SUB-COMMITTEE ON SAFETY OF NAVIGATION
56th session
Agenda item 3

ROUTEING OF SHIPS, SHIPS REPORTING AND RELATED MATTERS

New Traffic Separation Schemes off the coast of western Norway

Submitted by Norway

SUMMARY

Executive summary: This document presents a proposal to establish four Traffic Separation Schemes and three recommended routes off the coast of western Norway. The proposed routeing measures will reduce the risk of collisions and groundings and thereby provide better protection to the vulnerable marine environment along the Norwegian coast. They will enhance safety of navigation, give more time for activation of both emergency towing and oil spill response measures, as well as keep the traffic at a safe distance from environmentally sensitive areas. The proposed Traffic Separation Schemes will not cause an undue burden on the shipping industry. This proposal is submitted to the Sub-Committee for its consideration and approval and forwarding to the Maritime Safety Committee for adoption.

Strategic direction: 5.2
High-level action: 5.2.4
Planned output: 5.2.4.1
Action to be taken: Paragraph 48
Related documents: Ships' Routeing 9th edition, 2008; IMO resolution A.572(14) as amended; MSC/Circ.1060, MSC.1/Circ.1060/Add.1; SOLAS regulation V/10; NAV 56/3/4 (New Traffic Separation Schemes off the coast of southern Norway) and NAV 56/3/5 (Cancellation of the "Off Feistein" traffic separation scheme)

Background

1 The Norwegian coastline, including fjords and islands, extends for more than 83,000 km. It is estimated that 80 per cent of the Norwegian population lives in these coastal areas. The coastal zone and resources play a major role in settlement and employment patterns, as well as in the national and regional economy. Important activities in the coastal zone include fisheries, aquaculture, maritime transport, tourism and recreation. The coastal zone also represents a significant cultural heritage area, encompassing an important aspect of Norway's history and identity.
2 The bank areas off the Norwegian coast, north of 62º N, are spawning grounds for the most important fish stocks of the Northeast-Atlantic. This includes the Norwegian spring spawning herring which is at present the largest herring stock in the world, and the Northeast-Arctic cod. Fish eggs and larvae drift northwards with the current to their nursery grounds in the Barents Sea. These fish stocks are harvested not only by Norway, but also by other countries bordering the Northeast-Atlantic. Ecosystem-based scientific advice on sustainable exploitation of the marine living resources form the basis for international negotiated quotas for harvesting shared fish stocks.

3 Norway has recently developed integrated management plans for the Norwegian economic zones in the Barents Sea and the Norwegian Sea. Work has started to develop a similar management plan for the Norwegian part of the North Sea. The management plans deal with all activities related to the sea, and environmental aspects thereof. The offshore oil and gas industry, maritime transport and fishing industries are the principal users of the affected sea areas, and management plans provide guidelines for the coexistence of different interests. Ships' routeing is among the advocated measures.

4 The weather conditions along some parts of the coast of Western Norway are known to be extremely harsh. A number of ships have experienced navigational difficulties or engine breakdowns. In 2009, a total of 145 ships were reported drifting within the NOR VTS area of responsibility. Many of these incidents have or could have led to a serious accident as the ship in many cases has begun drifting towards the coast. Fortunately, most of these incidents have not developed further. It is clear, however, that moving traffic further out to sea would considerably reduce the risk of accidents. It will also give more time to respond to incidents where emergency towing or oil spill response is required.

5 There has been a considerable increase in shipments of oil and oil- and gas-products from the Barents Sea area to Western Europe and North America over the last decade. In 2009, about 16.5 million tons of oil and oil-/gas-products were transported along the Norwegian coast from this area. All estimates point to a further significant increase in the number of shipments, as well as volumes transported, along the Norwegian coast in the future. It is estimated that there will be 175 shipments of oil, 300 shipments of LNG and 150 shipments of LPG-mix and condensates yearly from the Norwegian parts of the Barents Sea by 2030. In addition to these shipments, comes the number of shipments from the Norwegian Sea and other parts of the Barents Sea. It is estimated that the latter of these shipments will be at least equal to or higher than the total number of shipments from the Norwegian area of the Barents Sea.

