Report on the investigation of the grounding of the vessel

CP Valour

in Baia da Praia do Norte, Faial, Azores

on

9 December 2005

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This is a joint investigation report between the Bermuda Department of Maritime Administration, which appointed the MAIB to investigate on its behalf, and the IPTM (Portuguese Maritime Safety Division). The MAIB, on behalf of the flag state has taken the lead role pursuant to the IMO Code for the Investigation of Marine Casualties and Incidents (Resolution A.849(20)).

Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ARPA	-	Automatic Radar Plotting Aid
BA	-	British Admiralty
BV	-	Bureau Veritas
Cable (distance)	-	One tenth of a nautical mile
DNV	-	Det Norske Veritas
DOC	-	Document of Compliance
DPA	-	Designated Person Ashore
ECS	-	Electronic Chart System
EOSP	-	End of Sea Passage
ETA	-	Estimated Time of Arrival
GPS	-	Global Positioning System (satellite navigator)
Hp	-	Horse power
ISM	-	International Safety Management (Code)
LT	-	Local time
NP	-	Nautical Publication
SBE	-	Standby Engine
SMC	-	Safety Management Certificate
TEU	-	Twenty Foot Equivalent Unit
UKHO	-	United Kingdom Hydrographic Office
UTC	-	Universal Co-ordinated Time
VHF	-	Very High Frequency (radio)
VRM	-	Variable Range Marker

SYNOPSIS

The 15,145gt Bermuda registered container vessel *CP Valour,* grounded in a bay off the NW coast of the island of Faial, Azores, on 9 December 2005. The next day, in worsening weather conditions, the vessel's hull began to fracture, eventually causing substantial pollution to the coast of Faial, and to the islands of Pico and São Jorge. The subsequent salvage operation was unsuccessful and she was declared a constructive total loss about 3 weeks later.

The vessel had been on a liner voyage from Montreal, Canada, to Valencia, Spain, when one of her main engine cylinder units was found to be overheating due to a cooling water leak. The vessel continued on her planned track towards the central Azores at slow speed, while the master and chief engineer decided on the best course of action. They decided to head for a bay, which they assessed would be sheltered from a heavy SW'ly swell, in order to make the necessary repairs. A cylinder head needed to be lifted and calm water was essential. The master discussed the proposed action with the managers who then further discussed the proposal with the owners. Agreement was reached and the master was granted permission to proceed.

The bay contained a charted designated anchorage, but the largest scale British Admiralty chart of the island was of 1:175,000 scale. Such a chart is not normally considered suitable for close inshore navigation. There was only a single sounding of 36 metres in the bay.

The passage planning for the vessel's approach into the bay was rudimentary. The bridge and anchoring team had different views on how the approach and anchoring operation was to be carried out. In the event, the master did not use the bridge team to its full capability, took on too much himself and became overloaded.

The vessel grounded at a speed of 6 knots while the master was manoeuvring the vessel in the bay in search of calm water. The engine telegraph had been inadvertently left on half ahead for several minutes.

Following the grounding, the initial salvage attempts by a local harbour tug were unsuccessful. The vessel was driven further aground the next day as the wind veered to blow directly into the bay. The 1172 MT of heavy fuel oil and 118 MT of gas oil onboard began leaking in to the sea.

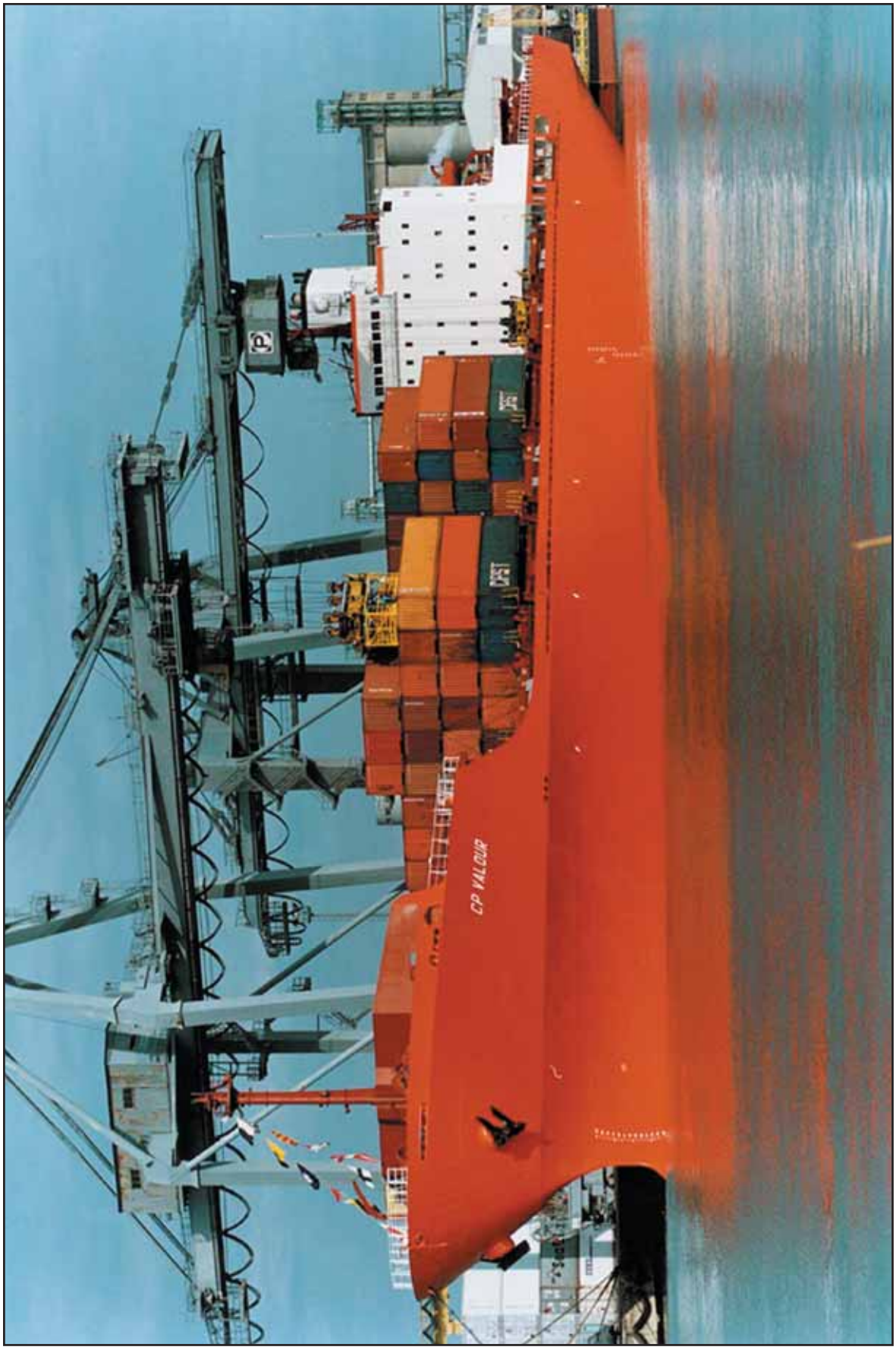
A powerful salvage tug was on scene about 24 hours after the initial grounding but her attempts to re-float the vessel were also unsuccessful.

CP Valour was abandoned on 25 December 2005, after all the IMO classified hazardous cargo had been safely removed, along with 450 cubic metres of oil and water from her bunker tanks. Operations to remove the vessel from the beach began in the summer of 2006.

*CP Valour'*s master, and the OOW at the time of the grounding had both attended bridge team management training courses run by the ship's manager. That this training was not put to good use, in the practices adopted on board *CP Valour,* raises questions about the effectiveness of the ship owner's and ship manager's auditing processes.

A recommendation has been addressed to the ship managers, and the lessons to be learned from the accident will be widely circulated to ships, shipowners and managers.

Figure 1



CP Valour

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *CP VALOUR* AND ACCIDENT

Vessel details (Figure 1)

Registered owner	:	CP Ships Limited
Manager(s)	:	Split Ship Management Limited
Port of registry	:	Hamilton
Flag	:	Bermuda
Type	:	Container
Built	:	1979
Classification society	:	DNV
Length overall	:	172 metres
Gross tonnage	:	15,145
Engine power / type	:	12,799kW / Sulzer RND90
Service speed	:	18.5 knots
1800 9 December 2005	:	1172 MT of fuel oil and 118 MT of gas oil onboard.

Accident details

Time and date	:	1709 LT / 1809 UTC, 9 December 2005
Location of incident	:	Baia da Praia do Norte, Faial, Azores
Persons on board	:	21
Injuries/fatalities	:	None
Damage	:	Constructive total loss Significant localised pollution

1.2 BACKGROUND INFORMATION

1.2.1 Split Ship Management Ltd (SSM)

SSM is based in Split, Croatia. It provides the technical management for 13 vessels, and supplies crew to a further 59 vessels worldwide. The company has a well developed safety management system and owns and manages a training establishment in Split, which includes a modern bridge simulator. It had a Document of Compliance (DOC) issued under the IMO's International Safety Management (ISM) Code by Bureau Veritas (BV) on 12 February 2003. The Designated Person Ashore (DPA) for *CP Valour* was the company's managing director.

1.2.2 Description of vessel and cargo

CP Valour was one of 9 container ships owned by CP Ships and managed by SSM. She was employed on a liner trade between Montreal and Southern European ports. The vessel had left Montreal on 3 December bound for Valencia with about 950 TEU on board weighing 9,600 tonnes.

