Report on the investigation of the

grounding of the passenger ro-ro ferry

Sardinia Vera

off Newhaven on

1 February 2002

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Extract from

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(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.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

BA	British Admiralty
DWT	Deadweight tonnage
ETA	Estimated time of arrival
GPS	Global positioning system
kW	kiloWatt
m	metre
MCA	Maritime and Coastguard Agency
PEC	Pilotage exemption certificate
RINA	Registro Italiano Navale
ro-ro	roll-on roll-off
SOLAS	Safety of Life at Sea convention
UTC	Universal Co-ordinated Time
VDR	Voyage data recorder
VHF	Very high frequency radio

SYNOPSIS

At 0851 UTC on 1 February 2002, the Italian-registered passenger ro-ro ferry *Sardinia Vera* ran aground at the entrance to Newhaven approach channel. She was refloated at 1048 on the rising tide. There was minor damage to the vessel, no pollution and no injuries to persons.

There was a 2.5 metre south-westerly swell running, with a wind speed of around 25 knots (force 6 on the Beaufort scale) gusting to 32 knots. It was just over 1 hour after low water.

A pilot was on board because the first officer was undergoing training for a pilotage exemption certificate. The master already held such a certificate for Newhaven.

The vessel was approaching the channel from the south-west. As the breakwater came abeam, the first officer ordered hard to port. However, the vessel failed to turn as expected and subsequently grounded on or just inside the eastern side of the approach channel.

The prevailing weather subsequently forced her into shallower water. A tug attempted to secure a line, but failed. Also attempts were made to refloat the vessel using her engines. She finally refloated with the use of her anchors and engines, and then entered the harbour and berthed without further incident.

The MAIB was able to gain information about the grounding from CCTV data recorded in the port control office. However, no voyage data recorder or any other recording device was fitted to the ferry. This lack of recorded information hampered the investigation.

The cause of the grounding was the vessel failing to turn sufficiently to port at the entrance to the approach channel. The precise reasons for this have not been determined. However, a number of contributing factors have been identified.

Recommendations have been addressed to Newhaven port.

Figures 1 and 2 - *Sardinia Vera*

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *SARDINIA VERA* AND ACCIDENT

Vessel details

Registered owner	:	Medcharter
Manager	:	Medcharter
Port of registry	:	Olbia
Flag	:	Italy
Type	:	Passenger ro-ro
Built	:	Bremerhaven, Germany in 1975
Classification society	:	RINA
Length overall	:	120.8m
Gross tonnage	:	12107
Engine power and type	:	Twin screw 5192kW MaK medium speed diesel engines
Service speed	:	18.5 knots
Other relevant info	:	Single bow thruster, twin rudders & twin controllable pitch propellers

Accident details

Time and date	:	0851 UTC on 1 February 2002
Location of incident	:	50°46.55'N 000°03.72'E (about 2 cables south of Newhaven east pier)
Persons on board	:	71 (53 crew, 1 pilot & 17 passengers)
Injuries/fatalities	:	None
Damage	:	Minor hull damage

1.2 BACKGROUND

Sardinia Vera **(see Figures 1 and 2)** operates on the Newhaven to Dieppe service throughout the year. She is owned by an Italian company, crewed by Italians and chartered by the French ferry operator Transmanche. At the time of the incident she had been operating out of Newhaven for almost a year. She makes two round trips each day with a crossing time of about 4 hours. She is a high-sided passenger ro-ro vessel and was built in 1975. She has spent the majority of her life engaged in ferry services in the Mediterranean.

On 29 November 2001, during an inspection by the Maritime and Coastguard Agency (MCA), *Sardinia Vera* was found to have several deficiencies. She was prevented from operating as a passenger vessel and was restricted to a freight only service. On 17 December 2001 her prevention order was lifted following a satisfactory inspection.

1.3 NARRATIVE (ALL COURSES TRUE, ALL TIMES UTC)

The night before the grounding *Sardinia Vera* had entered Newhaven harbour, without incident, in almost identical wind speed, sea and tidal conditions, using the same approach as the following morning. The same pilot was on board.

Sardinia Vera departed the berth at Dieppe at 0415 on 1 February 2002, and the pilot disembarked at 0423. There were 17 passengers, 8 articulated trucks, 1 high-sided vehicle and 1 car on board. Her draught was 5.30 metres even keel. The master and first officer slept from 0430 until 0800 when the duty officer called them approximately 30 minutes before Newhaven pilot station.

At 0737, the vessel gave Newhaven port control an ETA at the pilot station of 0837, and she requested a pilot on arrival.

At 0834, the vessel informed port control that she was about 10 minutes from the pilot station.

At 0840, the pilot boarded *Sardinia Vera* about 1 mile south-west of the breakwater in the normal boarding position. He made his way to the bridge where he joined the master, both first officers, the second officer, a cadet and a helmsman. The vessel was in hand steering.

The master had the conduct of the navigation. However, he was allowing the first officer to make the helm orders under his close supervision. The pilot was in a supervisory role for PEC training. All three were standing together by the centre compass repeater throughout the approach. The helm orders were given in Italian; the pilot had a basic understanding of Italian nautical orders.

The vessel approached the breakwater from the south-west steering a course of 040°at a speed over the ground of about 9 knots. Both combinator settings were on 4, the maximum setting being 7. The radar variable range marker was placed on 0.05 mile, and a parallel index of 040° at this range off the breakwater was established **(see Figure 3)**.

