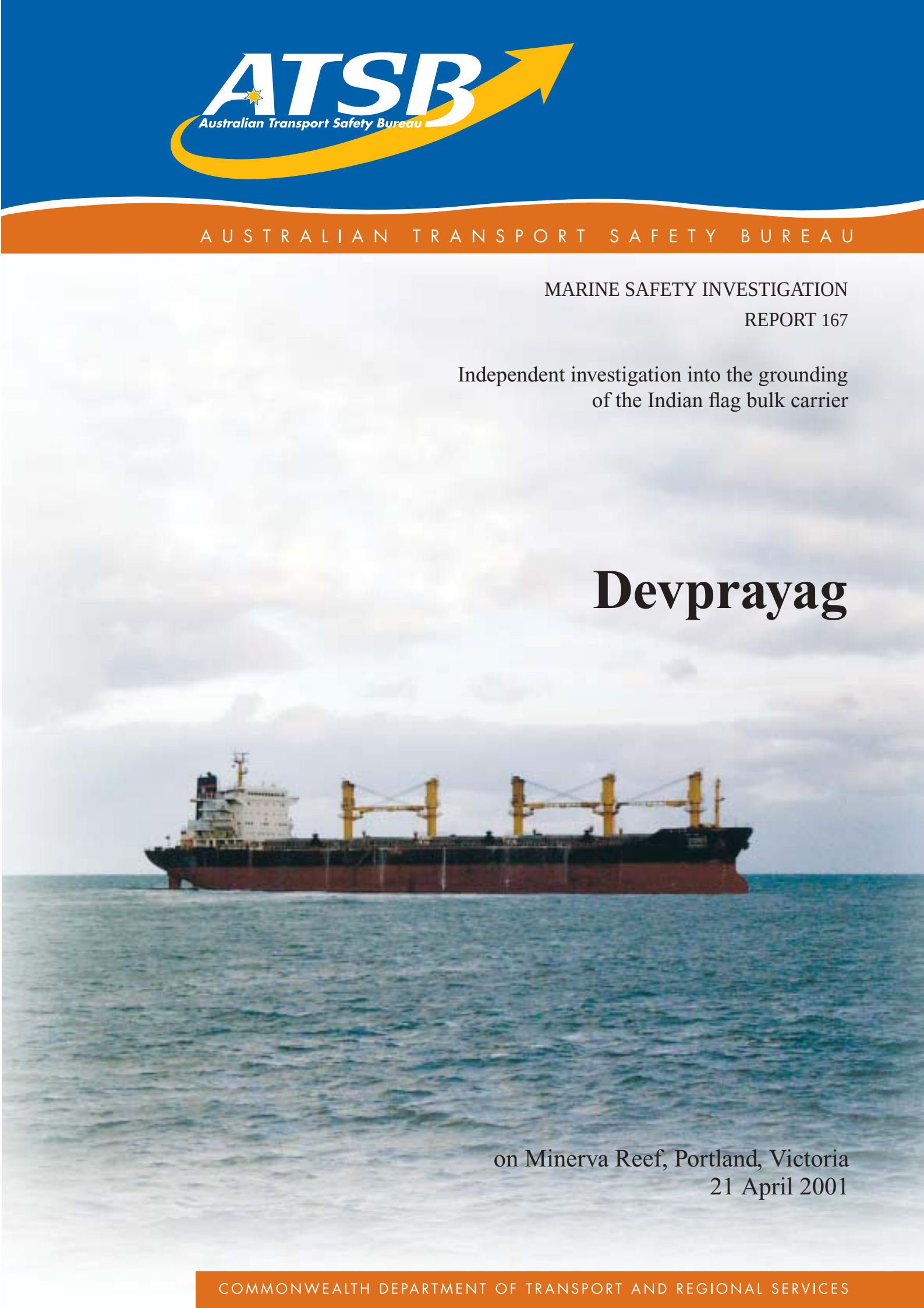
ATSB
Australian Transport Safety Bureau

AUSTRALIAN TRANSPORT SAFETY BUREAU

MARINE SAFETY INVESTIGATION
REPORT 167

Independent investigation into the grounding
of the Indian flag bulk carrier

Devprayag



on Minerva Reef, Portland, Victoria
21 April 2001

COMMONWEALTH DEPARTMENT OF TRANSPORT AND REGIONAL SERVICES

Department of Transport and Regional Services
Australian Transport Safety Bureau

Navigation Act 1912
Navigation (Marine Casualty) Regulations
investigation into
the grounding of the Indian flag bulk carrier
Devprayag
on Minerva Reef, Portland, Victoria
on 21st April 2001

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Investigations into marine casualties occurring within the Commonwealth's jurisdiction are conducted under the provisions of the Navigation (Marine Casualty) Regulations, made pursuant to subsections 425 (1) (ea) and 425 (1AAA) of the *Navigation Act 1912*. The Regulations provide discretionary powers to the Inspector to investigate incidents as defined by the Regulations. Where an investigation is undertaken, the Inspector must submit a report to the Executive Director of the Australian Transport Safety Bureau (ATSB).

It is ATSB policy to publish such reports in full as an educational tool to increase awareness of the causes of marine incidents so as to improve safety at sea and enhance the protection of the marine environment.

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Australian Transport Safety Bureau
PO Box 967
Civic Square ACT 2608
AUSTRALIA

Phone: 02 6274 6478
1800 621 372
Fax: 02 6247 3117
E-mail: marine@atsb.gov.au

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***Devprayag* aground at Portland**

Summary

At 1950 on 20 April 2001, the Indian flag bulk carrier *Devprayag*, after completing discharge of a cargo of fertiliser at the Victorian port of Portland, anchored off the port to prepare its hatches for a cargo of grain to be loaded at Geelong.

The anchorage at Portland is exposed to the south and east and, at the time of anchoring, the wind was southerly, force 3. It increased the next morning to force 5, then to force 6 later that afternoon.

At 1600 on 21 April, the master, concerned that the vessel was yawing excessively, had ordered the engine room to be on five minutes notice. Later that evening, the anchor dragged almost half a mile to the northwest before holding once more, but no action was taken by the ship's officers or the master.

By 2000 the wind was force 6/7. At 2230, the officer of the watch observed that the anchor was dragging again and he alerted the master and the engine room. The master sent the mate forward to weigh the anchor, intending to anchor again at the original position.

While the anchor was being weighed, the ship was set northwest towards Minerva Reef, along the Portland foreshore and, at about 2320, it grounded on the reef.

No one was injured as a result of the grounding and no oil or other pollutant escaped from the ship. The ship was checked for damage and no breach of the hull was found.

The vessel was detained by the Australian Maritime Safety Authority (AMSA) because of the possibility of hull damage and pollution. Four days after the grounding, the ship was refloated with tug assistance. It was inspected by divers at Portland and was released to continue its voyage after being issued with a condition of class.

This report concludes that, among other factors contributing to the incident:

- The master, after anchoring on a lee shore, permitted the vessel to remain at the exposed anchorage in deteriorating weather;
- The master had not noted the warning in the Sailing Directions that the anchorage was not recommended in strong E and SE weather and,
- Priority was given to the task of preparation of the hatches for cargo rather than to the safety of the ship.