1.3 NARRATIVE

(All times are Local Time (UTC -1 hour))

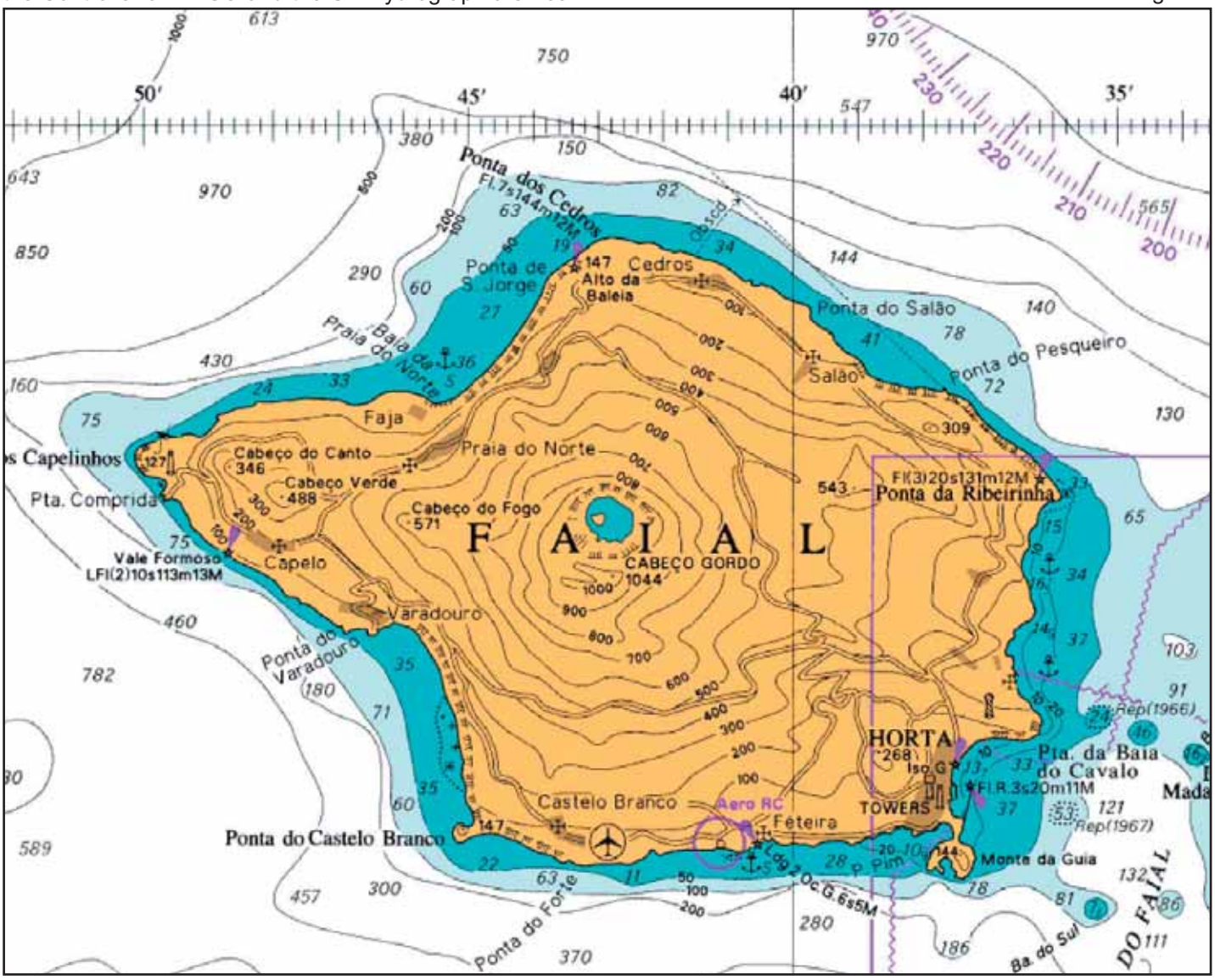
At about 0800 on the morning of 9 December 2005, when *CP Valour* was passing the western Azores, the vessel's chief engineer was informed that No 5 main engine cylinder unit was overheating. He went into the engine room to investigate the problem and diagnosed a main engine cylinder fresh water cooling problem. He informed the master of the problem and then reduced the main engine revolutions from 108 to about 85. This reduced the cylinder temperature to an acceptable level, but had the effect of reducing the vessel's speed from 18.5 to 14 knots.

The master and chief engineer discussed the options available to them. It was necessary to remove a cylinder head in order to investigate the problem. They could either continue on voyage to Valencia at slow speed and complete the necessary repairs there, or divert to an anchorage, which would need to be sheltered from the prevailing southerly wind and south-westerly swell, and complete repairs as soon as possible. The master and chief engineer's decision was to look for a suitable anchorage.

The master contacted the vessel's DPA and informed him of the problem. The DPA discussed the situation with the vessel's superintendents and they, too, agreed that the best option was to investigate the cause and effect repairs as soon as practicable. This plan was further discussed with the owners and all parties agreed with the master's proposal.

The master consulted the British Admiralty (BA) charts of the Azores, and nautical publications, including the appropriate Admiralty Sailing Directions. He dismissed possible anchorages off Flores and Horta because he felt they were too exposed to the south. However, he found a designated anchorage on the BA charts situated in a bay off the north-west coast of the island of Faial. The bay appeared to provide good shelter from the prevailing weather. The vessel was just 7 hours steaming from the bay, which gave an estimated time of arrival (ETA) in daylight. It was also close to their intended track, involving a diversion of fewer than 10 miles. The Admiralty Sailing Directions described the anchorage as being about 4 cables north of the head of the bay in 35 metres water depth **(Figure 2)**.

Figure 2



Faial Island on chart BA1956

The repairs were predicted to take about 12 hours and the master updated the vessel's Valencia ETA and communicated this to all interested parties. He also told the vessel's managers the details of the anchorage.

The managers consulted the relevant chart and Admiralty Sailing Directions and agreed with the master that the intended anchorage appeared to be safe and appropriate for the planned repairs.

At 0920, the vessel's course was adjusted from 115° to 120° to make for the anchorage, and the ship's engineers began making preparations for the repairs.

At about 1400, 2.5 hours before arrival, the master tried to contact the captain of the port at Horta, the main port on the island, using VHF radio. However, he was unsuccessful, probably due to the distance and topography of the island. The master then consulted the appropriate Admiralty List of Radio Signals, found the telephone number for the port office, and at about 1500 called the captain of the port using a mobile telephone. He described the engine problem to him and explained that it was

not an emergency situation. He requested permission to anchor in the bay. The captain of the port asked a number of questions concerning the vessel and then advised the master to call back after 20 minutes. The master did so, and the captain of the port gave him permission to anchor in the bay but cautioned that the wind and swell was due to veer around to the north-west the following day. The master replied that he expected the repairs to be completed within 12 hours and *CP Valour* would have left the bay and resumed her voyage before this time, and, so the expected change of swell did not overly concern him.

A little before 1600, the chief officer arrived on the bridge to take over the watch. He entered a waypoint into the vessel's standalone GPS which equated to the position of the anchor symbol on the chart of the bay. The position was 5 cables from the head of the bay.

The master discussed the intended anchoring procedure with the chief officer. He stated that he wanted the starboard anchor lowered to one shackle on deck, so as to give them warning of any shallow water as they approached. He also stated that, on this occasion, when the vessel was in position, he wanted the anchor walked out and not let go on the brake, as was the normal practice.

The chief officer and bosun then went forward to standby on the forecastle, where they prepared both anchors for use.

The second officer remained on the bridge as the officer of the watch. He advised the master of the position and speed as the vessel began to make her approach into the bay. He was monitoring the port radar and the adjacent electronic chart system (ECS). At 1620 he input a waypoint into the ECS, which was 8 cables north of the head of the bay, as an intended anchor position and informed the master that he had done so **(Figure 3)**.