6 In order to reduce the risk of accidents, Norway has already established a series of Traffic Separation Schemes, joined by recommended routes, off the northern coast of Norway. These Traffic Separation Schemes and recommended routes were adopted by IMO in 2006. Based on the experience from the implementation of these routeing measures, the aim of this proposal is to further increase traffic safety along the Norwegian coast by establishing a set of Traffic Separation Schemes and recommended routes along the whole coast. In addition to this proposal Norway, Denmark and Sweden will also present a similar joint proposal for new Traffic Separation Schemes off the southern coast of Norway.

Introduction

7 Several risk reducing measures are already in place, and others will be operational in the near future. These include a land-based AIS monitoring network, the NOR VTS (located in Vardø) and an emergency towing preparedness. Norway also participates in the Safe Sea Network (SafeSeaNet). The SafeSeaNet system gives valuable data for a better
detection of potential risk situations as well as a more prompt reaction in case of a threat to maritime safety and the environment.

8 Although several risk reducing measures are in place, a sufficient time to respond in an emergency situation is decisive in terms of achieving a successful outcome. Moving traffic farther away from the coast gives an increased response time in the event of an accident. Thus improves the chances to react in time to enable emergency towing or oil spill response measures.

9 Norway therefore proposes to establish four Traffic Separation Schemes and three recommended routes off the coast of western Norway. The routeing measures, as described in annexes 1 and 2, are proposed as a routeing system for ships carrying polluting goods (MARPOL 73/78, Annexes I and II), and all other ships of 5,000 gross tonnage and upwards, in transit or on international voyages to or from Norwegian ports.

10 The objective of this proposal is to address concerns relating to the safety of ships in transit, the fisheries and the offshore petroleum exploration and production. Another important objective is to reduce the risk of pollution to the marine environment and the Norwegian coastline. The proposed routeing system is designed to cope with the safety issues and at the same time form an effective and important mitigation measure.

11 The proposal involves moving tankers and other risk traffic away from the coast to minimize the risk of grounding and to separate north- and south bound traffic to avoid collisions. As is the case today, traffic will be AIS-monitored by NOR VTS. The increased distance from the coast will give additional time to respond to incidents by various means, including towing the vessel(s).

12 The proposed Traffic Separation Schemes are located in areas where the fishing activity is limited. They are also clear of offshore oil/gas installations. The proposed Traffic Separation Schemes will not cause an undue burden on the shipping industry.

Description of the Area

13 The proposed routeing measures extend from approximately 12-55 nautical miles off the coast of western Norway. A map of the area with the proposed routeing system is shown in Appendix 1.

14 The area is covered by Norwegian charts number 300 (INT 10), 301 (INT 140), 304 (INT 101), 306, 307, 308, 558 and 559. Details about the charts as well as ENC cells covering the area are given in Annex 1.

Co-operation between States

15 Other countries interests in the area would be of a more indirect nature (foreign operating companies, ships in international ship registries, etc.). The shipping industry’s interests have been taken into account in developing the proposal. The proposal will not cause an undue burden on commercial activity in the area.

Traffic Considerations

16 Approximately 65 per cent of today’s shipping traffic follows a route within the Norwegian territorial sea – sometimes as close as 0.1-1 nautical miles off the coast. The remaining traffic follows a route beyond the Norwegian territorial sea approximately 12-35 nautical miles off the coast. In order to reduce the overall risk for
accidents and the consequences of an oil spill, the proposed routeing system has been
designed to be in accordance with the latter of the two routes. Course alterations are kept to
a minimum and the placements of the proposed Traffic Separation Schemes were carefully
selected to avoid any conflicts with crossing traffic and other commercial activities in the
area.

**Existing and proposed aids to navigation**

17 The coastal waters are well marked with aids to navigation, including lighthouses,
lights and radar beacons. In general, these aids will be of use for position fixing on ranges up
to 12 nautical miles off the coast, but some of the aids will also be applicable to parts of the
proposed route that lies beyond this distance.

18 Global Navigation Satellite Systems (GNSS) as GPS or GLONASS, will provide
navigational guidance in accordance with the operational requirements for navigation in
ocean waters as stated in resolution A.953(23) – World-Wide Radio Navigation System,
or better.

