.

Within Byfjorden, channel draughts (7.2) are as follows:

To Frölandshamnen (8.250): 10.3 m.

To Skeppsholmspiren (8.257): 10.3 m.

- 2 In more detail, the limiting conditions in South Channel are given at 8.152 and at 8.225; and those in North Channel are given at 8.126.

Vertical clearance

8.241

- 1 Uddevallabron, a cable bridge with a vertical clearance of 47 m, spans the narrows at Rödberget (58°19'6N 11°50'4E).

Deepest and longest berths

8.242

- 1 The deepest berth is at Frölandskajen (8.257). The longest berth is at Badökajen (58°20'8N 11°54'6E) (8.257).

Mean tidal levels

8.243

- 1 The mean tidal range is 0.6 m. For other conditions affecting water levels see 1.187.

Density of water

8.244

- 1 The density ranges from 1.005 to 1.020 g/cm³.

Maximum size of vessels handled

8.245

- 1 **Largest.** This vessel had a maximum sailing draught of 10.06 m and a maximum air draught of 43.5 m.
Badökajen. At the grain berth the maximum allowable LOA is 190 m with a draught of 9.2 m at MLW.
- 2 **Kasebukten.** At Skeppsholmspiren the maximum allowable draught is 10.9 m at MLW.

Arrival information

Vessel traffic service

8.246

- 1 Uddevalla and its approaches lie within the area of Marstrand VTS which is mandatory for certain vessels and is described in *Admiralty List of Radio Signals Volume 6* (2).

Pilots

8.247

- 1 Pilotage information for vessels approaching Uddevalla is given at 8.97. Pilots for vessels leaving Uddevalla can be obtained at any time.

Tugs

8.248

- 1 Tugs are available at Uddevalla. It is reported that three tugs are required in order to berth vessels with an LOA of more than 180 m at Badökajen (8.257).

Regulations concerning entry

8.249

- 1 **Speed limit** in Uddevalla inner harbour is 5 kn.
Right of way. Mariners in vessels which cross the channel must give way to those passing in the long direction of the channel.

Harbour

General layout of harbour

8.250

- 1 **Byfjorden** (58°20'N 11°53'E) contains three independent berthing areas along its NW side. Of these the largest is Frölandshamnen which fronts the fjord.

The inner harbour, centred around Uddevalla Front Leading Light (58°20'9N 11°55'2E), consists of three main basins which all stem from the harbour mouth.

Natural conditions

8.251

- 1 **Current.** The current, which always sets SW and S from Uddevalla, often attains a considerable rate in Sunningesund (58°19'5N 11°50'6E).
- Ice** seldom obstructs the harbour; in severe winters the channel is kept open by icebreakers (1.95).
- 2 **Wind.** The prevailing wind is from the W.

Directions for entering harbour

(continued from 8.145 and 8.235)

Entrance channel

8.252

- 1 The approach to Uddevalla leads ENE for 1 mile through Vrångelyckan (58°19'N 11°49'E), with a channel draught of 11.0 m, then through Sunningesund, close ENE, which had a swept depth of 13 m (1997) in a channel with a width of 100 m.

Directions

8.253

- 1 From a position W of Stången Light (58°19'0N 11°49'0E), the recommended track leads ENE through the entrance channel for 1¼ miles, passing (with positions relative to the light):
NNW of Stången, the SW entrance point of the channel, from which Stången Light (lantern on white GRP structure) is exhibited, thence:
- 2 Beneath Uddevallabron (1 mile ENE), crossing the narrows at Rödberget. The limits of the navigational fairway are marked by lights (lateral), and its centre is indicated by an illuminated board. Thence:
NNW of Sundstånge (1¼ miles ENE).

8.254

- 1 When clear of the entrance channel the recommended track is indicated by Uddevalla Leading Lights:
Front light (white pole, elevation 15 m) (58°20'9N 11°55'2E).
- 2 Rear light (pole, elevation 34 m) (970 m from the front light).
The alignment (060¼°) of these lights leads ENE for 1½ miles through Byfjorden into Uddevalla Inner Harbour, passing (with positions relative to the front light):
- 3 SSE of Hansagrund (2 miles WSW), a shallow patch which is marked by a spar buoy (starboard hand) on its W edge and by a light-buoy (port hand) off its SE side, thence:
- 4 Close NNW of a 4.6 m patch (6 cables WSW), which is marked off its NW side by a spar light-buoy (starboard hand) and off its N side by a spar buoy (starboard hand).

Basins and berths

Basins

8.255

- 1 **Bäveån**, a major river which forms the S boundary of the harbour, contains berths on both sides between its

mouth, at the head of Byfjorden, and a bridge 7 cables ENE.

- 2 **Kasebukten**, a large basin containing many major berths, extends 5 cables N and NE from its entrance near the head of Byfjorden. Both sides and the head of this basin are quayed and a finger jetty extends 260 m S from the N quay. A disused dry dock provides a small basin close W of Kasebukten.

