Commonwealth and New South Wales joint investigation into the contact damage sustained by the Barbados flag bulk carrier MV Claudia at Bass Point, New South Wales on 16 December 1998

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Contents

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joint investigation into the contact damage sustained

by the Barbados flag bulk carrier

MV Claudia

at Bass Point, New South Wales

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For further information please contact:

Inspector of Marine Accidents
Marine Incident Investigation Unit
P O Box 967 Civic Square ACT 2601
AUSTRALIA

Phone: +61 2 6274 7324
Fax: +61 2 6274 6699
Email: miiu@miiu.gov.au

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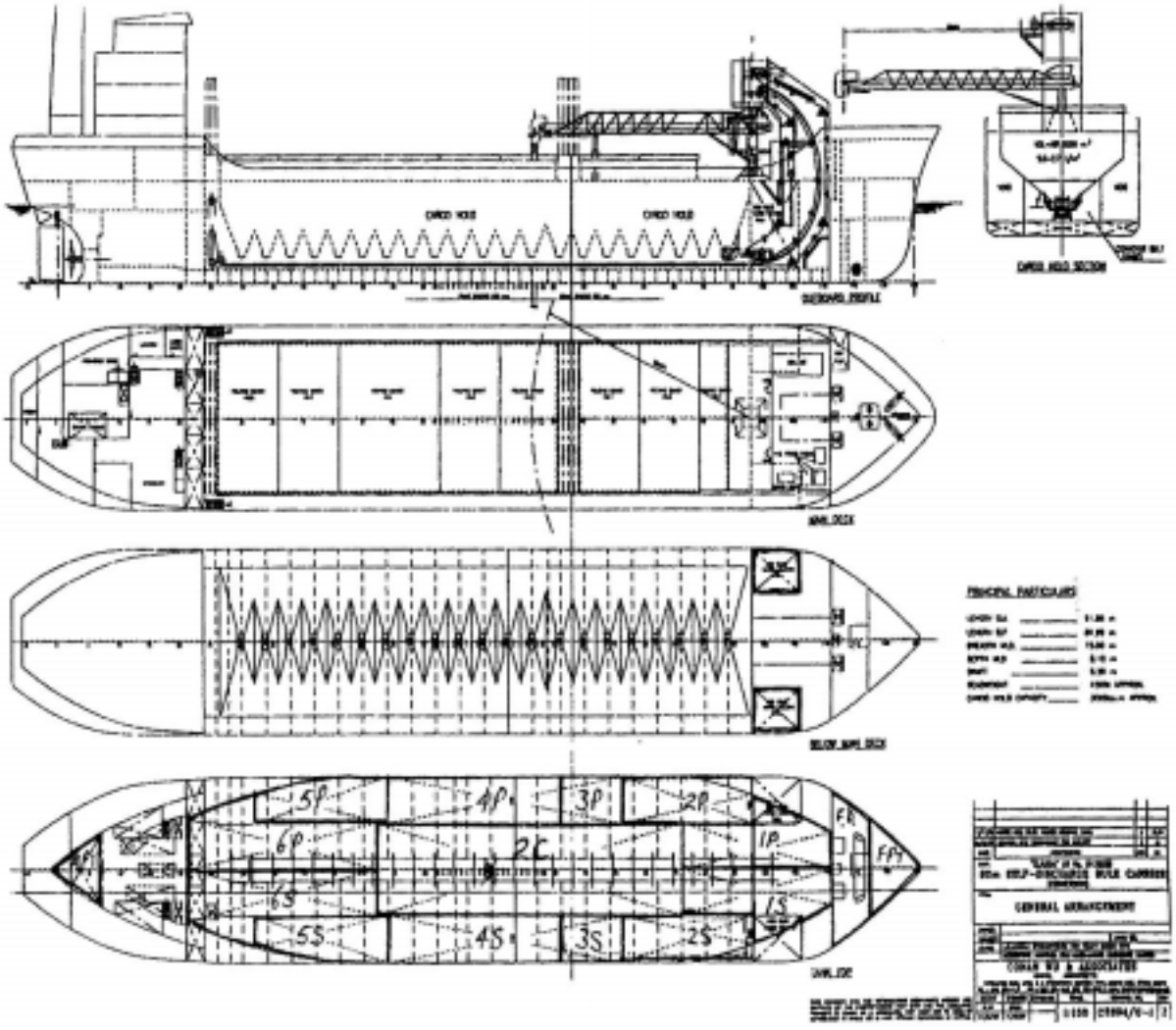
Summary