This report recommends that:

- Mariners note the importance of using Sailing Directions when planning passages, when entering or leaving a port or anchoring in or near a port and
- That they be fully aware of weather conditions as well as the fact that inclement weather can alter a relatively safe anchorage into one that is unsafe.

Sources of Information

Master, officers and crew of *Devprayag*

Portland Port Authority

Residents of the port of Portland, Victoria

Marine Board of Victoria

Australian Maritime Safety Authority

The Bureau of Meteorology, Melbourne

Acknowledgment

The Criminalistics Team, Forensic Services, Australian Federal Police

Devprayag

Devprayag is a 5-hatch, geared, Indian flag bulk carrier, owned by The Shipping Corporation of India Limited (SCI). The vessel was built by Daewoo Shipbuilding and Heavy Machinery Ltd in Okpo, Korea in 1986 and is classed by Det Norske Veritas (DNV).

Devprayag has a length overall of 189.00 m, a moulded breadth of 30.40 m and a moulded depth of 16.40 m. It has a summer draught of 11.825 m and a summer deadweight of 47 349 tonnes.

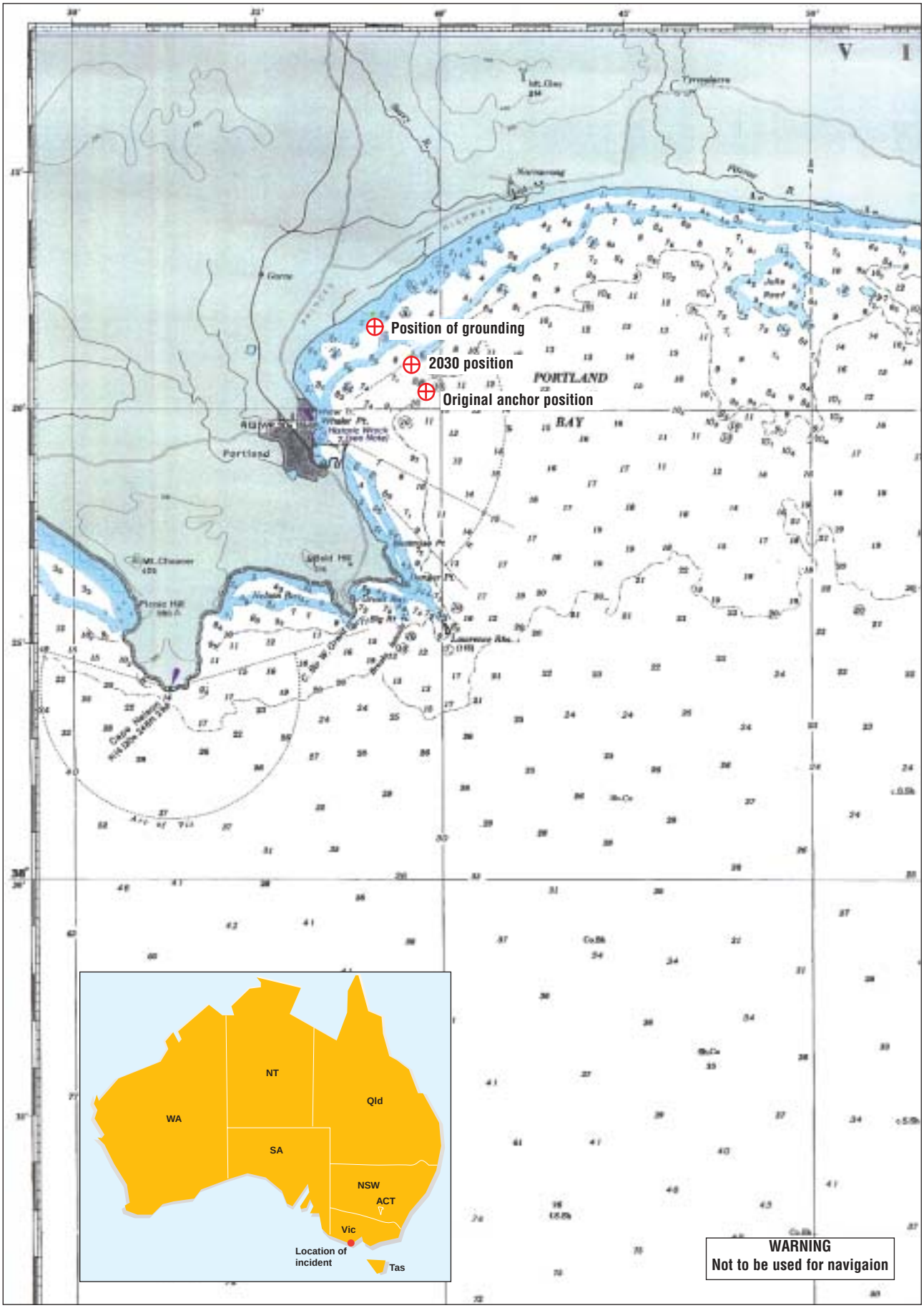
Propulsive power is provided by a 6-cylinder B&W 6L60MCE, slow speed direct drive diesel engine producing 7 944 kW at 111 rpm. This drives a single, four-bladed propeller, 6 000 mm in diameter.

Devprayag is equipped with a range of bridge and navigation equipment, including two radars (a JRC JMA9000 Series ARPA and a Selesmar) and a Koden KGP-98 GPS.

At the time of the incident, the vessel had 44 crew on board, all Indian nationals. The complement included a master, three mates, a cadet, a radio officer, a chief engineer, three engineers and an engineering cadet.

The master and other officers were all appropriately qualified.

FIGURE 2:
Portion of Chart Aus 786 (as used by the vessel) showing positions of *Devprayag*



Narrative

Devprayag sailed in ballast from Portland at 1836 on 20 April 2001 after the completion of discharge of a cargo of fertiliser. The departure draughts were 4.34 m forward and 6.46 m aft.

The master had sought the advice of his agent about the vessel's proposed schedule and his options. He wished to anchor for hatch cleaning before continuing the voyage to Geelong to load a cargo of grain for Aden.

The agent suggested that the master drop anchor for hatch cleaning outside Portland where, in the agent's opinion, he would have some shelter from the wind and seas, whereas the anchorage at Geelong was very exposed and the holding ground was bad.

During the vessel's departure from the berth, the master asked the pilot to recommend a suitable anchor position. The pilot suggested a position northeast of the breakwater, outside the port limits.

At 1950, *Devprayag* anchored off Portland, about 0.5 miles south of the 6 fathom contour, 2.02 miles from the main breakwater, which was bearing 231° (T). This position was about 1.5 miles south-southeast of Minerva Reef. The master, expecting strong winds, used the port anchor and 7 shackles (192m) of cable in about 16 metres of water.

At 2000, the wind was from the south at force 3 and the seas were slight with a low swell. Weather conditions were the same at midnight.

After the vessel was brought up to the port anchor, the GPS anchor watch alarm was set at 0.3 miles.

The master's night orders for 20 April stated that the standing orders were to be observed and that the anchor bearings and distances from the coast and the breakwater were to be frequently checked. The officers were instructed, if the weather deteriorated, to get the engine ready and call the master immediately. They were also instructed to call the master at any time if they had any concerns.

