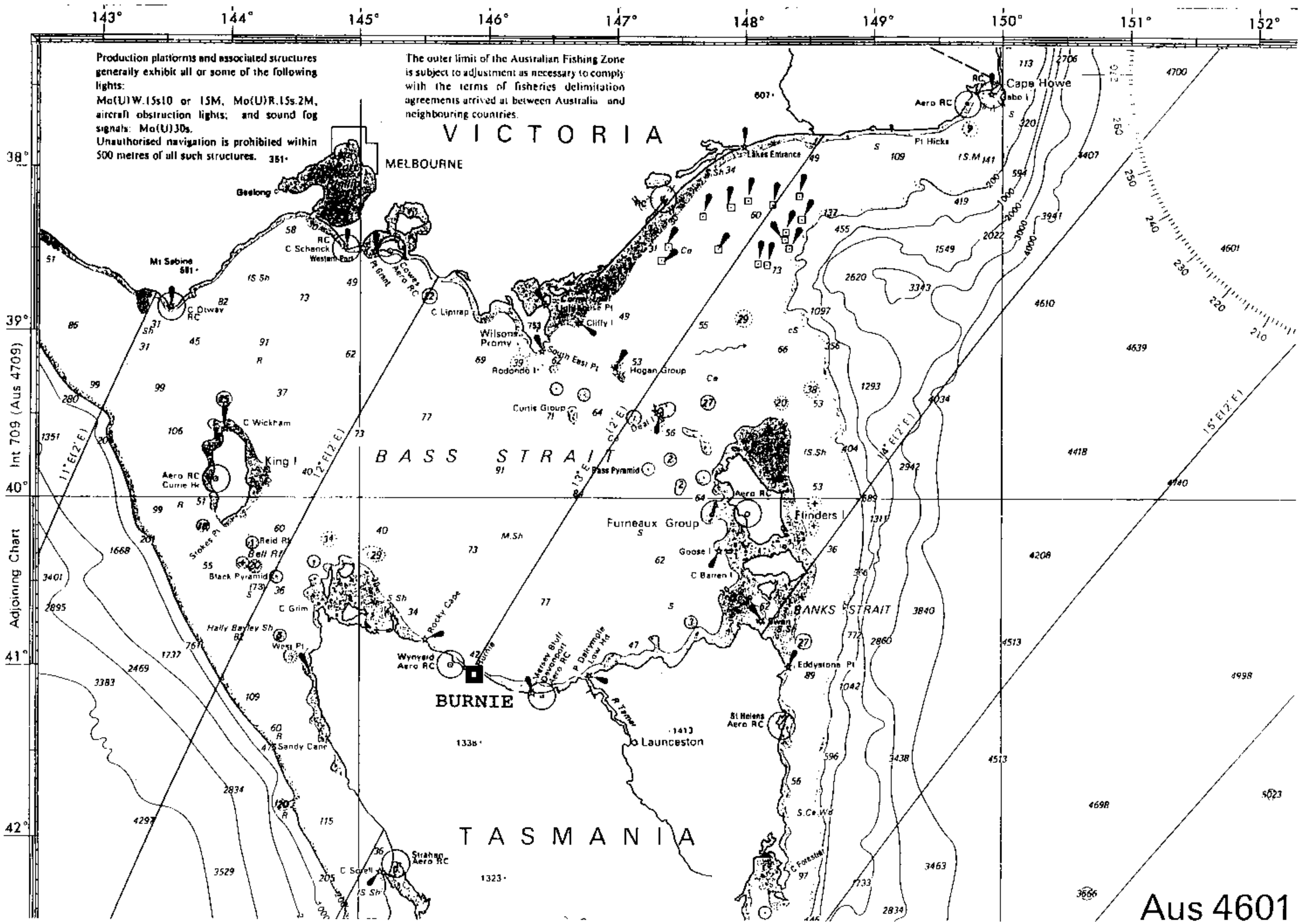
Contents

Illistrations and charts



Production platforms and associated structures generally exhibit all or some of the following lights:
Mo(U)W.15s10 or 15M, Mo(U)R.15s.2M, aircraft obstruction lights; and sound fog signals: Mo(U)30s.
Unauthorised navigation is prohibited within 500 metres of all such structures.
The outer limit of the Australian Fishing Zone is subject to adjustment as necessary to comply with the terms of fisheries delimitation agreements arrived at between Australia and neighbouring countries.
VICTORIA
MELBOURNE
Geelong
Mt Sabine
C Otway
C Schanck
Western Port
Pt Grant
Cowes Aero RC
C Liptrap
Wilsons Promy
Rodondo I
South East Pt
Cliffy I
Hogan Group
Curtis Group
Deal I
Lakes Entrance
Pt Hicks
Cape Howe
Gabo I
Aero RC
King I
C Wickham
Currie
Stokes Pt
Reid Rk
Bell Rf
Black Pyramid
Hally Bayley Sh
West Pt
C Grim
Rocky Cape
Wynyard Aero RC
BURNIE
Mersey Bluff
Devonport Aero RC
P Dalrymple
Low Hd
R Tamar
Launceston
BASS STRAIT
Pass Pyramid
Furneaux Group
Flinders I
Goose I
C Barren I
BANKS STRAIT
Swan I
Eddystone Pt
St Helens Aero RC
C Forestier
Sandy Cape
C Sorell
Strahan Aero RC
TASMANIA
11° E(2' E)
12° E(2' E)
13° E(2' E)
14° E(2' E)
15° E(2' E)
Adjoining Chart Int 709 (Aus 4709)
143°
144°
145°
146°
147°
148°
149°
150°
151°
152°
38°
39°
40°
41°
42°

Aus 4601

Summary

On Saturday, 1 October 1994, the Indian bulk carrier Chennai Nermai, while entering the Tasmanian port of Burnie under pilotage and being turned within the harbour, made heavy contact with McGaw Pier. The concrete pier was penetrated to a depth of about 4m and the ship sustained damage to the stem and bow plating.

The contact was an incident as defined in the Navigation (Marine Casualty) Regulations and, as one of a series of incidents under pilotage, was investigated by the Marine Incident Investigation Unit. The Australian Maritime Safety Authority's Survey Manager, Melbourne, and Senior Marine Surveyor, Devonport, were appointed as investigators under Regulation 6 of the Regulations to undertake the field investigation.

Information sources

Master, Chief and Second Engineers of Chennai Nermai

Harbour Master/Pilot Burnie

Portion of charts Aus 163, Port of Burnie and Aus 4601, reproduced by permission of the Hydrographic Office, RAN

The incident

Chennai Nermai, a 37,940 tonnes deadweight bulk carrier, was built for the South India Shipping Corporation at the Hyundai Heavy Industries yard, Ulsan, Korea in 1983. The vessel has an overall length of 190.13m, a breadth of 28.45m and a moulded depth of 15.6m.

