Report on the investigation of

the collision between

the container ship

P&O Nedlloyd Vespucci

and the yacht

Wahkuna

English Channel

28 May 2003

Marine Accident Investigation Branch
First Floor
Carlton House
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Southampton
United Kingdom
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Extract from

The Merchant Shipping

(Accident Reporting and Investigation)

Regulations 1999

The fundamental purpose of investigating an accident under these Regulations is to determine its circumstances and the cause with the aim of improving the safety of life at sea and the avoidance of accidents in the future. It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame.

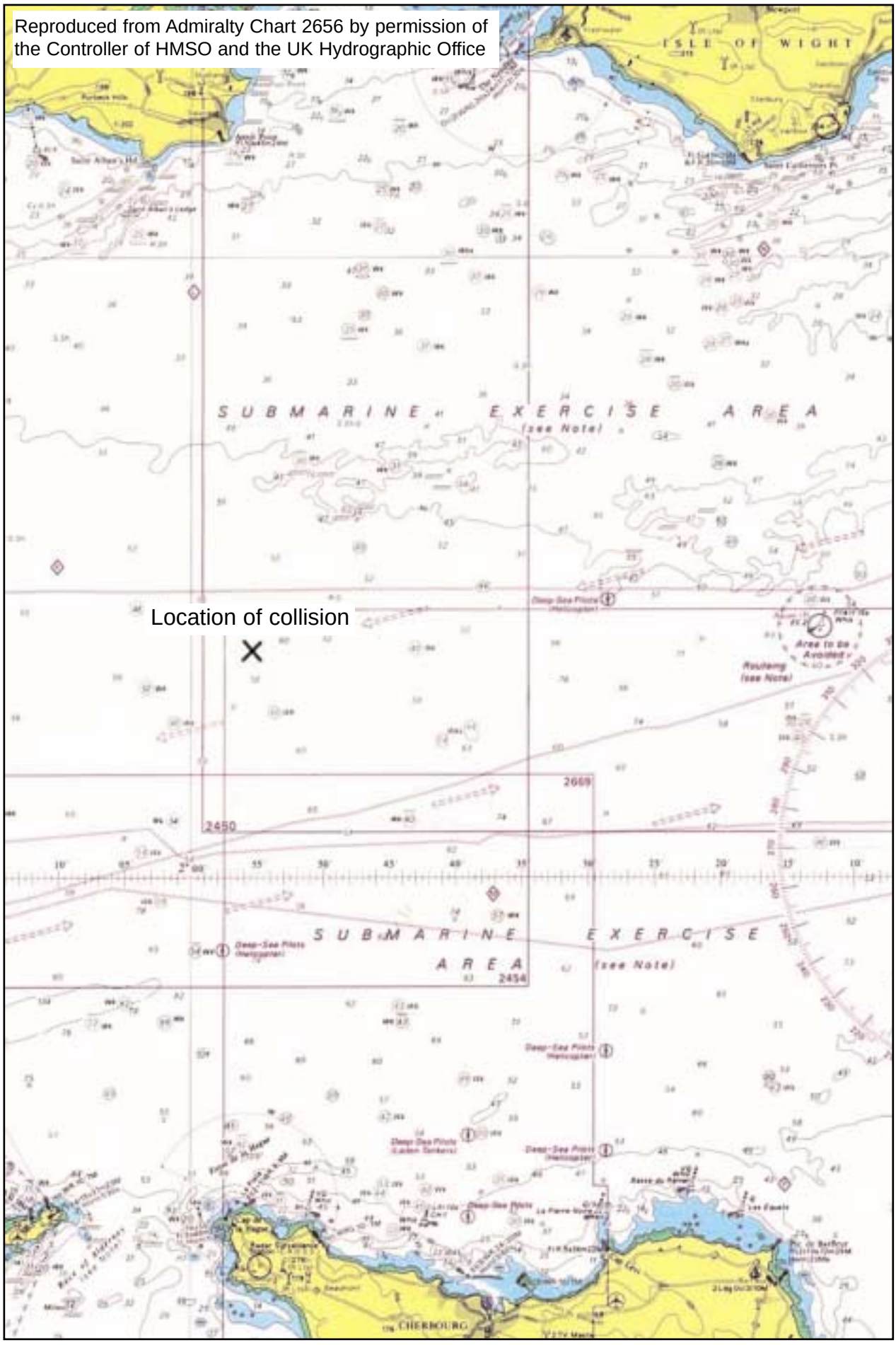
NOTE

This report is not written with liability in mind and is not intended to be used in court for the purpose of litigation. It endeavours to identify and analyse the relevant safety issues pertaining to the specific accident, and to make recommendations aimed at preventing similar accidents in the future.

CONTENTS

GLOSSARY OF ABBREVIATIONS, ACRONYMS AND TERMS

ARPA	-	Automatic Radar Plotting Aid
CPA	-	Closest Point of Approach
cable	-	one tenth of a nautical mile
CROSS	-	Centre Régional Opérationnel de Surveillance et de Sauvetage (traffic monitoring and rescue centre)
(D)GPS	-	(Differential) Global Positioning System
ECDIS	-	Electronic Chart Display Information System
IMO	-	International Maritime Organization
ISM	-	International Safety Management (Code)
kW	-	kilowatt
m	-	metre
(M)ARPA	-	Mini Automatic Radar Plotting Aid
MCA	-	Maritime and Coastguard Agency
MF	-	Medium Frequency
MGN	-	Marine Guidance Note
MRCC	-	Maritime Rescue Co-ordination Centre
OOW	-	Officer of the Watch
Point (of compass)	-	11¼° - there are 32 points to a full circle
RYA	-	Royal Yachting Association
TCPA	-	Time to Closest Point of Approach
teu	-	twenty-foot equivalent units
TSS	-	Traffic Separation Scheme
UK	-	United Kingdom
UTC	-	Universal Co-ordinated Time
VHF	-	Very High Frequency
VTS	-	Vessel Traffic Service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ISLE OF WIGHT
SUBMARINE EXERCISE AREA
(see Note)
Location of collision
Area to be Avoided
Routeing (see Note)
2669
2450
SUBMARINE EXERCISE AREA
(see Note)
2454
CHERBOURG

SYNOPSIS

At 1100 UTC on 28 May 2003, the container vessel *P&O Nedlloyd Vespucci* and the yacht *Wahkuna* collided in the English Channel in poor visibility. The MAIB was notified of the accident on 29 May, and an investigation started on the same day.

Each vessel had detected the other by radar when at a range of about 6 miles. The container ship was on a course of 255°(T) at a speed of 25 knots. The yacht was on the port bow of the container ship on a course of 012° (C) at a speed of 7.5 knots, and was due to pass about 8 cables ahead of the container ship.

The skipper of the yacht, however, incorrectly estimated from his radar display that *P&O Nedlloyd Vespucci* was passing 1.5 miles ahead of *Wahkuna*, and reduced speed by disengaging his engine. This action, which also resulted in a substantial alteration in the yacht's heading as it lost steerage, put the two vessels on a collision course. The actions of the yacht, the CPA of which now appeared as 2 cables to port on ARPA, concerned and confused the master of *P&O Nedlloyd Vespucci*, but he was reluctant to take any manoeuvring action because he was uncertain of what the yacht would do next.

Minutes later, the vessels collided and the bulbous bow of *P&O Nedlloyd Vespucci* struck the forward part of *Wahkuna*'s hull, demolishing the first 3m of her hull and dismasting her. Despite having sent a lookout to the port bridge wing, the master of the container ship was not aware that a collision had occurred, and continued on passage. The yacht crew had to abandon to a liferaft, where they stayed for 5.5 hours before being rescued.

Several factors contributed to the accident including:

- Misunderstanding by *Wahkuna*'s skipper of which of the Collision Regulations are applicable in fog.
- Over-confidence in the accuracy of ARPA by the master of the container ship
- Acceptance by the master of the container ship of a small passing distance
- The inability of the yacht skipper to use radar effectively
- The failure of both vessels to keep an effective radar lookout
- The high speed of the container vessel
- Poor bridge resource management.

A recommendation has been reiterated to the MCA with regard to the issue of guidance to assist in determining a safe speed in restricted visibility. Recommendations have also been made to the Royal Yachting Association and the British Marine Federation with a view to improving radar knowledge among yachtsmen. The manufacturer of the locating beacon has been advised to check new and existing beacons for similar faults.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *P&O NEDLLOYD VESPUCCI* AND ACCIDENT

Vessel details (Figure 1)

Registered owner	:	First Tiger Shipping Inc. on behalf of MS 'E.R' LONDON' Schiffahrt GmbH
Ship Managers	:	ER Schiffahrt GmbH * Cie.KG
Port of registry	:	Monrovia
Flag	:	Liberia
Official Number	:	11259
Type	:	Container. 5762 teu. One deck above waterline, two hatches aft, six forward.
Built	:	Samsung Heavy Industries Koje, in 2000
Classification	:	Germanischer Lloyd
Construction	:	Steel
Length overall	:	277.26m
Gross tonnage	:	66289
Engine power	:	54840kW
Service speed	:	25.1 knots
Other relevant info	:	On charter to P&O Nedlloyd, London (UK)

Accident details

Time and date	:	Between 1057 and 1058 on 28 May 2003
Location of accident	:	50°10'.871N, 001°55'.621W
Persons on board	:	26
Injuries/fatalities	:	None
Damage	:	Nil

Figure 1

P&O Nedlloyd Vespucci

1.2 PARTICULARS OF SAILING VESSEL *WAHKUNA*

Vessel details (Figure 2)

Registered owner	:	Mr Michael Dresden, New Malden, Surrey, UK
Port of registry	:	Southampton
Flag	:	UK
Type	:	Yacht Moody 47
Built	:	2002
Construction	:	GRP
Length overall	:	14.53m
Gross tonnage	:	19
Displacement	:	15330kg
Engine power	:	Yanmar 57kW
Service speed	:	7 knots

Accident details

Time and date	:	1100 on 28 May 2003
Location of accident	:	50°10'.871N, 001°55'.621W
Persons on board	:	Five
Injuries/fatalities	:	None
Damage	:	Vessel lost

Figure 2

An example of a Moody 47 (Note: this is **not** *Wahkuna*)

1.3 BACKGROUND

P&O Nedlloyd Vespucci was owned and managed by E R Schiffahrt of Hamburg, Germany. At the time of the accident, she was on long-term charter to P&O Nedlloyd of London and was on passage from Antwerp to Singapore. The ship operated between Northern Europe and the Far East hub container ports on a 56-day cycle.

At the time of the accident, *Wahkuna* was on a cross-Channel passage from Dielette, on the western side of the Cherbourg peninsula, to the River Hamble, near Southampton.