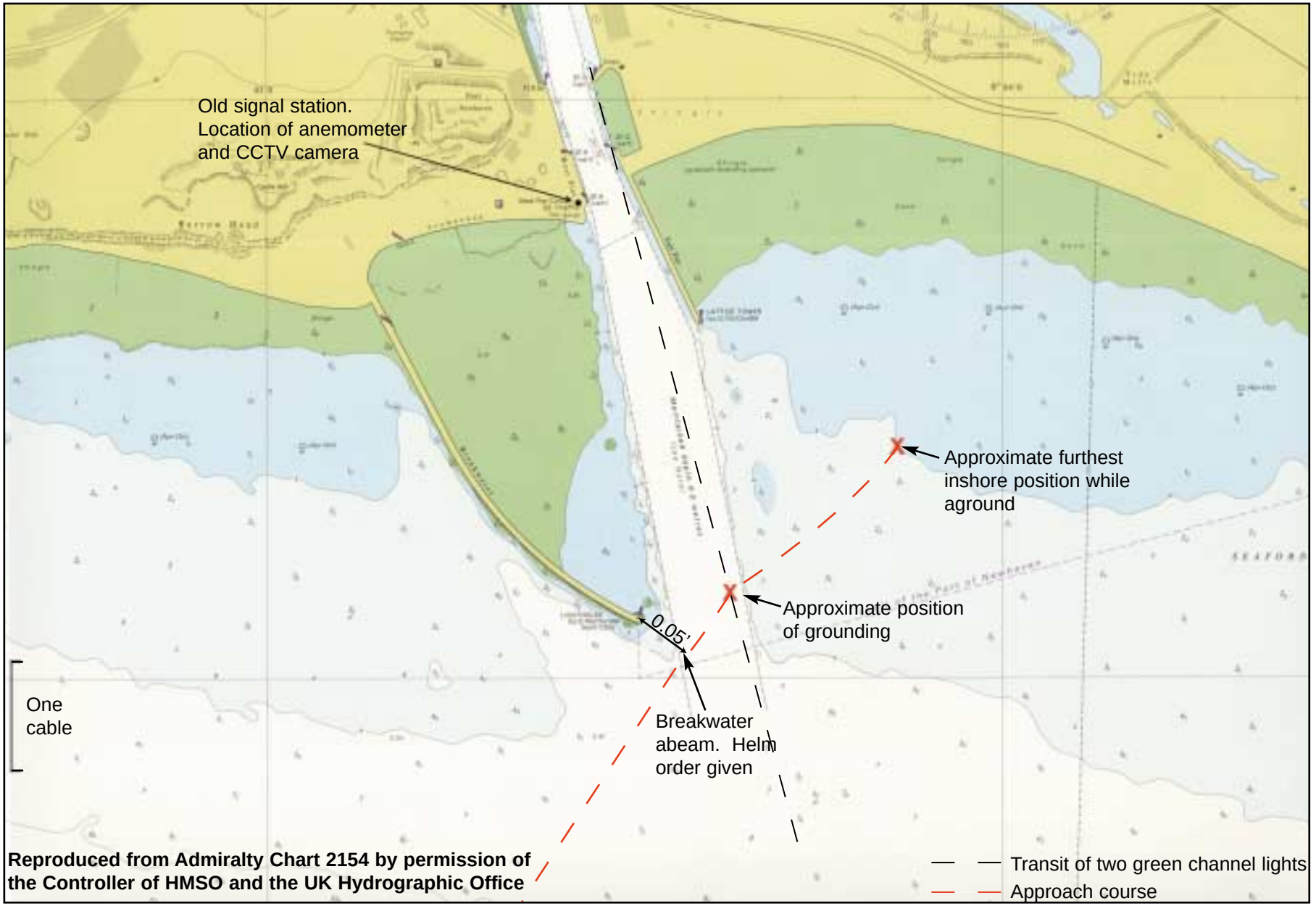


Figure 3

Chart extract showing the Newhaven approach channel

At 0850, while following the parallel index, the first officer ordered “hard to port” as the end of the breakwater came abeam of the bow. Immediately, the wheel was turned hard over to port **(see Figures 4 to 8 for the port control closed circuit television footage)**.

However, the vessel continued on the same heading. After a few seconds, the master and the pilot realised that something was wrong. The master ordered the port engine to be stopped and the starboard engine to full ahead to “slew” the vessel’s head around to port. The pilot was about to give the same order but realised that the master had already given it.

After a further period of about 10 seconds, the master could see the vessel was still heading for the eastern side of the channel and ordered the port engine full astern and the bow thruster hard to port. The vessel started turning to port, and was aligning with the general direction of the approach channel, when the starboard bow grounded. The heading when *Sardinia Vera* grounded was just to the east of north, and the speed over the ground was about 5 knots. The time of grounding was 0851. At the point of grounding, the master and others on the bridge could see the northern-most of the two green lights marking the eastern side of the approach channel slightly to the left of the southern green light.

The pilot cutter had been standing back off the eastern side of the channel to allow the ferry to enter first, and realised that she had grounded. She stood by to assist.

At 0856, the pilot contacted the port channel and asked for the tug *Fox Bay* to be placed on stand-by. Solent Coastguard was also in contact with the vessel at about 0900.

Sardinia Vera tried manoeuvring ahead and astern using her bow thruster, but without success. She was being forced slowly inshore by the prevailing weather into shallower water to the eastern side of the approach channel.

Fox Bay was by the vessel at about 0930 and, at 0935, a rope caught around her propeller. She returned to harbour at slow speed at 0958. A second tug was placed on stand-by but was still awaiting enough water to enable her to leave her berth.

The vessel was then being pushed further inshore by the weather and was, at one stage, on the 2-metre contour line. At that time, there were fears that she might not be refloated at high water and, with the poor forecast, might be blown further aground towards, or even on to, the beach without the possibility of being refloated until the next spring tides **(see Figures 9 and 10)**.