At 0545 on 16 December 1998, the Barbados flag self-discharging bulk carrier, *MV Claudia* arrived off Pioneer Concrete's Bass Point jetty at Shellharbour to load a cargo of aggregate. The vessel manoeuvred alongside, starboard side to, against an offshore wind of 15 to 20 knots and was all fast at 0650.

About 10 minutes after loading commenced, *MV Claudia* developed a starboard list (See figure 1). The ballast was adjusted but the list continued to increase. At 0737, when the list had increased to about 15 degrees, loading was suspended and the cause of the list investigated by the vessel's crew. On sounding the vessel's ballast tanks and void spaces it became apparent that the vessel had a hole in No 1 void space (starboard). It was apparent that as the draught increased with loading more water entered No 1 void space (starboard) thus increasing the list. The hatch covers and watertight doors on the vessel were closed and No 1 void space pumped out. Temporary underwater repairs were effected to seal the hole and the vessel sailed for Sydney without loading any more cargo.

Investigation into the cause of the hole in the hull showed that a horizontal steel girder on No 3 dolphin protruded beyond the dolphin's piles below the high tide level. It was evident that in berthing, the vessel had made contact with the girder causing it to pierce the hull.

No one was injured and no pollution occurred as a result of the damage.



General arrangement plan of MV Claudia

Sources of Information

Master and crew of *MV Claudia*

Pioneer Concrete Quarry Manager, Bass Point

Jetty – Leading Hand, Bass Point

Acknowledgments

The investigators gratefully acknowledge the permission by the Illawara Mercury to reproduce the photograph of *MV Claudia*.

Extract from Chart 808 is reproduced by permission of the Hydrographer, Royal Australian Navy.

Narrative

The vessel

MV Claudia is a Barbados flag, 3295 gross tonnage, 2 hold, self-discharging bulk carrier, owned by Pioneer Construction Materials Pty. Ltd. of New South Wales. The vessel has an overall length of 92 metres, a beam of 15 metres and a summer draught of 6.5 metres.

Built in 1982 to carry general cargo, *MV Claudia* underwent a major refit in China and was converted to a self-discharging bulk carrier in early 1998 to carry aggregates from Bass Point to the batching plant at Blackwattle Bay (Sydney Harbour). Although the vessel has a capacity of about 4,500 tonnes, due to draught constraints at Blackwattle Bay, it carries about 2800 tonnes of aggregate on each voyage. The general arrangement of the vessel is shown in figure 2.

The vessel has 2 hatches and 2 holds (figure 2). The holds do not extend over the entire breadth of the vessel but are protected on either side by two void spaces. No 1 void space extends the length of No 1 hold and No 2 void space, the length of No 2 hold. This makes the vessel, to some extent, double hulled.

A continuous belt runs in a space beneath the cargo hold and above the double bottom. Twenty one “gates” set into the bottom of the hold feed the belt. The vessel is loaded by a gantry located on the jetty at Bass Point, and it (the vessel) discharges its cargo at Blackwattle Bay using its self-discharging equipment.

The vessel has 2 peak tanks, fore and aft, a forward deep tank, 6 pairs of double bottom tanks and, in addition, a centre tank (running below Nos 1& 2 holds) which are used to carry ballast water. The vessel is capable of holding about 1170 tonnes of ballast.