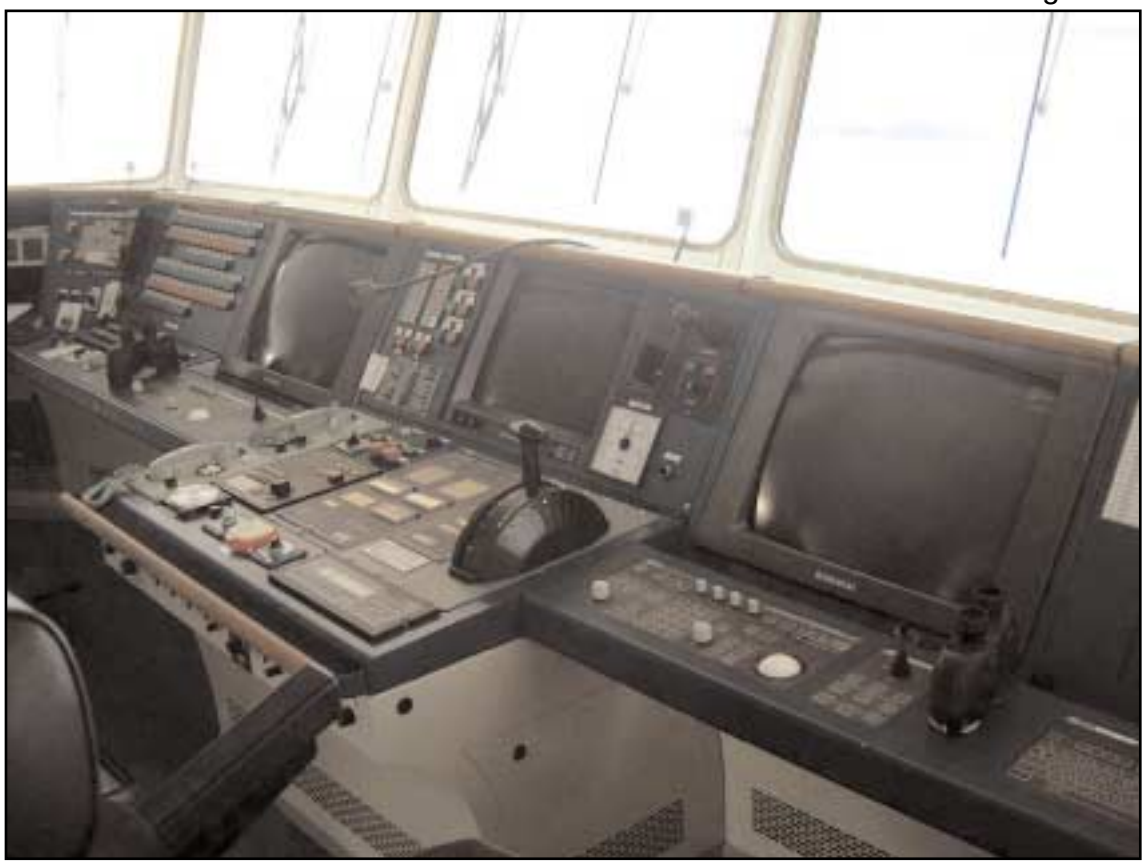
1.4 DESCRIPTION OF VESSELS AND PERTINENT NAVIGATION EQUIPMENT

1.4.1 *P&O Nedlloyd Vespucci*

The ship's superstructure, which included the accommodation and bridge, was situated aft. The bridge ran the full width of the vessel. Positioned central to, and aft of, the forward end of the bridge was an operating console fitted with the main engine controls and navigational equipment **(Figure 3)**.

Two whistles were fitted, one forward and one aft. Only one could be operated at a time. The forward whistle was selected. The signal operated on a 5 second signal on a 60 seconds cycle.

Figure 3



Photograph of the operating console on board *P&O Nedlloyd Vespucci*

P&O Nedlloyd Vespucci was fitted with the following navigational equipment: DGPS and GPS navigators, magnetic and gyro compasses, autopilot, echo sounder, ECDIS, MF and VHF radios, and two Atlas ARPA radars were situated port and starboard of the bridge centreline. An ARPA radar is capable of automatically acquiring and plotting targets which it detects.

On both ARPA radars either S or X band could be selected. Three scanners were fitted: two above the bridge and one on the bow. The scanner on the bow was only used in pilotage waters and as a spare. The fitting of a bow radar, and its operation, is not a requirement under current regulations. There were no radar blind arcs. The master used the display on the starboard side of the bridge with S band selected. He operated it on the 6-miles range scale, reducing to 3 miles when appropriate. The display was offset to the north-east, enabling him to look further ahead in the ship's direction; true motion, fixed origin mode was selected. Speed input was provided by GPS, although log input could also be selected. The port display was used by the OOW and was switched between the 12- and 6-miles range scales. The radar picture was reported as good.

1.4.2 *Wahkuna*

Wahkuna was operated by her owner, a retired solicitor. She normally berthed on the River Hamble at Moody's Marina, Bursledon. He had owned and operated offshore sailing boats in excess of 40 years. *Wahkuna* was delivered to him in late August 2002.

Built by Princess Yachts plc, Plymouth, in 2002, *Wahkuna* was a Moody 47 design. The vessel incorporated one deck above the waterline, with the steering cockpit set aft of amidships **(Figure 4)**. All the vessel's controls were located conveniently within the cockpit.

The accommodation area, for up to six people, was situated below deck. It incorporated a navigation area, comprising a desk and chart table.

Wahkuna was fitted with a Raymarine R70 3cm (M)ARPA radar display in the cockpit, and a Raymarine R80 3cm (M)ARPA radar display in the navigation saloon. Both displays had the following features: ten target tracking, selectable target vectors, target risk assessment with danger alarm, history plots, target speed, course, CPA and TCPA calculations. However, during the events leading to the accident, only the display in the cockpit area was being monitored, and none of the features listed was used. Neither the skipper nor the crew fully understood, or appreciated, the information that could have been provided by the equipment.

The vessel was also fitted with a GPS receiver, autopilot, speed log, echo sounder, VHF radio, magnetic compass, radar reflector on the main mast, an automatic sound signalling apparatus, and a Locat 121.5MHz EPIRB beacon. The beacon had been tested in April 2003, and had then registered normal operation. Since purchase it had always been kept below decks. At the time of the accident the sound signal apparatus was set to sound for 5 seconds every 2 minutes.

Figure 4

Example of a Moody 47’s cockpit.
(Note: this photograph does not show the navigational equipment fitted to *Wahkuna*)

1.5 THE CREWS

1.5.1 *P&O Nedlloyd Vespucci*

P&O Nedlloyd Vespucci had a complement of 26 crew, including the master, three watchkeeping officers and a deck cadet.

The master was the holder of a Liberian unrestricted master's certificate of competency and had served on container vessels as chief officer and master since 1999.

He attended the nautical school in Dubrovnik until 18 years old, then went to sea for a year as a cadet. After obtaining his third officer's certificate he returned to nautical college for 2 years and, after a further 2 years at sea, he obtained his master's licence in 1983. After 11 months military service during 1984, he returned to sea in 1985 as second officer with a Yugoslavian shipping company, and was promoted to chief officer in 1989. In 1994 he moved to a Dutch shipping company to serve on large container ships up to 5000 teu and was promoted to master in 1999.

The master joined ER Schiffahrt in 2000 as chief officer, and had served on board *P&O Nedlloyd Vespucci* in that capacity during 2001. Since then he has been master of the sister ships *Magellan* and *Los Angeles*, before joining *Vespucci* on 30 January 2003, in Southampton.

The second officer, who was on watch with the master at the time of the accident, was the holder of an unrestricted second mate's certificate of competency. *P&O Nedlloyd Vespucci* was the fourth vessel of this type he had served on since obtaining his certificate of competency.

The master and most other senior officers work for 4 months on board, followed by 2 months leave.

1.5.2 *Wahkuna*

Wahkuna had a complement of five crew members, which included the owner, who was skipper of the vessel.

He had over 40 years sailing experience and was the holder of an RYA coastal and offshore yachtmaster's certificate of competency.

The remaining crew members had varying degrees of yachting experience and qualifications, ranging from RYA offshore yachtmaster to a day skipper's certificate of competency.

All five crew members belonged to the High Sea Sailing Club of North West London.

1.6 ENVIRONMENTAL CONDITIONS

At the time of the accident, the weather conditions were an easterly wind of force 2 to 3 with very little swell in a sea state of 2. The visibility was very poor with thick fog.

The predicted tidal stream was south-westerly at a rate of approximately 2 knots.

1.7 NARRATIVE OF EVENTS ON *WAHKUNA* (ALL TIMES ARE UTC)

Wahkuna sailed from the port of Dielette, bound for the River Hamble, at 0500 on 28 May 2003. When she sailed the weather conditions were good: wind variable force 1 to 2, sea calm and the visibility 3 to 5 miles.

Once clear of the Channel Islands, a course of 012° to 015° (compass) was set towards the Needles Fairway buoy, and the autopilot engaged. The skipper had the con of the vessel and, along with the remainder of the crew, was stationed in the cockpit. *Wahkuna* was making good a speed of approximately 7.5 knots. Her position was plotted every 20 minutes by one of the crew.

At approximately 0930, the visibility began to deteriorate and, at times, was reduced to approximately 50m. In addition to switching on the automatic fog signal, the skipper instructed the crew to raise the mainsail to increase their visibility both visually and by radar.

Just before 1100, the skipper and one other crew member, both of whom were constantly monitoring the radar which was set to the 6-mile range, detected two targets, about ¼ mile apart, bearing approximately north-east at a range of 6 miles.

The targets were visually tracked, until the range had decreased to 3 miles, when the skipper assumed that *Wahkuna* was on a collision course with the nearest target.

At that point, the skipper, in consultation with the other crew member monitoring the radar, decided to take manual control of the steering and to slow the vessel down to approximately 1 to 2 knots. After a while, it was decided to disengage the main engine to bring the vessel to a stop. At that point both the skipper and other crew member estimated by eye and agreed that the target would pass ahead at a distance of 1.5 miles.

Soon after, one of the crew recalled hearing a fog signal, then saw the bow of a large container vessel looming out of the fog at a distance of approximately 50 to 60 metres to port. In an attempt to avoid a collision, the skipper came hard-to-starboard, and ahead on the main engine.

Unfortunately, his actions were unable to prevent a collision. The container vessel's bulbous bow struck the forward part of *Wahkuna*'s port hull, demolishing the first 3 metres of her bow **(Figure 5)**.

Figure 5

Photograph of the damage to *Wahkuna*

As a result of the impact, *Wahkuna* rose up 2 metres on the container vessel's bow wave and slalomed at an angle of 20° to 30° down her starboard side stern-first for a distance of approximately 75 metres, before being dropped back into the sea. The container vessel continued on her passage with *Wahkuna* scraping alongside. Moments later, the container vessel's stern passed, leaving *Wahkuna* in her wake. One of the crew managed to read the word *"Monrovia"* on the vessel's stern, but was unable to make out a name. Another was able to record the GPS position.

The skipper's immediate thoughts were to transmit a "Mayday" by VHF radio but the mainmast, which housed the VHF radio aerial, had been torn away during the impact.

He then opened the forward cabin door and noticed a substantial ingress of water. Closing the door immediately, he instructed the crew to don their lifejackets, which were stored in the main cabin area, and collect some food and water. He then put the main engine astern and began making stern way at a speed of about ½ knot through the water. This reduced the amount of water ingress forward.

A further assessment of the damage was made, but it was soon realised that *Wahkuna* was sinking.

Instructions were given to deploy and inflate the liferaft. After collecting flares and a locating beacon, the crew boarded the liferaft. Soon after, *Wahkuna* sank by the bow.

Once in the liferaft, the crew tried to activate the locating beacon, but the light indicating normal operation failed to illuminate. They were also unable to make any contact by mobile phone and therefore had to wait until they were seen by a passing ship. Some 5½ hours after boarding the liferaft, one of their flares was seen by *Condor Express*, a high-speed ferry operating between Poole, Weymouth and the Channel Islands.

Once recovered on board the ferry, the crew were landed in Guernsey and taken to the local hospital for a routine medical examination. Later on that evening, they sailed to Poole on a return ferry.