Sardinia Vera dropped her port anchor with 3 shackles of cable and tried the bow thruster to no effect. She then dropped the starboard anchor and allowed the weather to turn the vessel into the wind. Once the head was pointing clear of the breakwaters the engines were put ahead, and the vessel dredged her anchors and refloated at 1048 on the rising tide.

She then weighed her anchors, made another approach from the south-west, and entered the channel successfully at 1140.

She berthed in Newhaven at 1150.

There were no injuries and, after a diver's inspection, only minor hull damage was found to have been caused by the grounding.

No defects were found with any bridge, machinery or steering equipment.

The MAIB was informed shortly after the accident and an investigation began immediately.

Figure 4

Port control CCTV - breakwater abeam of vessel (Photographs 4-8)

Figure 5

Figure 6

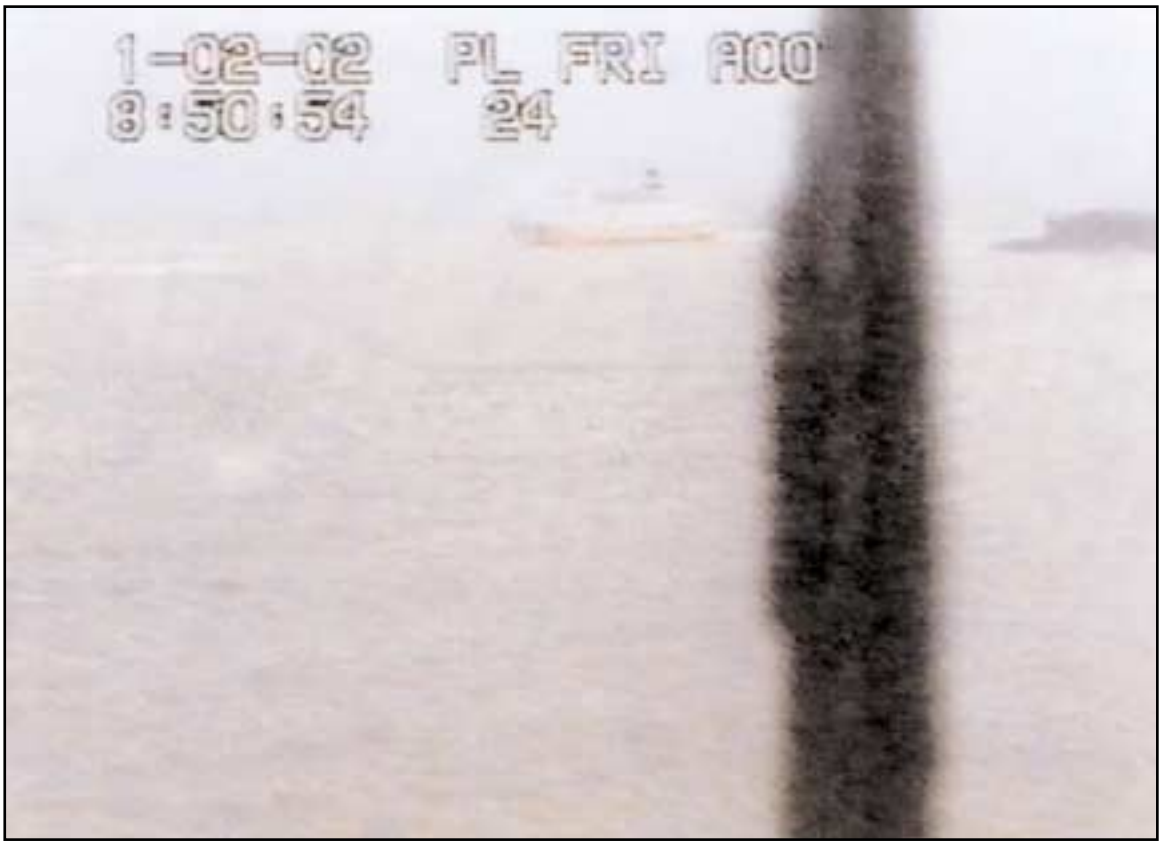


Figure 7

Figure 8

Sardinia Vera aground

Figures 9 and 10 - *Sardinia Vera* aground

1.4 ENVIRONMENTAL CONDITIONS

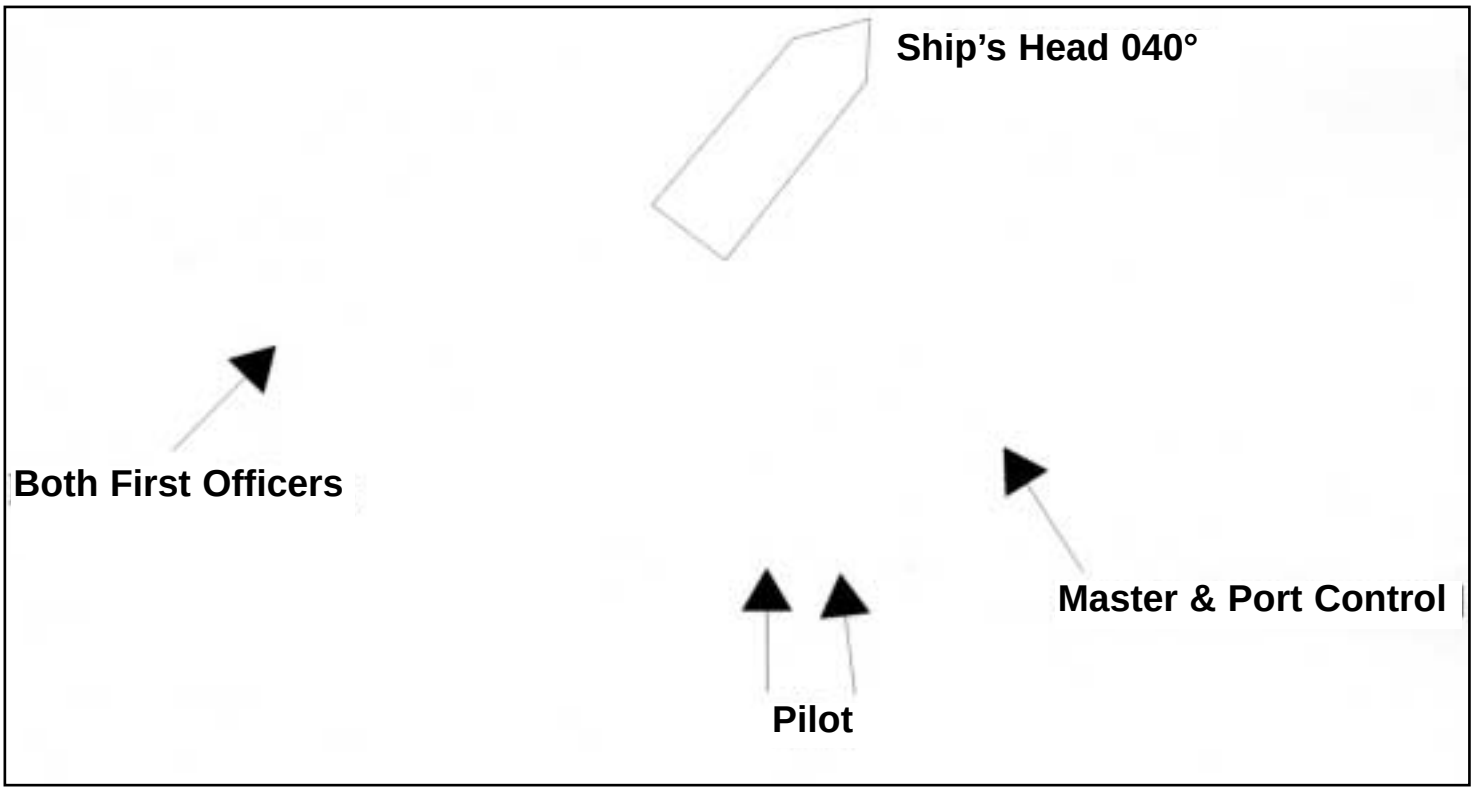
The incident occurred just over an hour after low water on a spring flood tide. The predicted tidal range was 6.4 metres and the predicted height at the time was 0.8 metre. Observations showed the tide to be above prediction by approximately 0.5m. The tidal stream just south of the breakwaters was 105° at 0.8 knot. Sunrise was at 0736. The visibility was good with occasional showers.

There was a 2.5 metre south-westerly swell running with a wind speed of around 25 knots (force 6 on the Beaufort scale) gusting to 32 knots. The wind direction at the time of the incident was estimated by various parties to be as follows **(see Figure 11)**:

Pilot	S or slightly east of S
Master	SSE
First officer (training)	SW
First officer	SW
Port control	SSE

The forecast was for deteriorating weather conditions up to gale force 9.

Figure 11



Estimation of wind direction at the time of the incident

1.5 BRIDGE EQUIPMENT (see Figure 12 below)

The following main navigational equipment was fitted on board *Sardinia Vera* at the time of the incident:

Two x Consillium Selesmar MM 950 radars

Two x JRC GPS NWZ-4570

Furuno GPS navigator

Navionics GEONAV LCD11 GPS plotter

Simrad echo sounder

Gyro compass

Autopilot

Figure 12

Bridge interior

1.6 THE CREW

Sardinia Vera had a crew of 53 at the time of the incident. All were Italian except for a French stewardess.