At 0400, the next morning, the mate went to the bridge for his watch together with the cadet and a quartermaster. He noted that the vessel had maintained its position.

At about 0645, the cadet left the bridge to open the hatches for cleaning. The officers' watch routines were changed to permit them to be on deck for hatch cleaning while the master, assisted by the radio officer, kept watch on the bridge.

At 0800, the wind was logged as southerly, force 4 (this entry, however, was overwritten to read force 5). There was a moderate sea and swell with an overcast sky. At noon the wind was logged as southerly, force 6 with moderate seas and swell. The sky was overcast and it was raining.

At 1415, the master decided to rest. The senior second mate went periodically from the deck to the bridge to check the vessel's position while the master was absent. At 1600, the senior second mate handed over the watch on the bridge to the cadet and returned to the deck. Also at 1600, the master instructed the engine room to be on five minutes notice as the ship was yawing excessively. At that time, the wind was logged as southerly, force 5 (overwritten to read force 6). The sea and swell were logged as moderate and the sky was overcast with intermittent rain.

At about 1600, the mate went to the bridge and checked the ship's position. He found that there had been no change. He left the cadet on the bridge to keep the anchor watch and went down to the deck to supervise the preparation of hatches.

The mate remained on deck until about 1830, by which time it was raining heavily.

The senior second mate went to the bridge at 1830 where he observed that the GPS position

was 0.37 miles from the original position. He asked the cadet about the change and was told that the ship's position was now constant. Before leaving the bridge, he instructed the cadet to inform the mate of any further change of position.

Five or ten minutes later, when the cadet noticed that the GPS position was now 0.39 miles from the original position, he informed the mate. The cadet had apparently not heard an alarm from the GPS to indicate that the vessel was more than 0.3 miles from its original position.

The mate went to the bridge and, telling the cadet to monitor the GPS to see if the vessel continued to drag, checked the echo sounder, which was indicating 10.3 metres under the keel. He also checked the position using the radar. At the time, the position appeared 'perfectly all right' to him.

Just before 1900, the master went to the bridge where he spoke to the mate. The cadet heard the master and mate discussing the hatch cleaning, after which, at about 1915, the master left the bridge. At about 1920 the mate, having told the cadet to monitor the vessel's position using radar, also left the bridge.

At 2000, the wind was from the south at force 6 (the original entry had been overwritten to read force 6/7). The cadet wrote up the deck logbook and, at about 2015, handed over the watch to the junior second mate. The cadet informed him that the radar distances and bearings were now constant, but the GPS showed that the vessel was 0.42 miles from its original position. The cadet also said that the mate had been informed of the GPS position and that there had not been any alarm from the GPS.

Before he left the bridge, the cadet asked the junior second mate to inform the master and the mate if the anchor dragged any further.

The junior second mate, alone on the bridge, checked the GPS and found that the vessel had dragged 0.47 miles from the original position of the day before. The bearing and distance of the main breakwater was now 216° (T), 2.3 miles. The distance from the nearest land was 1.4 miles. The vessel maintained this position for some time.

At 2230, the junior second mate noticed that the vessel was dragging anchor once more towards the coast and the bearing of the main breakwater was decreasing. He informed the master that the vessel was dragging anchor and called the engine room, telling them to get the engine ready.

The master went to the bridge immediately and called anchor stations. At 2235, the engine room confirmed that the engine was ready. The mate, the bosun and the carpenter went forward and commenced weighing the anchor at 2236, at which time the engine was put on 'stand by'.

The senior second mate went to the bridge to assist and, since there was no quartermaster on the bridge, took the helm. A quartermaster arrived about 10 or 15 minutes later and took over the helm. The junior second mate stood by the engine telegraph and also checked bearings and distances on the radar, plotting positions on the chart. Some positions were also plotted on the chart by the senior second mate.

The first engine movement was 'half ahead' at 2246. The ship was on a heading of 130° and, as the anchor was being weighed, the vessel was swinging to port. The cable was reportedly leading initially to port but, soon after this, started to lead under the bow to starboard. The master ordered 'full ahead' on the engine for a short period and 'hard a starboard' on the rudder to bring the ship's head around to seaward.

Despite starboard rudder and the use of the engine ahead, the vessel would not, according to the master, turn to starboard. The master then thought that he might be able to drag the anchor south, away from the coast. The vessel's heading was now 060° and, between 2255 and 2306, he stopped weighing the anchor while the engine was working ahead with full starboard rudder.

There were 4 shackles of cable out as the master attempted to turn the bow towards the south, away from the coast.

However, the vessel would still not come round to starboard and, at 2306, on a northeasterly heading, the master ordered the anchor to be weighed once more. The ship's head went further to port, to 030° and, in an attempt to prevent the vessel going aground, the master ordered the engine put to full astern at 2307.

At 2315 the anchor was aweigh and the engine was still at full astern. Despite various other engine movements, ahead and astern and use of the rudder, the vessel grounded at 2324.

Meanwhile, ashore, the police had been informed by a member of the public that the ship appeared to be in trouble. This message was passed to Portland port control at 2310. The log of events maintained by the port stated that, at 2320, the vessel was believed to be aground, bearing 018° (T) from the main breakwater, distant 2.83 miles (GPS position 38° 17.9' S, 141° 38.2' E), on a heading of 270°. At 2323, port control called the vessel and was advised that it was aground. However, shortly afterwards, the vessel advised port control that the actual time of grounding was one minute later, at 2324.

Nobody was hurt as a result of the grounding and no oil or other pollutant escaped from the ship. The ship was checked for damage. All tanks in the engine room, all ballast tanks, bilges and void spaces were sounded and the hull was found to be sound.

Following the grounding, the owners and the salvage company negotiated the terms of the salvage agreement. The ship was eventually refloated at 1045 on 25 April using two tugs from Portland with the assistance of a tug from Melbourne. After refloating, the ship was inspected by divers whilst alongside at Portland and then released by AMSA to continue with its passage. A condition of class was imposed on the vessel by DNV.

Comment and analysis

Evidence

Investigators from the ATSB interviewed the master, the mate, both second mates, the cadet, the helmsman and the chief engineer of *Devprayag*.

The ship's log books, bell and engine movement books were copied to assist with the investigation. The ship's navigation chart was also copied as a replacement chart was not readily available to leave on board the vessel. The ship's chart was later sent to the ATSB.

Relevant messages to and from the ship were obtained as well as a copy of the master's statement of facts in respect of the grounding. Radar and GPS manuals were also used to assist with the investigation.

Information on the weather at the time of the incident was obtained from the Harbour Master's office in Portland. This weather data was downloaded from the weather station at Portland, situated mid-way along the lee breakwater of the port. The Bureau of Meteorology had advised the Harbour Master's Department that the wind recorded by the Bureau at the airport was predominantly from east of south during the incident.

The Bureau of Meteorology provided the ATSB with weather information from the automatic weather stations at Cape Nelson, Portland and Cape Otway.

A local resident, himself a seafarer, who had witnessed the incident from the shore, provided the ATSB with a diagram of the track followed by the ship, from his perspective, in the hour before the grounding.