1.8 SUBSEQUENT INVESTIGATION

Following the report of the collision to the MAIB, CROSS Jobourg MRCC in France was asked for detailed radar information concerning all vessels transiting the relevant part of the English Channel at the time of the collision, using the position reported and information provided by *Wahkuna*'s crew.

Given the time and the position reported, the tracks of two vessels were interrogated: *Yokohama Senator* and *P&O Nedlloyd Vespucci*, both large container vessels, and both registered in Monrovia **(Annex 1)**.

Of the two vessels, only one, *P&O Nedlloyd Vespucci*, was in the vicinity of the position reported at 1100 UTC.

Following enquiries by Ushant Traffic, the master of *P&O Nedlloyd Vespucci* reported that he had *"a radar target coming from his port side on a northerly heading at a speed of 5.5 knots in approximate position 50°10' N, 001° 56' W at 1100 UTC. The target passed on his port quarter at a distance of 2 cables"*.

On receipt of the above information, two MAIB inspectors travelled to Hong Kong to interview the master, the officer of the watch and the lookout at the time of the accident, on board *P&O Nedlloyd Vespucci*. During this visit, paint marks of similar colour to the Moody 47 were found on the vessel's starboard bow, supporting the probability that *P&O Nedlloyd Vespucci* was the vessel involved in the collision with *Wahkuna*. Full co-operation was given by the vessel's ship managers, master and crew.

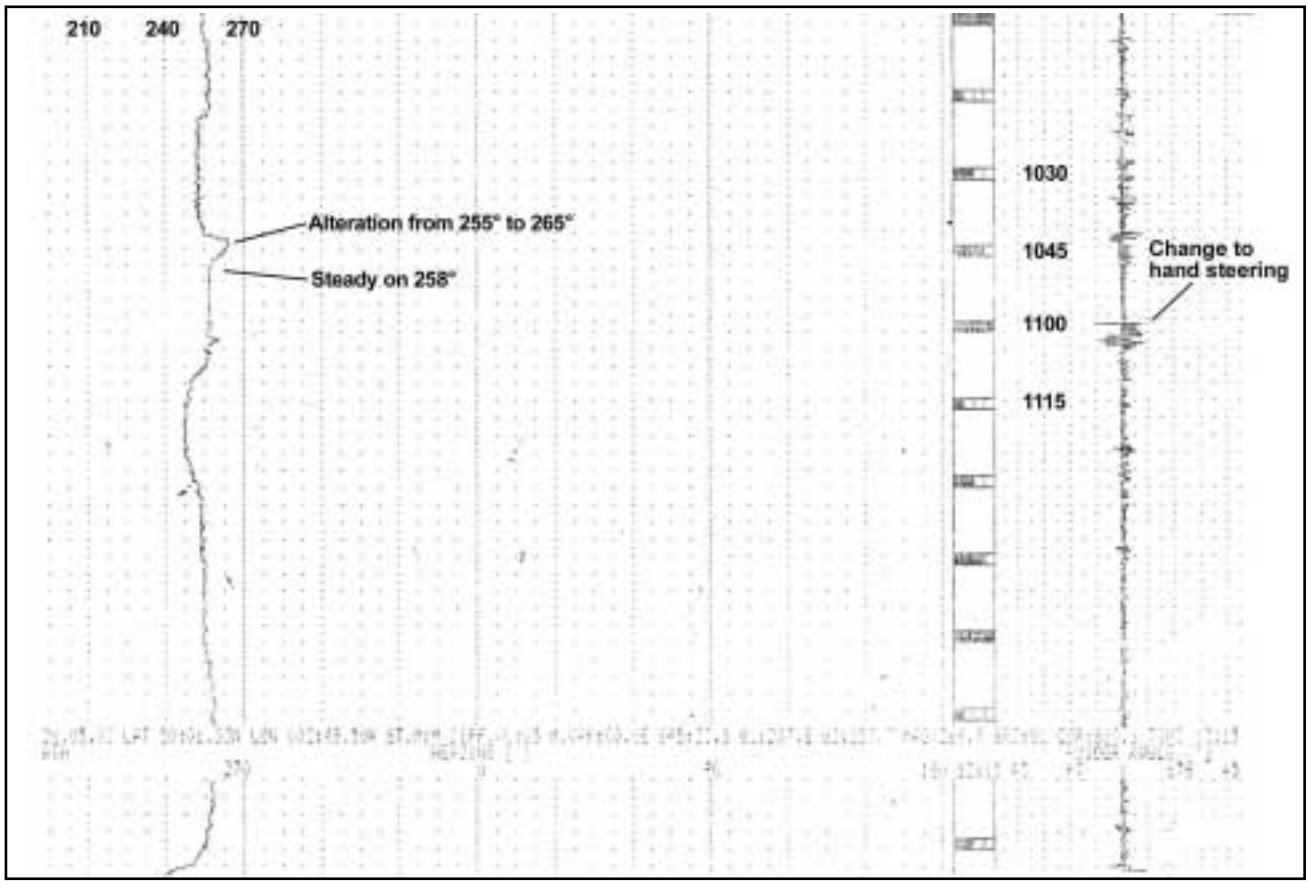
1.9 NARRATIVE OF EVENTS ON *P&O NEDLLOYD VESPUCCI* - (ALL TIMES ARE UTC)

P&O Nedlloyd Vespucci sailed from Antwerp at 2042 on 27 May 2003 for passage to Port Said; she should have sailed at 2000, but was delayed by cargo operations and tidal restrictions. The following day, during passage through the English Channel, visibility started to reduce from about 0800 because of fog. At this time, the ship began sounding fog signals. By about 0900, visibility had reduced to the extent that the bow was not visible from the bridge. The vessel was following a track of 255° in autopilot at a speed of 25 knots.

The master had remained on the bridge since leaving Antwerp. He had accompanied the pilot until he disembarked at 0400, and then remained for the passage past the sunken vessel *Tricolor*, and the transit through the Dover Strait. He then supervised the third officer during his 0800 to 1200 watch. A rating had also been on the bridge during each watch.

Between about 1040 and 1045, a small radar contact was detected at a range of between 4 to 5 miles at an angle of 50° on the port bow; the CPA of the contact was reported to be less than 1 cable. The rating was sent to the port bridge wing and the master altered course about 10° to starboard to increase the CPA. This alteration was maintained for less than 2 minutes before returning to port to a course of 258°. The rating on the port bridge wing never saw or heard the contact.

Soon after, another contact was detected on the port bow at a range of between 5 and 6 miles. By ARPA, its course was northerly and speed was 6.5 knots; the master estimated it would cross 8 cables ahead. However, when about one point on the port bow at a range of between 1.5 and 2 miles, the contact slowed quickly and the ARPA vector indicated that it had also altered course towards the north-east. Its speed by ARPA reduced to zero. This concerned the master,



Extract of *P&O Nedlloyd Vespucci*'s course recorder

who immediately started the second steering motor and ordered the second officer, who was then the OOW, to change to manual steering. This was done, but neither course nor speed was adjusted.

The CPA of the contact was then 2 cables on the port side and the master was uncertain of its intentions. The contact was monitored by the master on the starboard radar display using S-Band radar. The display was set to the 3-mile range scale and, initially, was off-centred to the north-east. The master reported that the contact was never seen to be lost in the radar ground wave or clutter and that its range by ARPA was not less than 2 cables. As the contact passed, the radar was recentred, and the master saw the contact's trail pass 2 cables astern. The time was shortly before 1100. When the contact was between 1.5 to 2 miles astern, its course and speed by ARPA was about 075° at 3 knots. The contact was cancelled from ARPA and the ship continued on passage. The lookout on the port bridge wing did not see or hear anything, and the master was completely unaware that a collision had occurred. An extract of the vessel's course recorder is shown at **Figure 6**, which shows:

- Prior to the alteration of course to starboard between 1040 and 1045, course was 255°.
- The heading reached during the alteration was about 265°.
- The time taken to alter to starboard from 255° to 265° and back to port to 258° was 6 minutes.

- The interval from being steady on 258° until changing to hand steering was 11 minutes.

- While in hand steering, heading oscillated no more than 5° either side of 258°.

- The ship remained in hand steering for about 6 minutes.

1.10 NAVIGATION IN FOG

Advice concerning navigation in fog is contained in *Marine Guidance Note MGN 202 (M&F)*, published by the MCA and entitled *Navigation in Fog*, **(Annex 2)** which states, in part:

The Maritime and Coastguard Agency (MCA) is concerned that a number of casualties to ships have resulted from serious disregard for the basic principles of good seamanship and prudent navigation in bad visibility. Sensible use of radar and other aids to navigation greatly assists the conduct of ships in fog, but these aids have not reduced the need to comply fully with the Collision Regulations: to proceed at a safe speed, pay special attention to good watch-keeping, and navigate with proper caution.

It further gives a brief outline of three casualties in fog, then states:

None of the casualties described led to loss of life, but clearly this was only due to good fortune. In all cases those responsible for the ship's navigation sacrificed seamen for expediency. They failed to recognise the limitations of aids to navigation; or to follow the requirements of the Collision Regulations and the advice of Marine Notices. It is worth stressing that the ships involved were all well-equipped vessels in the charge of men with sound qualifications; it was not skill or experience that was lacking, but the proper seamanlike approach to the situation.

Whatever the pressure on masters to make a quick passage or to meet the wishes of owners, operators, charters or port operators, it does not justify ships and those on board them being put unnecessarily at risk.

The document also stresses the responsibilities of owners; it is the duty of the company to take all reasonable steps to ensure that the ship is operated in a safe manner. The company must have established and implemented an effective safety management system, which includes procedures to ensure safe operation of ships.

1.11 RADAR AND PLOTTING AIDS

1.11.1 Accuracy

The radars fitted to both vessels satisfied the performance standards required by IMO IEC60954 and IEC60936. The standard gave minimum accuracies to be achieved under four standard conditions with 1 and 3 minute trends as follows:

Condition	1 minute	3 minutes
End on	1.6 miles	0.5 miles
Opening	-	0.8 miles
Crossing	1.8 miles	0.7 miles
Overtaking	2.0 miles	0.7 miles

1.11.2 Speed input

In accordance with IMO guidance, speed input for all ARPA installations should be derived from the vessel's log. This enables water-based information, the correct format for anti-collision avoidance, to be displayed.

Ground-based radar information, derived from GPS or other sources, is affected by the set and drift in any given particular area, and can have an adverse effect on the accuracy of any radar plotting carried out.

1.11.3 RYA - training

The RYA is the UK governing body representing sailing, windsurfing, motor boating, powerboat racing and personal watercraft, at sea and on inland waterways.

Thousands of people annually take an RYA training course or qualification. As part of its programme, the RYA offers a 1 day course in the operation of radar. This course is available to all yachtsmen.

1.11.4 British Marine Federation

The British Marine Federation is the trade association for the British boating industry, with over 1500 members accounting for over 90% of the industry's turnover. Members of the Federation are drawn from both the sea going and inland sectors of the marine industry and supporting services. The Federation also offers a range of related training courses and initiatives in a variety of areas.

One such initiative was a point of sale training voucher given to purchasers of jet skis. This voucher, provided by the manufacturer, enabled the purchaser to undergo partly funded training in the safe use of jet skis.

1.12 CROSS JOBOURG MRCC

1.12.1 Background

Jobourg reporting system (MANCHEREP) is a mandatory reporting system under SOLAS regulations.