The main engine is a six cylinder Wärtsilä medium speed diesel of 1840 kW, which provides a service speed of 10 knots. The vessel is also equipped with a Schottel 350 kW bow thruster which has three preset thrust positions (70 per cent, 85 per cent and 100 percent). The vessel is equipped with a left-handed variable pitch propeller.

The propeller pitch is normally controlled from the bridge. The pitch control is sited near the centre line adjacent to the steering consol. There are bow thrust controls on each bridge wing.

On the forecastle deck, the vessel has an anchor windlass with two drum ends that are used to heave in mooring lines. In addition, on the starboard side of the forecastle deck is a newly fitted capstan. At the after end, mooring lines are heaved in using two capstans one situated at the break of the poop deck and the other at the aftermost end of the poop deck. All deck machinery is powered by an electrohydraulic system.

The vessel has a crew of nine Australian nationals; a Master, two deck officers, two engineer officers and four ratings. The vessel maintains a regular service between Bass Point and Blackwattle Bay, of three round voyages each week.

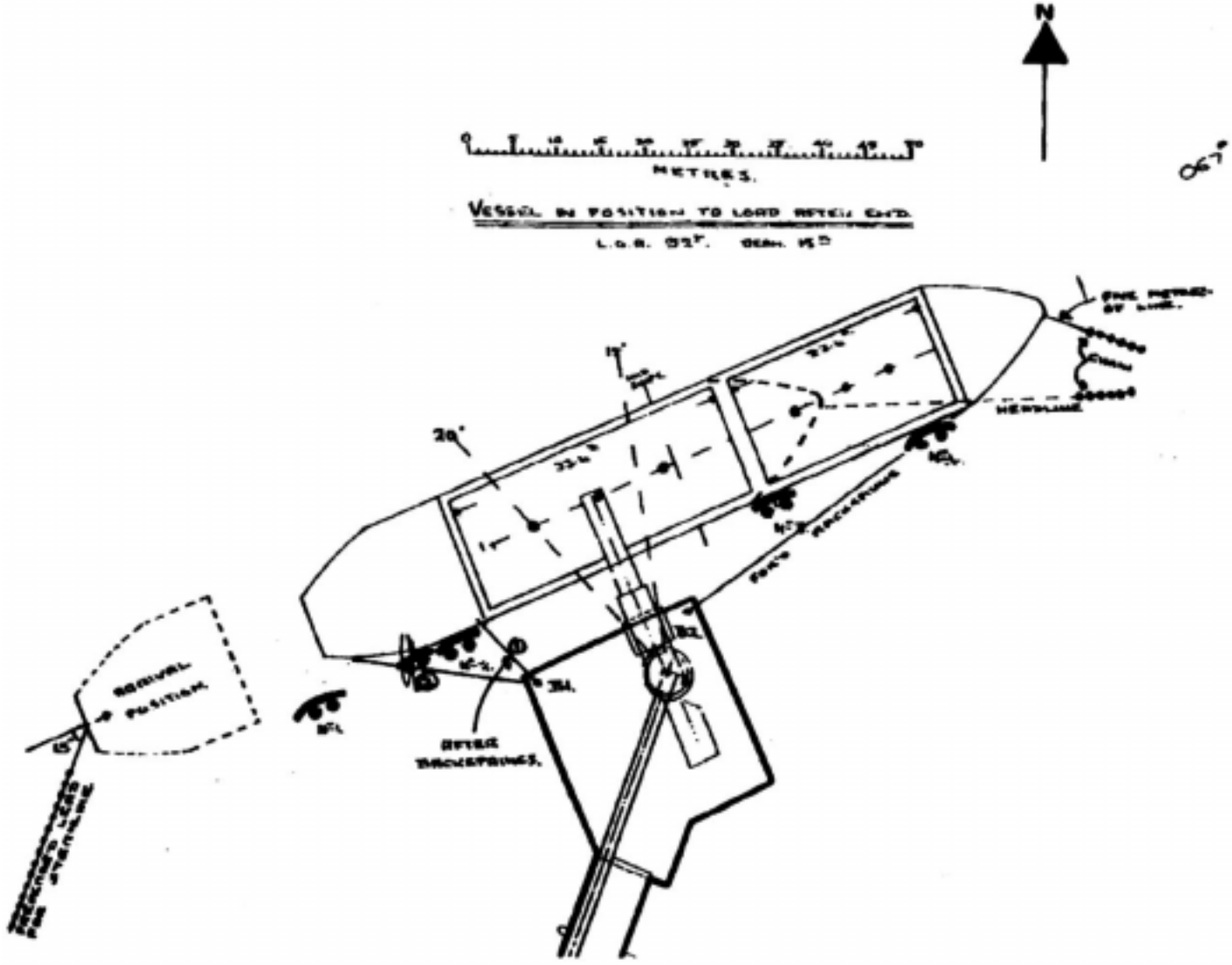
The Jetty at Bass Point

Bass Point is situated on the south coast of New South Wales, about 5 miles north of Kiama and about 7 miles south of Port Kembla.

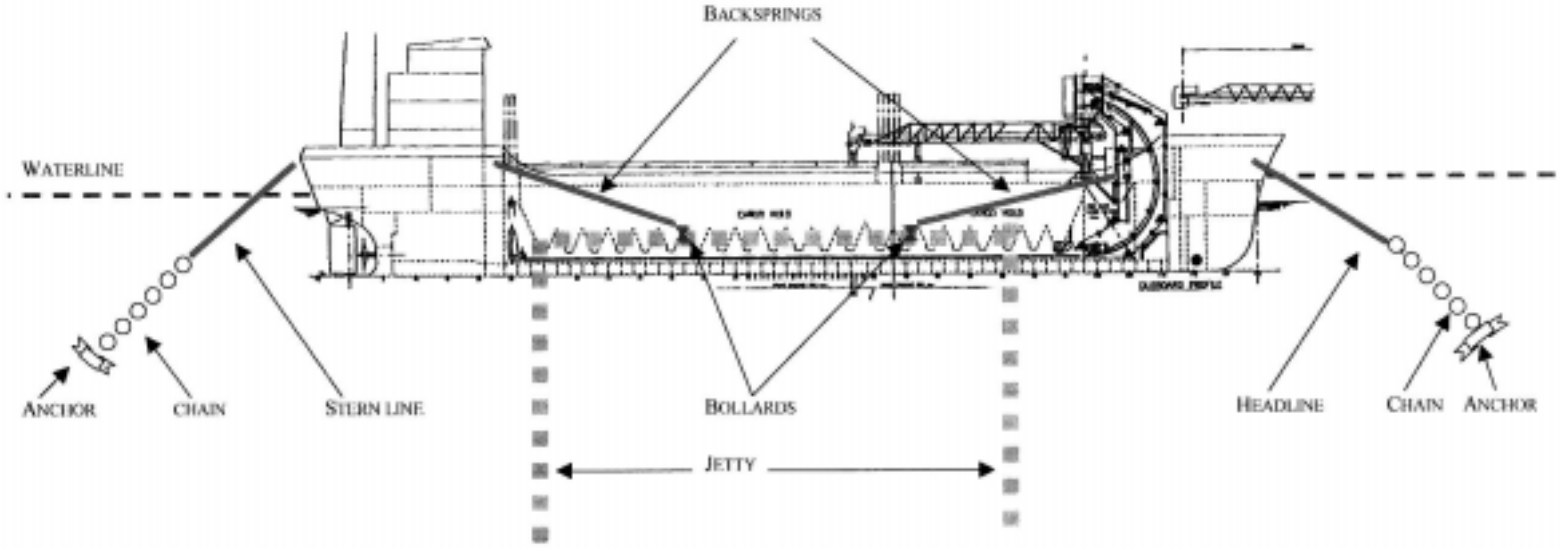
A jetty located on the north side of Bass Point services the quarry and extends seaward from the mainland in a north-north-easterly direction. Vessels are secured alongside 4 dolphins (Figure 3) of the jetty. Each of the dolphins is constructed using two vertical steel piles, on to which are clamped horizontal steel girders. Wooden vertical beams are fitted on to the horizontal girders. Two rubber tyre fenders are chained against the wooden beams. In addition, on top of each pile a rubber tyre fender is fitted.