- 3 **Badökajen**, which extends 6 cables NNE from the mouth of Bäveån, is separated from Kasebukten by Skeppsholmsen, on its NW side.

Anchorage

8.256

- 1 Anchorage can be obtained in Gustavsbergbukten, 9 cables SW of Uddevalla Front Leading Light, as shown on the plan. The depth is 40 m, mud, clear of the reef extending 1 cable NE from Lillön, an above-water rock in the middle of the bay.
- 2 A local regulation states that vessels anchored within the harbour area must have stand-by on the engines, bridge watch and a radio watch on VHF channel 16.

Alongside berths

8.257

- 1 **Frölandshamnen**. The largest berth is Frölandskajen with a length of 225 m and depths of 12 m alongside. A Ro-Ro ramp with a width of 18 m and a depth of 8.0 m is positioned alongside two dolphins at the SW end of the berth.
- 2 **Kasebukten**. The largest berth is Skeppsholmspiren, on the SE side of the basin, which has a length of 340 m and

depths from 10.7 to 11.2 m alongside. A Ro-Ro ramp with a depth of 7.4 m is positioned at its NE end.

Sörvik Dock. A former dry dock with an entrance close W of the W side of Kasebukten provides five berths with a total length of 900 m and depths alongside of 10 m. The entrance has a least depth of 8.2 m; maximum allowable draught 8.0 m.

- 3 **Badökajen**. The longest berth, at the S end of the quay, has a length of 360 m with depths from 6.0 to 9.5 m alongside.

Oil berth. There is an oil terminal at Lövås. The berth has a length of 130 m and a depth of 7.2 m; maximum allowable draught 6.9 m at MLW.

Port services

Repairs

8.258

- 1 Repairs can be undertaken.

Other facilities

8.259

- 1 Compass adjuster available from Göteborg; deratting can be carried out; Deratting and Exemption Certificates issued; regional hospital in the town; reception facilities for oily waste which is removed by road tanker; containers for garbage are provided.

Supplies

8.260

- 1 Fuel can be supplied by road tanker or by barge; fresh water available; provisions and ship's stores obtained in the town.

APPENDIX I

(See “Laws and Regulations appertaining to navigation” on page 1)

REGULATIONS CONCERNING THE ENTRY INTO AND PASSAGE THROUGH NORWEGIAN TERRITORIAL WATERS IN PEACETIME OF FOREIGN, NON-MILITARY VESSELS.

Laid down by Royal Decree pursuant to section 418, subsection 2, of Act no. 10 of 22nd May 1902 and section 1 of Act no. 3 of 18th August 1914 and section 8, third paragraph, of Act no. 19 of 17th June 1966, put forward by the Ministry of Defence.

Introductory Provisions

Section 1. These regulations only apply when Norway and the State whose flag the vessel is entitled to fly are at peace, or until contingency measures have been implemented.

Section 2. The regulations do not apply to Norwegian territorial waters off Svalbard, Jan Mayen or dependencies unless otherwise prescribed by statute.

Section 3. For the purpose of these regulations, foreign, non-military vessel means any foreign vessel, or Norwegian vessel the master of which is a foreign national, to which current Norwegian regulations concerning the admission of foreign warships and military aircraft to Norwegian territorial waters in peacetime do not apply. In these regulations, foreign, non-military vessel also means equipment belonging to the vessel (lifeboats, landing craft, aircraft, etc).

Section 4. Nuclear-powered vessels are subject to special licensing pursuant to section 4 of Act no. 28 of 12 May 1972. Vessels carrying nuclear substances are required to hold a permit pursuant to section 5 of the said Act.

Section 5. Sections 13, 15 and 16 of these regulations apply subject to any restrictions established by agreements with foreign States.

Section 6. Pleasure craft carrying foreign nationals who are required to hold a visa shall be subject to the regulations concerning the admission of foreigners to the Kingdom and their stay there pursuant to sections 83 and 111 of the Crown Prince Regent's Decree of 21st December 1990.

Pleasure craft over 24 metres in length or 50 gross tons shall use prescribed sea lanes and are required to give notification pursuant to section 17 and may be ordered to report pursuant to section 19. Pleasure craft are otherwise excepted from the restrictions set out in sections 16, 17, 18 and 19.

Norwegian territorial waters and sea limits

Section 7.

- a. For the purpose of these regulations, baselines means straight lines drawn between the base points.
- b. For the purpose of these regulations, Norwegian territorial waters means all waters within the territorial limit.

c. For the purpose of these regulations, internal waters means all waters that lie within the baselines.

d. For the purpose of these regulations, the territorial sea means the waters between the baselines and the territorial limit.

Responsibility of the shipmaster

Section 8. Masters of all foreign, non-military vessels are required to familiarize themselves with the substance of these regulations before entering Norwegian territorial waters.

Norwegian authorities

Section 9. For the purpose of these regulations, the Norwegian authorities means the Ministry of Defence or whosoever the Ministry so authorizes. All enquiries, notifications, reports, applications for clearance etc, to the Norwegian authorities shall be directed to Forsvarskommando Nord-Norge (FKN) for vessels in positions north of 65°N and to Forsvarskommando Sør-Norge (FKS) for vessels in positions south of 65°N and shall be submitted in Norwegian, Danish, Swedish or English.