Shore-based facilities at Jobourg Vessel Traffic Service are able to monitor shipping movements, and provide advice and information about navigational hazards and weather conditions.

1.12.2 Events (1000 - 1400 UTC - 28 May 2003)

On 28 May 2003, from 1000 until 1400 UTC, the period in which the visibility was very poor, CROSS Jobourg MRCC recorded, by radar surveillance, another 19 vessels.

Latitude, longitude, course and speed were recorded every 5 minutes for each vessel.

Only one of the 19 vessels in question reduced speed because of the visibility conditions.

1.13 SCHEDULING

The responsibility for *P&O Nedlloyd Vespucci*'s schedule lay with the charterer, P&O Nedlloyd.

In determining this schedule the distance between each port of call was divided by the speed of the vessel, which, in this case, was 24.1 knots.

The number of containers to be loaded and discharged and with the hourly capacity of the cranes in operation, dictated the amount of scheduled time spent in port.

Normally, no allowance in the schedule is made for unexpected events such as bad weather, restricted visibility etc. However, the ship managers reported that the company would fully support the master in any action he took, in the interests of safety, which could result in the vessel being delayed.

1.14 SAFETY MANAGEMENT SYSTEM

P&O Nedlloyd Vespucci had been issued with a safety management certificate and had, in compliance with the ISM requirements, guidance and instructions to masters and crew in the form of fleet instructions **(Annex 3)**.

Relevant parts of her *Fleet Instruction, A03 Ship at Sea, Chapter A - Nautics,* state:

5.1.1 Performing the navigational watch

In order to keep an efficient watch and safe navigation of the ship the officer should ensure:

- *the correct execution of the planned passage during his watch, in particular maintaining safe speed at all times, constant verification of vessel's position and true course at least once per hour at sea, half hourly at coastal waters and as specified by the master for all areas,*
- *that proper operation of electronic equipment and data display is always regularly checked,*
- *to maintain a proper lookout at all times,*
- *observation of radar and echo sounder displays,*
- *that he takes early and positive action for avoiding collision and that he basically will not use VHF for collision avoidance purposes.*

Relevant parts of the *Master's Standing Orders* state:

Restricted visibility

- *is considered 4 miles or less,*
- *post a proper lookout and helmsman and, in congested waters, revert to hand steering immediately,*
- *operate two radars,*
- *sound fog signal.*

Close quarter situations

- *try to avoid close quarter situations by early and substantial course alterations and in open waters give all traffic plenty of room (nothing is gained by two ships with unmanned engine room on automatic pilot, with high speed, passing close to each other),*

- *through timely planning of actions and manoeuvres - safe CPA is considered 1 mile or more in open sea. In confined waters this distance may be reduced, however safest possible CPA should be obtained always.*

P&O Nedlloyd Vespucci did not have any further detailed instructions or guidance regarding what actually constitutes a safe speed in restricted visibility.

1.15 MANOEUVRING DATA - *P&O NEDLLOYD VESPUCCI*

In the normal loaded condition at full ahead sea speed, the vessel was able to turn 90º to starboard with an advance of 0.45 miles. She could also be stopped in 2.4 miles by going full astern. When proceeding at slow ahead, the vessel could be stopped in about 0.3 miles, again by going full astern.

1.16 LOCATING BEACON - *WAHKUNA*

The MAIB arranged for the locating beacon to be tested by a reputable contractor, which discovered that the unit had not functioned despite being in date, because the battery unit was badly corroded. The fault was within the battery and was most likely to have been caused by a bad weld or poor glass-to-metal seal on the cell.

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of this analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 GENERAL

Fortunately, there were no injuries as a result of this accident. However, there could quite easily have been five fatalities. By good fortune and the last minute evasive action of *Wahkuna*'s skipper which probably reduced the damage sustained, all five crew managed to survive by abandoning their yacht and boarding the liferaft.

Even then, in a busy shipping lane, and having no means of verbal communication, (there was every possibility) they could have been run-down by another vessel, especially in conditions of restricted visibility.

2.3 THE ACCIDENT

Given the position and time of collision, the identification of the container vessel's country of registry by the crew of *Wahkuna*, the radar information provided by CROSS Jobourg, the account of the master of *P&O Nedlloyd Vespucci*, and the blue paint on the vessel's starboard bow, the MAIB is certain that the vessel in collision with *Wahkuna* was *P&O Nedlloyd Vespucci*. It is considered that *Wahkuna* was the radar target, which the master first detected at a range of between 5 and 6 miles and estimated would pass about 8 cables ahead.

At that time, *Wahkuna* was on a compass course of about 012° (about 009° true) at a speed of about 7.5 knots, which was indicated by the ARPA on board *P&O Nedlloyd Vespucci*. The master's observation that the radar contact suddenly slowed when at a range of between 1.5 and 2 miles also correlates with the actions taken by the yacht's skipper.

After *Wahkuna* had started to reduce speed, however, the ARPA information used by the master could not have been accurate. For the vessels to collide, the CPA must have been zero, not 2 cables. Had he monitored the radar echo, he would have recognised that a collision was imminent. Subsequently, the master was unaware of the yacht's predicament, as he saw *Wahkuna* clearly painting a radar 1.5 to 2 miles astern. He had no way of knowing that the course and speed of the target displayed by ARPA as 075 degrees at 3 knots was probably due to inaccuracies of the ARPA, and later the very slow astern movement of the yacht to try and stay afloat, rather than her continuing on passage. His decision to continue was, therefore, understandable. *P&O Nedlloyd Vespucci*

was in position 50°11'10"N, 001°54'10" making good 27 knots through the water on a course of 257.6°. From this it is calculated that she passed within 1 cable of the position of the collision at about 1057.

An estimation of the tracks of *P&O Nedlloyd Vespucci* before the collision is shown at **Figure 7**. This has been constructed using information from CROSS Jobourg, *P&O Nedlloyd Vespucci*'s course recorder, and personal accounts of those on board both vessels. The information provided by CROSS Jobourg for *P&O Nedlloyd Vespucci* at 10:35:09, 10:45:09 and 10:55:09, showing that the vessel's heading was 254.1°, 261.7° and 257.6° respectively, correlates with the vessel's heading shown on her course recorder. The headings recorded during this period reflect the manoeuvring from 255° to 265° and to 258°.

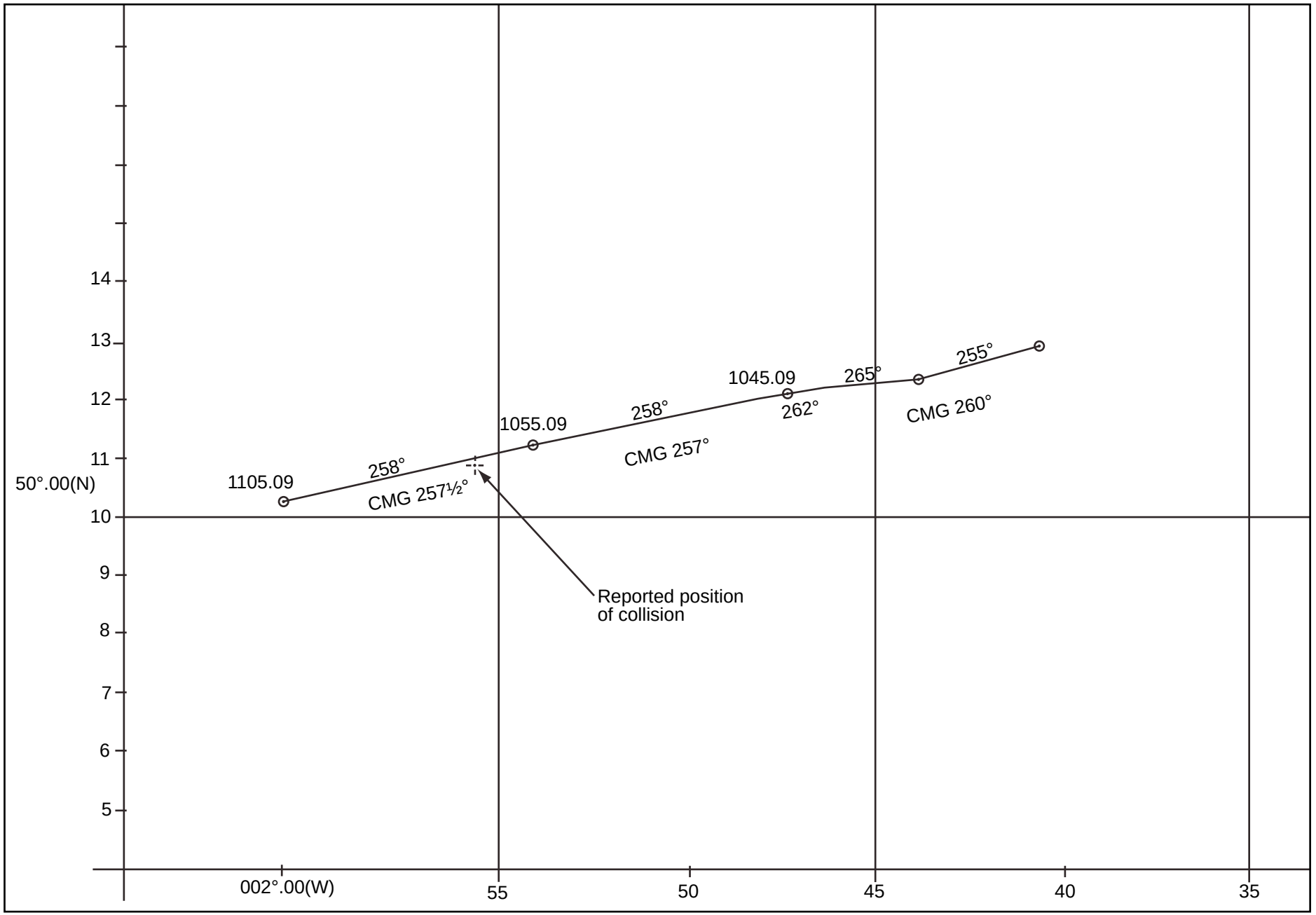
As it is known that the manoeuvre spanned 10:45:09, and that the course recorder shows that *P&O Nedlloyd Vespucci* was steady on a course of 258° for about 11 minutes after the alteration until changing to hand steering, the manoeuvre must have been completed by 1046 at the latest. This would have been at a distance of 4.95 miles from the position of the collision. The probability that *P&O Nedlloyd Vespucci* was altering from 265° to 258° at 10:45:09 is also supported by the fact that the course made good between 10:35:09 and 10:45:09 was 260°, compared to 257° between 10:45:09 and 10:55:09. This indicates that most of the manoeuvre was completed in the first period. However, as *P&O Nedlloyd Vespucci* was unlikely to have been steady on a course of 258° much before 1046, even allowing a time delay for the shore radar to process her changing course, it follows that hand steering was probably selected at a closer range to *Wahkuna* than recalled by her bridge team.

2.4 ACTION TAKEN

2.4.1 *P&O Nedlloyd Vespucci*

When the bridge team first detected *Wahkuna*, the master was content with the vessel crossing 8 cables ahead. He did not consider this to be a close quarters situation even though given both vessel's courses and speeds, the CPA would have been between 2 to 3 cables to starboard. Consequently, the master took no action.

After the yacht had reduced speed and the CPA by ARPA had changed to 2 cables to port, the master became so concerned by *Wahkuna*'s actions, which were unexpected, that he considered it necessary to change to manual steering and put the OOW on the helm. However, he was confused by the unexpected actions of the yacht to the extent that he was reluctant to take any manoeuvring action because of the uncertainty of what the yacht would do next.



