ANNEX A

Lykes Voyager - engineering response and damage

Lykes Voyager **– Engineering Response and Damage**

Personnel and Machinery Status Immediately Prior to Accident

Personnel

Just prior to the accident, all of engineering personnel were either in the engine room, or in the control room waiting for their respective daily work allocations by the chief engineer.

Main Propulsion Machinery

There were no main propulsion defects at the time of the accident and full power was available.

Auxiliary Machinery

The main shaft generator was engaged providing electrical power and No 2 generator was standby.

Numbers 1 and 3 electrical generators were both out of action. The defect to No 1 was linked to its governor, and the chief engineer had transferred the governor from No 3 generator to No 1 to assist with his fault diagnosis.

Engineering Department Actions

At the time of the accident the chief engineer was on the engine room generator platform where he felt the impact of the collision. The bridge immediately put the engine telegraph to stop.

As the main shaft slowed to 84 shaft rpm, No 2 electrical generator automatically started as the control system sensed the voltage drop. Load was then transferred to No 2 generator. The captain then called the ship to emergency stations.

As the chief engineer entered the control room, personnel were checking the integrity of the machinery spaces. Water was reported to be “jetting” over the machinery and electrical control boxes in the refrigeration, air conditioning and air compressor space. Initially, it was unclear where the water was coming from.

The chief engineer immediately conducted electrical isolations of the compartment. Further examination confirmed that the hull had not been breached, and that the water was coming from the fractured outlet valve from No 3 refrigeration condenser.

At about 1000, about 5 minutes after the leak was discovered, No 2 generator high temperature alarm sounded. This was because the water was leaking from the closed circuit intermediate water supply for the auxiliary machinery.

The self-contained emergency generator started as No 2 generator automatically shut down on high water temperature protection. The emergency generator was connected to the emergency switchboard that provided power to the ship's essential services. While the pipework was repaired to allow the cooling water supply to be re-instated to the auxiliary machinery, the governor was re-fitted to No3 electrical generator.

No 3 generator was then re-started at about 1115, and electrical supplies were transferred from the emergency generator to No 3 generator. Unfortunately, because of air locks in the cooling water system, the generator tripped out on high cooling water temperature at about 1125. The emergency generator again started automatically, and emergency electrical supplies were quickly restored. However, a short period of "blackout" was experienced.

The cooling water system was then continually purged of air and at about 1215, No 3 generator was re-started and continued to operate satisfactorily. The emergency generator and No 2 generator were then left in the stand-by condition.

Engineering System Recovery

During the repairs to the auxiliary machinery cooling water system, a comprehensive structural survey was completed, which included the double bottom. At the same time, the fresh water was pumped out of the refrigeration, air conditioning and air compressor space. The steering system was also checked, and the main engine and shafting was successfully turned using turning gear. Although there were no indications of mechanical problems, the main engine was not initially turned under power, because the chief engineer was concerned that the resultant vibration might have an adverse affect on several containers, which were in precarious positions following impact.

Deck Container Stow Integrity

Conscious of the possibility of losing the containers in the damaged area, the chief engineer arranged for about a 2º list to starboard to assist in stabilising and securing the containers in the area of damage.

At about 1700, the master, chief engineer and chief officer decided to attempt to remove a container, which had shifted from *Washington Senator* during the collision, and was now hanging under the port bridge wing. It was intended to use No 3 crane to attempt to lift the container clear. As the crane slewed, other containers at position No 38 began to shift. These were secured using chain blocks and strops, and a second attempt was made to remove the container under the port bridge wing. However, as the lifting strops were fitted around the container and weight taken by No 3 crane, the container fell overboard.

Damage

Lykes Voyager suffered widespread structural damage to the upperdeck, TEU supporting systems, port side shell plating and loss of upperdeck equipment. **(Figure 1)**

Equipment Loss

- Port poop deck windlass
- Port poop deck Panama fairlead **(Figure 2)**
- Port boat deck Suez crane, pedestal and motor (**Figures 3 & 4)**

Structural Damage

- Port Boat deck

  - Refrigeration Space exhaust ventilation terminal destroyed
  - Deck edge turned over for whole of its length **(Figures 5 & 6)**
  - Severe creasing of the deck and of the access ladder supporting structure

- Port Bridge Wing

  - Deck severely creased
  - Guardrail damaged throughout their length
  - Roofing destroyed **(Figure 7)**
  - Floodlight destroyed
  - Front of bridge wing severely distorted

- Port poop deck

  - Two Panama fairleads badly damaged **(Figure 8)**
  - Severe deck edge creasing extending to access ladder **(Figure 9)**

- Port side main deck walkway

  - Nine containers supports (crutches) severely damaged **(Figure 10)**
  - Other support suffered impact damage and weld failure **(Figure 11)**
  - Guardrails destroyed
  - Deck damage – various levels

- Hull damage

  - The shell plating was severely set back for approximately one third of her length to the stern. **(Figure 12)**

- Between deck damage

  - **Gymnasium** - extensive deck head creasing and compartment lining displacement **(Figure 13)**

- **Refrigeration, air conditioning and air compressor space** – pipe work systems damaged, beams and girders displaced and bulkhead distortion. Split adjacent to 607 fresh water tank at frame No 5 **(Figure 14)**. Numerous frames set back throughout the full length of the space. **(Figure 15)**

- **Passage to Electrical Distribution Suite** – frames severely distorted.