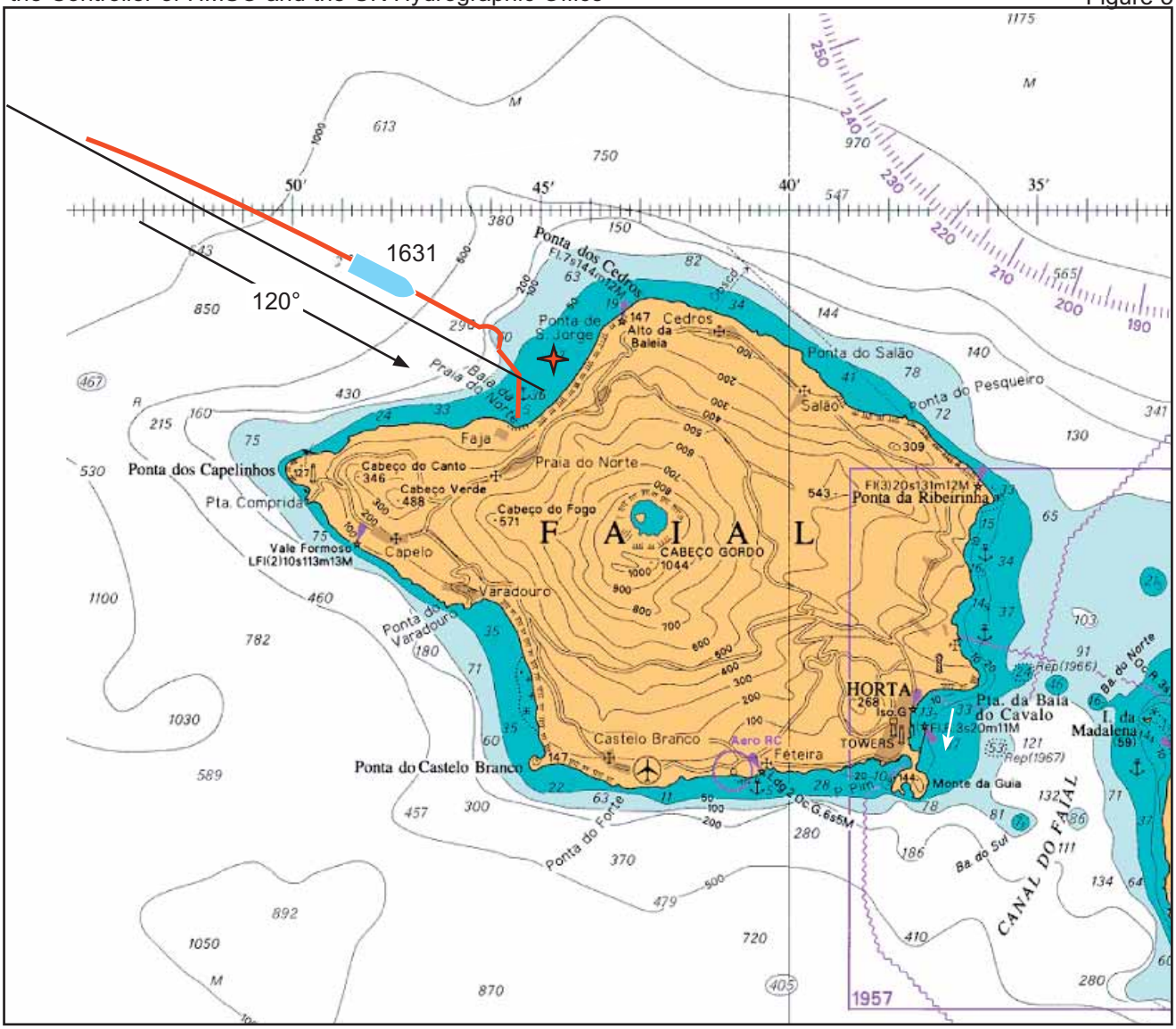
At 1631, the engine was slowed to manoeuvring speed, and 'standby' engines was rung. Engine control was passed to the engine room and the master took the con from the second officer. Shortly afterwards, the master started the echo sounder and changed the steering mode to manual, putting the seaman lookout on the wheel. The master usually positioned himself on the starboard side of the bridge so he could monitor the starboard radar and be close to the engine telegraph.

The master ordered the chief officer to lower the starboard anchor to one shackle on deck. Once this had been done, the master told the chief officer to keep a watch on the cable for any signs of shallow water.

At 1644, the master put the engine telegraph to stop as he was considering whether the sea was calm enough for *CP Valour* to anchor. Not satisfied with the prevailing conditions, he put the telegraph to dead slow ahead at 1645 and, at about 1648, ordered the helmsman to alter course to 220° to head into the swell.

At 1655 *CP Valour* was steady on a course of 220° about 12 cables from the head of the bay, but in the master's opinion the vessel was still moving too much. He also looked at the echo sounder and found the depth to be 70m and increasing; too deep for anchoring. He put the telegraph to slow ahead and then half ahead as he ordered the helmsman to begin turning the vessel to port to take her further into the bay where the sea conditions were calmer.

Figure 3



8 cable position

He told the second officer to find the course to steer to the 8 cable anchorage position which he, the second officer, had input into the ECS and to give the helmsman the necessary orders to steer towards it.

At 1700 *CP Valour* was to the north of the charted anchor symbol and on a steady heading of 140° under orders from the second officer. The vessel's speed had increased to 6 knots, as the telegraph was still set on half ahead. The master went to the echo sounder again, saw that the depth was reducing and changed the range scale.

The master ordered the helmsman to bring the vessel around to starboard and into the wind, onto a heading of 180° towards the position of charted anchor symbol and the head of the bay.

At 1705 *CP Valour* was at the position of the charted anchor symbol, about 4 cables from the head of the bay, heading 180°. However, unnoticed by the bridge team, her speed had increased to 7 knots. The master estimated the vessel's position using the radar

variable range marker (VRM). He assessed that it was sufficiently calm in this position to effect the repairs. He was aware that the vessel was still moving ahead, but was unaware of her speed. He knew that by the time the vessel was stopped, he would be closer to the shore than 4 cables, but he believed he had sufficient water because there were no soundings on the chart and it was a steep sided volcanic island.

At 1706 he moved to the telegraph and pulled it back from half ahead to dead slow ahead. The master realised that the telegraph had been at half ahead for a few minutes. He had concerns about the speed, and as the vessel's log was not operational he asked the second officer, who was standing by the port radar, what the vessel's speed was. The master heard the reply "point six" and assumed that this had been read from the GPS information on the radar. He did not personally check the speed.

Content that *CP Valour* was just creeping ahead, the master then went to the chart room to check the echo sounder. He found that he had about 15 metres under the keel. He changed the range again.

During the next 2 minutes, the master put the telegraph to dead slow astern, slow astern and then half astern. The vessel ran aground at 1709 while still proceeding at 6 knots. This was not noticed by anyone on board.

Satisfied that the vessel was in a suitable position, the master ordered the chief officer to begin walking out the starboard anchor. He put the telegraph to full astern to start to lay out the cable. The chief officer called out each shackle as the anchor was lowered to 5 shackles in the water.

The master reduced the engine speed to dead slow astern and waited for the chief officer to report that the vessel was brought up. However, the cable remained up and down, and the vessel's position remained static.

By 1717 the master and the second officer realised *CP Valour* was aground, and the master put the telegraph to full astern in an effort to refloat her. This was unsuccessful and the master stopped the engine at 1727.

The master ordered the chief officer to heave up the anchor and for the vessel's tanks to be sounded to assess whether there had been any breach of the hull.

He continued trying to refloat the vessel using the engine.

Realising the vessel was hard aground and could not be refloated using engine alone, at 1755 the master called the ship managers in Split, Croatia to inform them of the situation. He stated that the vessel had lightly grounded on sand at a speed of between 0.2 and 0.4 knots **(Figures 4 and 5)**.

Shortly afterwards, he informed the captain of the port at Horta.

The hull was found to be intact at this time, and there was no evidence of water ingress or pollution. The vessel's draughts were confirmed as 7.20m forward and 8.10m aft; a change from the predicted arrival draughts of 8.05m and 9.05m respectively.

Figure 4

Vessel aground on 13th December 2005

Figure 5

View from bridge over deck containers

1.4 THE SALVAGE OPERATION

CP Valour's owners in the UK, and the managers in Croatia, activated their respective emergency response procedures, and manned their response rooms.

The managers began assessing the local towage options. They found a local harbour tug and a French naval tug in Horta, and one of the world's largest salvage tugs in Ponta Delgada, just 18 hours away.

After being contacted through the local agent, the Horta harbour tug *Ilha de São Luis* (1200hp), sailed from the port and arrived on scene at about 2100 the same day, and quickly made two ropes fast to the stern of the vessel. The master of *CP Valour* placed the engine on standby, and put the telegraph to full astern as the tug began pulling from astern. The vessel remained aground, and as the tug power was increased, both towropes parted at 2141. The tug then returned to Horta.

The large salvage tug *Fotiy Krylov* (24,480hp) departed Ponta Delgada at 0100 the following morning, bound for *CP Valour*'s position.

The harbour tug returned early the following morning, and was made fast, but was again unable to tow the vessel clear. By that time, the wind had begun to veer and was from the south-west. The vessel was slowly being driven further inshore by an onshore current.

By mid-morning the vessel had begun leaking oil to the sea from the engine oil sludge tank as the hull began fracturing.

At about 0900, the managers agreed to a Lloyd's open form salvage contract with the salvage company Tsavliris, owners of the salvage tug which was proceeding from Ponta Delgada.

The harbour tug was still on scene, and the salvage company took her under charter.

That afternoon, the full length *of CP Valour'*s double bottom began to sustain fractures, and fuel oil, gas oil and ballast tanks became open to the sea **(Figures 6, 7 and 8)**.

At about 1600, *Fotiy Krylov* arrived on scene. It was decided to use the harbour tug to assist in running a line to *CP Valour*, because of the limited depth of water around her.

During the operation to connect the tow line, one of the *Fotiy Krylov'*s propellers and tailshaft became fouled by a rope. After unsuccessful attempts by the salvage tug's divers, to clear the propeller, the vessel was forced to abort the operation. She left the bay, with the harbour tug, just after 1800 to find shelter in which to remove the rope.

The weather continued to deteriorate and, that night, strong NW winds and a heavy swell caused further damage to the vessel and her deck cargo.

The small harbour tug returned on the morning of Sunday 11 December, and was made fast to the vessel by 1045, in rough weather. She was let go at 1620, and returned to Horta. Meanwhile, *Fotiy Krylov* was at anchor off Horta, attempting to clear her fouled propeller in rough seas, as no suitable berth was available in the port.

Figure 6 and 7

Oil clean up operation

Figure 8

Oil boom and clean up operations

Figure 9

Helicopter operations to remove the hazardous cargo

A salvage team attempted to board the grounded vessel by helicopter during the day, but were unsuccessful due to the strong winds.

The master reported that all the vessel's double bottom tanks were breached and open to the sea.