19 Four stations are transmitting differential GPS corrections and integrity data for the
area in accordance with IALA standards. Users will be warned of system non-availability or
discontinuity either by this system or by the International Maritime Safety Information service.

20 In addition to the existing aids to navigation, a virtual AIS AtoN will be
established 4 nautical miles south and north of the Gjøa platform. Southbound ships
following the proposed routeing system will get a CPA of minimum two nautical miles to
the Gjøa platform. This oil and gas installation will be the only petroleum installation in vicinity
of the proposed route.

**Traffic patterns**

21 Annually approximately 19,000 ships equipped with AIS pass the northern parts of
the area (Stad area). The statistical profile of the passing ships includes 50 per cent cargo
ships, 17.5 per cent fishing vessels, 15.5 per cent tankers and 5.5 per cent passenger ships.
In 2009 a total of 1,046 of these ships reported carrying cargo of hazard or pollutant
category A-D.

22 Annually approximately 12,000 ships equipped with AIS pass the southern parts of
the area (Utsira area). The statistical profile of the passing ships includes 50 per cent cargo
ships, 31 per cent tankers, 6.5 per cent fishing vessels and 3 per cent passenger ships.
In 2009 a total of 1,312 of these ships reported carrying cargo of hazard or pollutant
category A-D.

23 Today most ships pass the area off Stad at a distance within 0.1-6 nautical miles off
the coast. In the south, off Utsira, most ships pass at a distance within 1-8 nautical miles off
the coast. In the event of an accident, the current passing distances give Norwegian
authorities little time to react and provide contingency services, such as:

- tugs for a ship that is in need of assistance due to on-board defects such as
  loss of propulsion or steering, and

- equipment for emergency unloading of bunker or cargo, and other measures
to prevent environmental damage.
24 There is a lot of fishing activity off the coast of western Norway. The activity is most extensive outside Utsira and the northern areas of the west coast. Fishing activities have been duly taken in to account, and the proposal has been prepared in close cooperation with the Norwegian Fishermen’s Organization and local fisheries organizations. The proposed routeing system will contribute to a significant reduction in interaction with fishing vessels operating near the coast compared with the current routes.

25 Crossing traffic is found predominately in the area off Florø, Bergen and Stavanger. The crossing traffic consists mainly of supply vessels serving the offshore petroleum installations.

26 The north- and southbound routes of the proposed routeing system are marginally longer than the present average route. It has been calculated that passing traffic from Røst to Utsira will be incurred by an extra sailing distance of approximately 4 nautical miles.

Adequacy of hydrographical surveys and charting

27 Navigational charts, at appropriate scales, are published by the Norwegian Hydrographic Service. In addition to paper charts there are electronic navigational charts (ENCs) for the entire area. Further details are given in annex 1.

28 Hydrographical surveys have been carried out between 1964 and 1975 (single beam) and between 2003 and 2005 (multi beam). Approximately 37.5 per cent of the proposed routeing system is covered by the latest multi beam soundings. Hydrographical surveys show that the sea depths along the route vary between 150 and 370 metres. Average sea depth is more than 275 metres.

29 Surveys performed between 1964 and 1975 comply with S-44 order 2. Newer surveys comply with S-44 order 1. The Norwegian Hydrographic Service considers these surveys as adequate for the intended use in these areas. The Norwegian Hydrographic Service is planning on modernizing the coastal chart series within the next five-year period, starting in 2010 with chart 306. The survey data that is not yet included will then be included in the new editions of the charts.

Offshore exploration and production

30 Drilling rigs, exploration platforms and other offshore structures are currently not present or planned established within the traffic lanes of the proposed schemes or near their terminations. In case of any future petroleum activity, the consultation process established by the Norwegian government will ensure that maritime traffic is duly taken into account to avoid any conflict.

31 The only offshore installation in vicinity of the route will be the Gjøa installation. It will be located in position 61°19’54.803˝N 3°53’42.530˝E (WGS-84) during 2010. Southbound ships following the proposed routeing system will get a CPA of minimum 2 nautical miles to the Gjøa platform. A virtual AIS AtoN will be established 4 nautical miles south and north of the platform.