Estimation of the track of *P&O Nedlloyd Vespucci*

Figure 7

This raises the issue of what constitutes a close quarters situation, and the action that should be taken.

A N Cockcroft and J N F Laeijer state: *The distance at which a close quarters situation first applies has not been defined in miles, and is not likely to be, as it will depend upon a number of factors. The 1972 Conference (IMO Revision of the Collision Regulations) considered the possibility of specifying the distance at which it would begin to apply but after lengthy discussions it was decided that this distance could not be quantified.*

On the other hand, the Seafarers' International Research Centre (SIRC) in a paper dealing with near miss encounters in the Dover Strait (Belcher P (2002) *"Overtaking in the Dover Strait, an analysis of near miss encounters"*) states: *from a review of literature on ships' domains (Fuji and Tanka, 1971, Goodwin, 1977, Coldwell, 1983, Zhao, et al., 1993) it has been found that the domain required for a ship in congested waters can be approximated to a circular space with a radius of 8 cables. It also states: it might be argued that a criterion of a minimum passing distance of 8 cables is too stringent a measure for such a busy area. However, a passing distance of 3 cables or less, is on anyone's measure, a very dangerous occurrence that could lead to a collision with only a very slight change in circumstances.*

In this case, where the vessel was transiting in thick fog at high speed, the master's acceptance of such a small passing distance was inappropriate. Given the manoeuvrability of his vessel, and the light traffic density, both a bold alteration to starboard within the 1.5 mile to 2 miles sea room available in accordance with Rules 2(a) and 19(d), or a reduction in speed in accordance with Rule 19(e) could have easily been made **(Annex 4)**. Either course of action would have prevented the collision, but neither was taken.

Fleet Instructions, which were on board *P&O Nedlloyd Vespucci* in accordance with ISM Code requirements, stated that close quarters situations should be avoided by early and substantial course alterations and that in open sea, plenty of room should be given to all traffic. In addition, they stated that a safe CPA was considered 1 mile or more in the open sea, but that the safest CPA should always be obtained. Although there was no specific guidance regarding CPAs in shipping lanes, the ship was not in confined waters and there were few other vessels in the vicinity, so there was no reason why the master could not have complied with his own standing orders and the Fleet Instructions.

Several factors probably contributed to the master's acceptance of such a small CPA and lack of action, including; over-confidence in the accuracy of ARPA, the short period of time available in which to assess and react to the situation, and fatigue. Although having rested in Antwerp, the master had been awake from 1600 on 27 May, and had been on the bridge for 14 hours at the time of the accident. Being on the bridge for such a long period would inevitably have been tiring, which might have reduced his alertness to the potential consequences of the situation.

2.4.2 *Wahkuna*

The skipper of *Wahkuna* was under the mistaken assumption that he was "the stand-on vessel". There is no such thing in the Collision Regulations as a stand-on vessel in restricted visibility. Section II of the Collision Regulations (Rules 11 - 18) apply to the "Conduct of Vessels in sight of one another". Section III (Rule 19) governs the "Conduct of Vessels in Restricted Visibility". Rule 19d states *"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 of abaft the beam."

Thus the onus in fog is for both vessels to take "avoiding action in ample time" to avoid a close quarters situation developing.

The skipper of *Wahkuna* had slowed down after estimating by eye on his radar display, that *P&O Nedlloyd Vespucci* was passing about 1.5 miles ahead. As the vessels eventually collided without *P&O Nedlloyd Vespucci* altering either course or speed, it is evident that had the yacht not reduced speed, she would have passed safely ahead of the container ship.

It is unlikely that *Wahkuna* completely stopped in the water after disengaging her engine due to her momentum, and the light wind acting upon her raised sail. The fact that the crew of the yacht saw the bow of the container ship off the port side also indicates that the yacht had lost steerage, and had substantially altered her heading towards the south-east.

The actions taken by the yacht were based on an inaccurate assessment of the situation by radar and served to confuse the bridge team on *P&O Nedlloyd Vespucci*, as well as putting the two vessels on a collision course. Had the skipper been able to make full use of his radar, a more accurate assessment would have been possible, and it would have been apparent that a substantial alteration of course to starboard in accordance with Rule 19(d) would have been more appropriate. This would not only have resulted in the vessels passing at a safe distance, it would also have shown clear intent and have been readily apparent to the bridge team on *P&O Nedlloyd Vespucci*.

2.5 USE OF RADAR AND ARPA

2.5.1 Accuracy

A crucial factor in *P&O Nedlloyd Vespucci*'s bridge team's assumption that they would pass clear of the yacht, was their over-confidence in the accuracy of the information provided by ARPA. Several factors reduce the accuracy of relative velocity or triangular calculations carried out by automatic radar plotting equipment. These include:

1. Where there is a large own ship vector produced by high speed where course and speed information is reliant on own ship sensors and equipment for course and speed information.

2. Where the speed of the radar target is small in relation to own ship speed.

3. Where the radar target or own ship is continually changing courses and speeds.

4. Where the speed information is ground-based rather than water-based in areas of strong tidal streams.

ARPA requires adequate time to produce accurate information suitable for assessing collision risk and assessing appropriate action to be taken; it also requires time to detect any alteration in course and speed. Consequently, with the container ship proceeding at 25 knots in manual steering, *Wahkuna* gradually slowing from 7.5 knots to almost zero and changing heading as she lost steerage, with GPS speed data being used rather than data from a speed log, and with the tidal stream of about 2 knots, there was considerable scope for inaccuracy in the information displayed on ARPA.

Given that the master and the OOW were content with a CPA of 2 cables, they were probably unaware of the accuracy parameters of their radars. With a required CPA accuracy of 7 cables or below in a crossing situation, and 5 cables or below in an end on situation, it is possible that small displayed ARPA CPAs could in fact be zero, as it was in this case. For this reason alone, a CPA as small as 2 cables should be treated with caution unless the CPA accuracy has been confirmed by cross-checking.

The radar information displayed on *P&O Nedlloyd Vespucci* was ground-based, the incorrect format for anti-collision avoidance. It should have been water-based, in accordance with IMO guidance. When radar is ground-stabilised, the output of data will relate to their ground track and, although accurate, can be highly misleading when assessing target aspect.

The MAIB has been informed by instructors of ship handling simulator courses that many masters and officers place an unwarranted degree of confidence on radar during simulations in confined waters or when approaching a port entrance. As a consequence, it is probable they are prepared to travel at greater speeds with radar in restricted visibility, than without it in clear weather conditions.

2.5.2 Radar lookout

1. *P&O Nedlloyd Vespucci*

The master of *P&O Nedlloyd Vespucci* could not have constantly monitored the radar bearing of the yacht when he first became aware of its speed reduction. Had he done so, it might have caused him to question the information on the target provided by ARPA. Also, by keeping his radar display on the 3-mile range scale, and not reducing the range scale as the yacht closed, he undoubtedly denied himself a clearer picture of the situation, which should have prompted him to take avoiding action. Again, it is possible that the master's performance in this respect was affected by fatigue.

The consequence of the potential inaccuracies in the information from ARPA already detailed, along with the master's failure to make full use of the radar's facilities to manually monitor the yacht as she closed, was that his decision to take no action was based on incomplete or scanty radar information.

2. *Wahkuna*

When *Wahkuna* was virtually stopped in the water, her skipper estimated that the radar contact of *P&O Nedlloyd Vespucci* would pass 1.5 miles ahead as a result of his action. This assessment, however, was based on only a visual interpretation of the radar display because none of the crew knew how to use the radar's automatic plotting facilities, and a manual plot was not undertaken. Consequently, the yacht skipper's actions were also based on scanty radar information, which contravened Rule 7(c) of the Collision Regulations.

After making the assessment that the container ship would pass ahead, it is apparent that a radar lookout was not maintained. Had it been, it would have been evident that the container ship was closing rapidly, and avoiding action could have been taken sooner.

2.5.3 Knowledge and training

It is imperative, whenever radar equipment is fitted on board any type of vessel, that watchkeepers are fully versed and trained in its use and capabilities. The fitting of radar and ARPA, without knowing its limitations or how to use it, can contribute to accidents. Had the master of *P&O Nedlloyd Vespucci* taken into account the potential inaccuracies of ARPA in this situation, it is possible he

might have treated such a small CPA with greater caution and taken avoiding action. Likewise, had *Wahkuna*'s skipper been able to use his (M)ARPA effectively, he might have realised that his action of reducing speed substantially increased the probability of collision.

The carriage of radar and ARPA equipment on vessels such as *P&O Nedlloyd Vespucci* is mandatory, and the training of officers in its use is part of certification, and ongoing training arranged by ship managers. Carriage of radar in pleasure vessels of this size, however, is not mandatory. Therefore, where such equipment is carried, it is considered that a similar initiative to that available to purchasers of jet skis, initiated by the British Marine Federation, would help in the training of yachtsmen and owners of small pleasure craft in its use.

2.6 BRIDGE RESOURCE MANAGEMENT

P&O Nedlloyd Vespucci's bridge team comprised the master, the second officer, and a rating. In the prevailing conditions of visibility, the positioning of the rating on the bridge wing was appropriate to maintain an aural and visual lookout. By not having a second rating available on the bridge to act as helmsman, however, in accordance with his standing orders, the master had no alternative but to use the second officer as helmsman after changing to manual steering. As a result, a valuable second pair of eyes which could have been used to enhance the radar lookout either at long range to allow the master to safely reduce his range scale, or at short range to provide a second opinion on the situation, was lost.

2.7 SAFE SPEED

A safe speed for *P&O Nedlloyd Vespucci* could be considered to be that speed which enables the vessel to stop within the visibility range, which, in this case, was 50 to 100 metres. As it would have taken 3 cables to stop the vessel even when at slow ahead, such a speed was impracticable and thus was clearly not an option if steerage was to be maintained. At 25 knots, however, the possibly tired master had less than 5 minutes to assess the situation and react to the yacht's unexpected action using potentially inaccurate data. Also, the vessel could only have been stopped after 2.4 miles, which was beyond the yacht's position at the time, and it would have been extremely difficult for the external lookout to hear other vessels' sound signals because of the induced wind over the deck.

Rule 6 of the Collision Regulations comprehensively lists criteria to be used to judge what is a safe speed. The Rule is central to assessments made to ensure that the speed of the vessel is such that the risk of collision is as low as is reasonably practicable.

Such an assessment requires not only knowledge of the Rule, but a practical awareness by the bridge team of the situation, its vessel, and the potential for the situation to change. For example, a bridge team must be aware of the need

for a timely realisation of a potential close quarters situation, the reaction time needed to take action in the prevailing circumstances, and the potential for small vessels and other floating objects not being detected by radar.

What is considered to be a speed that maintains risk of collision as low as reasonably practicable is open to debate because of different perception throughout the industry of what and how the criteria in Rule 6 are considered. However, education of bridge teams and management can improve knowledge and develop a culture to enable them to make a more balanced judgment of what speed is required in the prevailing circumstances.

Guidelines to supplement Rule 6, particularly for circumstances in which vessels are unable to proceed at a speed which allows them to be stopped within the prevailing visibility, would help in this education. The guidelines could show how to determine a safe speed and a close quarters situation in restricted visibility. Such guidelines could facilitate good practice. Bridge teams would be better placed to assess the factors to be used when determining safe speed in the conditions that prevail.