The master was 46 years old and had been at sea for 29 years. He had been master for 12 years and had been with the company for 11 years. He had served on the sister vessel for about 18 months and had spent 2 months on *Sardinia Vera* in the spring of 2001, during which time he gained his Pilotage Exemption Certificate (PEC) for Newhaven.

There are normally two masters on board *Sardinia Vera* working 24 hours on, 24 hours off. One of them had left the vessel for personal reasons on 28 January. The master, therefore, was alone in command, and involved in training one of the first officers for command. Both the master and the first officer under training had slept for 7 hours in the previous 30 in 2 x 3.5 hour spells.

The first officer, who was training for the master's position, was 41 years old. He had been at sea for 20 years and had held a master's licence for 10 years. He had been first officer for just under 2 years, had spent 5 months on the sister vessel, and had joined *Sardinia Vera* 3 days before the incident. He had not been to Newhaven before he joined *Sardinia Vera*.

The other first officer was 43 years old. He had been at sea for 20 years and had held a master's licence for 7 years. He had served with the company for 4 years and had been on the Newhaven to Dieppe service for 2 months. He did not hold a PEC for Newhaven.

All the deck officers on board *Sardinia Vera* spoke good English.

The pilot was 46 years old. He had been at sea for about 20 years and had served as master. He had been a Newhaven pilot for 6 years. The pilotage training period was 3 months. The pilots work 5 days on and 5 days off. *Sardinia Vera* was the largest vessel to use the port at the time of the incident, and only took a pilot if the master did not have a PEC or if another officer was training for one, as was the circumstance at the time. The pilot had been on *Sardinia Vera* both entering and leaving Newhaven on many occasions during the previous 12 months. He had started his 5-day shift on 30 January and had had 7 hours continuous sleep immediately before the incident.

1.7 THE PORT OF NEWHAVEN

Situated at the mouth of the River Ouse in East Sussex, the entrance to Newhaven's harbour lies between two piers, protected from the prevailing wind by a substantial breakwater to the west **(see Figure 3)**.

The port is used by a variety of, mainly, small vessels. Ferries are the largest vessels which operate out of Newhaven. In 1998 the port was used by 184 vessels with a total DWT of 864,960 tonnes.