Fotiy Krylov's propeller was cleared by midnight, and *Fotiy Krylov* and *Ilha de São Luis* departed Horta early the next morning, bound for the casualty.

The vessels arrived at about 0600. *Fotiy Krylov* was made fast to *CP Valour*'s stern, but was unable to refloat her.

The salvage operation then became protracted, hampered by bad weather and sand continually accumulating on the offshore side of the vessel.

The vessel was finally abandoned, and the salvage attempts were called off on 25 December. By that time all of the IMO classified hazardous cargo had been removed by helicopter **(Figure 9)**, and about 450^3m of oil and water had been removed into a barge.

At the time of publishing this report (August 2006), an operation to salve the cargo and remove the wreck of *CP Valour* had begun.

Figure 9 reproduced with the kind permission of the Departamento de Oceanografia e Pescas da Universidade dos Azores

1.5 ENVIRONMENTAL CONDITIONS

Baia Da Praia Do Norte

9 December 2005

Wind southerly force 4 to 5 with a south-westerly swell. The tidal range in the bay was about 0.55 metres, and the evening high tide was predicted to occur at 20.39 at a height of 1.3m.

10 December 2005

The wind veered to south-westerly force 4 to 5 in the morning, and further to north-westerly by the late afternoon, strengthening to force 7 by 1600. The swell was recorded as north-westerly and 5m in height at that time. A high tide of 1.2m was predicted at 2151.

11 December 2005

The wind remained north-westerly force 6 during the morning, and then veered further to northerly force 6 to 7 by the afternoon and evening. High tides, with heights of over 1.3m, were predicted at 1031 and 2249.

By Monday 12 December the wind and swell waves had veered further and were from the north-east.

1.6 *CP VALOUR*

1.6.1 Training and experience of the crew

The 21 officers and crew were all Croatian nationals.

The **master** was aged 46 and had been in command of the company vessels for 2 years. Prior to this he had served 6 years as chief officer, 4 years as second officer, and 2 years as third officer. He had joined *CP Valour* in Livorno on 23rd September, 2.5 months before the accident on a normal tour of duty of 6 months.

The master held a Class I Certificate of Competency. In addition, he had completed and been issued with the following certificates for relevant non-mandatory training courses:

Bridge Team Management	July 2002
Bridge Resource Management	May 2002
ECDIS	January 2003

The **second officer** was aged 59 and had sailed in the rank for many years. He had joined *CP Valour* in June. He held a Class III Certificate of Competency. He had also completed and been issued with the following certificates for relevant non-mandatory training courses:

Bridge Team Management	February 2002
ECDIS	March 2003

1.6.2 Certification and the International Safety Management (ISM) Code

CP Valour was issued with a Safety Management Certificate (SMC) under the ISM Code on 3 August 2004 by the government of Bermuda. She was last audited on 23 July 2004 by BV on behalf of the government of Bermuda. The vessel had also undergone a safety inspection by her owners on 15 and 16 November 2005.

The vessel's mandatory certification was in date.

1.6.3 Description of the cargo

CP Valour was carrying 950 TEU weighing 9,600 tonnes at the time of the accident.

The units contained various general cargo including agricultural seeds, animal hides, machinery, personal effects. Three units contained IMO classified hazardous cargo, as follows:

- 8 tonnes Triphenyl Phosphate (toxic fire retardant)
- 6 tonnes flammable liquid, ink and paint
- 19 tonnes of Sodium Persulphate.

Additionally, some empty containers were carried on deck.

1.6.4 Description of the bridge navigational and recording equipment (Figure 10)

CP Valour was fitted with the following navigational equipment:

- Transas electronic navigation/chart system (ECS)
- Two ARPA type radars
- GPS unit supplying the radars and the ECS with position information
- Second GPS sited on the chart table, used for navigation
- Echo sounder also sited on the chart table (see below)
- Course recorder that was inoperative at the time of the accident
- Speed log that was also inoperative at the time of the accident
- AIS unit

The following electrical equipment contained recorded evidence of the vessel's approach to the anchorage:

- The ECS
- The echo sounder
- A course recorder
- An engine movement recorder

The vessel was supplied with a British Admiralty chart folio system and associated nautical publications, including the appropriate volumes of Sailing Directions and the Mariner's Handbook.

Figure 10

Bridge layout

The echo sounder was a Furuno Mark II, type F-851-S unit, fitted prior to new-building delivery 26 years earlier. The type incorporates a stylus on a rotating loop which burns a trace onto a slow moving reel of impregnated paper. The unit has no remote readout or depth alarm capability. This echo sounder unit was positioned on the chart table, behind and out of sight of anyone in the fore part of the wheelhouse.

The single transducer for the echo sounder was sited aft.

The master had switched the echo sounder on as the vessel was approaching the bay. It showed a good return from the seabed as she closed on the land. The range scale was changed at about 1701, and then again at about 1707, just 2 minutes before she grounded. A clear trace can be seen as the depth of water below the keel sharply reduced to zero as she ran aground. This was not noticed by the bridge team at the time.

1.7 HYDROGRAPHIC ADVICE AND DIRECTIONS

1.7.1 History of the anchorage

Information concerning a safe anchorage in the bay was included in a Portuguese publication dated 1943, which stated: “one good anchorage could be found in depth 35 metres”.

The bay and adjoining coast was last surveyed in 1958 by lead line, following a large volcanic eruption on the island.

The anchorage first appeared as a designated anchorage on a Portuguese chart dated July 1963, and on British Admiralty (BA) charts shortly afterwards, in July 1966.

1.7.2 Charts

CP Valour was supplied with BA charts. The largest scale BA chart of the bay was the 1:175,000, *BA 1956 Arquipelago Dos Acores – Central Group* **(Figure 11)**.

The Mariner's Handbook (NP100) gives advice on the interpretation and use of charts. It indicates that frequently used anchorages are generally covered by charts of a scale of 1:25,000 or larger, and it also states:

> *a general survey of a coast which vessels only pass in proceeding from one place to another is seldom made on a scale larger than 1:50,000,*

The handbook continues:

> *in such general surveys of coasts or little frequented anchorages, the surveyor does not contemplate that ships will approach the shore without taking special precautions.*

The captain of the port at Horta had a copy of the largest scale Portuguese chart of the bay, chart 46403 - *Ihla Do Faial e Canal do Faial*, scale 1:50,000 **(Figure 12)**. This chart, though of a scale that is more useful for anchoring, has no more soundings than those included on the smaller scale BA chart.

In 1957/58 a volcanic eruption on Faial added 2.5km² of land to the western edge of the island **(Figure 13)**.

BA chart 1956 contains a general warning as follows:

> *Mariners are warned that volcanic activity may exist within the area covered by this chart and can change depth information significantly.*

The Portuguese chart was not carried on *CP Valour*, but it was available to be referred to by the captain of the port at Horta. It contained the following warning notes:

> *Due to the age of the surveys, to the volcanic properties of the islands and to the possibility of existence of unknown shoals near the coastline, it is unwise, except in the Canal do Faial, to navigate into the depth contour of 100 metres.*

1.7.3 Admiralty Sailing Directions

NP 67 West Coasts of Spain and Portugal Pilot is the appropriate volume of Admiralty Sailing Directions for the region.

The anchorage in the bay is described as follows:

> *Anchorage may be obtained, as shown on the chart, in Baía da Praia do Norte (38° 37' N, 28° 45' W). The town of Praia do Norte stands above a sandy beach at the head of the bay.*
>
> *The anchorage is in a depth of 37m sand, about 4 cables N of the head of the bay.*

The master had read this description prior to arrival and had fixed it in his mind that the anchorage was 4 cables off the shore.

Reproduced from Admiralty Chart 1956 by permission of
the Controller of HMSO and the UK Hydrographic Office