The jetty is exposed to the sea and affected by the prevailing swell. It is relatively exposed to all winds, but particularly to easterly and northerly winds. The short isthmus, between the headland of Bass Point and the hills to the west, forms a saddle. Easterly and southeasterly winds may be funnelled through the saddle creating a local southerly offshore wind. There is some protection from sea conditions from the south-east, through south to the west, although any offshore swell causes the ship to surge. Vessels berthing at the jetty do so without the aid of tugs. They normally berth starboard side to, allowing them, when sailing, to let go and clear the jetty safely.

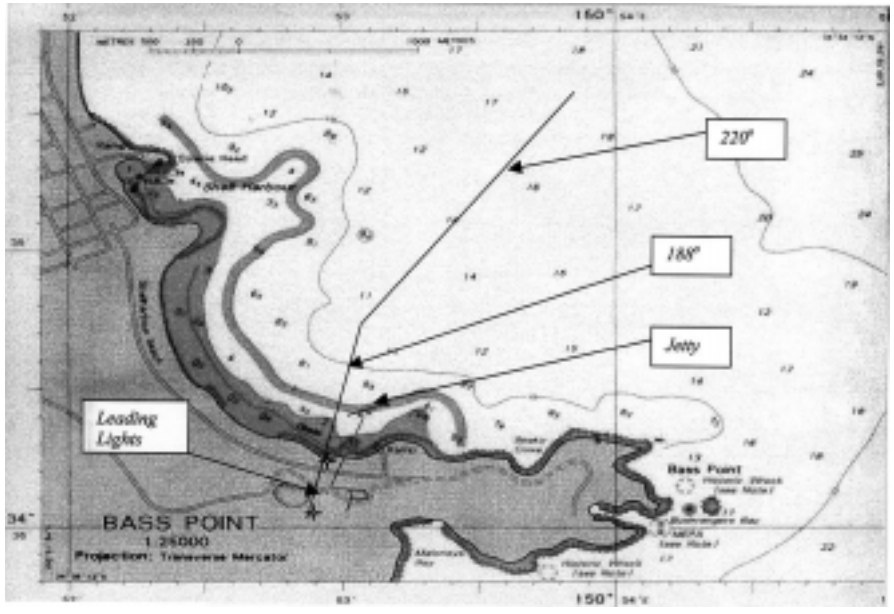
MV Claudia replaced a smaller vessel, *Troy D.* The commissioning of the *MV Claudia* for the dedicated service was planned with some care. Pioneer Concrete engaged an experienced Master with ten years command experience and 24 years as a pilot in the ports of Sydney Harbour and Botany Bay. Before the vessel took up the service the Master visited Bass Point jetty and together with Pioneer Concrete management, formulated the



General Layout of the Dolphins
Figure 3



MV Claudia
Figure 4
Note: As the vessel shifts up and down the jetty to facilitate loading the fore and aft springs will vary in length. The engine and bow thruster are used to hold the ship and prevent high loading stresses on the short lines, sometimes additional lines may be run.



Extract of chart showing approach courses
Figure 5

Temporary repairs effected to No 1 void space
Figure 6

Horizontal girder which caused the hole in No 1 void space
Figure 7

mooring arrangements namely, that the vessel would be secured alongside the jetty with a headline and forward spring and a stern line and after spring. The vessel provides the two springs which are secured to bollards on the jetty and the quarry provides the head and stern lines which are secured to a ground tackle arrangement consisting of mooring anchors and chains. (See figure 4)

Berthing Procedure at Bass Point

The normal berthing procedure is for the vessel to secure starboard alongside although on one previous occasion the vessel secured portside to, due to the weather. The vessel is secured alongside the jetty with 2 x 72 mm diameter, polypropylene nylon lines which are sent from ashore (one as the headline and one as the stern line) and 2 similar size springs which are sent from the vessel. There is some delay associated with this operation. This delay occurs because the eyes of the two lines sent from ashore are attached to messenger lines (40mm dia and about 40 metres in length) which have first to be heaved on board. The messengers are heaved on board by the crew using the vessel's drums on the windlass and capstans.