Marine Environmental Considerations

32 The mean direction of the ocean currents off the western coast of Norway is northbound. The speed is normally around 0.5 knots and seldom reaches 1 knot. Wind conditions will however affect the surface flow and thus lead to major changes to the general flow pattern. Winds of gale force or stronger occurs more than 25 per cent of the
time. There are five areas along the western coast of Norway known to have dangerous waves. All these areas are within 5-10 nautical miles off the coast. The proposed routeing measures are well clear of these areas.

33 An oil spill may harm living resources and in particular sea birds. In addition, oil pollution will also be a threat to the many fish farms located along the coast. An oil spill's potential harm to marine ecosystems is well documented from several studies of oil spills around the world. The potential impact may last for several years depending on the actual polluted area. There is scientific evidence of negative effects of an oil pollution even after 10 to 20 years. At some parts of the western coast of Norway, were the frequency of passing ships is high and the coastal environment and weather conditions are harsh, there is a relative high probability for incidents. There is also a possibility of creation of cumulative pollution effects. Measures in order to reduce probability of oil spills along the vulnerable coastline of western Norway are therefore important.

34 Several locations along the western coast of Norway have already suffered oil pollution in the last 15-20 years. Relatively small amounts of oil released can cause severe harm, as is shown by example of the grounding of "MS Server" north-west of Bergen in January 2007. The bad weather during the following days made the recovery of heavy fuel oil difficult. Around 400 tons of heavy fuel oil was spilled. Six months later a total of 230 sites, including nine natural reserves (mainly seabird breeding colonies) had to been cleaned up manually before the breeding season. Despite a thorough cleaning process, certain breeding spots for herring gulls were unfortunately not restored. It was estimated that between 3,200-8,000 seabirds died as a consequence of the oil spill. This incident alone may not cause long-term effects, but the fact that the seabird populations in this area did experience a similar accident only three years earlier may increase the total environmental effect.

35 Along the western coast of Norway there are numerous environmental sensitive areas that are highly vulnerable to oil pollution. Important seabird colonies, breeding areas, wintering areas, wetland areas and migratory bird areas are found along the entire coast. The bank areas, north of 62° N, are spawning grounds for the most important fish stocks of the Northeast-Atlantic. This includes the Norwegian spring spawning herring which is at present the largest herring stock in the world, and the Northeast-Arctic cod.

36 MOB (Miljø Og Beredskap = Environment and Preparedness) is the national regime for the prioritization of environmental resources during oil spills emergency response within Norwegian waters. The prioritizing is made using a system of parameters, e.g., oil pollution vulnerability, conservation value, the resource's natural occurrence as well as whether the environmental loss can be compensated economically or not. These parameters form the basis for the priority category, which range from A-D; with "A" being the highest level of priority. An overview of "MOB A" and "MOB B" areas follows in figure 1 below.
Effect of the proposed scheme on the environment

A risk assessment¹ of the proposal has been conducted by the Institute of Transport Economics (TØI) in cooperation with Det norske Veritas (DnV), Norconsult AS, Christian Michelsen Research (CMR) and Maritime Preparedness Operations AS (MAPO). The assessment shows that the proposed routeing measures reduce both the probability of accidents and the consequences of possible accidents. Transferring tanker traffic to the

proposed routeing system would reduce accidents by over 20 per cent and give 15 per cent reduction in oil spill volumes according to simulations carried out using traffic figures for 2008. When traffic forecasts for 2025 were used, accidents and oil spill volumes were both reduced by almost 30 per cent. Thus, adopting the proposed routeing measures will give a significant risk reduction.

38 Two comparative oil spill scenarios were constructed outside Stad and Sotra in order to analyse the environmental effects of a ship accident involving an oil spill. At both places one scenario assumed the existing routes, and the other scenario used the proposed recommended routes. The modelled oil drift showed that an oil spill in the new proposed routes will use significantly more time (3 to 5 times) to reach the shoreline. This will give more time to organize emergency towing and/or mobilize oil spill response equipment out to sea, which will significantly reduce the overall environmental impact. In addition, the extended oil drift time at sea will increase natural degradation of oil through evaporation and natural dispersion. The highest benefit is expected to be for crude oil spills resulting from tanker accidents.