- **Port Pipe Passage** – (Engine room forward bulkhead at frame 47) deckhead fractured opening onto the upper deck **(Fig 16)**. Extensive frame distortion.

Figure 1 - Port side damage general

Figure 2 - Panama firlead

Figure 3 - Boat deck Suez Crane

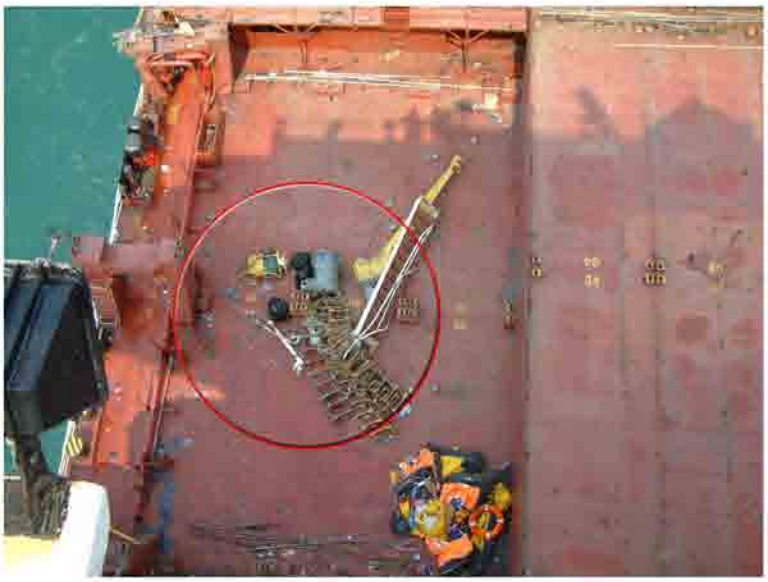


Figure 4 - Crane and motor

Figure 5 - Boat deck damage

Figure 6 - Boat deck edge

Figure 7 - Port bridge wing

Figure 8 - Poop deck

Figure 9 - Creased deck

Figure 10 - TEU Supports

Figure 11 - Port upperdeck passage

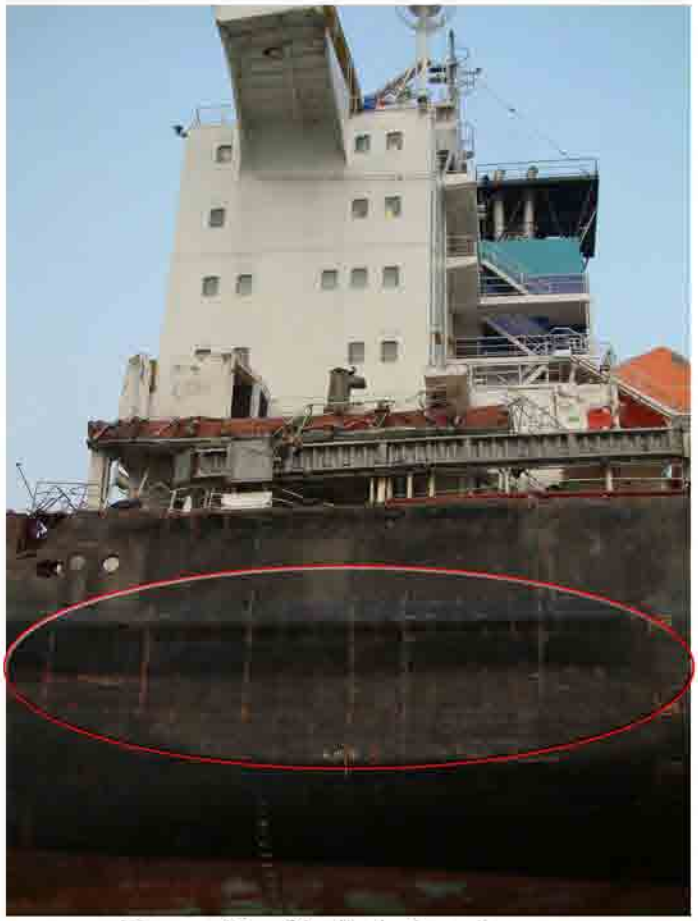


Figure 12 - Shell plating damage

Figure 13 - Gym deckhead

Figure 14 - FW tank damage

Figure 15 - Fridge space damage

Figure 16 - Split to deckhead opening to UD

ANNEX B

Washington Senator - engineering response and damage

Washington Senator **– Engineering Response and Damage**

Personnel and Machinery Status Immediately Prior to Accident

Personnel

The chief engineer was in the machinery control room immediately prior to the collision dealing with his routine paperwork. The second and third engineers, two oilers and a trainee engineer were spread throughout the machinery spaces undertaking routine maintenance and conducting machinery rounds.