Figure 11

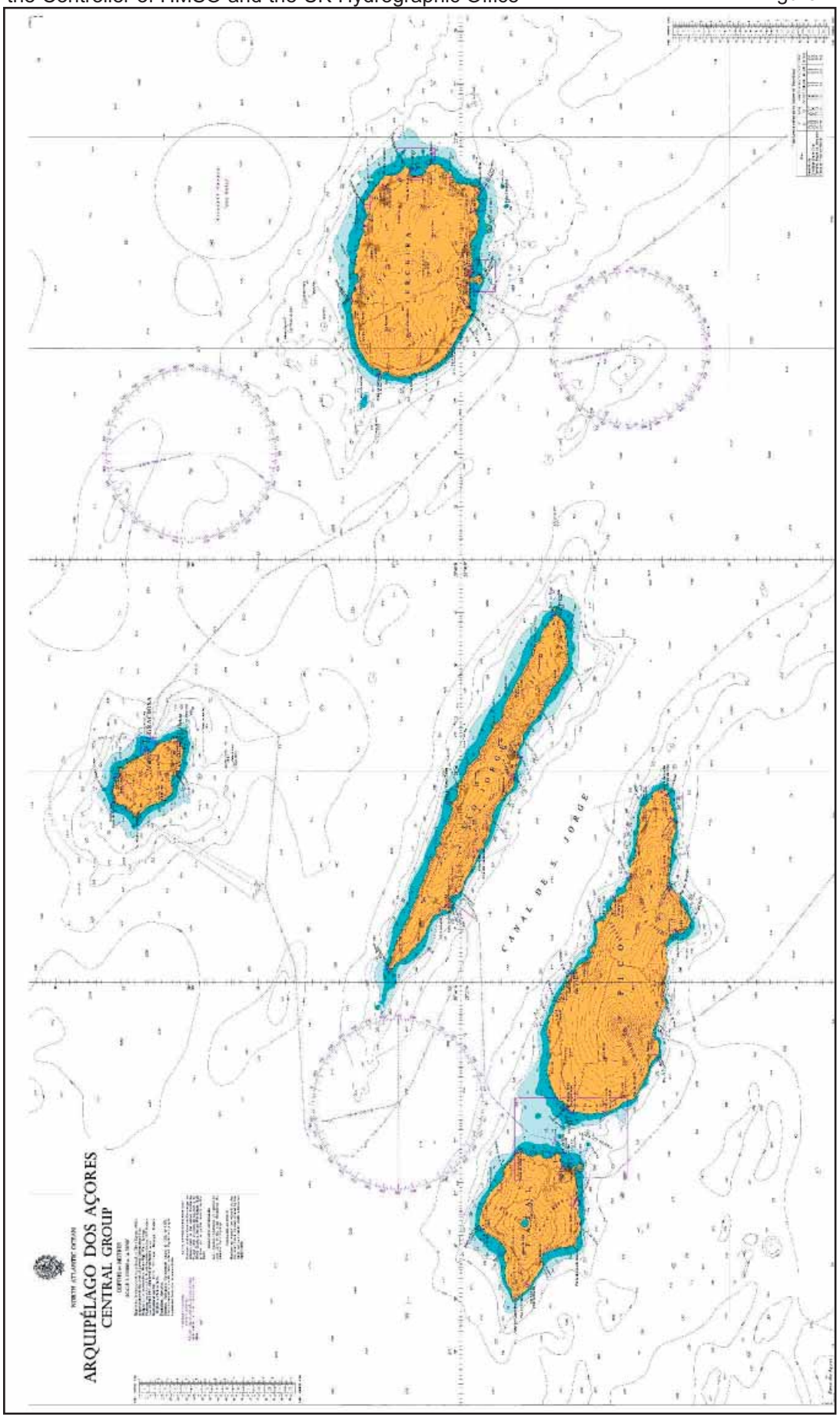
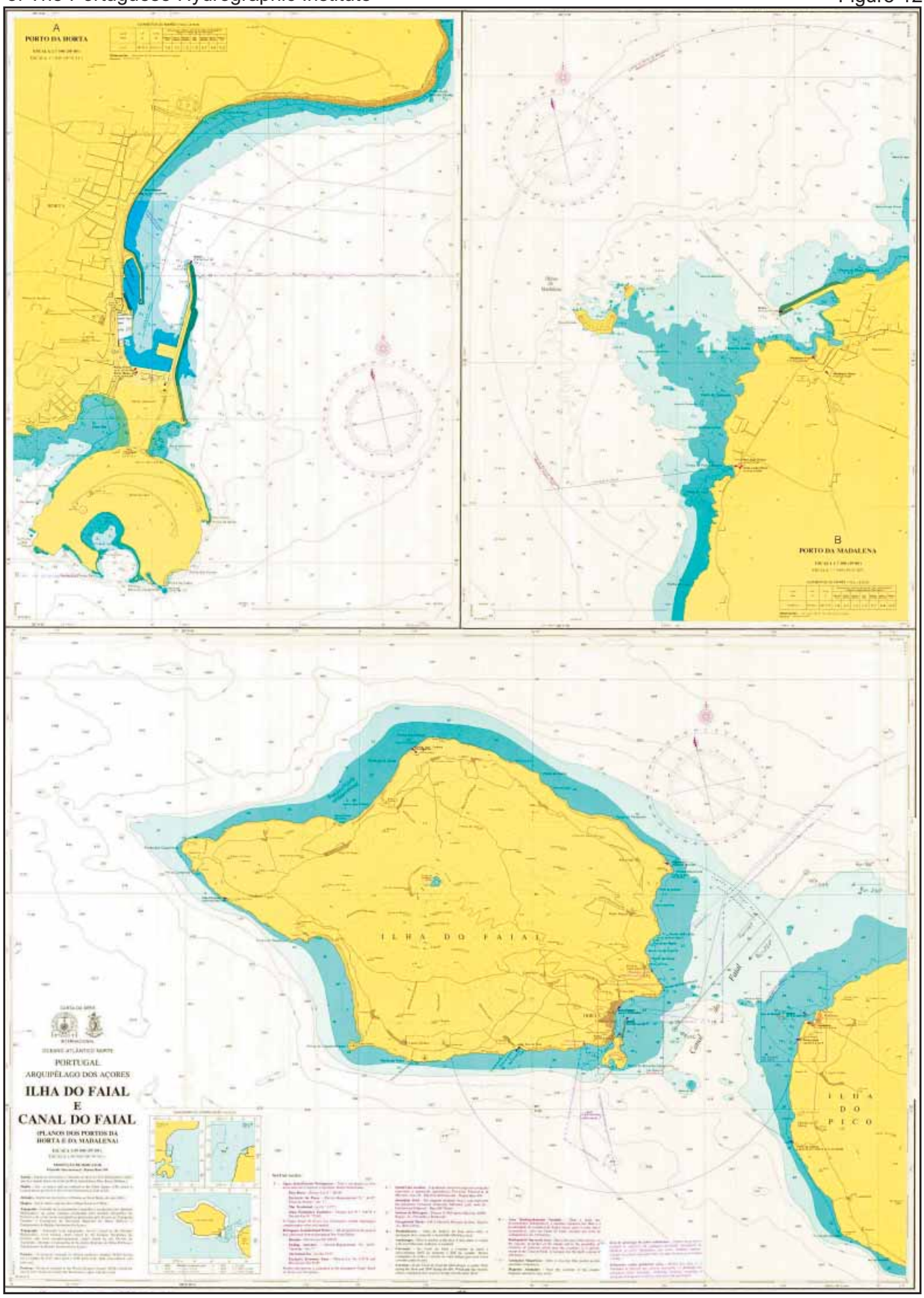


Chart BA1956

Chart reproduced with the kind permission
of The Portuguese Hydrographic Institute

Figure 12



Portuguese chart 46403 (Ilha do Faial e Canal do Faial)

Figure 13

Land added to Faial Island after volcanic eruption in 1957-8

1.8 PREVIOUS ACCIDENTS

The MAIB database of accidents and their causal factors has been interrogated for similar grounding and contact accidents that have occurred since the beginning of 2003. This research has found that the Branch has investigated 21 groundings and contacts where bridge management was a causal factor.

Many of these investigations have identified very similar safety issues to those of this investigation. A small selected sample is mentioned below.

- Grounding of *Attilio Ievoli* in June 2004. This Italian registered, double hulled chemical tanker ran aground on Lymington Banks in the west Solent. As a result of the accident, she suffered bottom plate indentation forward, but no hull penetration. It was found that poor bridge team management on the vessel resulted in a lack of awareness of the vessel's position and an inappropriate division of tasks.

- The vessel *Daggri* made contact with a breakwater in August 2004, while entering the terminal in severely restricted visibility. This accident resulted in the forward azimuth thruster blades of the propellers becoming distorted, the hull was indented but was not breached, and there were no injuries or pollution. It was found that the master and chief officer were not working together effectively in accordance with the principles of good bridge team management. Had they done so, the mistakes that were made could have been detected and corrective action taken.

- *Pride of Provence,* a ro-ro passenger ferry with 641 persons on board, collided with the end of the southern breakwater at the eastern entrance to Dover Harbour on 18 April 2003. It was daylight, the weather was good and the visibility clear. There was a strong north-easterly wind and a southerly flowing tidal stream across the entrance. Thirty passengers and crew suffered minor injuries in the accident, and the vessel was extensively damaged above the waterline. It was found that the principal cause of the accident was poor bridge communication and passage planning. Although the master briefed his bridge team on his intended approach and pre-berthing manoeuvre, the briefing was rudimentary and did not give key team members the information they needed to monitor the approach. The master's approach was not planned in detail, and was flawed, in that he did not show positive control of the navigation and did not allow sufficiently for the effects of the tide and wind.

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 OPERATIONAL PLANNING

2.2.1 The decision to anchor

CP Valour's master and chief engineer discussed the possible options during the morning of 9 December 2005. There were two realistic choices open to the master. The first was to continue the passage to Valencia at slow speed and conduct the repairs there; the second was to find a suitable anchorage in the Azores and to shelter from the southerly winds and south-westerly swell, where the repairs could be carried out.

Quick calculations showed that the second option would cause less delay. The master was confident that the engineers could fix the problem and enable the vessel to continue the passage at full service speed. The chief engineer suggested they would need up to a maximum of 12 hours in the anchorage and, as the cylinder head needed to be lifted, it was essential for it to be as calm as possible for safety reasons.

The master consulted the chart and the pilot book and found a suitable anchorage on the north-west coast of Faial Island which was just 7 hours away. This necessitated a detour of only 10 miles from their intended route. He was aware he could arrive there before sunset. Other possible charted anchorages were considered but were ruled out because they were not sufficiently sheltered from the southerly weather. The master had not been to any of these anchorages before. He decided to adjust the heading to steer towards the anchorage in Baia da Praia do Norte, Faial Island.

The master was under no external pressure to keep the accumulating delays to a minimum. Nevertheless, he and the chief engineer would have been very aware of the need to complete repairs as soon as practicable. The master would also have been fully aware of the penalties to the schedule if he had detoured but been unable to find suitably sheltered water. These considerations both informed his decision and placed added stress on his actions.

The MAIB considers that the master's decision to anchor in Baia da Praia do Norte was fully justified under the circumstances.