Innocent passage through the territorial sea

Section 10. Innocent passage through the territorial sea is permitted for foreign, non-military vessels. Innocent passage means navigation through the territorial sea, either in transit or for the purpose of proceeding to or from Norwegian internal waters or ports.

Stopping or anchoring while passing through the territorial sea is only permitted when such action is incidental to ordinary navigation or is rendered necessary by *force majeure* or distress or for the purpose of rendering assistance to persons, ships or aircraft which are in danger of distress.

Section 11. Any vessel in innocent passage through the territorial sea which for reasons set forth in section 10, second paragraph, must make a temporary stop or remain stationary or enter Norwegian internal waters or call at a Norwegian port facility, shall notify the Norwegian authorities without undue delay.

Admission of foreign, non-military vessels to Norwegian internal waters

Section 12. Foreign, non-military vessels to which the list in section 13 does not apply may, subject to the restrictions set out in section 16, enter Norwegian internal waters without obtaining written permission in advance.

Foreign, non-military vessels may be refused admission to Norwegian internal waters when special grounds make this necessary. Such special grounds exist when *inter alia* fishing vessels plan to enter these waters in connection with fishing or bringing ashore a catch as set out in section 8, first paragraph, of Act no. 19 of 17th June 1966.

Section 13. Admission to Norwegian internal waters is permitted for the following foreign, non-military vessels only when written permission has been granted in advance by the Norwegian authorities:

- a. Research vessels.
- b. Seismic vessels and other vessels carrying equipment used for surveying and charting the sea bed.
- c. Factory ships, repair ships and expedition vessels.
- d. Vessels for special purposes, including floating and mobile oil platforms, tugboats, dredgers, icebreakers and floating cranes, unless entry into Norwegian internal waters is necessary due to a binding agreement with a Norwegian company which requires the vessel to call at a Norwegian port facility.
- e. Non-military government ships and stand-by and support vessels for naval units.
- f. Vessels specified in section 4 of these regulations.
- g. Vessels carrying aircraft.

In cases of doubt, the Norwegian authorities will decide whether a foreign, non-military vessel is subject to this provision.

Section 14. The vessels specified in section 13 b, c, d and g may be granted admission into Norwegian internal waters without a prior written application in order to be repaired or laid up in a Norwegian port provided a binding agreement with a Norwegian company exists. In such cases, deviations may be made from the deadlines referred to in section 15. The Norwegian authorities shall be notified of such admission as soon as possible.

Foreign, non-military vessels which are obliged to seek a port of refuge for the reasons specified in section 10, second paragraph, may enter Norwegian internal waters without a prior written application.

Section 15. A written application for permission to enter Norwegian internal waters under section 13 a, b, c, d, e and g shall have reached the Norwegian authorities at the latest 7 days before entry is expected to take place. Applications under section 13 f shall have reached the Norwegian authorities at the latest 14 days before entry is expected to take place. All applications shall contain the information specified in section 17 and any other information deemed to be of importance in connection with the planned entry.

Notwithstanding these regulations, the Norwegian authorities may require information from foreign, non-military vessels which is considered to be of relevance to the planned entry, including information about catches carried on board and, if the catch is to be delivered in Norway, fishing activities within Norwegian fishery jurisdiction in which the vessel has been engaged.

Entry, passage and notification requirement when navigating through Norwegian internal waters

Section 16. For foreign, non-military vessels, entry into and passage through Norwegian internal waters (*as given in Enclosure I*) is restricted to the following activities:

- a. Navigation to and from Norwegian ports in connection with loading, unloading, restocking, bunkering, carrying out necessary repairs or carrying out binding agreements with Norwegian interests. Laytime in a Norwegian port shall be limited to the necessary length of time as dictated by the purpose of the call at the port.

- b. Navigation in transit via specified sea lanes when the vessel's mission makes this necessary.

- c. Navigation in order to seek a port of refuge.

Stopping or anchoring while passing through internal waters is only permitted when such action is incidental to ordinary navigation or is rendered necessary by *force majeure* or distress or for the purpose of rendering assistance to persons, ships or aircraft which are in danger or distress. If the vessel makes a temporary stop or remains stationary, the Norwegian authorities shall be notified without undue delay.

Section 17. Masters of all foreign, non-military vessels over 24 metres in length or 50 gross tons who intend to navigate their vessel into Norwegian internal waters are required to give notification of such entry and shall notify the Norwegian authorities at the latest 24 hours in advance. Such notification may be made in written or oral form and shall contain:

- a. Vessel's IMO identification Number, if any.
- b. Vessel's nationality, name, international radio call sign (distinctive letters) and any mobile or satellite telephone numbers.
- c. Type of vessel, cargo, draught and size in gross tons.
- d. Purpose of the entry, including any information about the entry as specified in section 14 of these regulations.
- e. Specification in latitude and longitude of the point where the vessel intends to cross the Norwegian baseline when entering and leaving.
- f. Intended ports-of-call with specification of times of arrival and departure.
- g. Norwegian contact (agent, operator, shipowner, etc).