Main Propulsion Machinery

There were no propulsion or steering gear defects at the time of the accident and full power was available.

Auxiliary Machinery

The main shaft generator was engaged, providing electrical power. Numbers 1 and 3 generators were designated as standby.

Engineering Department Actions

At about 0935 the chief engineer heard the collision, and at the same time saw the shadow of the *Lykes Voyager* passing the engineers office windows, which are adjacent to the machinery control room. The impact of the collision occurred immediately afterwards, which knocked the chief engineer off his feet. He suffered minor bruising to his right shoulder.

The general alarm was then sounded, followed by an explanatory broadcast by the master, who then called the crew to their muster stations. The master also reduced main engine power. As the main shaft revolutions dropped below 82 rpm, the standby generators started, were excited and connected to the switchboard automatically. There were no interruptions to the electrical supplies.

The chief engineer assembled the engineering department in the machinery control room. He then designated routes for each of them to check for breaches in the hull and to check for system and equipment damage. After about 5 minutes, the second engineer reported that he had discovered fuel oil in the workshop area. The fuel was spilling onto the engine room floor plates, and into the engine room bilge. The chief engineer broadcast that there was to be no smoking in the engine room, and then went to the engine room area to determine the source of the leak.

The oil leak was found to have come from No 2 settling tank, which was holding 110 m^3 of heavy fuel oil at 80º C. Other fuel tanks were checked, but were found to be undamaged. The chief engineer opened the run down

valve from the settling tank to No 5 bunker tank. His prompt action enabled 80 m^3 of hot oil to be saved and reduced the fire risk. However, 30 m^3 flooded into the engine room bilge.

Further checks of both ballast and fuel tanks were made and, although there was some distortion, all others were intact. Following these checks the chief engineer transferred the engine room bilge sludge contents into the sludge and dirty oil tanks in order to reduce the fire risk.

Assessments of damage to the hull showed that there was a good deal of structural damage to the shell plating, frames and internal sub-division. However, there was no damage to the propulsion train or steering gear, and at about 1115, after ensuring that the fire risk was acceptable, the chief engineer reported to the captain that the vessel was safe to proceed.

Damage

Washington Senator suffered widespread structural damage to the upperdeck, TEU supporting systems, the port side shell plating, and internal decks, longitudinals and frames. A general view showing the extent of the shell plating damage is at **Figure 1.**

Shell Plating

The damage to the port side shell plating was extensive **(Figures 2 & 3).** There were large areas of shell plating that were set back causing pronounced dishing of the plating. There were also several splits throughout the external damaged area **(Figures 4 & 5).**

The damage sustained by the shell plating was more easily discernible from inside the vessel where the splits were clearly visible. At the time of the inspection, some doubler plates had already been welded in place to provide water integrity. **(Figures 6,7& 8).**

Internal Decks

The deformation of the shell plating caused severe creasing of the internal decks and under deck stiffeners. The creases in some areas deformed the deck by as much as 200 mm **(Figures 9 & 10).**

Internal Bulkheads

There was significant damage caused to internal fore and aft bulkheads particularly within the port pipe passage caused by the deformation of the shell plating, longitudinals and bulkhead stiffeners. **(Figures 11 & 12).**

Damage was also caused to No 2 settling tank outboard juncture with the shell plating that caused severe structural failure and spilling of the contents into the workshop area of the engine room. **(Figure 13).**