2.2.2 Passage planning

The decision had been taken to anchor the vessel in a little used anchorage which was unfamiliar to anyone on board. Information about the anchorage was contained in the Admiralty Sailing Directions and on the BA chart, both of which were consulted by the master. The chart was of a small scale, making it unsuitable for close inshore navigation. There was a warning on the chart which indicated that depths may vary considerably due to the volcanic activity. The chart contained no information on the surveys used to construct the chart, so the master could not have been aware of when, and how accurately, the anchorage had been surveyed. The chart depicted just one sounding in the whole bay.

The Admiralty publication "The Mariner's Handbook" was also carried on board. Had this been consulted, the master might have seen the warning that such a coastline needed to be approached having taken *special precautions*. Bearing in mind the factors highlighted above, good seamanship and navigation practice dictated the need for extreme caution and thorough passage planning.

A course line from the vessel's position directly to the charted anchor symbol had been pencilled on the chart in the morning, and the course to steer read off. Subsequently, just after he had come on watch at 1600, the chief officer had entered the latitude and longitude of the anchor symbol as a waypoint in the standalone GPS ie the one which was not integrated with the electronic chart system. Very soon afterwards, the second officer had entered another position, about 8 cables from the head of the bay, into the Transas electronic chart system. The master had read the sailing directions and consulted the chart; he was aware that the anchorage was about 4 cables from the head of the bay. The master had deduced from the lack of soundings on the chart that the bay had a fairly uniform depth of about 36 metres, and that it was, therefore, safe to take the vessel quite close to the charted shoreline, if necessary. The steep contours of the cliffs indicated to him that the shoreline was steeply shelving. This appears to have constituted the extent of the passage planning that took place. It would seem that there was no agreed cohesive plan of the approach, with each person involved having their own ideas about what was going to happen.

The MAIB considers that, as a minimum, the master should have determined:

- A planned anchorage position.
- A planned approach to the anchorage position, including desired speed and direction.
- A minimum shore approach distance.
- Radar clearing distances (and marked them on the chart).
- How the navigation was to be conducted.
- Clearly laid down roles and appropriate instructions for all personnel involved in the operation.

2.2.3 Pre-operation briefings

Operations such as this require prior discussion, to inform the bridge team and everyone else involved, of what is planned and what their individual roles will be in ensuring the operation's safe and efficient completion.

There appears to have been a cursory attempt by the master to brief his officers on what he expected from them during the anchoring operation. He spoke with the chief engineer about the engineering requirements for the repairs and he took these into account in his choice of anchorage. The master also discussed the anchoring arrangements with the chief officer. It was at this meeting that the master asked for one shackle of anchor cable on deck to be walked out prior to the approach into the anchorage, apparently to provide prior warning of any unexpected shallow water. The master also requested that, when the vessel was in position, the chief officer should walk the cable out with the windlass in gear, rather than let the anchor go with the windlass out of gear and control the cable using the windlass brake only.

This appears to be the extent of pre-operation briefings that took place.

2.2.4 Team management

It is apparent from the lack of a more inclusive meeting and thorough planning that the master liked to do things himself. The subsequent operation lacked any form of cohesive teamwork or an agreed plan. It appears the master was intending to take the vessel to the rough position of the anchor symbol on the charts and then see whether the sea conditions were calm enough for the engine repairs. If they weren't, he then intended to take *CP Valour* closer to the shoreline until they were. The master was navigating largely by eye and using the radar's VRM for indications of the distance from the head of the bay. The master was content to approach as close as 2 cables from the beach in his search for calm water.

This placed the vessel in a hazardous situation, which might have been identified before the vessel grounded if there had been a more thorough assessment of the risk and the bridge team had been fully briefed of the plan before *CP Valour* was committed to her approach into the bay. Because the approach plan had not been properly discussed, the key team members, ie the master, chief officer and second officer, all had different ideas on how the operation was going to be conducted. Crucially, the master had not told the second officer what his plan was, including that he might take the vessel in as close as two cables to the shore, if necessary. The second officer had not been given clear direction on what was expected of him, and was generally underutilised. He should have been used to frequently monitor the vessel's position and speed and to feed this information to the master. The master's management of the operation was poor, but the problem was further compounded by the second officer showing little or no initiative in supporting the master.

In any anchoring operation, knowledge about the depth of available water is vital. When anchoring in an area with limited charted soundings, frequent reference to the echo sounder becomes essential. Given these circumstances, it would have been prudent for the master to have called the third officer to the bridge to continuously monitor the echo sounder during the approach into the anchorage.

In the event, the master tried to do nearly everything himself, which caused him to become overloaded and to miss the fact that the engines had been left on half ahead inadvertently, and to misinterpret the speed of the vessel and the situation in general.

The master had completed both a bridge resource management course and a bridge team management course, in 2002, at the ship manager's own training facility in Split. However, few of the lessons taught during the courses appeared to have been put in place during this attempted anchoring.

The second officer had also completed the bridge team management course in 2003, but had put few of the skills taught on the course into practice.

2.3 CONDUCTING THE ANCHORING OPERATION

2.3.1 Navigation

The scale of the chart did not allow many positions to be marked during the vessel's approach. Just two positions taken from the vessel's GPS were plotted on the chart between EOSP, at 1631, and the vessel grounding at 1709. There was little room on the chart for any plotting to be done.

It is extremely difficult to judge distances solely by eye and, during *CP Valour*'s initial approach into the bay, the apparent proximity of the looming cliffs which surround the bay probably caused the master to misjudge the vessel's distance off the shore and turn the vessel in readiness for anchoring too early. Having done this, he quickly realised that the water was too deep and steeply shelving to make anchoring a possibility, and, in any case, the swell was causing the vessel to roll too much in that location.

It is probable that the master felt concerned regarding the schedule and, having made the decision to anchor rather than proceed at slow speed, it was important for him to find sheltered water in which to complete the repairs.

Daylight was fading as *CP Valour* approached the bay. The master was aware that anchoring in the bay, in darkness, would be more difficult than in daylight.

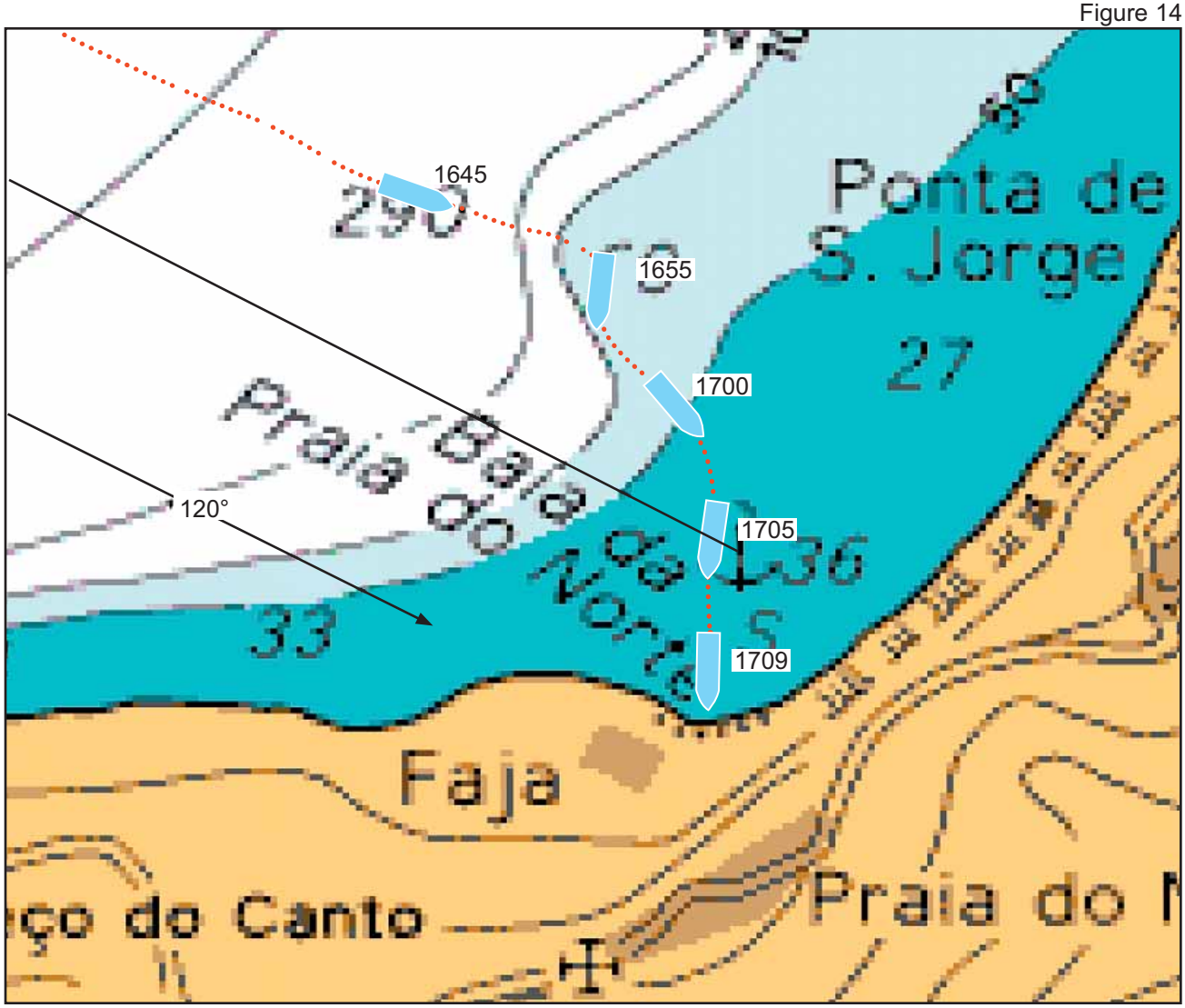
The master asked the second officer to take the con and steer *CP Valour* towards the anchoring position 8 cables offshore. In fact, this would probably have been a good location for *CP Valour* to anchor under the circumstances but, the master took the con back and headed further into the bay towards the shore. In doing so, he managed to take the vessel directly over and past the charted anchor position.