39 The simulations indicated, as a direct result of the extended oil drift time, that the amount of oil reaching the shore would be significantly reduced. The calculations indicated that the amount of oil reaching the shore (given oil spill response) would vary between 9 and 24 per cent of the total oil spill volume if the accident took place within the proposed route. If the accident took place within existing routes, the amount of oil reaching shore would be significantly higher and vary between 38 and 59 per cent.

40 An incident with oil spill farther away from the coast may lead to an increase in the polluted area and thus a possibility for reaching a higher number of vulnerable sites. But there is evidence that the number of vulnerable areas polluted is not proportionate with the total polluted area. In addition, due to longer time at sea where dispersion and natural degradation will reduce the concentration of the oil in water mixture that finally reaches the coast, the impact will be reduced accordingly.

**Recommendatory Routeing System**

41 The routeing measures, as described in annexes 1 and 2, is proposed as a recommendatory routeing system for ships carrying polluting goods (MARPOL 73/78, Annexes I and II), and all other ships of 5,000 gross tonnage and upwards, in transit or on international voyages to or from Norwegian ports. The routeing measures will not apply to any category or size of ship in domestic traffic with passengers and/or goods between Norwegian ports.

**Position-fixing in relation to the routeing system**

42 Existing aids to navigation are considered adequate to enable mariners to determine their position with sufficient accuracy to navigate in accordance with rule 10 of COLREG. The affected area is within coverage of Global Navigation Satellite Systems (GNSS) as the fully operational GPS and GLONASS systems. In addition several stations transmit differential GPS corrections and integrity data in accordance with IALA standards. There is full electronic navigational chart (ENC) coverage of the area. Paragraphs 17-20 of this document give further details.
Miscellaneous Information

43 A general overview of the fishing activity is illustrated by the fishery density plots given in Appendix 2 to this document. The density plots are based on satellite tracking data from the Norwegian Directorate of Fisheries for fishing vessels of length above 24 metres. It is mandatory for all vessels fishing in the Norwegian economic zone to have an active satellite tracking system on board. From 2011, this will be required for all fishing vessels with total length over 15 metres. Up till present, the requirement of having active satellite devices on board has applied to EU-vessels with a length above 15 metres and Norwegian fishing vessels with a length above 24 metres.

44 The proposed routeing system is in compliance with the designated ballast water exchange areas along the Norwegian coastline.

45 NOR VTS (located in Vardø) is responsible for monitoring all tanker traffic and other risk traffic movements along the Norwegian coast. It is envisaged that the proposed routeing system will be monitored by NOR VTS, and moving the ships farther out from the coast will give sufficient time to handle an unwanted situation by for example initiating emergency towing.

46 This proposal has been developed by an Expert Working Group consisting of members from the oil industry, fishing industry, the Norwegian Shipowners' Association, environmental organizations and various government agencies. The various interests have been duly taken into account.

47 A draft of this proposal was submitted to the fishing and shipping community, the offshore oil and gas industry, environmental organizations, various state and local government agencies, etc., in Norway for their comments. There was broad support for the proposal, and only minor adjustments had to be made to the final documents. The traffic separation schemes will not cause an undue burden to the shipping industry or fisheries.

Action requested of the Sub-Committee

48 The Sub-Committee is invited to consider and approve the proposed new Traffic Separation Schemes and recommended routes off the coast of western Norway and to forward them to the Maritime Safety Committee for adoption. The proposed effective date of implementation is six months after the adoption date.
ANNEX 1

TRAFFIC SEPARATION SCHEMES OFF THE COAST OF WESTERN NORWAY

Reference charts: Primar Stavanger and Norwegian Hydrographic Service Charts:

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The ENC Cells are by convention in Datum WGS 84.

and

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<td>307</td>
<td>Stavanger - Florø</td>
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<td>308</td>
<td>Florø - Smøla</td>
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<td>ED 50</td>
<td>59° 00´ N</td>
<td>109 m (NE-diagonal)</td>
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</table>

Note: The geographical positions, (1) - (37), listed below are given in the WGS 84 Datum.