The Forensic Services of the Australian Federal Police assisted the ATSB with an examination of erasures and indentations on the navigation chart used by the ship at Portland.

Ship's equipment, logs and charts

All the ship's main systems and equipment were functional apart from the ship's course recorder, which was unserviceable.

Positions plotted on the navigation chart by the cadet and the second mates, as the ship dragged and grounded, had all been erased before the investigation commenced, the master stating that he 'might have been responsible' for the erasures. This made it difficult to verify, from the chart, those positions or the direction in which the ship had dragged during the incident.

The ship's JRC ARPA radar stores past track information and evidence was provided to the investigation that it had, indeed, stored the ship's track from the initial anchored position to the position of the grounding. However, this information had also been deleted. The radar had been in use continuously since the night of the grounding and the removal of the track must have been carried out deliberately.

Entries relating to the wind force in the ship's log had been altered before the investigators boarded the ship. The original entries of wind force had been amended upwards. Interviews revealed that all the officers were aware of the correct means of altering a log book entry by putting a line through an incorrect entry before inserting the correct entry and initialling it. However, no one admitted to the alterations that had been made in the ship's log.

The erasing of positions on the chart and the removal of the track from the radar as well as conflicting evidence from the master and the officers made it difficult to reconstruct an accurate sequence of events leading to the grounding.

At best, the overwriting in the log and the chart erasures show unprofessional watch-keeping practices. At worst, there was a deliberate attempt to obstruct the investigation.

Anchor watch

The ship's anchor position was checked using visual bearings, radar ranges and bearings as well as by GPS.

The anchor watch alarm was set on the GPS for a distance of 0.3 miles after the vessel was brought up at the anchorage. The GPS anchor watch alarm sounds when a ship moves a preset distance from the initial position, in this case at a distance greater than 0.3 miles. By 1830, the vessel had moved more than 0.3 miles from the original anchor position and the alarm should have sounded. There is no evidence that the alarm was defective, but the cadet apparently did not hear it.

The mate's submission on the draft report read in part:

> …At about 1835 hrs on 21 April 2001, when I went to the bridge, the GPS position was definitely not 0.39 miles from the original position but was much less than that. The exact distance I cannot however recall as the same was not recorded. Additionally, the position of the vessel as ascertained from the radar as well as on the chart indicated the vessel to be well within its swinging circle. Obviously therefore the GPS alarm set at 0.3 miles did not sound and the cadet did not hear the same.
>
> At about 1900 hrs on 21 April when the master came on the bridge, he was first shown the vessel's position both on the radar as well as on the chart and the master himself verified the same. It was only after that, other issues including hatch cleaning were discussed. Had the vessel's position been significantly different from her original position at that time, the same would have definitely been noticed by the master. Prior to leaving the bridge, the master ordered the cadet to monitor the vessel's position frequently.
>
> …In all probability the vessel's position might have shifted to more than 0.3 miles sometimes after 2000 hrs during which time, the GPS alarm might have sounded.

It is possible that the anchor watch alarm was not correctly set. Setting the anchor watch alarm is done in two stages. The anchor watch alarm range is first set, then the alarm itself is set. However, the senior second mate, who set the anchor watch alarm on the GPS, did give the investigators the impression that he was familiar with the procedure for setting it up.

It is not likely that the alarm would have failed to sound after the vessel dragged beyond the limits set by the senior second mate.

The alarm should then have sounded continuously until it was cleared or cancelled. Pressing the clear (CLR) button would have stopped the sound of the alarm. It is possible that the cadet subconsciously silenced the alarm using the clear button and did not recall the alarm going off.

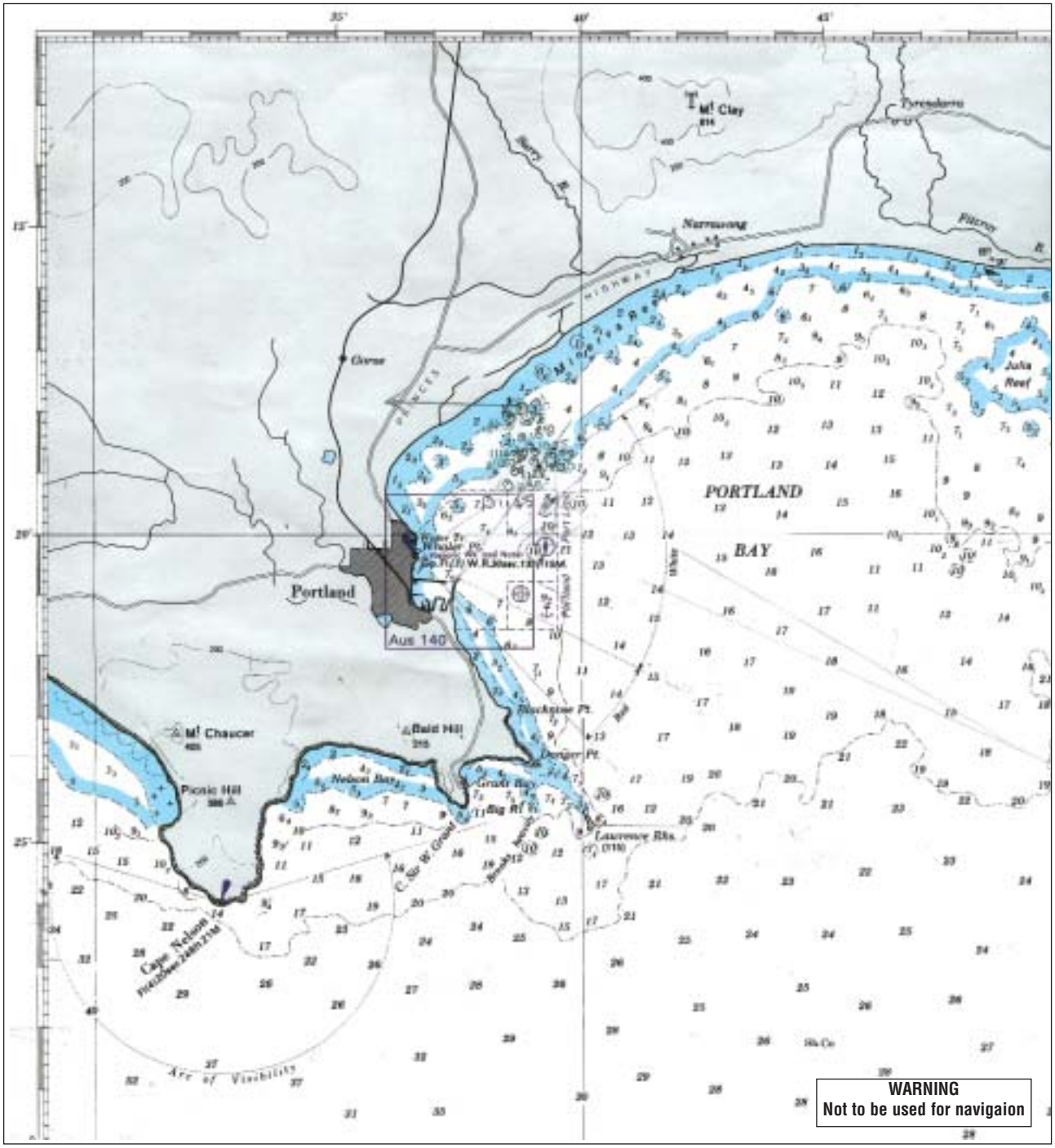
Regardless of alarms, however, by 1830 it was clear that the vessel had dragged almost 0.4 miles and the cadet advised the mate of this shortly after 1830. The mate checked the position, stating that it appeared 'perfectly all right'.