Shortly before *CP Valour* grounded, the master realised that the telegraph had been inadvertently left on half ahead. He asked the second officer for the ship's speed, and believed he heard "point six" as the reply. Understanding this response to mean a speed of 0.6 knots, the master was therefore content that the vessel's speed was appropriate. It appears that the second officer did not hear clearly the master's question concerning the speed, and his reply might have been intended to indicate the distance off the head of the bay. Whatever the circumstances, the master heard a reply which put his mind at rest concerning the vessel's speed, and he allowed the vessel to edge further towards the shore while he started astern engine movements in preparation for lowering the anchor **(Figure 14)**.

No one on board noticed *CP Valour* taking the ground, when she did so at 6 knots. However, the seabed in that location consisted of rocks covered by sand, and it is possible that she slowed gently. The master on the bridge, and the chief officer on the forecastle, considered the vessel to have stopped in the water. The master ordered the anchor to be walked back as he put increasing astern power on to help lay out the cable. It was only the fact that the vessel did not move that alerted the crew that they were aground. By that time, 5 shackles of cable had piled up on the seabed.

Once the master realised his vessel was aground, he ordered the chief officer to heave the anchor up, believing that he would soon be able to refloat the vessel under her own power.

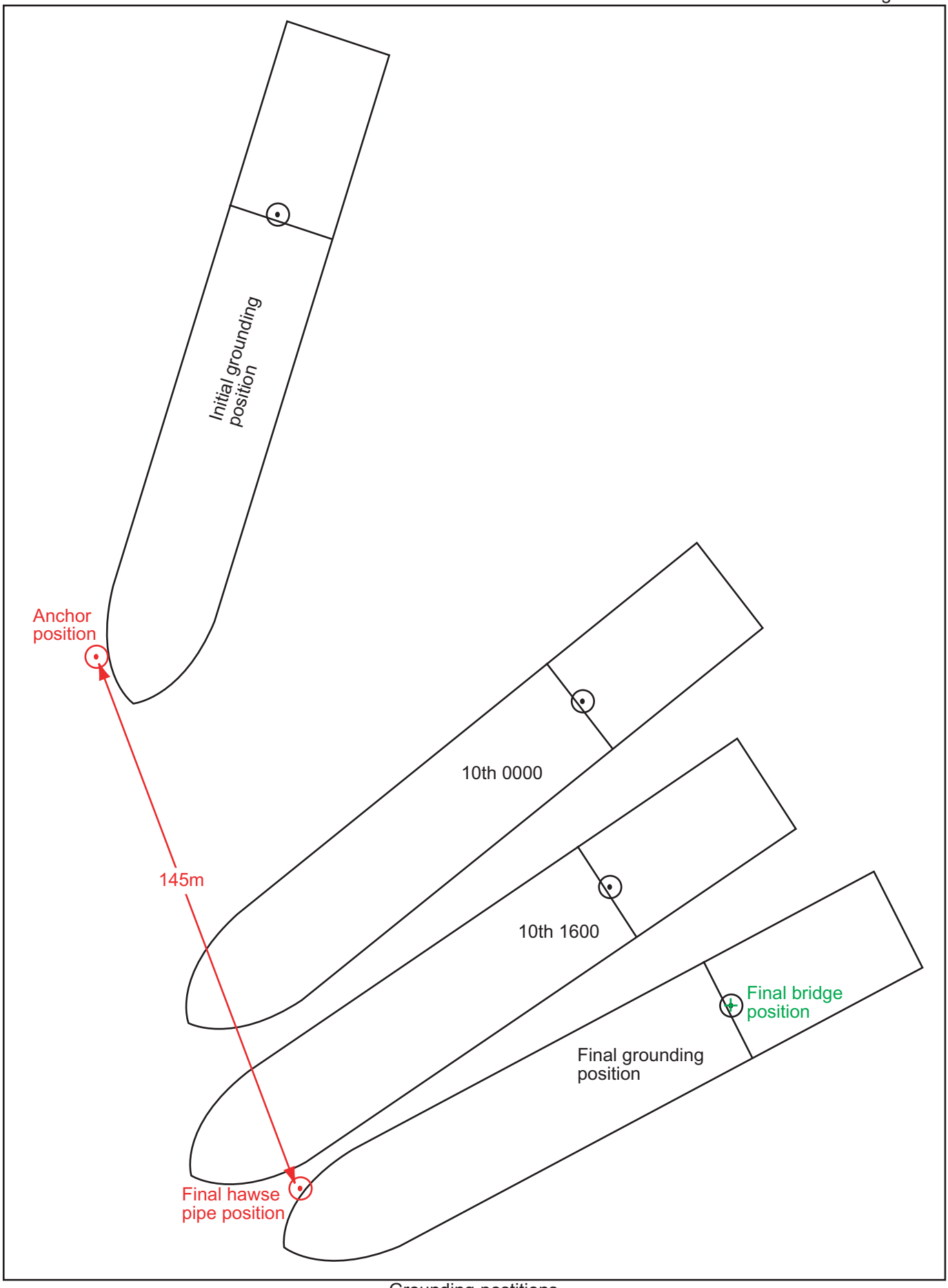
Figure 14



Plot of the vessel's track

Over the next 2 days, the vessel was driven further ashore under the influence of an onshore current, and later wind and waves. She finally came to rest at noon on 11 December. Had the master decided to leave the anchor down, he would have had 5 shackles of cable laid on the seabed on 11 December. In that situation, it is unlikely the anchor could have been used to keep the vessel from being driven further aground. However, in many circumstances, it is good practice to leave it out **(Figure 15)**.

Once it had been established that *CP Valour* was aground, the bridge team made no further attempt to monitor her position. It would have been advisable to establish a plot of the vessel's position and aspect on a large scale plotting chart to determine if she remained stationary, or tacked further inshore. Such information could have been useful to the salvors.



Grounding postitions

2.3.2 Using the anchor to warn of shallow water

The master had ordered the chief officer to walk out the anchor prior to arrival, to give warning of shallow water. This is not a conventional method of detecting the approach of shallow water, but it does show that the master had some concerns regarding anchoring in the bay. During the incident, the master appears to have relied heavily on this somewhat questionable early warning system

The master's intention was for the anchor to be 10 metres below the keel. The chief officer had been ordered to lower the anchor to one shackle on deck. The distance from the keel to where the first joining shackle was reported to have been positioned was about 23 metres.

A standard shackle of cable was traditionally 15 fathoms or 27.4 metres in length. A shackle of cable as supplied from some Far Eastern countries is actually 25 metres in length. To this, the length of the swivel joining section, and the height of the anchor itself, would need to be added to establish how far the base of the anchor was beneath the keel. Notwithstanding the possible variation in the length of the first shackle, simple extrapolation would indicate that, with one shackle of cable on deck, the base of *CP Valour*'s starboard anchor was significantly less than 10 metres below her keel as she approached the anchorage.

As *CP Valour* grounded, the master received no warning from the anchor team that she had entered shallow water, despite frequent requests for information. This could be for any of the following reasons:

a) The vessel grounded on the port side only, and had deeper water on the starboard side where the anchor was walked out;

b) The anchoring party were distracted, possibly due to the close proximity of the land, and did not notice a cable movement as the anchor dragged along the bottom; or

c) Insufficient cable had been walked out;

d) The height from the base of the anchor to the first shackle mark was less than 23 metres; or

e) A combination of any of the above.

Using the anchor for this purpose is fraught with problems. If the anchor is lowered too far it may bite as the vessel enters shoaling water, and cause damage. If it is not lowered far enough it may give insufficient warning to avoid a grounding. A carefully monitored echo sounder, even if the transducer is positioned aft in the vessel, will give better and more detailed warning of the presence of shallow water.

2.3.3 The master's role

The master had become overloaded by the time *CP Valour* grounded, because he had not delegated sufficient monitoring tasks to the second officer Simultaneously, the master was: monitoring the distance off the head of the bay; keeping a picture in his mind of his intended anchorage position and the sea bottom topography; adjusting the ship's speed using the telegraph; occasionally checking the echo sounder, talking to the chief officer via walkie-talkie; giving orders to the helmsman; and assessing the suitability of the sea and swell conditions.

2.3.4 Anchoring

The master onboard *CP Valour* had completed very few anchoring operations either as a chief officer in charge on the bridge or when in command. Container vessels on liner routes rarely need to anchor as they generally adjust their ETA to meet the pilot boat on arrival.

The anchoring operation he was planning to undertake on this occasion was not easy, taking into consideration the chart scale, lack of sounding information, the weather conditions and lack of local knowledge.

The centre of the charted anchor symbol was, in fact, 5 cables off the head of the bay. The Sailing Directions describe the anchorage as being about 4 cables north of the head of the bay. The master had already decided to anchor even closer inshore, if necessary, to be sure of calm water.