The Norwegian authorities shall be informed without delay of any changes in the submitted plan of navigation.

Passenger and car ferries in regular service to and from Norwegian ports are excepted from the notification requirement provided an approved navigation plan has been forwarded to the Norwegian authorities at the latest 14 days before the service is put into operation. The Norwegian authorities are to be informed if the navigation plan is withdrawn or if major changes are introduced.

The vessels specified in section 13 are required to give notification as described above irrespective of their length or size.

Sea lanes and report points in Norwegian internal waters

Section 18. When navigating through Norwegian internal waters, foreign non-military vessels shall only use those sea lanes prescribed by the Ministry of Defence.

Section 19. Foreign, non-military vessels shall report to the Norwegian authorities when entering and leaving Norwegian internal waters and when passing specified geographical positions in the sea lane. Such reports shall include the vessel's name, call-sign, destination and estimated time of passing the next report point or of arrival at the vessel's next port-of-call. The report points are determined by the Ministry of Defence (*and given in the relevant Admiralty List of Radio Signals*).

Section 20. Foreign, non-military vessels which are obliged to enter Norwegian internal waters due to *force majeure* or distress or to provide assistance to persons, ships or aircraft that are in danger are excepted from the above provisions concerning the requirement to report and

the use of sea lanes. Such vessels shall nevertheless and by the fastest possible means contact the Norwegian authorities for specific instructions regarding anchoring or continued navigation.

Vessels lying in Norwegian territorial waters

Section 21. No registrations or measurements other than those necessary for safe navigation are permitted without special permission from the Norwegian authorities.

Section 22. It is prohibited for all persons on board foreign, non-military vessels to make maps or sketched maps of ports, waters, airfields or seaplane ports of the Kingdom. It is also prohibited to make maps, sketches of maps, take photographs or record descriptions of Norwegian military facilities or equipment.

Section 23. Foreign, non-military vessels shall fly their national flag at all times while navigating through Norwegian territorial waters. When the vessel is at anchor or moored, the flag shall be hoisted during the day.

Section 24. Officers on Norwegian warships or guard ships and other officers in the Norwegian Armed Forces may inspect any foreign, non-military vessel, including its documents, cargo, equipment and any persons on board. The master of the vessel under inspection shall provide any assistance necessary to facilitate the inspection, including placing the vessel's communications equipment at the disposal of the inspecting officers free of charge. The master shall provide on request any information which is of interest to the Norwegian authorities. He is under obligation to comply with instructions regarding the remainder of the voyage.

Section 25. The master and crew of a foreign, non-military vessel shall comply with current Norwegian legislation including regulations concerning the environment, health, customs, use of pilot, traffic, ports, foreign nationals and rules of conduct. Norwegian regulations governing the use of communications equipment shall be complied with.

Infringements of the regulations

Section 26. Should the master or crew of a foreign, non-military vessel fail to comply with the laws and regulations laid down for the presence and navigation of vessels in Norwegian territorial waters, the Norwegian authorities may order the vessel to leave Norwegian territorial waters immediately or within a specified, reasonable period of time. The vessel may also be brought to the nearest police authority to be charged and prosecuted.

Section 27. Unless otherwise prescribed by statute, infringement of these regulations is punishable by fines or by imprisonment for a term not exceeding three months pursuant to section 418, subsection 2, of Act no. 10 of 22nd May 1902.

Concluding provisions

Section 28. The Ministry of Defence or whosoever the Ministry so authorizes may grant exemption from these regulations and may issue further provisions for the supplementation and implementation of these regulations.

Section 29. These regulations enter into force on 1st May 1995.

REGULATIONS ON MANDATORY LANES AND REPORTING POINTS FOR FOREIGN NON-MILITARY VESSELS IN NORWEGIAN TERRITORIAL WATERS.

- 1 Decreed by the Ministry of Defence 4th May 1995 in accordance with Royal Resolution of 23rd December 1994 No.1130 on foreign non-military vessels calling at and travelling in Norwegian territorial waters during peacetime. (See Appendix I, sections 18 and 19).

Mandatory lanes

- 2 Foreign non-military vessels shall follow prescribed channels which are summarised in the Coast Directorate's fairway system.
- 3 Foreign non-military vessels wishing to call at places which are not directly connected to the prescribed channels, shall follow prescribed channels as far as possible and then take the shortest safe channel in or out. Where a prescribed channel cannot be followed as in the previous sentence, a vessel shall cross the baseline at a point which allows the shortest safe channel in or out between the baseline and the port of call, and the vessel shall follow that channel.
- 4 Foreign non-military vessels which, after entering Norwegian internal waters, have a need to follow channels other than those described in paragraphs 1 and 2 above, can obtain special permission from the Norwegian authorities (i.e. Headquarters Defence Command North Norway / South Norway) to follow these channels as long

as there is a state pilot on board. In areas regulated by traffic centres, the appropriate pilot master at the traffic centre can give dispensation as necessary.