Shortly after 2000, the junior second mate found that the vessel had dragged almost half a mile. Despite this, no action was taken until 2230, when the vessel started dragging again and the master was informed.

The port of Portland

The port of Portland services the region's agricultural industry, mainly grain, cattle and sheep, the forest product industry, the Portland aluminium smelter and fertiliser production. The port, which has six shipping berths, is described in the Sailing Directions as a sheltered all-weather port, enclosed by two breakwaters. The Lee Breakwater gives protection from the north and the Main Breakwater from the E.

FIGURE 3:
***Devprayag*'s chart with anchor and other positions prior to grounding erased and overprinted when vessel refloated**



However, the Sailing Directions describe the anchorage thus:

> Portland Bay affords good anchorage with holding ground of limestone ledges, full of holes filled with sand, blue clay or limestone pebbles and is sheltered from all except SE winds.
>
> Vessels awaiting a berth may find safe anchorage off the port of Portland about 1½ miles NE of Main Breakwater.
>
> …The holding ground is good with excellent shelter from the W but anchoring is not recommended in strong E and SE weather as there may be a confused sea and swell.

Weather

The Bureau of Meteorology had issued a high seas weather warning for Metarea 10 at 0039 UTC 21 April 2001. The message stated that

there was a gale warning for the southeastern area, covering the area within 38S141E, 38S160E, 40S160E, 40S141E and 38S141E. The forecast was for E/SE winds of 30/40 knots, very rough seas and a moderate to heavy swell.

The forecast for 0700 UTC 21 April 2001 contained the same warning.

The area covered by the forecast included Portland. The master of *Devprayag* should have known that E/SE gales were forecast with accompanying very rough seas and moderate to heavy swell and taken appropriate precautions for the safety of the ship and its crew.

Weather data for Cape Nelson, about 8 miles south west of the ship, was obtained by the ATSB from the Bureau of Meteorology. According to the data, at 1130 on the day that the vessel grounded, the wind at Cape Nelson was from 140° (T) at an average speed of 22 knots, with gusts of 29 knots. At 1600, the wind was from the same direction at 23 knots with gusts of 32 knots. At 2000 the wind was from 160° (T) at 32 knots with gusts of 41 knots and, at 2330, just after the vessel had grounded, the wind was from 130° (T) at 27 knots with gusts up to 39 knots.

The anchorage

SCI's Shipboard Safety Management System Manual, under Anchor Watch, states in part:

- There shall be one officer in charge of the navigational watch in the wheelhouse while the vessel is at anchor, to ensure the vessel is maintaining her position. In addition, there shall be a seaman on watch at all times, when the vessel is at anchorage.
- Master shall assess the prevailing situation at the anchorage and decide on notice to be given to engine room for availability of main engines.
- The officer-in-charge of the navigational watch shall verify the vessel's position frequently by all possible means and ensure that vessel is not dragging anchor.
- Should the weather deteriorate the master may consider paying out more cable to ease the strain and main engines may also be used to ease the strain on the cable.
- The officer in charge of the navigational watch shall verify that the anchor is holding and the cable is not slipping by close observation of anchor bearings. If there is doubt that the vessel is maintaining its position, the officer in charge of the navigational watch shall:
  - Inform the master
  - Inform the engine room
  - Call anchor stations
- In congested anchorages, keep an adequate number of fenders ready and rigged.
- Under heavy weather conditions or when threatened by a storm, the master shall consider picking up the anchor in good time and clear the anchorage area. It would be safer to head into the sea and swell in open waters.
- Master shall be notified if the officer in charge of the navigation watch has doubts about the ship dragging anchor or if visibility deteriorates.
- Ship's position circle, showing maximum reach of the vessel as she swings around at change of tide and exact position of the anchor is to be charted on the largest scale chart available.

The master had anchored on a lee shore and he had permitted the mate to be on deck. At 1600, he had arranged for the engine to be ready at five minutes notice because the vessel was yawing excessively.

According to the Admiralty Manual of Seamanship, Volume 3;

> If it is expected that a ship will have to ride out a strong and prolonged gale both anchors should be used and they should be let go in such a way that when the ship is riding to the cables the angle between them will be about 20°.
>
> …To check a yaw, the second anchor could be released when the ship reaches the limit of her yaw to the side which is furthest from the first anchor.

The master did not consider the use of a second anchor.

His main concern seemed to be the necessity to get the hatches prepared for the next cargo. He did not appear to foresee that he had very little margin for safety in the exposed position where the ship lay.

The International Association of Classification Societies Requirements concerning Mooring and Anchoring (IACS Req. 1994/Corr.95) makes the following statement regarding the design of anchoring equipment:

> A1.1.2 The equipment is therefore not designed to hold a ship off fully exposed coasts in rough weather or to stop a ship which is moving or drifting. In this condition the loads on the anchoring equipment increase to such a degree that its components may be damaged or lost owing to the high energy forces generated particularly in large ships.

The master had received warning of gales from the E/SE and very rough seas. This warning and the warning in the Sailing Directions of the unsuitability of the anchorage under such conditions should have alerted him to the need to clear the anchorage in good time.

Training and experience

The master had started his career at sea in 1960 as a cadet. After obtaining a second mate's certificate, he joined SCI as fourth mate and sailed with the company as third mate and second mate. He obtained a mate's certificate in 1968 and, after sailing as second mate for a further year, was promoted to mate. During this time, he sailed on general cargo ships and tankers. He obtained a master's certificate in 1972 and sailed as mate for three years before he was promoted to master in 1975. He remained with SCI until 1978, sailing on general cargo ships, before joining overseas companies with whom he also sailed as master on general cargo ships and car carriers. He rejoined SCI as a contract master in 1998 and his previous command to *Devprayag* had also been a bulk carrier.

The mate had started his career at sea with the Indian Navy in 1976 where he specialised in anti-submarine warfare until 1997. In 1995, he obtained a master class 1 certificate and joined SCI in 1997. Since then he had sailed as mate on four bulk carriers, including 15 months on a sister ship of *Devprayag*. He had joined *Devprayag* at Geelong on 12 April.

The senior second mate had joined SCI as a cadet in December 1995, sailing on a sister ship of *Devprayag* and on tankers, before he obtained his second mate's certificate in 1999. He had sailed on *Devprayag* since January 2000 as second mate and would have completed the required sea time for a mate's certificate six weeks after the grounding.

The junior second mate had joined SCI as a cadet in 1996 and, after sailing on bulk carriers and tankers, had obtained his second mate's certificate in September 2000. *Devprayag* was his first ship as second mate. He had been on board since 30 November 2000.