The vessel is powered by a five cylinder 6804kW B&W engine, driving a single, fixed propeller, providing a service speed of 15.5 knots.

On the evening of 1 October 1994, the vessel arrived off the northern Tasmanian port of Burnie to load a cargo of 13000 tonnes of lead and zinc concentrates, having already loaded a part cargo of 19000 tonnes of zinc concentrate at Port Pirie, South Australia.

Sea passage was ended at 1924, just after sunset, which was at 1921. Speed was gradually reduced and at 1942 the engine was test-run astern on "slow astern" for approximately one minute. On the bridge were the Master, the Mate, a deck cadet and a helmsman, while the Second Engineer was in charge in the engineroom. For picking up the Pilot, in a position west of the main port approach leads and north of the Round Hill leads, speed was reduced to "dead slow ahead". The wind was from the north-east at 18 knots, gusting to 28 knots.

The Pilot boarded at 2000, when the vessel was 1.62 miles north of the breakwater light and the Master advised him that the gyro compass error was 2 degrees low, that the vessel did not have very good astern power and that the draught was 7.5m even keel. The Pilot acknowledged these facts, advised the Master that the vessel would berth stern first at No.5 berth, then ordered "slow ahead" and brought the ship on to the leads (213°). The Mate left the bridge to go to forward stations.

Predicted time of high water was 2012, with a height of tide of 3m above datum, providing a depth of 13m in the turning area inside the harbour breakwater.

As Chennai Nermai was scheduled to berth starboard side to, or heading out, at No.5, or Bulk Berth, on the north side of New Jones Pier, this meant the vessel had to be turned around in the harbour, before approaching the berth stern first. The Pilot's intention was to swing the vessel to starboard, using the forward tug, the transverse effect of the propeller going astern and the effect of the wind on the starboard side of the accommodation block, although he did not discuss this with the Master.

At 2011, as the vessel entered the red sector of Round Hill leads, at a distance of 7.75 cables (1426m) off the breakwater, the Pilot ordered "dead slow ahead" and altered course to starboard, to bring the ship on to the fixed green Port Entry leads. When on the leads (260°), at 2014, he ordered "stop engines". However, the effect of the wind on the starboard quarter caused the vessel to fall off to starboard and at 2015, he had to order "dead slow ahead, wheel hard to port",

in order to maintain the correct heading. He ordered "stop engines" again after about half a minute.