Figure 1 - General view of damage

Figure 2 - General view outer shellplate

Figure 3 - Mid ships outer shellplate

Figure 4 - Port aft outer shellplate

Figure 5 - Aft outer shellplate

Figure 6 - Inboard shell plating split

Figure 7 - Shell plate split

Figure 8 - Shell plate split with doubler

Figure 9 - Example of deck creasing

Figure 10 - Shell plate and deck creasing

Figure 11 - Passageway 1st strake buckled

Figure 12 - Shell plate and stiffener damage

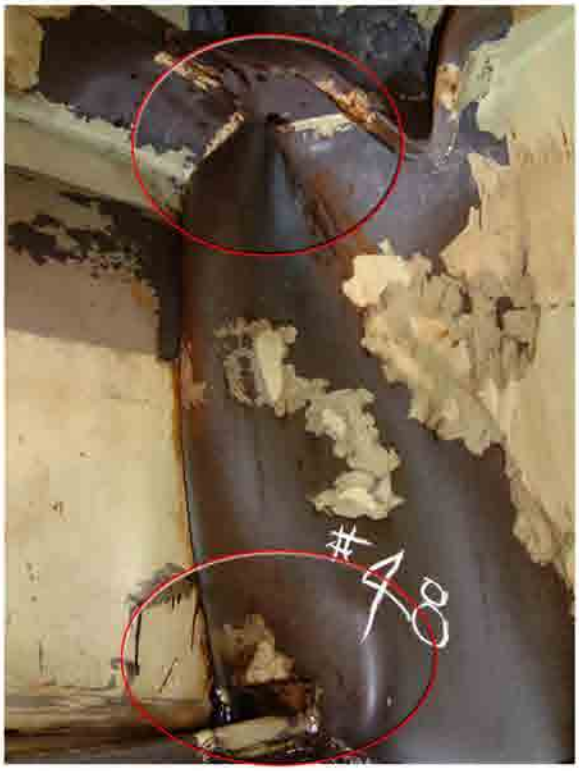
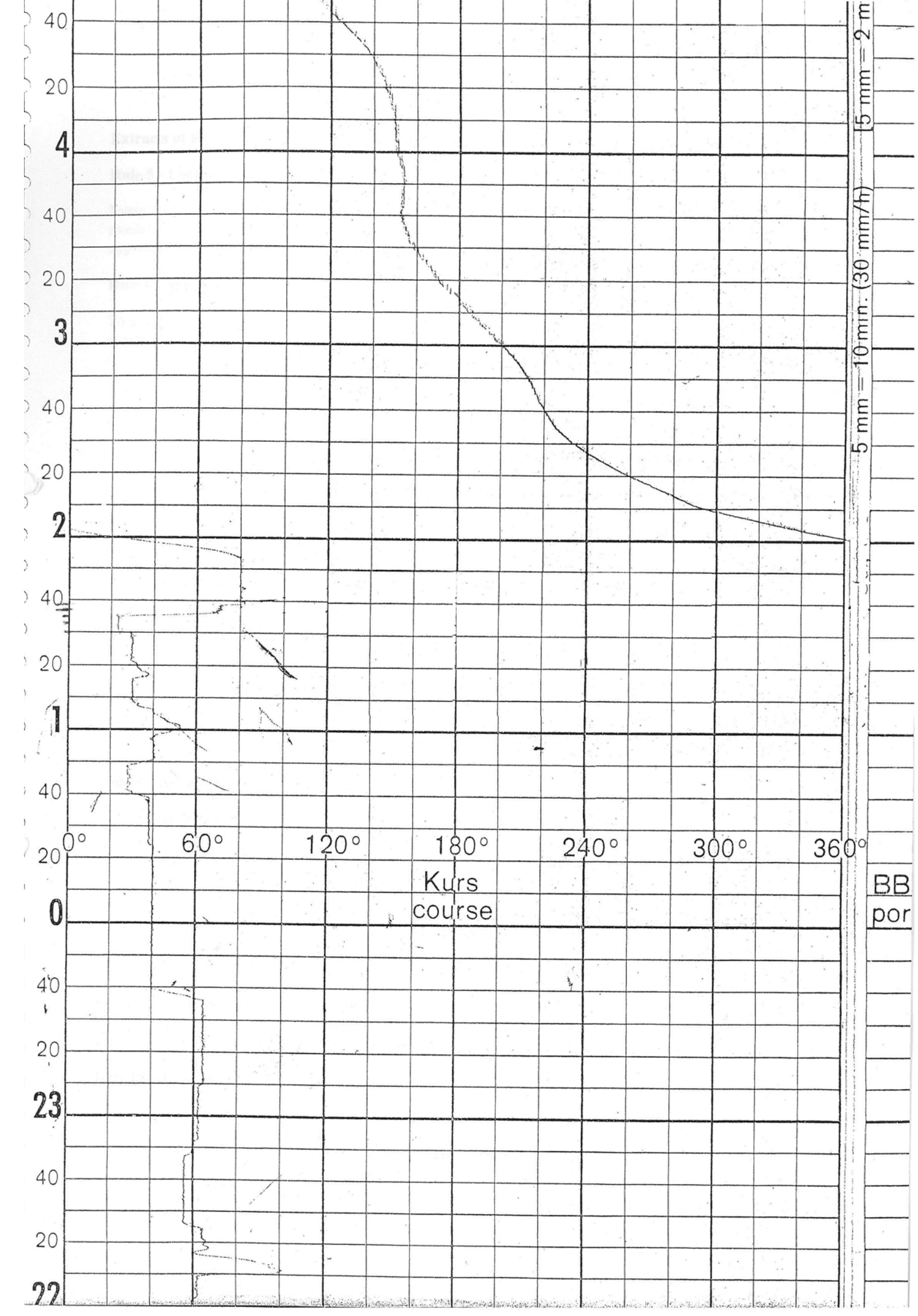


Figure 13 - No 2 settling tank damage

ANNEX C

Extract of the course recorder from *Lykes Voyager*


40
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60°
120°
180°
240°
300°
360°
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5 mm = 10 min. (30 mm/h)
5 mm = 2 m
BB
por

ANNEX D

Extracts from the International Regulations for Preventing Collisions at Sea

Extracts of Rules from the International Regulations for Preventing Collisions at Sea

Rule 5 - Lookout

Every Vessel shall at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and the risk of collision.