At 1709, *CP Valour* was only 2 cables off the shore, and was aground. The master, believing his vessel to be stationary but still afloat, continued to try to anchor the vessel in that position.

The length of the vessel was 172 metres. The bridge and, more importantly, the GPS antenna, were situated aft and about 125 metres or 0.67 cable from the bow. The master was content to anchor as close as 2 cables from the shore because he believed the vessel would lie to the wind, and therefore the stern would stay offshore. This decision indicates a lack of seamanship skills and anchoring experience. In this sheltered anchorage, the direction and strength of any tidal streams or currents would have had the largest effect on how the vessel lay to her anchor. This was completely unknown in this location.

If *CP Valour* had anchored at the charted anchor symbol position 5 cables off the head of the bay, or even 4 cables off, as the Sailing Directions had indicated, she would have had sufficient room to swing, even if she had encountered an onshore current.

2.4 FATIGUE

The vessel had been working a normal sea routine for 6 days prior to the accident. An examination of the hours of work and rest reported by the officers involved in the accident indicated a low probability that fatigue influenced the decisions they made.

2.5 AUDITING PERFORMANCE OF SHIP'S STAFF

The officers on *CP Valour* were experienced and well trained, and there were adequate resources in the form of fleet orders and operational guidance on board. However, the performance on board on the day of the accident fell short of company and, indeed, industry expectations. In particular, despite both the second officer and the master being fully qualified, and having received good quality bridge resource management training, the bridge team performed poorly; this was the principal cause of the accident.

This accident, and the accidents detailed in Section 1.8, share the common factor of poor bridge team management. However, another similarity exists in these and other cases, in that the ISM systems appeared good and in order, and the crew were reasonably well qualified and trained. There is no benefit to be gained from good training and qualifications unless they are used as the basis for good practice when the

crew return to their ships. This raises the question of how employers and others can be sure that bridge teams are actually following instructions and guidance, and performing well on board their vessels.

There is thus a need for ship owners and managers to ensure that their orders and training are being put into practice by those operating their ships. One way of achieving this, which has been tried by a number of companies including CP Ships and Split Ship Management, is onboard auditing, where superintendents occasionally sail with the vessel to monitor performance on board. This has been found to be only partially effective and there is no guarantee that the crew don't change their performance because they are being monitored.

Another method of monitoring, which shipowners and managers will be able to utilise in the future, involves the use of voyage data recorders (VDRs). Where a VDR is fitted, the vessel can be visited in port and the recent data downloaded to enable managers to analyse bridge team performance under 'normal' operating conditions. Feedback from this monitoring process could then be given to the bridge team to encourage improved performance.

VDRs are already fitted to many vessels, and they will be fitted to all vessels over 3,000gt within the next few years.

CP Valour was not fitted with a VDR, but she did have an electronic chart system. The second officer was monitoring the system during the incident. In post incident investigation, the recording from the ECS proved invaluable to the MAIB inspectors. However, this recording was not used by those on board to evaluate their own performance and to see what had actually happened. The master had reported to the managers that the vessel grounded at a speed of between 0.2 and 0.4 knots on sand. This was what he had thought at the time. On the basis of this information, the managers had arranged for the harbour tug to attend the vessel. The master, however, had doubts in his mind as to how the vessel had grounded. Her ECS had an easily accessible replay capability, which clearly showed the vessel grounding at 6 knots.

2.6 THE DELAYS TO THE SALVAGE OPERATION

If the managers and the captain of the port at Horta had known that *CP Valour* had been proceeding at a relatively high speed, and was therefore likely to be firmly aground, a more effective salvage response might have been started earlier.

The local harbour tug was quickly on the scene after being contacted, and managed to attach tow lines to *CP Valour*'s stern. Unfortunately, she was too hard aground for a tug of this power to tow her clear. Realising that she was hard aground, the salvage tug *Fotiy Krylov* was then ordered, and it very soon got underway, making for *CP Valour*'s position.

Fotiy Krylov arrived on scene on Saturday evening, after the weather had begun to deteriorate. The harbour tug was chartered by the salvors to assist. However, as she attempted to run a tow rope between the two vessels, the salvage tug's propeller and tailshaft became fouled by a rope. *Fotiy Krylov* was forced to leave the area to clear her propeller, and did not return for another 36 hours. By that time, the weather had deteriorated even further, and the vessel was aground in her final position.

CP Valour had been forced further ashore, turned by currents and the sea during Friday night and Saturday morning, and was aground on rocks below the sand. Many of the vessel's tanks were holed prior to the salvage tug's initial salvage attempt to connect a tow, and oil was leaking to the sea.

It is considered unlikely that, even if a towline had been successfully secured at the first attempt, on the Saturday evening, the tug would have been able to refloat the vessel as, by then, most of her bottom tanks were holed, and she had settled deep into the sand and onto the rocks below **(Figure 16)**.

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Figure 16

Vessel still aground 24th January 2006

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES

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

- The master's decision to anchor in Baia da Praia do Norte was fully justified under the circumstances. [2.2.1]

- Good seamanship and navigation practice dictated the need for extreme caution and thorough passage planning when approaching the coast to anchor using a small scale chart. [2.2.2]

- The master had deduced from the lack of charted soundings in the bay that it was safe to take the vessel quite close to the charted shoreline if necessary. [2.2.2]

- There did not appear to be an agreed and cohesive plan of the approach, each person involved seemed to have their own ideas about what was going to happen. [2.2.2]

- No formal pre-operation briefing took place. [2.2.3]

- The management of the bridge team was poor, but the problem was compounded by the second officer showing little or no initiative in supporting the master. [2.2.4]

- Due to the obvious concerns in undertaking such an anchoring operation and the fact the echo sounder was of a type with no remote readout or alarm capability, due consideration should have been given to having another officer on the bridge. [2.2.4]

- Daylight was fading as *CP Valour* approached the bay. The master was aware that anchoring in the bay in darkness would be more difficult than in daylight. [2.3.1]

- It appears that the second officer did not hear clearly the master's question concerning the speed and his reply might have been intended to indicate the distance off the head of the bay in nautical miles. [2.3.1]

- Once the master realised his vessel was aground he ordered the chief officer to heave the anchor up. In this case it would have been better practice to leave it out. During the following days the vessel was swept further aground. [2.3.1]

- Using a lowered anchor to warn of shallow water is a practice that is fraught with problems. A carefully monitored echo sounder, even if the transducer is positioned aft in the vessel, is a better method. [2.3.2]

- Because the master did not delegate sufficient monitoring tasks to the second officer, by the time the vessel grounded, he had become overloaded. [2.3.3]

- The decisions the master took when attempting to anchor the vessel indicated a lack of seamanship skills and anchoring experience. [2.3.4]

- An examination of the hours of work and rest reported by the officers involved in the accident indicated a low probability that fatigue influenced the decisions they made. [2.4]

- Both the master and second officer had completed non-mandatory bridge team training courses, however few of the lessons learned had been put into practice on the bridge of *CP Valour* on the day of the accident. [2.5]

- There is a need for ship owners and managers to ensure that their orders and training are being put into practice by those operating their ships. [2.5]

- *CP Valour*'s electronic chart system had a recording feature, but the record of the incident was not evaluated by those on board to inform them about what might be necessary during the salvage. The owners were told that the vessel had grounded at between 0.2 and 0.4 knots on sand, when in fact she had grounded at 6 knots. [2.5]

- It is considered unlikely that, even if a towline had been successfully secured at the first attempt on the Saturday evening, the salvage tug would have been able to refloat the vessel as, by then, most of her bottom tanks were holed, and she had settled deep into the sand and onto the rocks below. [2.6]

SECTION 4 - ACTION TAKEN

Split Ship Management Ltd has carried out internal and external investigations which concluded that good bridge team management is essential and in particular, attention should be paid to effective passage and operational planning plus the need for good communications. In particular the company has:

- Issued a new fleet circular for revised anchoring procedures.
- Immediately instigated refresher training in bridge team management, engine team management and ships' handling/manoeuvring such that all officers will be retained every two years.
- Revised its ports of refuge in the Contingency and Emergency Response Manuals.
- The external report recommended that vessels do not anchor in Baia do Praia Norte and that whenever possible, masters should seek licenced pilotage if anchoring in unknown waters.

Additionally, the company's external report recommended the following for the Western Azores region due to its vulnerable coastlines and high traffic density:

- VHF and SAR systems should be improved.
- Tug(s) on permanent standby should be of sufficient power to take into account the increasing size of vessels and the implications of the visible increase in extreme weather events.
- Thought should be given to the immediate availability of vessels/barges with capacities capable of taking discharged fuel etc from stricken vessels.
- There should be immediate availability of equipment and materials to swiftly deal with pollution.

The Portuguese Hydrographic Agency has carried out a hand lead line survey of the bay and found the soundings to be in accordance with the charted depths.

The UK's Marine Accident Investigation Branch will circulate, at the time of final publication of this report, a two-page account of this accident and the principal lessons to be learned from it. This summary account will be circulated as widely as possible within the international marine community. Among other issues, the Branch will stress the importance of good bridge team management procedures, and will highlight the problems associated with ensuring that the good practice espoused in training and in written procedures is mirrored by the actual practice on board ships. The Branch will particularly highlight the future use of Voyage Data Recorders for this purpose.

SECTION 5 - RECOMMENDATIONS

Split Ship Management Ltd is recommended to take the following additional action in the light of this investigation report:

2006/195 Revise its management controls to ensure verification of the effectiveness of its bridge management procedures.

Marine Accident Investigation Branch
August 2006