Reporting points

- 5 When passing in or out of the Norwegian internal waters and when passing defined geographical points in channels, foreign non-military vessels shall report to the Norwegian authorities. The report shall contain the vessel's name, call-sign and the time for passing the next reporting point in a channel or the next harbour.
- 6 The reporting points are defined as follows:
Defence Command
South Norway
Kvitsøy in Rogaland
Statt in Møre and Romsdal
Rørvik in Nord Trøndelag
North Norway
Landegode in Nordland
Tromsø in Troms
Honningsvåg in Finnmark

Implementation

- 7 This regulation comes into force immediately.

Mandatory lanes channels covered by this volume

<i>Channel No</i>	<i>Start position</i>	<i>Name</i>	<i>Description</i>	<i>Leads to</i>
1000	58°53'·5N, 10°35'·0E	Færder – Oslo		Oslo, Moss, Horten, Drøbak
1001	58°53'·5N, 10°35'·0E	Haldenleia	Torbjørnskjær – Sekken – Svinesund – Iddefjorden – Halden	Halden
2002	58°53'·5N, 10°35'·0E	Singlefjorden	Sponvikskansen – Belgen	
1002	58°53'·5N, 10°35'·0E	Løperen to Fredrikstad and Sarpsborg	Torbjørnskjær – Løperen – Fredrikstad – Sarpsborg	Fredrikstad, Sarpsborg
2004	58°53'·5N, 10°35'·0E	Kjøkøysundleia to Flyndregrunnen	Struten – Tenneskjær – Kjøkøysundet – Flyndregrunnen	
2005	58°53'·5N, 10°35'·0E	Vesterelva to Fredrikstad	Struten, Strømtangen – Vesterelva – Fredrikstad	Fredrikstad
2033	58°53'·5N, 10°35'·0E	Huikjæla	Færder – Huikjæla – Husøy	Tønsberg
2031	58°53'·5N, 10°35'·0E	Husøysundet – Tønsbergkanalen	Husøysundet – Tønsbergkanalen	Tønsberg
1012	58°54'·0N, 10°24'·0E	Tjømekjæla to Tønsberg	Sydostgrunnen – Tjømekjæla – Tønsberg	Tønsberg
1013	58°54'·0N, 10°24'·0E	Sandefjordsfjorden		Sandefjord
1022	58°51'·5N, 9°50'·5E	Helgerofjorden – Kalven	Langesundsbukta – Helgerofjorden – Kalven – Brevik	Brevik
1023	58°51'·5N, 9°50'·5E	Langesundsbukta – Dypingen – Skien	Langesundsbukta – Dypingen – Skien	Skien
1032	58°02'·5N, 8°21'·5E	Kristiansandsfjorden	Oksøy/Grønningen – Kristiansandsfjorden	Kristiansand

APPENDIX II

(See "Laws and Regulations appertaining to navigation" on page 1)

REGULATIONS ON THE USE OF THE APPROACHES TO THE HARBOUR DISTRICTS IN GRENLAND

Decreed by the Fisheries Ministry 21st January 1988 in accordance with the law of 8th June 1984 No 51 on harbours and waters, changed 21 February 1991 No 109 and 15th July 1994.

§1

Geographical extent and actual operational area

The regulation applies to the waters north of a straight line drawn through the most northerly point on Mølen and the most northerly point of Sæsteinen.

The regulation, with minor exceptions, applies to vessels over 50 grt or to unmeasured vessels with a length greater than 24 m, as shown in separate paragraphs. The regulation applies also to tows with a length or beam greater than 24 m. The towing vessel and the towed vessel are considered as one vessel under this regulation.

The regulation also applies to vessels over 50 grt when the vessel has a valid certificate according to Ships Measurement Convention of 1947. When a vessel has several certificates the greatest shall apply.

The regulation on vessels carrying dangerous cargo also apply to vessels carrying flammable condensed gases with a flash point lower than 23°C, and which in ballast is not gas free.

Particular regulations also apply at all times to the transport of chlorine in bulk.

§2

Definitions

The definition of vessel in this regulation is as in the law on harbours and waters etc, of the 8th June 1984 §3, all floating installations which can be used as transportation, conveyance, residence, production or manufacture, including submarine vessels of any kind. The term also includes hovercraft.

The Ministry can individually adapt or extend the definition of a vessel.

GT means gross registered tonnage according to the Ships Measurement Convention of 1969.

Dangerous cargo is:

1. Packed dangerous goods and solid bulk cargoes as covered by the regulations in the International

Safety at Sea Convention SOLAS 1974, Chapter VII, Part A, and listed in the respective codes of International Maritime Goods Code (IMDG-codes) and Code of Practice for solid bulk cargoes (The BC-code) Appendix B, with later changes, where the quantum of the cargo is 10 tons or more.