The application of guidelines fully supported by the owners and charterers, would help remove any suspicion that bridge teams are under commercial obligation to operate at a speed beyond that realised to ensure that a risk of collision is as low as is reasonably practicable.

2.8 COMMERCIAL PRESSURE

Commercial pressure might have influenced the master in his decision to proceed at 25 knots in such conditions. However, the owners of the vessel are quite adamant that this type of pressure is neither applied by them nor by the charterer.

The owners reported that, even though schedules are tight, especially in the liner trade, unexpected delays because of weather conditions are acceptable. The owners do not condone their vessels travelling at an unsafe speed, especially in areas of restricted visibility.

Although the owners do not apply this pressure, it may be possible that the master perceived a commercial pressure, perhaps borne out of a culture derived from expectations of previous owners, by whom he had been employed.

2.9 LOCATING BEACON

Although the locating beacon did not have a bearing on the collision, if the unit had not been corroded and had it functioned correctly, it might well have reduced the amount of time the crew had to spend in the liferaft, in fog, in a shipping lane.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES

The following are the safety issues identified by the investigation. They are not listed in any order of priority.

1. The acceptance of a 2 cable passing distance when transiting at high speed in thick fog was inappropriate and contrary to the ship manager's Fleet Instructions [2.4.1]

2. The factors contributing to the master's acceptance of this small passing distance probably included: over-confidence in the accuracy of ARPA, the short period of time available in which to assess and react to the situation, and fatigue. [2.4.1]

3. The master of *P&O Nedlloyd Vespucci*'s alertness to the potential consequences of the situation might have been reduced after spending 14 hours on the bridge overnight. [2.4.1]

4. The action taken by the skipper of *Wahkuna*, which put the vessels on a collision course, was not expected by the master of *P&O Nedlloyd Vespucci* and confused him. [2.4.1 and 2.4.2]

5. There was considerable scope for inaccuracy in the information displayed by ARPA. [2.5.1]

6. The radar information on *P&O Nedlloyd Vespucci* was ground-stabilised, which can be misleading when assessing target aspect. [2.5.1]

7. Neither the master of *P&O Nedlloyd Vespucci* nor the skipper of *Wahkuna* kept an appropriate radar lookout as the vessels approached each other, and both made decisions based on scanty radar information. [2.5.2]

8. It is imperative, whenever radar equipment is fitted on board any type of vessel, watchkeepers are fully versed and trained in its use, capabilities, and limitations. [2.5.3]

9. The lack of a helmsman meant that the second officer had to undertake this duty, rather than enhancing the radar lookout and assisting the master in his assessment of the situation. [2.6]

10. At 25 knots, the master had less than 5 minutes to assess the situation and react to the yacht's unexpected action using potentially inaccurate data, and could only have stopped after 2.4 miles, which was beyond the yacht's position at the time. [2.7]

11. Had the locating beacon not been corroded and had functioned correctly, it might have reduced the time the yacht's crew had to spend in the liferaft. [2.9]

SECTION 4 - ACTION TAKEN

1. Since the collision, E R Schiffahrt has issued an ISM memorandum to all its vessels regarding sailing in restricted visibility, with the emphasis on proceeding at safe speed at all times.

   This action will be audited on a regular basis by the company.

2. A Chief Inspector's letter has been sent to E R Schiffahrt, the owners and managers of *P&O Nedlloyd Vespucci*, recommending them to:

   a. Advocate the use of water-based data input for displayed radar information on its vessels in accordance with the IMO recommendation.

   b. Issue advice to its masters on the potential inaccuracies of ARPA.

   c. Referring to IMO's "Guidelines on Fatigue", ISBN 92-801-5128, issue guidelines to assist masters to better understand and manage fatigue.

3. The owner of *Wahkuna*, has been given guidance on the correct interpretation of Rule 19 of the Collision Regulations, and has been advised of the importance of radar training.

4. The Chief Inspector has requested that the Royal Yachting Association consider:

   Ways how best to remind yachtsmen the importance of Rule 19 of the Collision Regulations, with particular emphasis on the fact that this Rule requires avoiding action by both parties.

5. Following the collision between *Diamant* and *Northern Merchant* in restricted visibility in the English Channel, one of the recommendations made by the MAIB to the MCA on 2 April 2003 was to:

   Issue guidance on how operations should determine safe speed and a close quarters situation in restricted visibility by:

   - Listing the factors to take into account, in addition to those prescribed in Rule 6 of the Collision Regulations; and

   - Defining the extent to which reliance can be placed on radar for detection of small vessels and other floating objects.

6. A Chief Inspector's letter has been sent to the manufacturer of the locating beacon recommending:

   a. They should review design and quality control to ensure the battery failing in the locator beacon is not repeated.

   b. They should take appropriate action to ensure all existing beacons with similar fittings are checked and rectified/modified if required.

SECTION 5 - RECOMMENDATIONS

The Maritime and Coastguard Agency is recommended to:

1. Implement as soon as possible the recommendation regarding the provision of guidance in determining safe speed and close quarters situations, made by the MAIB following the collision between *Diamant* and *Northern Merchant* in restricted visibility in January 2002.

The Royal Yachting Association is recommended to:

2. Encourage yachtsmen to undergo training in the use of radar, especially ARPA radar, who have, or intend to have, this equipment fitted on their vessels.

The British Marine Federation is recommended to:

3. Advise members who supply radars to yachtsmen to encourage and, where possible, fund training in their use.

Marine Accident Investigation Branch
December 2003

ANNEX 1

CROSS Jobourg Radar Surveillance

DERNIER CONTACT POUR LE NAVIRE

Numéro de pas: 355252 Date: 28/05/2003 Heure: 11:54

INDICATIF: ELWD5 NOM: YOKOHAMA SENATOR

NUMERO OMI: 9147095 Numéro MMSI: 636 090 292

TYPE: UCC JAUGE: 53324 PAYS: LBR

Numéro de plot: 087 Voie: DESC ETA Arrivée:

Provenance: Felixstowe Vitesse: 25 G T E ☐

Destination: Singapore Tirant d'eau: 12.50 En remorque ☐

Observations: 25 POB
36877,9mt cts

Azimut distant: 357 Distance: 28,46

IMO CLASS: 2 3 4 5 6 8 9 UN Class: Dangereux ☑ Not Gas Free ☐

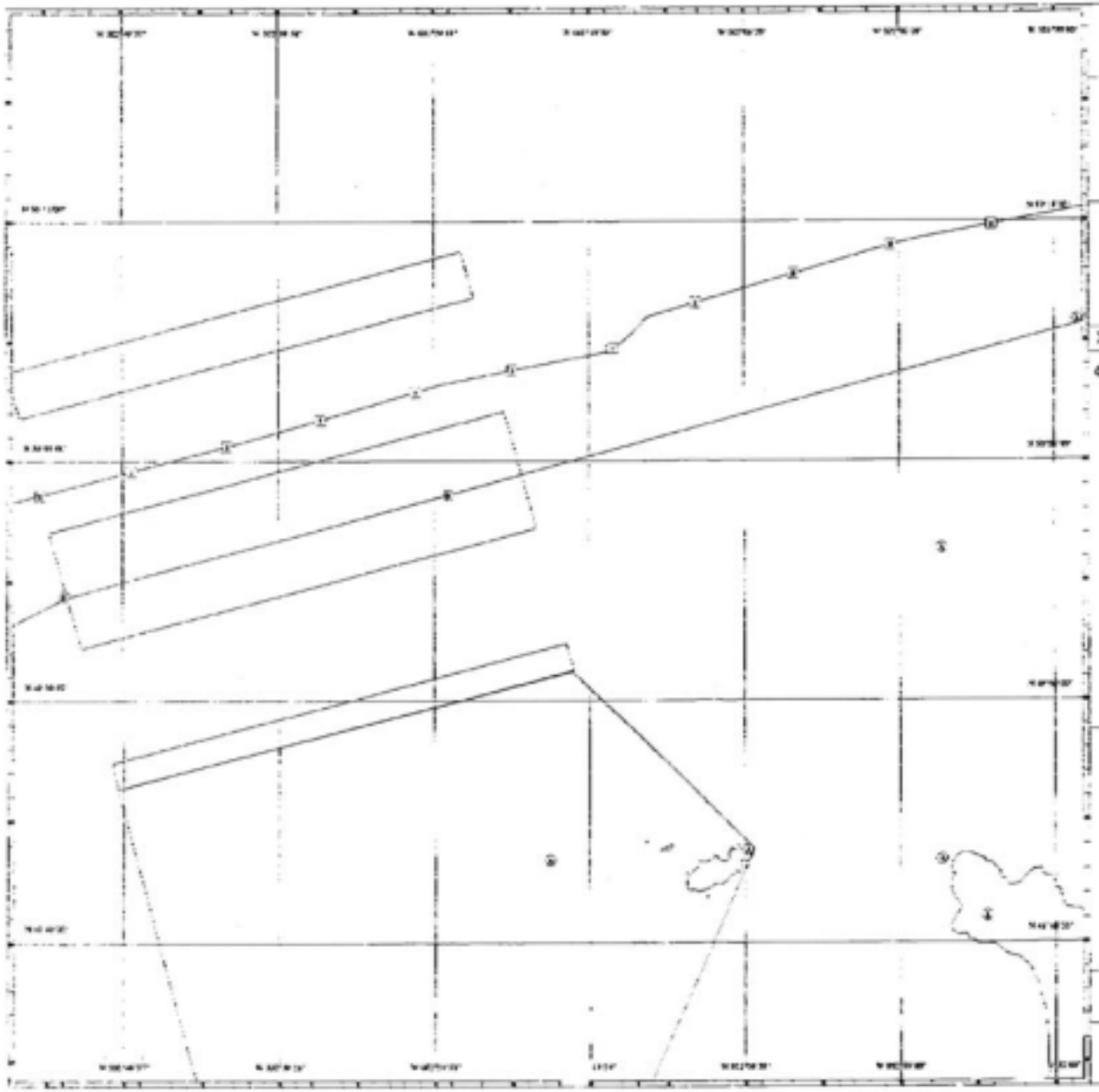
Type de cargaison: imo Quantité: 726704,5kg

Retour

Annuler le contact

Trajectoire de la piste (410) Nom (YOKOHAMA SENATOR)
Debut : 28/05/2003 10:15:00 GMT
Fin : 28/05/2003 13:45:00 GMT
Pas entre les symboles : 600 s
Système géodésique : ED50
Unite de vitesse : Nd
Nombre de points (Total/Plottés/Intermédiaires) : (1073/19/1054)