In April 2001 the east quay, adjacent land and buildings, harbour authority rights and outer harbour were sold to the French company Transmanche which charters *Sardinia Vera*.

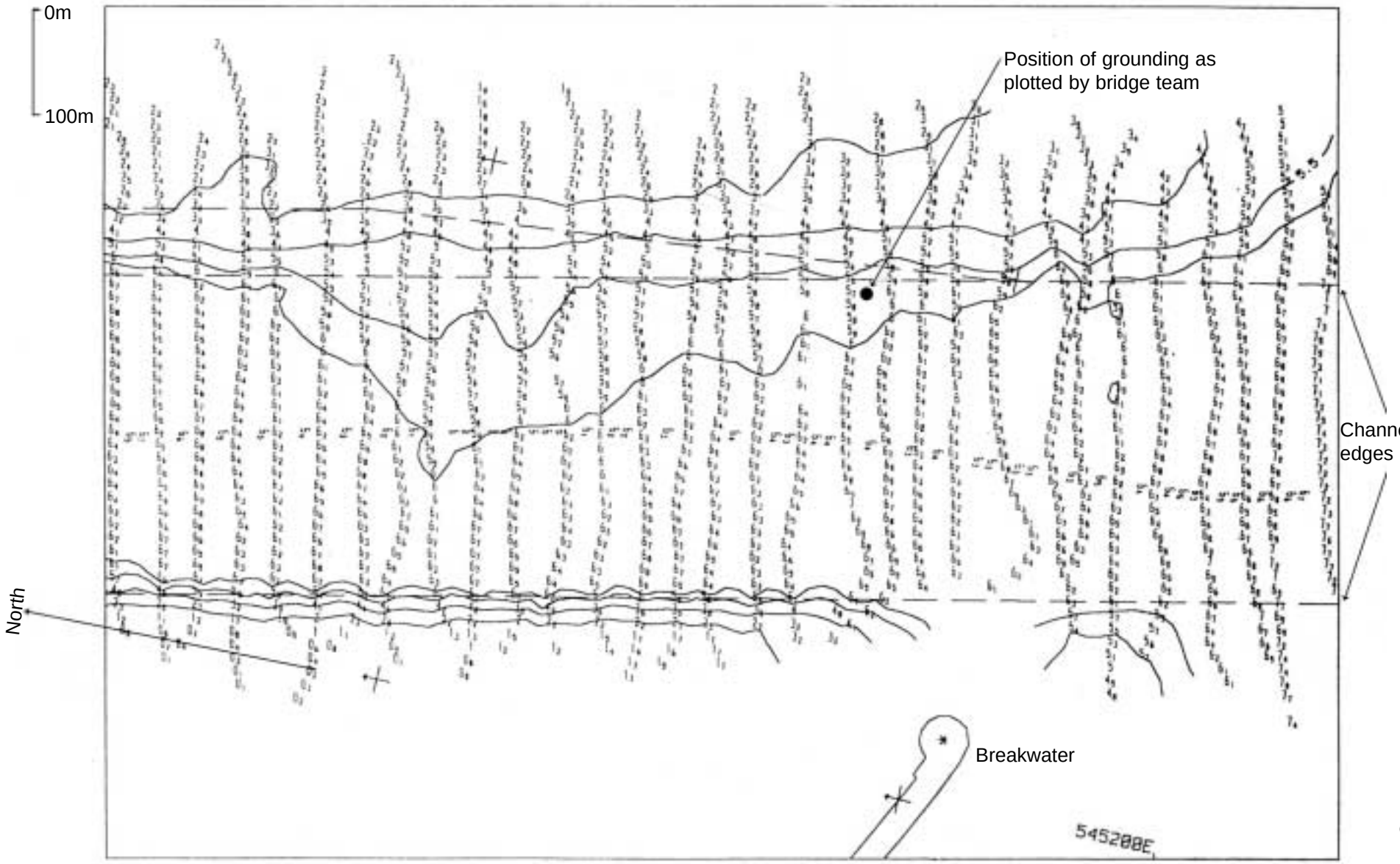
A seasonal high-speed ferry operates from Newhaven to Dieppe. In spring 2002, an additional larger ro-ro ferry, *Dieppe*, operated by Transmanche but with a different owner and crew to *Sardinia Vera*, started operating from the port.

The Port Marine Safety Code had not been implemented at the time of the incident, mainly because of delays caused by the sale of the port. Since the incident, the code has been fully implemented.

Newhaven harbour can accommodate vessels of up to 158 metres in length, with a maximum draft of 7.6 metres for vessels which take the bottom, soft mud, at low water. The entrance channel is kept dredged to a depth of about 6 metres and the south part of the harbour to the ferry berths is dredged to about 5.5 metres.

The western part of the approach channel between the signal station and the breakwater end is steep-sided, rising from 6 metres to almost drying. Depths vary sharply and do not appear to suffer much from silting. The eastern part of the approach channel, however, suffers significant silting problems because of shingle and mud from Seaford Bay, which encroaches on the eastern boundary of the channel between the end of the east pier and the entrance off the breakwater. The amount of encroachment between dredgings varies considerably, depending on the frequency and degree of combination of rough weather and large tides. The nominal 6-metre depth over the 120-metre channel width may therefore, at times, be reduced substantially. Because of the silting on the eastern side of the channel, vessels were kept as close as possible to the western part of the channel when both inbound and outbound.

Maintenance dredging normally occurred twice a year and had been completed shortly before the incident. A depth survey was made on completion of the dredging operation. The latest survey, conducted in January 2002, is shown in **Figure 13**. No further survey was intended to be made until the next dredging operation.