2. Liquefied chemicals in bulk as covered by the regulations in the International Safety at Sea Convention SOLAS 1974, Chapter VII, Part B. The materials are listed in the codes:

For new ships (built after 1 July 1986) International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC code) Chapter 18 with later changes. For existing ships (built before 1 July 1986) Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH code) Chapter 6 with later changes.

3. Liquefied gases in bulk as covered by the regulations in the International Safety at Sea Convention SOLAS 1974, Chapter VII, Part C. The materials are listed in the codes:

For new ships (built after 1 July 1986) International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC code) Chapter 19 with later changes. For existing ships (built after 31 October 1976 but before 1st July 1986) Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (Gas Carrier code) with later changes. For existing ships (built before 31st October 1976) IMO's code for existing gas ships with later changes.

Substances which have a flash point of 23° or higher shall not be classified as dangerous cargo.

Additionally, the following substances are not classified as dangerous cargo:

Product designation	Chemical designation	UN number	UN class
Ammonium nitrate	NH ₄ NO ₃	1942	5-1
Ammonium nitrate fertiliser		2067	5-1
Ammonium nitrate fertiliser		2068	5-1
Ammonium nitrate fertiliser		2069	5-1
Ammonium nitrate fertiliser		2070	5-1
Ammonium nitrate fertiliser		2072	5-1
Ammonium nitrate fertiliser		2071	9
Argon	Ar	1006/1951	2
Potassium lye	KOH	1814	8
Carbon dioxide	CO ₂	1013/2187	2
Formic acid	HCOOH	1779	8
Magnesium granules	Mg	2950	4-3
Sodium hypochlorite	NaOCl	1791	8

Product designation	Chemical designation	UN number	UN class
Soda lye	NaOH	1824	8
Spent caustic	NaOH	1824	8
Nitrogen	N ₂	1066/1977	2
Ammonium chloride	NH ₄ Cl	2672	8
Saltpetre	NaNO ₃	2031	8
Hydrochloric acid	HCl	1789	8
Sulphuric acid	H ₂ SO ₄	1830	8
Titan trichloride	Ti ₂ Cl ₃	2441	4.2

The Coast Directorate can decide on which new substances constitute dangerous cargo. Such decisions will take account of the damage the substances will inflict on the environment in the area in the event of spillage caused by grounding, collisions, etc.

§3

The Traffic Centre

The Traffic Centre at Brevik can implement safety operations as considered necessary to provide the highest degree of safety at all times.

The Traffic Centre can actively become involved in a vessel's sailing and navigation. This regulation does not alter the Master's responsibility for everything in connection with the vessel's progress, navigation and manoeuvring.

The Traffic Centre shall ensure that this regulation and orders issued on its authority are complied with.

Vessels wishing to enter or that find themselves within the waters, shall address all reports and questions relating to the vessel's sailing and navigation to the Traffic Centre via VHF radio-telephone channel 80, or by telephone or telex. Radio traffic which concerns the vessel's business shall be transmitted via the nearest coast radio station.

§4

Permission

Vessels wishing to use the waterway must obtain prior permission from the Traffic Centre. Permission must be requested in good time and at least one hour before arrival in the waterway or before leaving the quay, anchorage or other mooring installation in the waterway.

Vessels carrying dangerous cargo, however, must give twenty four hours notice of arrival in the waters.

The Traffic Centre can, when considered necessary for safe vessel management, cancel or impose special conditions on the permission.

The Traffic Centre can in some cases give a vessel permission to use parts of the waterway.

When requesting permission the following information shall be given to the Traffic Centre:

- a. vessel name
- b. call sign
- c. nationality
- d. ship owner's name
- e. length overall
- f. beam
- g. draught
- h. greatest height above the water surface
- i. GT
- j. destination harbour
- k. nature of cargo

l. amount (in tons) of dangerous cargo

m. estimated time of arrival

n. estimated time of departure.

Vessels have a duty to supply further information which the Traffic Centre or the ship's Master may consider necessary to the safe and effective management of traffic.

§5

Position reporting and listening obligations

Vessels intending to use the waterway must be equipped with functioning maritime VHF radio telephone.

Where the VHF radio installation is powered by the vessel's electrical circuits, there must be facilities to transfer quickly to battery power, or the vessel must be equipped with transportable battery powered VHF of adequate range.

All communication with the Traffic Centre on VHF 80, 16, 14, 13 and 12 is automatically recorded on tape.

Vessels shall send position reports when:

- a. passing the waterway's southern limit
- b. departure from the quay, anchorage or mooring
- c. arriving at the quay, anchorage or mooring
- d. passing other positions the Traffic Centre may stipulate
- e. accidents occur
- f. requested by the Traffic Centre.

Reports shall contain the following information:

When arriving:

- vessel name
- new time for passing the waterway's southern limit
- new ETA at quay, anchorage or mooring.

When leaving:

- vessel name
- departure time from quay, anchorage or mooring
- estimated time of passing the waterway's southern limit
- actual time of passing the above line.