Prior to arrival at Bass Point the Master is provided with an estimate of the wind direction and speed at the jetty, and also swell conditions, by shore personnel as per the company's procedures, which assists in the overall berthing process.

Approach to Jetty

The typical approach courses for the vessel to berth starboard to are shown at figure 4.

A vessel would approach from the north-east on a course of about 220° to bring two leading beacons, marginally to the west of the jetty, in line on a heading of 188°. When about 2 ships length from the jetty the vessel would commence its turn to port to bring it parallel to, and about 3 metres off the jetty and in position to send out and receive the mooring lines. On this occasion, the Master came parallel to the jetty but the bow was a few metres ahead of No 4 dolphin.

When manoeuvring astern, it can be difficult to manoeuvre the stern alongside with the transverse thrust of the propeller. This effect, together with an offshore wind may mean that a vessel may be forced to berth port side to

the jetty. The vessel's after and forward springs are usually sent away first, before the fore and aft 72 mm shore moorings are taken on aboard. Rapid recovery of the shore lines is important as the use of the bow thruster and, more particularly propeller pitch is severely restricted with ropes trailing the water.

The loading arm of the shore gantry is unable to traverse the entire length of the vessel's hatches. Consequently, the vessel has to be warped along the jetty during the course of the loading, to ensure that the cargo is loaded as evenly as practicable. No trimming of cargo is carried out.

The Incident

The *MV Claudia* started the service between Bass Point and Blackwattle in October 1998. Prior to the incident in question, the vessel had completed 10 trips to the jetty at Bass Point without incident.

On 16 December 1998, the vessel arrived off Bass Point at approximately 0545 to load 2700 tonnes of aggregate from the Pioneer Concrete Quarry. The draught of the vessel was 2.61 m forward and 4.14 m aft. The wind at the jetty was offshore from the south at approximately 15-20 knots (Beaufort force 4-5) and the tide was flooding with about 2 hours to high water. The vessel approached the jetty and the Master aligned the vessel parallel to the jetty with the bow a few metres ahead of No 4 dolphin to keep the vessel up into the wind and parallel to the jetty. The after spring was sent ashore first with the aim of controlling the movement of the stern. It was passed using a heaving line. The bow thruster was used to control the lateral movement of the bow.

Before the after spring could be hove taut, the vessel dropped astern with its stern drifting away from the jetty due the southerly wind, causing the bow to move into the space between No 3 and No 4 dolphin. The starboard side in way of the void space came into contact with No 3 dolphin and the ship rested against the horizontal tyre fender. The contact was slight and no undue impact was felt. The Master then used the vessel's engine and bow thruster to remove the bow from between the two dolphins and realign the vessel with the jetty. The messengers attached to the head and stern lines were heaved on board by the crew using the vessel's windlass and capstans, which are slow-moving. The vessel was finally secured with a head and stern line and forward and after springs.

At 0652, the vessel commenced loading in No 2 hold at an approximate rate of 1000 tonnes per hour. Discharge of ballast from No 2 centre double bottom (CDB) tank commenced at the same time. After 10 minutes of loading,

the vessel started to develop a starboard list. The chief officer assumed that the list was due to the deballasting operation. He nevertheless decided to deballast No 6 starboard DB tank to correct the list. After about 15 minutes of loading and deballasting of both tanks, the list continued to increase. At about 0737 when the list had reached approximately 15^{o} (by which time about 800 tonnes of cargo had been loaded), the chief officer and Master realised that the increasing list was not due to the ballast or cargo and decided to cease loading and investigate further. The writers realise the obvious discrepancy in the times stated but these are based on information provided by the Master of the vessel. The deballasting of all tanks was stopped and all tanks and spaces on the vessel were sounded. On sounding No 1 void space (starboard), it was found to have 6 metres of water in it (about 180 tonnes). Deballasting of this space commenced immediately. The Master immediately ordered the hatch covers and watertight doors on the vessel to be closed and the owners were advised. The terminal staff were advised and arranged for divers to inspect the vessel in way of No 1 void space.