Rule 6 - Safe Speed

To avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

(a) By all vessels:
  (i) the state of visibility;
  (ii) the traffic density including concentrations of fishing vessels or any other vessels;
  (iii) the manoeuvrability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions;
  (iv) at night the presence of background light such as from shore lights or from back scatter from her own lights;
  (v) the state of wind, sea and current, and the proximity of navigational hazards;
  (vi) the draught in relation to the available depth of water.

(b) Additionally, by vessels with operational radar:
  (i) the characteristics, efficiency and limitations of the radar equipment;
  (ii) any constraints imposed by the range scale in use;
  (iii) the effect on radar detection of the sea state, weather and other sources of interference;
  (iv) the possibility that small vessels, ice and other floating objects may not be detected by radar at an adequate range;
  (v) the number, location and movement of vessels detected by radar;
  (vi) the more exact assessment of the visibility that may be possible when radar is used to determine the range of vessels or other objects in the vicinity.

Rule 8 – Action to avoid collision

(a) Any action taken to avoid collision shall, if the circumstances of the case admit. Be positive, made in ample time and with due regard to the observance of good seamanship.
(b) Any alteration of course and/or speed to avoid a collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.
(c) If there is sufficient sea room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.
(d) Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.
(e) If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.

Rule 19 - Conduct of vessels in restricted visibility

(a) This rule applies to vessels not in sight of one another when navigating in or near an area of restricted visibility.

(b) Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power driven vessel shall have her engines ready for immediate manoeuvre.

(c) Every vessel shall have due regard to the prevailing circumstances and conditions of restricted visibility when complying with Rules of Section I of this Part,

(d) A vessel which detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:

  (i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken;

  (ii) an alteration of course towards a vessel abeam or abaft the beam.

(e) Except where it has been determined that a risk of collision does not exist, every vessel which hears apparently forward of her beam the fog signal of another vessel, or which cannot avoid a close situation with another vessel forward of her beam, shall reduce speed to the minimum at which she can be kept on her course. She shall if necessary take all her way off and in any event navigate with extreme caution until the danger of collision is over.

ANNEX E

MGN 167 - Dangers in the Use of VHF Radio in Collision Avoidance

Maritime and Coastguard Agency

MARINE GUIDANCE NOTE

MGN 167 (M + F)

Dangers in the Use of VHF Radio in Collision Avoidance

Note to Ship owners, Masters, Skippers, Officers and Pilots of Merchant Ships, Yachts and Fishing Vessels

This note supersedes Marine Guidance Note MGN 27 (M+F)

Summary

- Although the use of VHF radio may be justified on occasion in collision avoidance, the provisions of the Collision Regulations should remain uppermost, as misunderstandings can arise even where the language of communication is not a problem.

1. There have been a significant number of collisions where subsequent investigation has found that at some stage before impact, one or both parties were using VHF radio in an attempt to avoid collision. The use of VHF radio in these circumstances is not always helpful and may even prove to be dangerous.

2. Uncertainties can arise over the identification of vessels and the interpretation of messages received. At night, in restricted visibility or when there are more than two vessels in the vicinity, the need for positive identification is essential but this can rarely be guaranteed. Even where positive identification has been achieved there is still the possibility of a misunderstanding due to language difficulties however fluent the parties concerned might be in the language being used. An imprecise or ambiguously expressed message could have serious consequences.

3. Valuable time can be wasted whilst mariners on vessels approaching each other try to make contact on VHF radio instead of complying with the Collision Regulations. There is the further danger that even if contact and identification is achieved and no difficulties over the language of communication or message content arise, a course of action might still be chosen that does not comply with the Collision Regulations. This may lead to the collision it was intended to prevent.

4. In 1995, the judge in a collision case said "It is very probable that the use of VHF radio for conversation between these ships was a contributory cause of this collision, if only because it distracted the officers on watch from paying careful attention to their radar. I must repeat, in the hope that it will achieve some publicity, what I have said on previous occasions, that any attempt to use VHF to agree the manner of passing is fraught with the danger of misunderstanding. Marine Superintendents would be well advised to prohibit such use of VHF radio and to instruct their officers to comply with the Collision Regulations."

5. Although the practice of using VHF radio as a collision avoidance aid may be resorted to on occasion, especially in pilotage waters, the risks described in this Note should be clearly understood and the Collision Regulations complied with.

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January 2001
[File ref: MNA 5/50/294]

ANNEX F

NFS 01/05 - Dangers in the Use of VHF Radio in Collision Avoidance

★ **Gefahren bei Manöverabsprachen über UKW.**

(1/04-Wiederholung)

Erfahrungen haben gezeigt, dass Manöverabsprachen über UKW auf See im Schiff/Schiffsverkehr zur Vermeidung von Kollisionen ursächlich für das Entstehen ernster Gefahrensituationen sein können, insbesondere

- durch die Schwierigkeit, ein anderes Fahrzeug auf See eindeutig identifizieren zu können,
- durch Missverständnisse infolge ungenau übermittelter Informationen oder durch mangelnde Sprachkenntnisse,
- durch Manöverabsprachen entgegen den Fahr- und Ausweichregeln der Kollisionsverhütungsregeln (KVR).