N°	Latitude	Longitude	Cap	Vit.	Date
De	N 50°16'35"	W 001°18'34"	252.5	22.7	28/05/2003 10:46:09
3	N 50°14'59"	W 001°23'41"	232.1	24.1	28/05/2003 10:55:09
4	N 50°12'39"	W 001°28'38"	232.7	23.9	28/05/2003 11:05:09
5	N 50°12'04"	W 001°34'49"	273.2	24.7	28/05/2003 11:15:09
6	N 50°11'23"	W 001°41'06"	259.7	25.0	28/05/2003 11:25:09
7	N 50°10'37"	W 001°47'39"	259.5	25.5	28/05/2003 11:35:09
8	N 50°09'51"	W 001°54'01"	259.4	25.6	28/05/2003 11:45:09
9	N 50°09'00"	W 002°00'30"	257.7	25.3	28/05/2003 11:55:09
B	N 50°07'49"	W 002°06'46"	253.9	25.4	28/05/2003 12:05:09
1	N 50°06'37"	W 002°13'09"	253.7	25.7	28/05/2003 12:15:09
2	N 50°04'42"	W 002°18'30"	231.0	24.2	28/05/2003 12:25:09
3	N 50°03'47"	W 002°24'57"	258.9	25.2	28/05/2003 12:35:09
4	N 50°02'53"	W 002°31'10"	256.0	25.0	28/05/2003 12:45:09
5	N 50°01'42"	W 002°37'20"	254.3	24.6	28/05/2003 12:55:09
6	N 50°00'37"	W 002°43'18"	255.0	24.4	28/05/2003 13:05:09
7	N 49°59'35"	W 002°49'25"	256.0	24.2	28/05/2003 13:15:09
8	N 49°58'37"	W 002°55'19"	256.4	23.9	28/05/2003 13:25:09
9	N 49°57'33"	W 003°01'10"	251.7	23.2	28/05/2003 13:35:09
Fi	N 49°55'46"	W 003°06'17"	243.0	23.7	28/05/2003 13:44:49



CROSS Jobourg

Echelle 1:438632
Mercator ED50

0 20 km

Deb : 28/05/2003 10:15:00 GMT
Fin : 28/05/2003 13:45:00 GMT
Pas 600 s

N°	Nom	Deb GMT	Fin GMT
410	YOKOHAMA SE	28/05/2003 10:46:09	28/05/2003 13:44:49

Commentaire

28/05/2003 18:15:56 GMT

SOFRELOG

DERNIER CONTACT POUR LE NAVIRE

Numéro de pas: 355249 Date: 28/05/2003 Heure: 11:07

INDICATIF: ELZX7 NOM: P&O NEDLLOYD VESPUCCI

NUMERO OMI: 9214202 Numéro MMSI: 636 090 400

TYPE: UCC JAUGE: 33235 PAYS: LBR

Numéro de pist: 084 Voie: DESC ETA Arrivée:

Provenance: Antwerp Vitesse: 27 G T E

Destination: Singapore Tirant d'eau: 12.80 En remorque

Observations: 25 POB
43628 mt

Azimut distant: 353 Distance: 29

IMO CLASS: 2 3 4 5 6 8 9 UN Class: Dangereux: ✓ Not Gas Free:

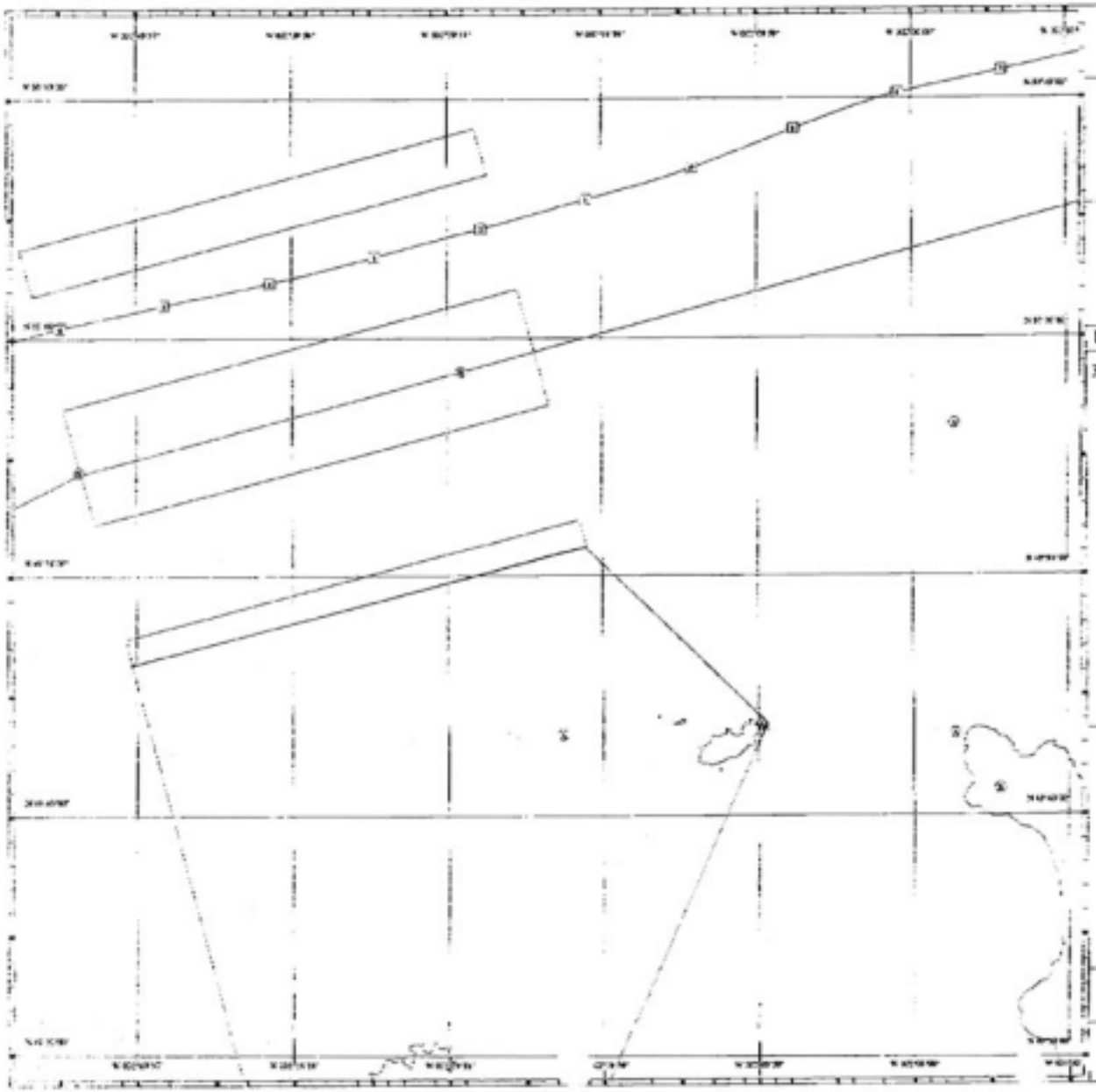
Type de cargaison: CONTAINERS Quantité: 1691

Retour

Annuler le contact

Trajectoire de la piste (351) Nom (P&O NEDDLOYD VESPUCCI)
Debut : 27/05/2003 10:15:00 GMT
Fin : 28/05/2003 12:45:00 GMT
Pas entre les symboles : 600 s
Système géodésique : ED50
Unite de vitesse : Nd
Nombre de points (Total/Plottés/Intermédiaires) : (1016/18/998)

N°	Latitude	Longitude	Cap	Vit.	Date
De	N 50°17'12"	W 001°14'37"	256.6	26.3	28/05/2003 09:55:39
2	N 50°16'14"	W 001°20'54"	256.6	26.0	28/05/2003 10:05:09
3	N 50°15'20"	W 001°27'32"	257.5	26.1	28/05/2003 10:15:09
4	N 50°14'10"	W 001°34'01"	253.9	26.2	28/05/2003 10:25:09
5	N 50°12'56"	W 001°40'39"	254.1	27.1	28/05/2003 10:35:09
6	N 50°12'09"	W 001°47'22"	261.7	26.6	28/05/2003 10:45:09
7	N 50°11'10"	W 001°54'10"	257.6	27.0	28/05/2003 10:55:09
8	N 50°10'13"	W 002°00'54"	257.6	26.9	28/05/2003 11:05:09
9	N 50°08'43"	W 002°07'37"	250.1	27.3	28/05/2003 11:15:09
P	N 50°07'06"	W 002°14'10"	249.6	27.6	28/05/2003 11:25:09
1	N 50°05'48"	W 002°21'00"	254.2	27.6	28/05/2003 11:35:09
2	N 50°04'35"	W 002°27'49"	255.1	27.4	28/05/2003 11:45:09
3	N 50°03'24"	W 002°34'42"	255.4	27.4	28/05/2003 11:55:09
4	N 50°02'19"	W 002°41'24"	257.0	27.0	28/05/2003 12:05:09
5	N 50°01'24"	W 002°48'14"	258.8	26.9	28/05/2003 12:15:09
6	N 50°00'26"	W 002°54'53"	258.0	26.6	28/05/2003 12:25:09
7	N 49°58'55"	W 003°01'15"	242.0	25.9	28/05/2003 12:35:09
Fi	N 49°56'38"	W 003°06'48"	238.5	26.3	28/05/2003 12:44:51



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Commentaire

28/05/2003 18:04:57 GMT

SOFRELOG

ANNEX 2

Marine Guidance Note MGN 202 (M&F)

Maritime and Coastguard Agency

MARINE GUIDANCE NOTE

MGN 202 (M+F)

Navigation in Fog

Note to Shipowners, Masters, Skippers, Officers and Pilots

This note supersedes Marine Guidance Notice 46

Summary

Key Points

- Reliance on radar and VHF can lead to accidents, as over dependence on navigational aids is no substitute for good watchkeeping practices and the exercise of proper caution.

1. The Maritime and Coastguard Agency (MCA) is concerned that a number of casualties to ships have resulted from serious disregard for the basic principals of good seamanship and prudent navigation in bad visibility. Sensible use of radar and other aids to navigation greatly assists the conduct of ships in fog, but these aids have not reduced the need to comply fully with the Collision Regulations: to proceed at a safe speed, pay especial attention to good watch-keeping, and navigate with proper caution.

2. The following brief outline of three casualties shows how lack of sensible caution, combined with over-reliance on radar (and in one case VHF) leads to accidents.

3. A medium-sized cargo ship left port intending to proceed to sea, in fog so dense that the forecastle could not be seen from the bridge, a distance of 100 metres. To reach the sea it was necessary to navigate a river though a channel with depths at low water of about 1.8 metres; the vessel's draught was 8 metres and she sailed on a falling tide. The channel is in places narrow and several bends have to be negotiated. The tide runs at up to 4 knots, falls at a rate of as much as 0.5 metres in 10 minutes, and in places sets across the channel. Great care is therefore necessary at all times, and to attempt the passage on a falling tide in dense fog was very foolhardy, even with the aid of radar. Not surprisingly the ship stranded.

4. A large container ship was in transit through the Dover Strait Traffic Separation Scheme, and despite very thick fog she was steaming at about 18 knots. The bridge was manned by the Master, Officer of the Watch and a look-out. Both radar's (one of which was an ARPA) were being used, but although they were found to be in good working order, when inspected after the casualty it is apparent that not all possible echoes were being displayed, perhaps due to the masking effect of clutter: there was a force 5 breeze and a considerable sea running. When radar clutter is experienced even a careful search by both automatic and manual clutter controls may not reveal the presence of small craft, and this fact should have been recognised by those on watch. Nevertheless, and despite a close-quarter encounter with a fishing vessel in which the ship had to take last minute avoiding action to avert collision, she continued at 18 knots and, later, collided with a trawler which was not seen on either radar. The trawler was stopped and hauling her nets at the time; she was severely damaged though she was able to make port. As well as demonstrating the folly of high speed in fog, this accident emphasises the need for

fisherman while working, to maintain prudent navigation and watchkeeping.

5. In the third case two vessels, one British and one foreign, were approaching one another in fog, and the latter used VHF radio to call for a "red-to-red" passing. Unfortunately the command of English of the Officer on watch in the foreign ship was limited, for what he actually intended was to pass starboard to starboard. The call was acknowledged by the British ship, but neither vessel made use of phrases in the Standard Vocabulary or paid regard to the danger in the use of VHF in collision avoidance. (See MGN 167 (M+F) Dangers in the use of VHF Radio in Collision Avoidance). Despite this, collision might still have been avoided had the British ship made a full assessment of the situation with the help of her radar and slowed down, especially since the other ship had reduced her speed to 'dead slow' but she did neither and collision followed. Both ships were seriously damaged.