The trainee navigating officer cadet on board had joined SCI in 1997 and, prior to joining *Devprayag*, had sailed on a tanker and a general cargo ship. He had completed the written examination for a second mate's certificate and would, after completion of the required sea time, appear for the second mate's oral examination.

The master's statement of facts

In a report to the company, the master stated that there was a duty officer on the bridge for anchor watch at all times.

When the senior second mate relieved the master for a rest at 1415 on the afternoon of the grounding, he was not able to maintain a continuous anchor watch on the bridge. He went to the bridge twice to check the position of the ship, otherwise he was on deck to check on the preparation of the hatches.

The master's statement contained the information that, at 2030 on the night of the grounding, he had checked the position and radar distance personally and found that the vessel was maintaining its position.

At 1830, however, the senior second mate had been to the bridge where he noticed that the GPS position was 0.37 miles from the original position. The senior second mate drew the cadet's attention to the fact that the vessel had dragged and, a short time later, the cadet informed the mate of the dragging.

Whether or not the master did check the position is not clear and could not be substantiated as the positions on the chart had been erased and no other record of positions was maintained.

There is no evidence that the mate told the master, during their discussion on the bridge at about 1900, that the vessel had dragged. The Inspector is satisfied that the vessel had dragged almost half a mile by 2030.

Given the number of years that the master and mate had been at sea, their lack of appropriate action to prevent the grounding was not consistent with their training and experience and showed a lack of effective communication.

The ship's track

The master seemed unable to turn the ship's head to starboard. According to him, the vessel, while dragging towards the northwest, was turning to port, despite the rudder being hard over to starboard. It took the ground aft, then swung round to port, grounding over its full length and settling on a heading of 270°.

The senior second mate who took the wheel when the engine was put on 'stand by' at 2236 recalled that the heading was then about 070°. There are inconsistencies in his recollection of events and there are differences in his account from that of the master. However, he recalls that he put the wheel hard over to starboard and the vessel went to starboard slowly, so that, when he handed the wheel to the quartermaster, the heading was about 075°. He was of the opinion that there was no difficulty in turning the vessel's head to starboard and that the ship's head went to the south and then further around, to the west before the grounding.

A local resident, a qualified professional fishermen, who is also a maritime training coordinator with the TAFE college in Portland and Warrnambool and a marine investigator for the Marine Board of Victoria, witnessed the grounding. He sent the ATSB a sketch of the incident as he saw it. His sketch (attached at page 15) and explanation indicate that, after he first sighted the vessel at 2252, the vessel had dragged northwest, through a gap in Minerva reef. According to him, the vessel steered a northeasterly course, parallel to the reef and the coast, before turning south, when its stern grounded on the reef. The vessel's bow continued to turn to starboard and eventually, *Devprayag* lay almost abeam to the wind, aground along its length, on a westerly heading.

With the positions on the chart being erased, the deletion of the track on the radar and without the assistance of a course recorder trace, it is not possible to reconcile the differences in these accounts.

Tide and wind

At 1830 on the 21st, after the initial dragging of the anchor had been noticed, the ship was just south of the 6 fathom contour. High tide at Portland was predicted at 0002 on 22 April at 0.77 metres and the set of the tide would accentuate any drift caused by the wind. The ship was left with very little margin for further drift and, while the anchor was being weighed, the ship was set by the wind and tide to the northwest as the chain was shortened. The ship was in ballast and would have made consid-

erable leeway due to its shallow draft and the large area of ship exposed to the wind. By the time the ship had weighed anchor it was possibly inside the line of Minerva reefs, grounding as the master attempted to turn it to seaward.

Charts and Sailing Directions

The chart covering this area (Aus 786) was a small scale chart (1:150 000). There was a large scale chart (Aus 140) covering Portland harbour on a scale of 1: 10 000 but this did not extend to the edge of the anchorages or out into Portland Bay where the ship grounded. The ship's initial anchor position was outside the limits of the large scale chart so the position was plotted on the smaller scale chart. The relative scales may have made the initial dragging, prior to 1830, appear less serious to the cadet and the mate, when the positions were plotted on the chart.

At the time of the incident, a new chart with a larger scale and different border locations was being prepared by the Hydrographic Office. The new chart, Aus 140, was published on 30 March 2001 and is divided into two parts. One part now covers the harbour and out to the port limits at 1:10 000 scale and the other covers Portland Bay at a scale of 1:100 000. Both of these are now metric charts.

Sailing Directions are indispensable companions to charts. They include information not included on a chart such as descriptions (including photographs) of the best approaches to harbours, harbour facilities, anchorages, local history, rules, regulations, and table of distances.

In the case of *Devprayag*, the master had not read the advice in the Sailing Directions and did not appreciate the danger to which the ship was exposed in the prevailing weather conditions.

Other groundings have been caused as a result of advice in the Sailing Directions not being read or understood, notably the *Torrey Canyon* off the Scilly Isles, UK, on 18 March 1967.