Survey made in January 2002

Figure 13

British Admiralty chart 2154 contains the following note:

Maintained Depths

Depths in Newhaven harbour are subject to silting. For the latest information consult the Harbour Master.

The ferry schedules were arranged so as to give 1 metre minimum underkeel clearance at all times. This allowed schedules to be maintained for the majority of the time. However, during large spring tides, some schedules had to be adjusted.

The normal approach made by the pilots and ferry PEC holders when inbound to the channel, is from a south-westerly direction, to keep the prevailing weather conditions roughly astern, and to make a sharp alteration, around 50°, to port into the channel as the western breakwater comes abeam. Course may be altered to approach from a direction closer to south if weather conditions dictate. If making a direct approach to the channel, the vessel may get set to the east by the prevailing weather on to the areas affected by silting. The preferred approach from the south-west also gives the option of aborting, at a later stage, by turning to starboard.

The port control at Newhaven was located in temporary accommodation in the car park at the North gate port entrance. A radar, VHF and wind speed and direction readout were available in the port control. A closed circuit television readout from the camera together with the anemometer was also located at the old signal station at the west pier.

Apart from the closed circuit television there was no recorded data at the port control.

A tide gauge was located at the old signal station. At the time of the incident the remote readout was inoperational.

1.8 MASTER/PILOT RELATIONSHIP

The vessel's master is charged with the responsibility for the safety of his vessel; pilots are engaged to assist with navigation in confined waters and to facilitate port approach, berthing and departure. The pilot is the local expert and has unique specialised knowledge and ability, but he never takes command of the vessel. He will normally advise the master as necessary, and usually has full conduct of the navigation. This is, however, very different from having command of the vessel. The master has the ultimate responsibility and has the right to interfere with the pilot's actions, as long as he acts reasonably and with good motive under the circumstances. He is also expected to take over the conduct of the navigation completely in the rare event of the pilot being incompetent or incapable. Good communication is essential in the master/pilot relationship, especially as the pilot may be unfamiliar with the vessel and the master unfamiliar with the port.

A PEC exempts a master from having to take a pilot as long as the certificate is kept valid. To obtain a PEC in Newhaven, a master/officer has to make 13 acts under the supervision of a pilot, and 12 acts under the supervision of an existing PEC holder (half at night) and then sit an examination.

In the instance of a pilot being on board with a PEC holder and a PEC "trainee" the pilot will have a purely supervisory role.

1.9 SHALLOW WATER EFFECT

Shallow water effect occurs when a vessel is navigating in shallow water. The vessel becomes sluggish, wave-making and turbulence increase, and there is a drop in speed and an increase in vibration. This effect increases with speed and is inversely proportional to underkeel clearance.

1.10 VOYAGE DATA RECORDER

There was no voyage data recorder (VDR), course recorder or any other recording device fitted on board *Sardinia Vera*. The revised Chapter V of SOLAS will require a VDR to be fitted not later than the first survey on or after 1 July 2002. EU Directive 1999/35/EC also requires the fitting of VDRs to EU ro-ro ferries and high-speed passenger craft by 31 January 2003, notwithstanding when the next survey is held.

1.11 ACTION TAKEN SINCE THE INCIDENT

The port control has moved to a new location at the southern end of the port near the East Beach. A mast has also been installed at the East Pier Knuckle for radar.

The remote readout for the tidal gauge has been repaired.

A survey software package has been purchased by the port, along with associated equipment which has been installed on the port launch. The port intends to undertake monthly surveys, and carry out dredging as required by the survey results. In September 2002 this equipment had not been used as the intended operators were undergoing training.

The UKHO has amended the note on BA 2154 to include:

Depths on the eastern side of the outer maintained area (50°46.7'N 00°03.6'E approx) may be reduced to less than 6 metres.

A VDR was fitted to *Sardinia Vera* on 19 July 2002.

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the 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 INTRODUCTION

Sardinia Vera was attempting a manoeuvre which had been successfully completed on this and other vessels on many previous occasions. She had completed the manoeuvre without incident the night before the grounding and, immediately after refloating, in almost identical environmental conditions and with the same personnel on the bridge using the same speed, course, wheel-over position and helm order. The night before the grounding, starboard helm had to be applied to slow the swing to port.

However, on this occasion, the vessel failed to turn as expected. The precise reasons for this have not been determined due, partly, to the absence of a VDR and any other recorded data, except closed circuit television ashore.

2.3 INTERNAL FACTORS

2.3.1 Master/pilot relationship

The pilot was on board with a PEC holder and a PEC “trainee”, and had a purely supervisory role for training purposes. The master had a valid PEC for the port of Newhaven and, therefore, did not require the services of a pilot. The pilot was on board at the time of the incident because the first officer was being trained for a PEC.

The master, first officer and pilot were standing close together at the centre console. The first officer was giving the helm orders under the close supervision of the master and pilot.

The timing of the helm order was, according to the master and the pilot, in accordance with the normal procedure, and the same as they would have given in the circumstances.

There is, therefore, no reason to suggest that the master/pilot relationship, along with the training being undertaken at the time of the grounding, was a contributory factor to the grounding.

2.3.2 Language

The master and first officer were conversing in Italian and giving helm and engine orders in Italian. The pilot did not speak fluent Italian but had a working knowledge of basic Italian nautical orders. He understood the orders being given immediately before the grounding. The master and first officer spoke good English and the pilot was able to converse with them as required.

The master, first officer and the rest of the bridge team were conversing in Italian which, for the purposes of the first officer's training, was the most practical and convenient language.

2.3.3 Fatigue

There are normally two masters on *Sardinia Vera* working 24 hours on, 24 hours off. One of them had left the vessel for personal reasons on 28 January. The master was, therefore, alone in command and training one of the first officers for command. Both the master and the first officer under training had slept for 7 hours in the previous 30 in 2 x 3.5 hour spells. The last spell was immediately before arrival that morning.