When navigating within the waterway:

- vessel name
- departure time from quay, anchorage or mooring
- ETA at quay, anchorage or mooring
- arrival time at quay, anchorage or mooring.

Position reports shall be addressed to the Traffic Centre on VHF channel 80.

Where position reports cannot be made directly to the addressee's VHF station, they must without fail be made by other means, in harbour by the use of radio telephone or telex and at sea through Tjøme Radio.

Vessels underway in the waterway, laying at anchor or at the waiting quay shall listen continually on VHF channel 16 and 80.

This listening duty applies to all vessels which are equipped with VHF radio telephone, regardless of size.

§6 *Visibility*

If visibility becomes less than one nautical mile (1852 m) in the waterway or parts of it, the Traffic Centre shall hold back all vessels carrying dangerous cargo.

When anchored vessels with dangerous cargo have clear visibility to a quay or mooring installation, the Traffic Centre can give permission for a vessel to move to such quay or mooring installation if the Traffic Centre considers it safe to do so. This correspondingly applies to moving from quay or mooring to a neighbouring anchorage.

§7 *Capacity limits*

To pass Dybingen, Kalven and Brevikstrømmen, vessels should not be greater in length, beam or draught than as listed:

Dybingen:

LOA 198.1 m (650 ft)
beam of vessel with dangerous cargo 27.4 m (90 ft)
beam of vessel with non-dangerous cargo 30.5 m (100 ft)
draught 10.4 m (34 ft).

Kalven:

LOA 274.3 m (900 ft)
beam 45.7 m (150 ft)
draught 14.2 m (46.5 ft).

Brevikstrømmen:

LOA 198.1 m (650 ft)
beam of vessel with dangerous cargo 27.4 m (90 ft)
beam of vessel with non-dangerous cargo 30.5 m (100 ft)
draught 9.9 m (32.5 ft).

The Pilot Master can impose conditions on the permission as considered necessary, taking account of the stream, light conditions, number of tugs, number of Pilots, visibility, etc.

Written application for passage must be made to the Pilot Master in Grenland, as far as is possible, one week prior to the intended passage.

§8 *Traffic Separation*

The Traffic Centre will indicate which marked route shall be used between Langesundbukta and Brevik when a vessel receives permission to transit the waterway.

§9 *Anchoring*

Vessels can anchor only when it is necessary. Before a vessel anchors consent should be obtained from the Traffic Centre. The Traffic Centre for reasons of safety can order a vessel to go to an allotted anchorage. Anchoring, with exceptions as follow this paragraph, should take place only in the following areas and positions:

Helgerøfjorden

- A 0.6 nautical miles from Åmliroga Light on 060° true.
- B 0.4 nautical miles from Åmliroga Light on 046° true.

Eidangerfjorden

- C N of a line true east/west through the most southerly point of Ørviktangen.

Frierflaket

- D 1.1 nautical miles from Ringholmen Light on 192° true
- E 1.1 nautical miles from Ringholmen Light on 207° true
- H 0.7 nautical miles from Ringholmen Light on 219° true
- I 0.9 nautical miles from Ringholmen Light on 226° true.

Herrebukta

- J 0.7 nautical miles from Rafnes quay No 3, 125° true.
- K 0.4 nautical miles from Rafnes quay No 3, 125° true.

The Traffic Centre can, in special circumstances, determine other anchorages.

A vessel can anchor outside these areas if it is necessary to avoid danger. The Traffic Centre will then advise on further action.

The Traffic Centre can refuse to give a vessel laying at anchor permission to leave the anchorage, and the Traffic Centre can order waiting vessels to leave an anchorage.

§10 *Use of tugs*

Vessels over 500 GT, carrying liquefied gases, and vessels over 3000 GT carrying dangerous cargo in bulk, as defined in this regulation, shall have tugs made fast during entry and exit and during manoeuvring to and from the quay, mooring or anchorage.

Tow connection shall, on entry, be established immediately after the Pilot boards, providing that sea and wind conditions allow it. On exit tugs shall be made fast before the vessel leaves the quay, mooring or anchorage and until it passes Arøya.

Vessels with non-dangerous cargo but which exceed one or more of the following measurements:

LOA 182.9 m (600 ft)
beam 26.2 m (86 ft)
draught 9.9 m (32.5 ft)

shall have a tug made fast when underway in an area of which the south limit is a line (drawn) 045°/245° true through Gjermesholmen Light, and which to the north is limited by a line (drawn) 270° true through Saltbuodden Light.

The Traffic Centre can, when it is considered necessary for safety reasons:

- 1) order any vessel to use a tug
- 2) order the use of several tugs.

Tugs shall have the capacity to keep the vessel movement under control at all times.

§11 *Tow lines*

During entry and exit vessels with dangerous cargo shall have a spark retardant and fireproof towing cable with eyes, fore and aft, made fast and lowered to the water.

§12 *Leisure craft traffic*

Leisure craft and open boats shall as far as possible keep out of the way of large vessels and their service vessels. They shall as far as possible sail along the shore within a distance of 100 m.