6. None of the casualties described led to loss of life, but clearly this was only due to good fortune. In all cases those responsible for the ship's navigation sacrificed seamen for expediency. They failed to recognise the limitations of aids to navigation; or to follow the requirements of the Collision Regulations and the advice of Marine Notices. It is worth stressing that the ships involved were all well-equipped vessels in the charge of men with sound qualifications; it was not skill or experience that was lacking, but the proper seaman like approach to the situation. Whatever the pressure on Masters to make a quick passage or to meet the wishes of owners, operators, charters or port operators, it does not justify ships and those on board them being put unnecessarily at risk. The MCA is concerned that proper standards must be maintained, and will take appropriate action which may lead to the loss of their certificates, against officers who in future jeopardise their ships, or the lives and property of others.

7. The MCA also wishes to stress the responsibilities of Owners. It has long been established, and Section 100 of the Merchant Shipping Act 1995 and the ISM Code now expressly provide, that it is the duty of the Company to take all responsible steps to secure that the ship is operated in a safe manner. The Company must have established and implemented an effective safety management system which includes procedures to ensure safe operation of ships, as well as reporting accidents and non-conformities. In the well-known case of THE LADY GWENDOLEN, the Court of Appeal said that "excessive speed in fog is a grave breach of duty, and ship owners should use their influence to prevent it". Because of their failure to do so, it was held in that case that the owners could not limit their liability.

   Furthermore under the Merchant Shipping (Distress Signals and Prevention of Collisions) Regulations 1996, where any of the Regulations is contravened, the owner, the operator, the master and any person for the time being responsible for the conduct of the vessel shall each be guilty of an offence.

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ANNEX 3

Fleet instructions

1 Purpose and scope of this document

This instruction ensures an adequate sea watch and a safe ship operation, while on sea.

2 Validity of this document

This instruction is valid from 01.05.2000 for all vessels under the management of the Company.

This procedure does not release from the obligation to comply with national and / or international regulations.

3 Special terms and definitions

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4 Responsibilities for process

The Officer of the watch is responsible at all times for the safe navigation of the ship and for complying with the COLREGS.

He has to comply with shipboard operational procedures as well as Master's written standing orders to ensure a safe manning level on the bridge at all times for the prevailing circumstances and conditions.

5 Description of process

5.1 Sea watch

5.1.1 Performing the navigational watch

The primary duties of the Officer of the watch (OOW) are watchkeeping, navigation and GMDSS radio watchkeeping complying all times with the COLREGS and STCW95.

The Officer of the watch is not allowed to leave the bridge until properly relieved.

In order to keep an efficient watch and safe navigation of the ship the Officer should ensure:

- the correct execution of the planned passage during his watch, in particular maintaining safe speed at all times, constant verification of vessel's position and true course at least once per hour at sea, half hourly at coastal waters and as specified by the Master for all areas,

- that proper operation of electronic equipment and data display is always regularly checked,
- to maintain a proper look-out at all times,
- that lights, shapes and signals comply with COLREGS,
- close observations of the movements, bearing and distances of approaching vessels,
- identification of ships and shore lights,
- close monitoring that the course is being steered accurately and that wheel orders are correctly executed,
- observation of radar and echo sounder displays,
- observation of changes in the weather, especially the visibility,
- that he takes early and positive action for avoiding collision and that he basically will **not** use VHF for collision avoidance purposes,
- to maintain a proper and formal record of navigational activities and incidents in the appropriate log books,
- the compliance with radio watchkeeping requirements of international and national regulations and rules.

In case of bad weather course and speed have to be adjusted accordingly to avoid any damage to ship and cargo.

The Officer of the watch should be familiar with the control of the engine, should know the time to achieve an emergency and a routine stop in both "open sea" and manoeuvring condition. He should not hesitate to use the engine to change speed if required in order not to jeopardize the vessel. If possible timely notice of changes to engine speed has to be given to the Engineer on duty.

The Officer of the watch should be aware that in areas where navigation demands special caution he has to use more than one steering gear power unit if possible.

Especially during night time fire and safety rounds should be made regularly (e.g. after the watch).

5.1.2 Changing over the watch

The Officer of the watch is not allowed to hand over the watch if there is any reason to believe that the relieving officer is unfit to, or is temporarily unable to, carry out his duties, e.g. due to illness, the effect of alcohol, drugs or fatigue. In this case the Officer of the watch has to call the Master.

The relieving Officer of the watch should at least ensure

- that members of his watch are fully capable of performing their duties properly,
- not to take over the watch until his eyes are fully adjusted to the light conditions,
- that he was given a full overview of the present situation regarding traffic and other important matters regarding his duty watch,
- that he is satisfied as to the ship's position and confirms its intended track, course and speed,
- that he notes any expected dangers to navigation during his watch,
- that a manoeuvre or other action to avoid a hazard is completed by the Officer of the watch before taking over.

5.1.3 Sole look-out

A sole look-out is allowed only during day light according to the STCW Code.

The Master, before allowing, has to ensure that it is safe to operate with a sole look-out and therefore carefully has assessed the situation, taking into account at least following relevant factors:

- state of weather,
- visibility,
- traffic density,
- proximity of dangers to navigation,
- the attention necessary when navigating in or near traffic separation schemes,
- assistance is immediately available to be summond to the bridge when any change in the situation so requires.

Further the Master has to ensure that

- essential navigational equipment is fully operational,
- communication systems and alarms are fully operational,
- the Officer of the watch is in all respect fit for duty, in particular that he has had sufficient rest prior to commencing watch and he has enough experience,

- the workload is well within the Officer of the watch's capacity to maintain a proper look-out and remain in full control of the prevailing circumstances,
- the Officer of the watch fully knows and understands Master's standing orders,
- back-up assistance is clearly designated and immediately available to be summoned (e.g. by walkie-talkie) to the bridge if required,
- the Officer of the watch knows who is the back-up assistance and when and how to call them,
- the circumstances for calling back-up assistance are known by the Officer,
- the Officer of the watch is fully aware that it is better to call for support instead of running the risk of involving the vessel into a dangerous situation.

The sole look-out watchkeeping is at least to interrupt in case of

- reduced visibility,
- navigating in a traffic separation zone, through channels and shallow waters,
- essential equipment failure or unreliable function,
- fatigue, sickness, injury or uncertainty of the Officer of the watch,
- coastal navigation,
- navigating with a pilot,
- emergency situations,
- any other situations stipulated by the Master.

5.1.4 Use of radar

Basically a radar should be kept running and fully operational at all times. Regular checks of e.g. heading marker alignment, speed and course have to be carried out.

When using radar for bearing, targets should be:

- safe and easy to identify,
- radar conspicuous,
- located outside the clutter field,
- limited to a number sufficient for safe navigation.

Over reliance or over confidence in ARPA information must not tempt the Officer of the watch to allow a closer CPA than he would allow if he did not have ARPA.

5.2 Log books

A correct record of the movements and activities of the vessel should be kept in the appropriate log book during the watch. Instructions for the completion of log books should be strictly observed as per respective national regulations and rules.

Following log-books are to be kept on the bridge:

- Ship's Log Book,
- Bell Book (including information between bridge and engine as applicable),
- Compass Deviation Log,
- Bridge Order Book,
- Direction Finder Log, if direction finder is available,
- Radar Log Book.

5.3 Periodical checks and tests of navigational equipment

All navigational and radio equipment has to be checked periodically to ensure satisfactory and safe operation (see **Part A section 3.2.5 and 3.5.4 of „Bridge Procedures Guide"**). Beside the tests prior departure and prior arrival checks should be carried out after long ocean passages and before entering restricted coastal waters. The testing and condition have to be entered into the respective log book.

5.3.1 Daily Tests and Checks

Daily tests and checks at least should include following:

- bridge and engine room telegraph, including revolution indicator,
- bridge telephones,
- bridge watch MF radio telephone receiver,
- clocks and chronometer,
- general emergency alarm signal,
- radio room auto alarm,
- ship's whistle (except where or when not appropriate),
- steering gear changeover procedure,

- gyro compass and repeaters,
- magnetic compass,
- signalling equipment.

5.3.2 Checks during the sea watch

Following tests basically have to be carried out during a sea watch:

- the correct execution of heading by either helmsman or automatic pilot,
- variation and deviation of the magnetic compass and errors of the gyro compass to be verified at least once a watch and if possible also after any major alteration of course,
- the standard magnetic and gyro compasses are to be compared frequently and repeaters to synchronize,
- the proper functioning of navigation and signal lights and other navigational equipment which is essential for the safe navigation of the vessel.

5.3.3 Meteorological duties

The Officer of the watch should carry out meteorological observations, to enter those into the log book and, on Master's discretion, to sent data to a meteorological institute.

He has to observe the weather and meteorological developments to be able to react in time to changes of sea condition and wind.

5.4 Calling the Master

The Officer of the watch should inform the Master immediately if there are unsure situations or other important questions or decisions regarding the navigation of the ship and, in accordance with the standing orders (in particular if restricted visibility is encountered or expected, if traffic conditions or the movements of other ships are causing concern, emergency situations, if the ship meets any hazards to navigation, such as ice or a derelict).

5.4.1 Dense traffic

Before entering areas with dense traffic the Master should basically be informed for deciding if the composition of the navigational watch is still appropriate or if the Master will stay on the bridge, too.

6 Notes and remarks

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Checked by: U. Groos 10.04.2000 Date:	Instructed by: K. Westphal 10.04.2000 Date:

7 Documentation of process for evidence

Ship's log book
Watch order book, bridge and engine

8 Distribution of this document

All vessels

9 Related or attached documents

ICS Bridge Procedure Guide
Fleet-Instruction "A01 Nautical Ship Operation – General"
Fleet-Instruction "A04 Preparing for Arrival - Deck"
STCW
SOLAS
COLREGS

ANNEX 4

Extract from International Regulations for Preventing Collisions at Sea

Rule 2

The International Regulations for Preventing Collisions at Sea, Rule 2, *Responsibility*, states:

(a) Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

(b) In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessel involved, which may make a departure from these Rules to avoid immediate danger.

Rule 5

Rule 5, *Look-out* states:

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 of the risk of collision.

Rule 6

Rule 6, *Safe Speed* states:

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

In determining a safe speed the following factors shall be among those taken into account:

(a) By all vessels:

(i) the state of the visibility;

(ii) the traffic density;

(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 of her own lights;

(v) the state of the wind, sea and current, and the proximity of navigational hazards;

(vi) the draught in relation to the 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 radar 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 aids used to determine the range of vessels or other objects in the vicinity.

Rule 7

Rule 7, *Risk of collision* states:

(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.

(b) Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

(c) Assumptions shall not be made on the basis of scanty information, especially scanty radar information.

(d) In determining if risk of collision exists the following considerations shall be among those taken into account:

(i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change;

(ii) such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large vessel or a tow or when approaching a vessel at close range.

Rule 8

Rule 8, *Action to Avoid Collision* states:

(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 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, an 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.

Rule 19

Rule 19, *Conduct of Vessels in Restricted Visibility*, states:

(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 the Rules of section 1 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-quarters situation with another vessel forward of her beam, shall reduce her 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 danger of collision is over.