Both the master and first officer were possibly suffering from the effects of fatigue at the time of the incident, but the extent to which it might have affected their judgment, if at all, is uncertain.

The pilot had been on board *Sardinia Vera* the previous evening and had had 7 hours continuous sleep and felt well rested.

2.3.4 Defects

No defects were reported to any bridge, machinery or steering equipment, and those on the bridge all reported seeing the helm indicator move hard over to port as soon as the order was given.

After the event, those on the bridge were unable to determine any definitive reason for the vessel not turning as expected.

In view of the above observations, it is concluded that external factors probably caused the vessel to fail to alter course to port as expected.

2.4 EXTERNAL FACTORS

2.4.1 Wind and tide

The weather conditions were not good, with the sea and swell approximately astern. There are differing accounts as to the wind direction **(see Section 1.3 and Figure 11)**. The reciprocal of the vessel's course was 220°. The two first officers reported the wind direction from the south-west. This would have been very slightly to port of right astern. The master and port control reported the wind as coming from the south-south-east. This would have put the wind about 25° abaft the starboard beam. The port control information came from an anemometer inside the port and, therefore, the conditions might have been different to those outside the port because of eddies etc. The pilot reported the wind as coming from the south or slightly to the east of south. This would have put the wind about 45° on the starboard quarter.

The sea and swell are reported by all as being south-westerly, which was virtually right astern.

Sardinia Vera is a high-sided ro-ro vessel and has a considerable area of windage **(see Figures 1 and 2)**. She is therefore very susceptible to the effects of the wind and attracts considerable leeway.

The approach made to the channel entrance is generally from the south-west to keep the prevailing weather astern. However, course may be altered to approach from a direction closer to south if weather conditions dictate. A direct approach may also lead to the vessel being set, by the prevailing weather, into the shallower water on the east side of the channel. Everyone agrees the wind speed was about 25 knots, with gusts up to about 32 knots. What is in doubt is the wind direction.

Because there are three different reported wind directions, three possible scenarios exist as to why the vessel failed to turn as expected.

<u>Scenario one</u>

If the wind direction of south-west, as estimated by both of the first officers, was correct the wind was virtually right astern at the time of the manoeuvre.

Vessels have, occasionally, been known to become "held up" with the wind right astern and have become "pinned" in position by the strength of the wind preventing the vessel from turning across it. The large windage area of *Sardinia Vera* could have contributed to this.

However, this possibility is considered less likely when taking into account the number of previous occasions the same manoeuvre had been conducted successfully in similar or worse weather conditions.

Scenario two

The wind direction as estimated by the master, and given by port control, put the wind about 25° abaft the starboard beam.

If this direction was correct, the wind, acting at right angles to the vessel's side, might have prevented the stern from coming to starboard and therefore the bow to port when the turn was attempted.

Scenario three

The wind direction as estimated by the pilot put the wind coming from about 45° on the starboard quarter. This direction would, probably, be the least likely of the three scenarios to prevent the vessel from turning.

However, if the wind had suddenly backed, so that it was on the starboard beam, instead of the direction the pilot had observed, this might have prevented the stern from coming to starboard as in scenario two.

In both scenarios two and three a less steep approach angle of, for example, 020° would have decreased the effects of the wind on the large windage area of the vessel, and kept the wind direction closer astern.

The tide was setting 105° at 0.8 knot and was acting on the port quarter of the vessel. The tide alone would, therefore, have been unlikely to have prevented the vessel turning to port. It is possible that at the wheel-over position, close in to the breakwater, at the particular state of tide and weather at the time of the incident, an unpredicted counter-flow existed that might have acted against the vessel turning to port. However, as a previous experience of any counter-flow had never been reported, this is considered unlikely.

2.4.2 Shallow water effect

The wheel-over point was on the 5-metre contour line **(see Figure 3)**. It was just over an hour after low water with a predicted height of tide of 0.8 metre, observed to be about 0.5m above prediction. This allowed minimal underkeel clearance at a draught of 5.3 metres. The depths marginally closer to the breakwater from this position are further reduced. If the vessel was just a few metres closer to the breakwater than the wheel-over position, it is possible she was at a depth close to touching bottom. This is even more likely when it is considered that there was a 2.5 metre swell running.

The vessel was making about 9 knots over the ground at the wheel-over position. The tide, sea and swell were all acting from astern.

Because of the underkeel clearance and speed, shallow water effect might have affected the vessel's ability to alter course. This possibility could have been avoided if the vessel had waited until a greater depth of water was available.

2.4.3 Position of grounding

The vessel grounded when her heading was just to the east of north. At the point of grounding, the master and others on the bridge could see the northern-most of the two green lights, marking the eastern side of the approach channel, slightly to the left of the southern green light.

From the closed circuit television pictures **(Figure 8)** it can be seen that the vessel is aground in a position just over a ship's length from the breakwater end.

The ship's crew plotted the position of the bridge, at the point of grounding, on the recently completed survey chart. This is shown in **Figure 13**.

In view of the above, the position of the grounding appears to be on, or just inside the eastern side of the approach channel.

2.4.4 Dredging and surveying

From the survey made a week before the incident **(Figure 13)** the minimum depth at the position of *Sardinia Vera'*s bridge at the time of the grounding was 5.7 metres. The draught was 5.3 metres and the height of tide was 0.8 metre. Observations showed the tide to be about 0.5m above prediction. This should have given a clearance of over 1.5m.

As *Sardinia Vera* has a forward bridge, her starboard bow grounded close to this position, and it appears that since the survey the depths had reduced. This was in a period of about a week. The silting from Seaford Bay occurs quite rapidly in adverse weather. This had the effect of making the survey charts unreliable almost as soon as they were completed.