Außerdem kann in einer Begegnungssituation durch Kontaktaufnahme über UKW-Sprechfunk wertvolle Zeit verloren gehen, die besser für rechtzeitige und durchgreifende Maßnahmen im Sinne der KVR genutzt werden sollte.
Bei Maßnahmen zur Abwendung einer Kollision sollten sich die Schiffsführungen daher stets bewusst sein, dass Manöverabsprachen über UKW Gefahren in sich bergen, die zu schwerwiegenden Folgen führen können.

★ ***Dangers in the use of VHF radio in collision avoidance.***

(1/04-repetition)

Past experience has shown that the use of VHF radio by ships to agree manoeuvres in collision avoidance may in fact be the cause of serious risk situations, in particular due to

- *the difficulty of clearly identifying other vessels at sea,*
- *misunderstandings caused by imprecise communication or insufficient language skills,*
- *collision avoidance manoeuvres not complying with the steering and sailing rules of the Regulations for Preventing Collisions at Sea.*

Besides, in close-quarters situations, valuable time may be lost in establishing contact on VHF radio, which should be better used to take early and effective action according to the Regulations for Preventing Collisions at Sea.
When taking action to avoid collision, the vessel's master should be aware of the fact that collision avoidance action using VHF involves risks and potentially serious consequences.

(BMVBW LS 23) 1/05

ANNEX G

MGN 22 - Proper Use of VHF Channels At Sea

Maritime and Coastguard Agency

MARINE GUIDANCE NOTE

MGN 22 (M+F)

Proper Use Of VHF Channels At Sea

Notice to Owners, Masters and Officers of Merchant Ships, Owners and Skippers of Fishing Vessels and Owners of Yachts and Pleasure Craft.

This Notice supersedes Merchant Shipping Notice No.1632

Summary

This note warns against improper use of VHF channels at sea.

Key Points

- Notes on guidance on the use of VHF at sea
- Use of marine VHF equipment in accordance with ITU Radio Regulations
- Examples of typical VHF ranges are shown in Appendix II.
- A table of Transmitting frequencies in the Band 156 - 174 MHz for Stations in the Maritime Mobile Service is shown at Appendix III.

1. The International Maritime Organisation (IMO) has noted with concern the widespread misuse of VHF channels at sea especially the distress, safety and calling Channels 16 (156.8 MHz) and 70 (156.525 MHz), and channels used for port operations, ship movement services and reporting systems. Although VHF at sea makes an important contribution to navigational safety, its misuse causes serious interference and, in itself, becomes a danger to safety at sea. IMO has asked Member Governments to ensure that VHF channels are used correctly.

2. All users of marine VHF on United Kingdom vessels, and all other vessels in United Kingdom territorial waters and harbours, are therefore reminded, in conformance with international and national legislation, marine VHF apparatus may only be used in accordance with the International Telecommunications Union's (ITU) Radio Regulations. These Regulations specifically prescribe that:

   (a) Channel 16 may only be used for distress, urgency and very brief safety communications and for calling to establish other communications which should then be concluded on a suitable working channel;

   (b) Channel 70 may only be used for Digital Selective Calling not oral communication;

   (c) On VHF channels allocated to port operations or ship movement services such as VTS, the only messages permitted are restricted to those relating to operational handling, the movement and the safety of ships and to the safety of persons;

   (d) All signals must be preceded by an identification, for example the vessel's name or callsign;

   (e) The service of every VHF radio telephone station must be controlled by an operator holding a certificate issued or recognised by the station's controlling administration. This is usually the country of registration, if the vessel is registered. Providing the Station is so controlled, other persons besides the holder of the certificate may use the equipment.

3. Appendix I to this notice consists of notes on guidance on the use of VHF at sea. Masters, Skippers and Owners must ensure that VHF channels are used in accordance with this guidance.

4. For routine ship-to-ship communications, the following channels have been made available in United Kingdom waters: 6, 8, 72 and 77. Masters, Skippers and Owners are urged to ensure that all ship-to-ship communications working in these waters is confined to these channels, selecting that most appropriate in the light of local conditions at the time.

5. Channel 13 is designated for use on a world-wide basis as a navigation safety communication channel, primarily for intership navigation safety communications. It may also be used for the ship movement and port services.

6. Typical VHF ranges are contained in the example at Appendix II.

7. A Table of Transmitting Frequencies in the Band 156 – 174 MHz for Stations in the Maritime Mobile Service is shown at Appendix III. This incorporates changes agreed by the 1997 World Radio Conference.

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December 1998

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DETR
ENVIRONMENT
TRANSPORT
REGIONS

An executive agency of the Department of the Environment, Transport and the Regions

GUIDANCE ON THE USE OF VHF AT SEA

(1) PREPARATION

Before transmitting, think about the subjects which have to be communicated and, if necessary, prepare written notes to avoid unnecessary interruptions and ensure that no valuable time is wasted on a busy channel.

(2) LISTENING

Listen before commencing to transmit to make certain that the channel is not already in use. This will avoid unnecessary and irritating interference.