Leisure craft and open boats shall not cross the leads or navigational channels in such a manner that other vessels,

able only to sail safely in the lead or channel, are forced to change course. For more information refer to Rules of the Road regulations 44 and 9.

This paragraph applies to all leisure craft and open boats regardless of their size.

§13

Dispensations

In very special cases the Coast Directorate can dispense with this regulation. Applications for dispensation should be made in writing to the Coast Directorate, where possible one month before the vessel's arrival.

The Traffic Centre can in very special cases dispense with the regulation on (the) permission (required) in §4.

§14

Penalties

Wilful or negligent breach of the regulation is punishable under the penal law's Section §418, if stronger penalties are not applicable.

§15

Enforcement

This regulation comes into force on the 1st March 1988. At the same time the rules and regulations on the combined approaches to the harbour districts in Grenland, decreed by the Fisheries Ministry on 1st March 1984 No 634, are rescinded.



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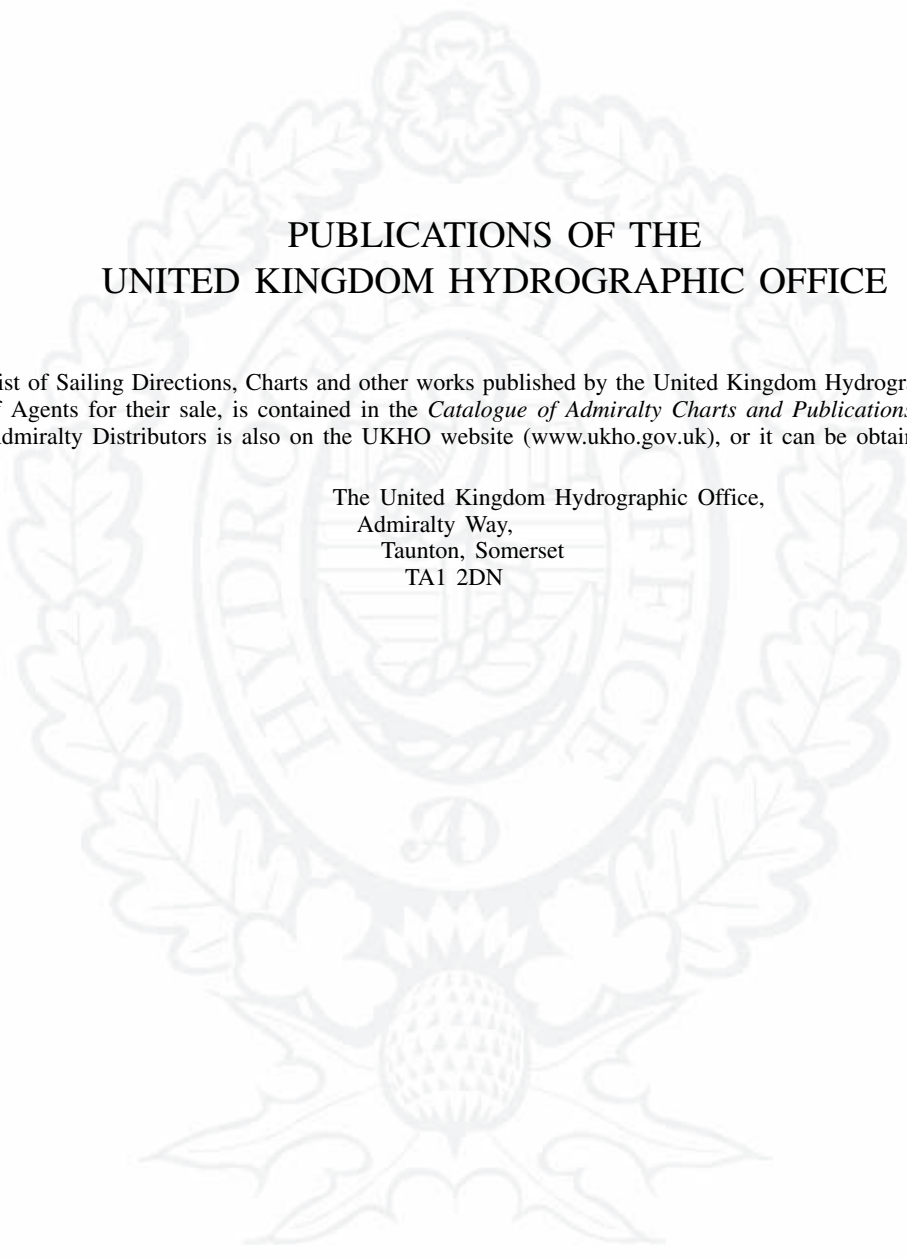
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CD-ROM Instructions

See Status, Disclaimer and Copyright at Explanatory Notes at Page vii.

The CD-ROM below contains the following:

Text and photographs in this volume in Portable Document Format (PDF). In certain cases additional photographs may have been provided.

Software to install Adobe Acrobat Reader.

A link to the UKHO website: www.ukho.gov.uk.

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The opening screen should appear within a few seconds.

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