The surveys were made after the completion of each maintenance dredging operation which was at approximately 6-monthly intervals. Between surveys no depth surveying was made at all, with the exception of vessels using their echo sounders. The control measure used to counter the possibility of grounding on the eastern side of the approach channel has been for the vessel to stay on the western side of the channel, regardless of whether she was inbound or outbound. However, the safety margin was small and arbitrary because of the unknown extent of silting. The time between maintenance dredging operations progressively increased the amount of silting. This safety margin could have been considered to be even further reduced when *Dieppe*, a larger vessel, started using the port.

Within the eastern half of the approach channel, the harbourmaster had no reliable information as to the extent of the silting and therefore the channel depths. He was, therefore, unable to provide accurate data when responding to requests for depth information as a result of the note on BA chart 2154.

However, the surveying equipment, recently purchased by the port, should ensure a monthly check on the extent of silting.

2.4.5 Tidal and weather information

Tidal and wind information within Newhaven port was obtained mainly by visual observations. Reliable visual aids have been used for many years by the pilots and PEC holders. For example, the bottom of the lifeboat slip is approximately 0.8 metre and the base of “Max Speed 5 knots” sign by the old signal station is approximately 7 metres above chart datum.

There was, at the time of the incident, no remote tidal readout at the port control which could have been given by VHF to vessels to indicate the height of actual tide against the predicted tide. Since the incident, the remote readout has been repaired.

The anemometer at the old signal station does have a remote readout to the port control. However, its location is affected by the nearby cliffs, associated eddies and funnelling **(see Figure 3)**. A better location would be on the end of the breakwater which would be likely to give a more accurate indication of the wind direction in the approaches to the port. This would give an immediate indication of any wind shifts, which the port control could then relay to vessels.

2.4.6 Refloating

Those on the bridge did well to refloat the vessel without external assistance before she became stranded on, or close to, the beach.

2.5 VOYAGE DATA RECORDER

There was no voyage data recorder (VDR), course recorder or any other data recorder fitted on board *Sardinia Vera*. The revised Chapter V of SOLAS will require a VDR to be fitted not later than the first survey on or after 1 July 2002. In addition, EU Directive 1999/35/EC requires a VDR to be fitted by 31 January 2003, notwithstanding when the next survey is held.

The only recorded data available to the MAIB was the closed circuit television from the port control. Most of the other information used in this investigation has come from interviews of those involved.

Had a VDR been fitted, accurate engine and helm movements, position, speed, heading, rate of turn, and bridge voice recordings would have been available to the inspectors. A VDR was not fitted, and the lack of one has meant that the investigation has been unable to determine the precise reasons why the vessel failed to turn as expected. The port control’s radar had no recording facility and it was not possible to record the wind information from the anemometer.

This incident illustrates the need for VDRs to be fitted to vessels, and for data to be recorded ashore so that the circumstances of accidents can be investigated fully. The causes and contributory factors could then be positively identified so that lessons may be learned, thus improving the safety of life at sea and preventing a recurrence of the accident.

SECTION 3 - CONCLUSIONS

3.1 CAUSE AND CONTRIBUTING FACTORS

3.1.1 The cause

The cause of the grounding was the vessel failing to turn sufficiently to port at the entrance to the Newhaven approach channel. [2.2]

3.1.2 Contributing factors

1. The vessel failed to alter course as expected, probably for external reasons. [2.3]

2. The wind might have backed just before the manoeuvre took place. [2.4.1]

3. The relative wind direction and the large windage area of the vessel could have contributed towards the failure to turn. [2.4.1]

4. Shallow water effect, because of the minimal underkeel clearance and speed over the ground, might have prevented the vessel from turning as expected. [2.4.2]

5. The state of tide at the time of the incident might have contributed towards the failure to turn. [2.4.1,2.4.2]

6. The reduced depth of water on and just inside the eastern side of the approach channel at the southern end, caused by silting, reduced the navigable width by an arbitrary amount. [2.4.4]

7. The time between maintenance dredging operations progressively increased the amount of silting. [2.4.4]

8. The exposed nature of the eastern side of the approach channel rendered a significant amount of silting to encroach on the channel. [2.4.4]

9. The length of time between surveys of the channel depths meant that the precise width of the navigable channel, at any time, was unknown. [2.4.4]

3.2 OTHER FINDINGS

1. The precise reasons why the vessel failed to turn as expected have not been determined caused, partly, because of the absence of a VDR, and any other data recording appliances, except closed circuit television ashore. [2.5]

2. It is concluded that external factors probably caused the vessel to fail to alter course to port as expected. [2.3]

3. It is assumed that there were no defects with any bridge, machinery or steering equipment. [2.3.4]

4. Those on the bridge did well to refloat the vessel without external assistance before she became stranded on, or close to, the beach. [2.4.6]

5. Possibly, both the master and first officer were suffering from the effects of fatigue at the time of the incident, but the extent to which it might have affected their judgment, if at all, is uncertain. [2.3.3]

6. The vessel grounded on, or just inside, the eastern side of the approach channel. [2.4.3]

SECTION 4 - RECOMMENDATIONS

Newhaven Port and Properties is recommended to:

1. With respect to Newhaven approach channel:

    - Take further steps to reduce the silting of the eastern side of the approach channel.

    - Carry out a formal written risk assessment with regard to vessels entering Newhaven approach channel in a variety of wind and tidal conditions.

2. With respect to the port control:

    - Install radars, which have the ability to record data for playback purposes, in the port control.

    - Install an anemometer on the end of the western breakwater with a remote readout to the port control.

Marine Accident Investigation Branch
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