(3) DISCIPLINE

VHF equipment should be used correctly and in accordance with the Radio Regulations. The following in particular should be avoided:

(a) calling on channel 16 for purposes other than distress, urgency and very brief safety communications when another calling channel is available;

(b) communication on channel 70 other than for Digital Selective Calling.

(c) communications not related to safety and navigation on port operation channels;

(d) non-essential transmissions, e.g. needless and superfluous signals and correspondence;

(e) transmitting without correct identification;

(f) occupation of one particular channel under poor conditions;

(g) use of offensive language.

(4) REPETITION

Repetition of words and phrases should be avoided unless specifically requested by the receiving station.

(5) POWER REDUCTION

When possible, the lowest transmitter power necessary for satisfactory communication should be used.

(6) COMMUNICATIONS WITH SHORE STATIONS

Instructions given on communication matters by shore stations should be obeyed.

Communications should be carried out on the channel indicated by the shore station. When a change of channel is requested, this should be acknowledged by the ship.

On receiving instructions from a shore station to stop transmitting, no further communications should be made until otherwise notified (the shore station may be receiving distress or safety messages and any other transmissions could cause interference).

(7) COMMUNICATIONS WITH OTHER SHIPS

The listening procedure outlined above should be followed before communications are commenced on the chosen channel.

(8) DISTRESS COMMUNICATIONS

Distress calls/messages have absolute priority over all other communications. When heard, all other transmissions should cease and a listening watch should be kept.

Any distress call/message should be recorded in the ship's log and passed to the master.

On receipt of a distress message, if in the vicinity, immediately acknowledge receipt. If not in the vicinity, allow a short interval of time to elapse before acknowledging receipt of the message in order to permit ships nearer to the distress to do so.

(9) CALLING

Whenever possible, a working frequency should be used. If a working frequency is not available, Channel 16 may be used, provided it is not occupied by a distress call/message.

In case of difficulty to establish contact with a ship or shore station, allow adequate time before repeating the call. Do not occupy the channel unnecessarily and try another channel.

(10) CHANGING CHANNELS

If communications on a channel are unsatisfactory, indicate change of channel and await confirmation.

(11) SPELLING

If spelling becomes necessary (e.g. descriptive names, call signs, words which could be misunderstood) use the spelling table contained in the International Code of Signals and the Radio Regulations.

(12) ADDRESSING

The words "I" and "You" should be used prudently. Indicate to whom they refer.

Example of good practice:

"Seaship, this is Port Radar, Port Radar, do you have a pilot?"

"Port Radar, this is Seaship, I do have a pilot."