Categories of ships to which the ships' routeing schemes apply

(a) Tankers as defined under Annex I to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78);

(b) Chemical tankers carrying noxious liquid substances in bulk assessed or provisionally assessed as Category X or Y of Annex II to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78);

(c) Ships of 5,000 tons gross tonnage and upwards, in transit or on international voyages to or from Norwegian ports; and

(d) The routeing schemes do not apply to any size or category of ship in domestic traffic with passengers and/or goods between Norwegian ports.
International voyages to or from ports in Norway

Ships of above categories on international voyages, to or from ports in Norway, should follow the traffic separation system, and should adhere to the recommended direction of traffic flow and the recommendation on navigation until a course to port can be clearly set. This also applies to ships calling at Norwegian ports for supplies or service.

Description of the traffic separation schemes

Positions are based on World Geodetic System 1984 Datum (WGS84)

I. Off Runde

(a) A separation zone is bounded by a line connecting the following geographical positions:

(1) 62° 59´.95 N 004° 08´.40 E
(2) 62° 55´.17 N 004° 04´.07 E
(3) 62° 49´.98 N 004° 04´.07 E
(4) 62° 49´.98 N 004° 08´.43 E
(5) 62° 54´.78 N 004° 08´.43 E
(6) 62° 59´.18 N 004° 12´.45 E

(b) A traffic lane for southbound traffic is established between the separation zone described in paragraph (a) and a line connecting the following geographical positions:

(7) 63° 01´.12 N 004° 02´.32 E
(8) 62° 55´.78 N 003° 57´.50 E
(9) 62° 50´.00 N 003° 57´.52 E

(c) A traffic lane for northbound traffic is established between the separation zone described in paragraph (a) and a line connecting the following geographical positions:

(10) 62° 58´.05 N 004° 18´.52 E
(11) 62° 54´.20 N 004° 15´.00 E
(12) 62° 50´.00 N 004° 14´.97 E

II. Off Stad

(d) A separation zone is bounded by a line connecting the following geographical positions:

(13) 61° 59´.00 N 004° 04´.13 E
(14) 61° 54´.00 N 004° 04´.13 E
(15) 61° 54´.00 N 004° 08´.37 E
(16) 61° 59´.00 N 004° 08´.37 E

(e) A traffic lane for southbound traffic is established between the separation zone described in paragraph (d) and a line connecting the following geographical positions:

(17) 61° 59´.00 N 003° 57´.78 E
(18) 61° 54´.00 N 003° 57´.80 E

(f) A traffic lane for northbound traffic is established between the separation zone described in paragraph (d) and a line connecting the following geographical positions:

(19) 61° 59´.00 N 004° 14´.72 E
(20) 61° 54´.00 N 004° 14´.70 E
III. Off Sotra

(g) A separation zone is bounded by a line connecting the following geographical positions:

(21) 60° 20´.00 N 004° 04´.23 E  (23) 60° 15´.00 N 004° 08´.25 E
(22) 60° 15´.00 N 004° 04´.25 E  (24) 60° 20´.00 N 004° 08´.27 E

(h) A traffic lane for southbound traffic is established between the separation zone described in paragraph (g) and a line connecting the following geographical positions:

(25) 60° 20´.00 N 003° 58´.20 E  (26) 60° 15´.00 N 003° 58´.23 E

(i) A traffic lane for northbound traffic is established between the separation zone described in paragraph (g) and a line connecting the following geographical positions:

(27) 60° 20´.00 N 004° 14´.30 E  (28) 60° 15´.00 N 004° 14´.27 E

IV. Off Utsira

(j) A separation zone is bounded by a line connecting the following geographical positions:

(29) 59° 05´.00 N 004° 04´.32 E  (31) 58° 57´.72 N 004° 08´.20 E
(30) 58° 59´.83 N 004° 04´.32 E  (32) 59° 05´.00 N 004° 08´.20 E

(k) A traffic lane for southbound traffic is established between the separation zone described in paragraph (j) and a line connecting the following geographical positions:

(33) 59° 05´.00 N 003° 58´.47 E  (34) 58° 58´.50 N 003° 58´.47 E

(l) A traffic lane for northbound traffic is established between the separation zone described in paragraph (j) and a line connecting the following geographical positions:

(35) 59° 05´.00 N 004° 14´.03 E  (37) 58° 58´.50 N 004° 19´.95 E
(36) 59° 01´.73 N 004° 14´.03 E

Descriptions of the recommended routes

The recommended routes between the traffic separation schemes are described in annex 2.
ANNEX 2

RECOMMENDED ROUTES JOINING THE TRAFFIC SEPARATION SCHEMES OFF THE COAST OF WESTERN NORWAY

Reference charts: Primar Stavanger and Norwegian Hydrographic Service Charts:

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<tr>
<td>308</td>
<td>Florø - Smøla</td>
<td>1:350 000</td>
<td>ED 50</td>
</tr>
</tbody>
</table>

Typical shift of position co-ordinates referred to the WGS 84 Datum to the ED 50 Datum are:

<table>
<thead>
<tr>
<th>From Datum</th>
<th>To Datum</th>
<th>Approximate latitude in the area</th>
<th>Datum shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGS 84</td>
<td>ED 50</td>
<td>62˚ 30´ N</td>
<td>99 m (NE-diagonal)</td>
</tr>
<tr>
<td>WGS 84</td>
<td>ED 50</td>
<td>59˚ 00´ N</td>
<td>109 m (NE-diagonal)</td>
</tr>
</tbody>
</table>

Note: The geographical positions, (38) - (43), listed below are given in the WGS 84 Datum.

Categories of ships to which the ships' routeing schemes apply

(a) Tankers as defined under Annex I to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).

(b) Chemical tankers carrying noxious liquid substances in bulk assessed or provisionally assessed as Category X or Y of Annex II to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).

(c) Ships of 5,000 tons gross tonnage and upwards, in transit or on international voyages to or from Norwegian ports.

(d) The routeing schemes do not apply to any size or category of ship in domestic traffic with passengers and/or goods between Norwegian ports.
International voyages to or from ports in Norway

Ships of above categories on international voyages, to or from ports in Norway, should follow the traffic separation system, and should adhere to the recommended direction of traffic flow and the recommendation on navigation until a course to port can be clearly set. This also applies to ships calling at Norwegian ports for supplies or service.

Description of the recommended routes

Positions are based on World Geodetic System 1984 Datum (WGS84)

(a) A recommended route is established between the traffic separation schemes Off Runde and Off Stad with a central line between the following geographical positions:

(38) 62° 50´.00 N 004° 06´.25 E (39) 61° 59´.00 N 004° 06´.25 E

(b) A recommended route is established between the traffic separation schemes Off Stad and Off Sotra with a central line between the following geographical positions:

(40) 61° 54´.00 N 004° 06´.25 E (41) 60° 20´.00 N 004° 06´.25 E

(c) A recommended route is established between the traffic separation schemes Off Sotra and Off Utsira with a central line between the following geographical positions:

(42) 60° 15´.00 N 004° 06´.25 E (43) 59° 05´.00 N 004° 06´.25 E
APPENDIX 1

CHARTLETS OF THE PROPOSED ROUTEING SYSTEM

Recommendatory routing system
"Off the coast of western Norway"

Figure 2 – Recommendatory routing system off the coast of western Norway
Figure 3 – TSS Off Runde

Figure 4 – TSS Off Stad

Figure 5 – TSS Off Sotra
APPENDIX 2

FISHERY DENSITY PLOTS

Figure 8 – Fishery density plot 2007
Figure 9 – Fishery density plot 2008
APPENDIX 3
TRAFFIC DENSITY PLOT (Ships > 100 metres)

Traffic density plot (ships > 100 metres)
January - December 2009

Legend
- Territorial border (12 nm)
- Surface installations
- Recommended route/track
- Traffic separation zone

Density - passages per km²
Value
- High: 27756.7
- Low: 2.24573

Figure 10 – Traffic density plot (Ships > 100 metres)