The divers from Southern Commercial Divers inspected the hull between 1000 and 1100 and reported that the hull was holed. The hole was about 450 x 100-mm and about 2 metres below the waterline. Temporary underwater repairs were made by bolting a steel plate, on the outside of the hull, to a strongback inside the void space. (See figure 6).

During the repairs, No 1 void space continued to be pumped out and at 1700 when the list had reduced to 7 degrees (about 100 tonnes in No 1 void space) the Master prepared the vessel for sea. The vessel departed Bass Point at 1708 without loading any more cargo and reached Sydney at 2330. On departure from Bass Point the vessel had about 550 tonnes of ballast and about 800 tonnes of cargo which would constitute a sufficient amount of deadweight in terms of the vessel's seaworthiness.

On the 17 December permanent repairs were carried out and surveyed by the vessel's Classification Society surveyor (Lloyd's Register).

Comment and analysis

The puncture

Examinations of the vessel's hull suggested that the damage was effectively a puncture as though the vessel had been pressed against a sharp object. Photographs of No 3 dolphin, taken later in the morning after the tide had fallen, clearly show a section of steel girder extending beyond the facing of the dolphin, between Nos 3 and 4 dolphins. The girder matched the dimensions of the punctured hole. There was no significant scoring to suggest that the vessel had been moving either in a forward or in an astern direction when the hole was made.

From the evidence available and the Master's explanation of the berthing operation, it is reasonable to believe that the vessel's hull was punctured by the steel girder, proud of the piling of No 3 dolphin (See figure 7). The girder, beneath the surface at high tide, formed a pre-existing hazard to any vessel where the bow may down between Nos 3 and 4 dolphins. Neither the Master nor any of the vessel's crew knew of the existence of the section of proud girder.

The Master stated that he had inspected the jetty, together with the personnel from Pioneer Concrete, mainly to formulate the mooring arrangements. The extension of the steel girder was not seen by the Master or brought to his attention. It is not clear whether the proud length of girder was known to Pioneer Concrete and, notwithstanding this, the responsibility is on the owner of the jetty to provide a safe berth.

Inspection of the jetty after the incident by an investigator indicated that the fendering on all four dolphins was generally not in good repair, although work had begun to upgrade the fenders (Recommendation 1). The length of steel girder that protruded from No 3 dolphin and caused the puncture had been cropped.

Berthing

On 16 December the wind was from the east-south-east at about 10 to 15 knots and there was about a one-metre swell. As *MV Claudia* made a normal approach to the jetty, the Master found that the wind was funnelling through the saddle between Bass Point and the hills to the east creating a wind which was directly offshore. The Master was advised of the wind direction and speed at the jetty by jetty personnel. There is no anemometer on the jetty

at Bass Point and any wind strength relayed by the jetty personnel can only be an estimate. As he approached the jetty, the Master realised that the conditions were marginal for a normal starboard side to jetty. However, given the problems of sailing if port side to (the westerly heading, the proximity of shoal water, loaded condition and the time taken to gain steerage way) he decided to make at least one attempt.

The vessel was brought parallel with the jetty, slight ahead of the final position and the stern spring passed ashore. However, the wind caught the accommodation and the stern blew off, the stern spring was not able to hold the vessel and the shore stern line was sent aboard. In trying to counteract the effect of the wind on the stern the bow fell between the dolphins 3 and 4, resting without any discernible impact against No 3 dolphin, with No 4 dolphin slightly on the port bow.