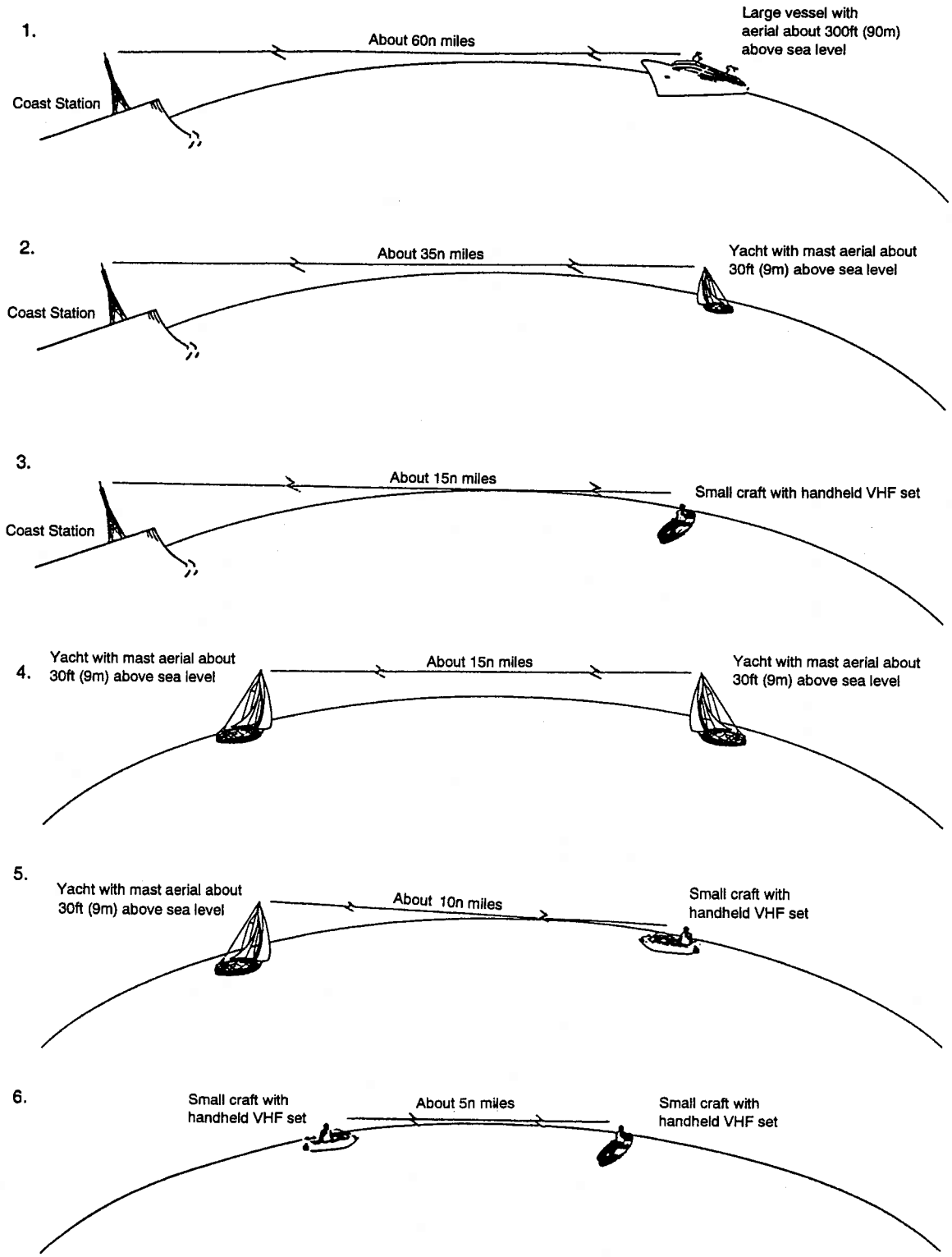
(13) WATCHKEEPING

Ships fitted with VHF equipment should, where practicable, maintain a listening watch on channel 16 and channel 13 when at sea.

In certain cases Governments may require ships to keep a watch on other channels.

APPENDIX II

TYPICAL VHF RANGES



APPENDIX III

Table of Transmitting Frequencies in theVHF Maritime Mobile Band

Note: For assistance in understanding the Table, see notes 1) to 4) below

Channel designators	*Notes*	Transmitting Frequencies Mhz		Inter ship	Port operations and ship movement		
		Ship Stations	Coast Stations		Single frequency	Two frequency	Public correspondence
60		156-025	160-625			x	x
01		156-050	160-650			x	x
61		156-075	160-675			x	x
02		156-100	160-700			x	x
62		156-125	160-725			x	x
03		156-150	160-750			x	x
63		156-175	160-775			x	x
04		156-200	160-800			x	x
64		156-225	160-825			x	x
05		156-250	160-850			x	x
65		156-275	160-875			x	x
06	1)	156-300		x			
66		156-325	160-925			x	x
07		156-350	160-950			x	x
67		156-375	156-375	x	x		
08		156-400		x		x	
68		156-425	156-425		x		
09		156-450	156-450	x	x		
69		156-475	156-475	x	x		
10		156-500	156-500	x	x		
70		**156-525**	**156-525**	**Digital Selective Calling for Distress,**			**Safety and Calling**
11		156-550	156-550		x		
71		156-575	156-575		x		
12		156-600	156-600		x		
72		156-625		x			
13		156-650	156-650-	x	x		
73		156-675	156-675	x	x		
14		156-700	156-700		x		
74		156-725	156-725		x		
15	2)	156-750	156-750	x	x		
75	4)	156-775			x		
16		**156-800**	**156-800**	**Distress, Safety and Calling**			
76	4)	156-825			x		
17	2)	156-850	156-850	x	x		
77		156-875		x			
18		156-900	161-500		x	x	x
78		156-925	161-525			x	x
19		156-950	161-550			x	x
79		156-975	161-575			x	x
20		157-000	161-600			x	x
80		157-025	161-625			x	x
21		157-050	161-650			x	x
81		157-075	161-675			x	x
22		157-100	161-700			x	x
82		157-125	161-725		x	x	x
23		157-150	161-750			x	x
83		157-175	161-775		x	x	x
24		157-200	161-800			x	x
84		157-225	161-825		x	x	x
25		157-250	161-850			x	x
85		157-275	161-875		x	x	x
26		157-300	161-900			x	x
86		157-325	161-925		x	x	x
27		157-350	161-950			x	x
87		157-375			x		
28		157-400	162-000			x	x
88		157-425			x		
AIS 1	3)	161-975	161-975				
AIS 2	3)	162-025	162-025				

NOTES REFERRING TO APPENDIX III

1) The frequency 156.300 MHz (channel 06) may also be used for communications between ship stations and aircraft stations engaged in coordinated search and rescue operations. Ship stations shall avoid harmful interference to such communications on channel 06 as well as to communications between aircraft stations, ice-breakers and assisted ships during ice seasons.

2) Channels 15 and 17 may also be used for on-board communications provided the effective radiated power does not exceed 1 W.

3) These channels (AIS 1 and AIS 2) will be used for an automatic ship identification and surveillance system capable of providing worldwide operation on high seas, unless other frequencies are designated on a regional basis for this purpose.

4) The use of these channels (75 and 76) should be restricted to navigation-related communications only and all precautions should be taken to avoid harmful interference to channel 16, e.g. by limiting the output power to 1 W or by means of geographical separation.