FIGURE 4:
Sketch of incident supplied by local resident

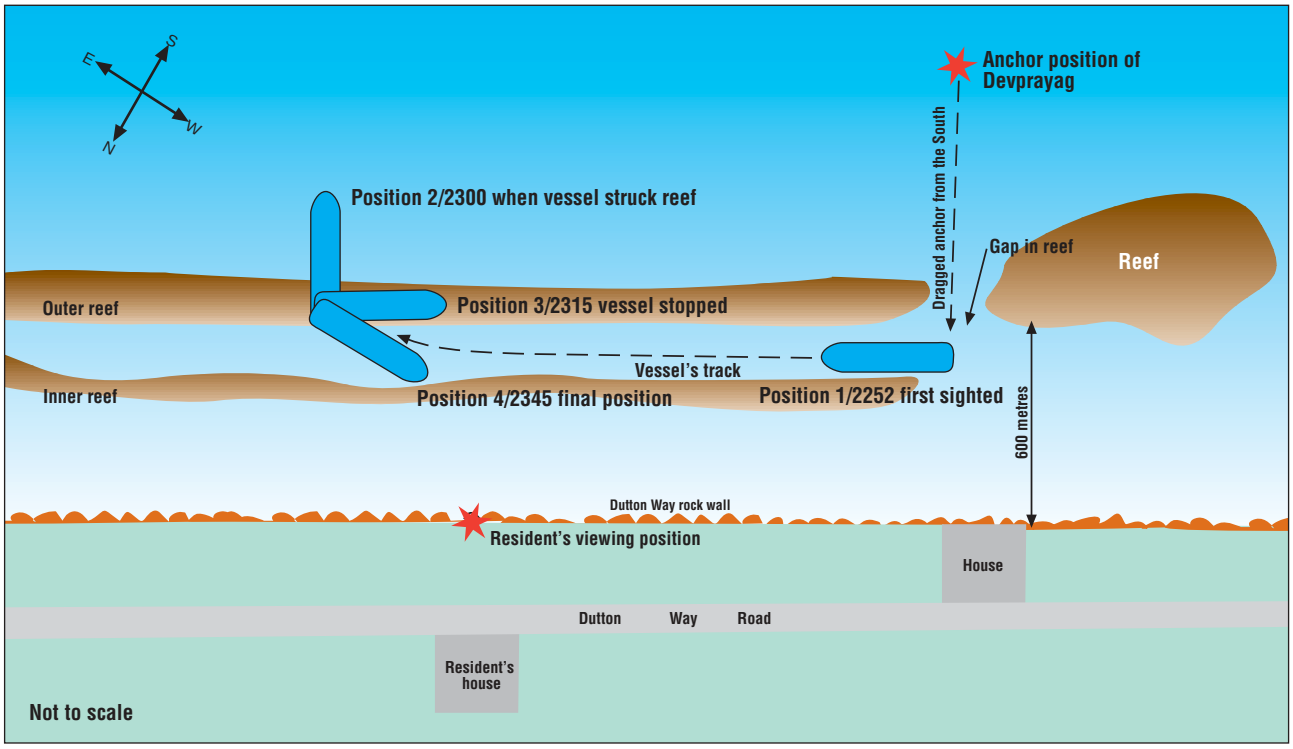
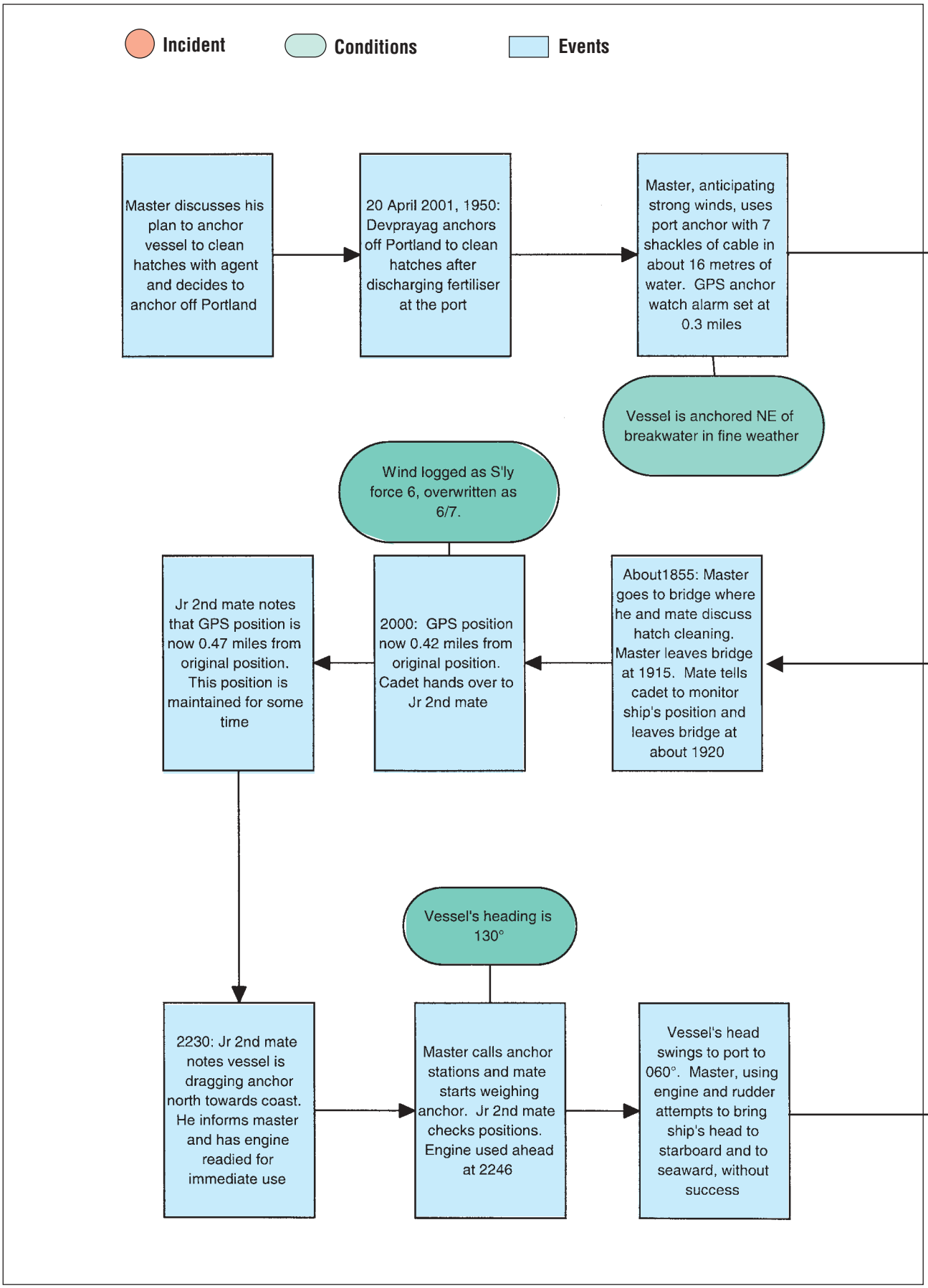
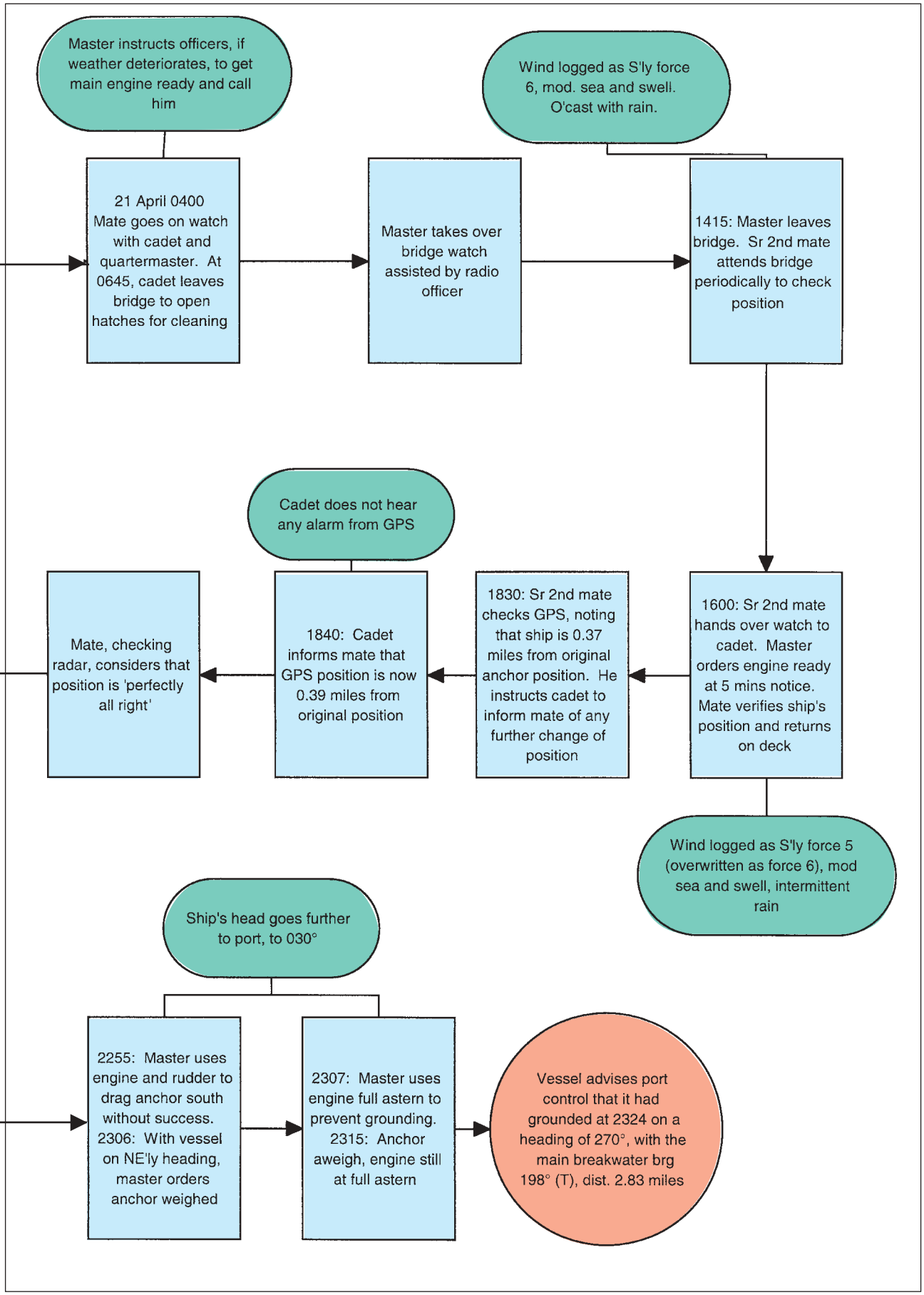