The speed of the forward windlass and the capstans is very slow (Recommendation 3). Recovery of the 40 m of 40 mm messenger using the drum end and then the 72mm line can take some minutes when direct control of the vessel is limited. The time taken to recover the head and stern lines may have contributed to the incident of 16 December. The time delay certainly increases the potential risks involved in berthing *MV Claudia,* particularly given the open and exposed nature of the Bass Point Berth

The bow thrust is powerful, the power being particularly useful when loaded. However, when the ship is in a light condition, given the “stepped” nature of the bow thruster controls it is not always easy to balance the power of the thruster against the engine and mooring line recovery. The siting of the propeller pitch control in the wheelhouse further complicates the control of the ship when manoeuvring in close proximity to the berths or hazards. The person berthing the ship has either to relay propeller commands or move between the bridge wing and the propeller control.

There was no obvious reason to try and keep the vessel off No 3 dolphin and using the dolphins to lean against and pivot a vessel can be a perfectly routine manoeuvre.

Berthing Portside to jetty

The Master stated that on one occasion he had been forced to berth port side to. He stated that he would only berth port side to if it was safe to do so when it was dangerous or impossible to berth starboard side to. When

port side to the ship is on a heading of about 250° close to shoal water. The ship is forced to make a sharp turn to starboard to avoid grounding. If a northerly wind developed, with limited room to manoeuvre the ship's options for manoeuvring and using its anchor would be severely restricted.

Improvements subsequent to the incident

As a result of the accident, the ship operators and the jetty owners took a number of steps to improve shipboard operations and safety at Bass Point.

Immediately after the incident an underwater survey was undertaken. New wooden facing to the dolphins and additional rubber tyre fenders have been fitted. A program of periodic underwater surveys of the berth has been introduced.

A new self-spooling winch has been fitted to *MV Claudia's* poop deck and its performance will be evaluated. Recognising the large void areas within the ship's hull, the ship's bilge and ballast pumping arrangements have been increased in capacity and an additional ballast pump has been installed.

Conclusions

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

The following factors are considered to have contributed to the contact damage:

1. The hole in the hull was caused by the steel girder proud of No 3 dolphin.
2. Nobody on the vessel knew that there was any obstruction on the dolphin.
3. No warning was given by the owners of the jetty as to any possible obstruction at the jetty.
4. Although the Master inspected the jetty before the vessel commenced the service, he did not notice the steel girder which was located in a rather inconspicuous position.
5. The speed of the capstans and the drums on the anchor windlass are such that mooring lines could not be retrieved with sufficient speed, given the jetty configuration and its exposed nature.

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 former Master, the current Master, Pioneer Concrete (Bass Point) and Pioneer Concrete (NSW Building Materials).

Submissions and corrections were received from the former and current Masters and Pioneer Construction Materials Pty Ltd. There comments and corrections have, where appropriate, been incorporated into the text.

In addition Pioneer Construction Materials Pty Ltd noted:

Immediately prior to MV Claudia's arrival in Australia, owners arrange for an underwater survey of all four dolphins together with associated fendering; necessary repairs were carried out at that time. It was not envisaged at the time of the inspection that the ship's bow would be placed between dolphins No 3 and 4 and the ship knuckled around dolphin No 3. In consequence owners were not advised by divers of the protruding girder in way of No 3 dolphin and were unaware of its existence until the ship suffered contact damage.

Details of MV Claudia

IMO Number	8128559
Flag	Barbados
Classification Society	Lloyd’s Register of Shipping
Vessel Type	Self-discharging bulk carrier
Builder	E J Smit & Zoons Schpsw B.V.
Year Built	1982
Converted	1998 (from general cargo to bulker)
Owner	Pioneer Construction Materials Pty Ltd
Vessel Managers	Pioneer Construction Materials Pty Ltd
Gross Tonnage	3295
Net Tonnage	988
Summer Deadweight	5050 tonnes
Summer draught	6.5 m
Length overall	92 m
Breadth	15.12 m
Moulded depth	8.1 m
Engine	Wärtsilä
Propellers	Left handed controllable pitch