FIGURE 5:
***Devprayag*: Events and causal factors chart**




Master instructs officers, if weather deteriorates, to get main engine ready and call him
Wind logged as S'ly force 6, mod. sea and swell. O'cast with rain.
21 April 0400 Mate goes on watch with cadet and quartermaster. At 0645, cadet leaves bridge to open hatches for cleaning
Master takes over bridge watch assisted by radio officer
1415: Master leaves bridge. Sr 2nd mate attends bridge periodically to check position
Cadet does not hear any alarm from GPS
Mate, checking radar, considers that position is 'perfectly all right'
1840: Cadet informs mate that GPS position is now 0.39 miles from original position
1830: Sr 2nd mate checks GPS, noting that ship is 0.37 miles from original anchor position. He instructs cadet to inform mate of any further change of position
1600: Sr 2nd mate hands over watch to cadet. Master orders engine ready at 5 mins notice. Mate verifies ship's position and returns on deck
Wind logged as S'ly force 5 (overwritten as force 6), mod sea and swell, intermittent rain
Ship's head goes further to port, to 030°
2255: Master uses engine and rudder to drag anchor south without success. 2306: With vessel on NE'ly heading, master orders anchor weighed
2307: Master uses engine full astern to prevent grounding. 2315: Anchor aweigh, engine still at full astern
Vessel advises port control that it had grounded at 2324 on a heading of 270°, with the main breakwater brg 198° (T), dist. 2.83 miles

Conclusions

These conclusions identify the different factors contributing to the incident and should not be read as apportioning blame or liability to any particular individual or organisation.

Based on the evidence available, the grounding occurred because of a combination of the following factors.

1. The master had anchored on a lee shore and permitted the vessel to remain at the exposed anchorage in deteriorating weather conditions.

2. The master had not noted the warning in the Sailing Directions that the anchorage at Portland was not recommended in strong E and SE weather.

3. Insufficient notice was taken of the gale warning for the area.

4. Advice in the company's safety manual, to consider picking up the anchor in good time to clear the anchorage when threatened by heavy weather or storm conditions, was not heeded.

5. Priority was given to the task of preparation of the hatches for the next cargo, rather than to the safety of the ship.

6. The master was not informed immediately at 1830, when the senior second mate realised that the vessel had dragged. There was a lack of bridge resource management principles in that the mate and other officers offered no advice to the master in respect of leaving the anchorage.

7. It is unlikely that the master personally checked the position at 2030. Had he done so, he would have realised that the vessel had dragged almost half a mile from the original anchor position.

8. The small scale chart in use might have caused the mate and the cadet to underestimate the significance of the distance that the vessel had dragged at about 1815.

Recommendations

The Inspector recommends that mariners note the importance of using Sailing Directions when planning passages, when entering or leaving a port or anchoring in or near a port.

The Inspector also recommends that mariners be fully aware of weather conditions and the fact that inclement weather can alter a relatively safe anchorage into one that is unsafe.

Submissions

Under sub-regulation 16(3) of the Navigation (Marine Casualty) Regulations, if a report, or part of a report, relates to a person's affairs to a material extent, the Inspector must, if it is reasonable to do so, give that person a copy of the report or the relevant part of the report. Sub-regulation 16(4) provides that such a person may provide written comments or information relating to the report.

The final draft of the report, or relevant parts thereof, was sent to:

The General Manager, The Shipping Corporation of India Ltd, the master, mate, both second mates and the cadet of *Devprayag*.

A submission was received from the mate, which is reproduced in part in the report.

A submission was also received from The Shipping Corporation of India Ltd. Their submission, reproduced in part below, stated:

> Your detailed report enabled us to arrive at the causes which led to this mishap. We have advised our fleet of vessels to be more careful when anchoring close to land or in proximity to a buoyed channel.
>
> Masters have been cautioned that tasks such as the cleaning of holds should not distract them from maintaining navigation watches.

In addition to the guidelines in the company's safety management manual, they have also been advised:

- To plan and study passages from berth to berth
- To select anchoring positions clear of shoals and navigational hazards, with appropriate depths for ships' drafts
- The Master and navigating officer will determine and chart the vessel's position during pilotages and chart the position prior to the pilot's departure
- To take into account the existing weather conditions and, in case the weather deteriorates, to maintain continuous weather message watches. Frequent weather observations are to be made, recorded and logged. If the need arises, to put the main engine and other essential machinery on stand-by or at very short notice for any possible manoeuvring. The main engine and other machinery are not to be immobilised at anchorages unless there is fair weather, the vessel is anchored away from hazards, there is no berthing program and the master has informed port control, the owners and charterers.
- Certified officers are to keep a stringent anchor watch aided by a lookout and a quartermaster. The vessel's position is to be checked frequently using all available navigational equipment, supervised by the master. The bridge is not to be left unattended or without the presence of certified officers. While determining the ship's position, the position and distance of other anchored vessels and navigation marks must be checked frequently. The VHF must be kept on at the channels prescribed for the port.

We are quite positive that the mishaps encountered at Portland can be averted in future.

Devprayag

IMO Number	8321072
Flag	India
Classification Society	Det Norske Veritas (DNV)
Ship Type	Bulk Carrier
Builder	Daewoo Shipbuilding, Okpo, Korea
Year Built	1986
Owner	The Shipping Corporation of India Ltd (SCI)
Gross Tonnage	28 739
Net Tonnage	15 763
Summer Deadweight	47 349 tonnes
Length overall	189.00 m
Breadth moulded	30.40 m
Depth (moulded)	16.40 m
Summer Draught	11.825 m
Engine	B&W 6L60MCE
Crew	44 (Indian nationals)

Independent investigation into the grounding of the Indian flag bulk carrier

Devprayag on Minerva Reef, Portland, Victoria

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