The south-eastern end of the Island Breakwater was abeam to starboard at 2018, when, with the bow entering the lee of the breakwater and the stern still exposed to the full force of the wind, the vessel veered to starboard and the Pilot again had to order "dead slow ahead, wheel hard to port". At 2019, as the vessel passed the tanker berth, the Pilot, bearing in mind the Master's advice about astern power, ordered "full astern", rather than his usual "slow astern" or "half astern", expecting to have to reduce to "slow astern" after about one minute. At this point the vessel's bow was 440m, just over two and a quarter ship's lengths, from the dolphin of the Bulk Berth and 500m from McGaw Pier. The tug Campbell Cove (twin screw, 1875kW, 40 tonnes bollard pull) was made fast on the port shoulder at this time and the Pilot gave instructions for it to "push full", to commence the swing. The Mate, on the forecastle, advised the Master that the bow was 300m from the wharf ahead and the Master passed this information to the Pilot, then instructed the Mate to keep him informed of the distance off the wharf.

The tug Spring Cove (single screw, 1266 kW, 26 tonnes bollard pull) was made fast on the port side, abreast No.5 hold, at 2020, at which time the Mate reported the distance from the wharf ahead as being 100m and decreasing rapidly.

The Pilot became concerned at the continued forward speed of the vessel, noting a lack of vibration and transverse thrust effect normally experienced on going full astern on such vessels. He looked at the engine revolution inidicator and noted that it was showing 55 rpm astern and, at approximately 2020.5, asked the Master for more power, but the Master said that the engine was on "full astern". The Pilot repeated his instruction to Campbell Cove, to "push full" on the port bow, to push the bow clear of McGaw Pier. He contemplated letting go an anchor, but decided against this as he did not wish to stop the bow from swinging to starboard. Spring Cove, normally only used for pushing the vessel alongside at the berth, was lying alongside the vessel, effectively being towed and was not in a position to be able to assist the swing.

According to the Master, having become concerned, he had requested the Pilot to ask the forward tug to push on the port bow and had then gone to give a double ring "full astern", but the ship had struck the wharf before he was able to do so. However, according to the Pilot, the Master had remained calm and had made no requests or given any orders throughout the incident.

At approximately 2021.25, the Mate advised the Master that the vessel was 30m off the wharf. The Pilot ordered an anchor to be let go, but at 2022 the stem of the vessel made contact with McGaw Pier, at a speed of between one and two knots on a heading of about 315°, and the port anchor dropped onto the concrete of the pier. The engine was put to "dead slow astern" on contact and the vessel was brought to a halt after penetrating the concrete for about 4m. As the vessel drew stern first away from the pier at

"dead slow astern", the Pilot noted the revolution counter showing 50 rpm. Chennai Nermai was then manoeuvred stern first to its designated berth, No.5, without further incident and was all fast alongside at 2118.

After the vessel was safely moored alongside, the Pilot asked the Master why only 55 rpm had been achieved for full astern, the Master replying that it was because the vessel had been moving ahead and also the depth of water would have had an effect.

Inspection of the stem and bow plating revealed a 1.3m high horizontal gash 2m above the waterline and extending 4m aft on the starboard side and a 0.75m high gash extending 1.5m aft on the port side. Internal frames and stiffeners in way of the gashes were buckled, torn and fractured.

The ship was off-hire for more than 12 days while temporary repairs were carried out to the stem and plating, before the ship was able to load its cargo.

Comment

Chennai Nermai struck McGaw Pier because the vessel failed to both stop in the water and to swing sufficiently to starboard.

The Pilot was very experienced, having conducted over 1000 such operations on vessels similar to Chennai Nermai. His normal procedure was to go either "slow astern" of "half astern" on the engine as the vessel passed the tanker berth and, in his experience, such action was sufficient to not only stop the vessel, but also to swing the bow to starboard. Because the Master had advised him that the vessel did not have good astern power, he had proceeded inwards at a slower speed and had stopped the engine much sooner than was his normal practice. When ordering "full astern", he had expected the vessel to be brought up in sufficient time and to swing to starboard.

According to the Pilot, when he looked at the revolution indicator it showed 55 rpm. The Master, who was reportedly standing at his side at the time, stated that he could not recall what the indicator showed, but thought it was 60 to 65 rpm. According to the Second Engineer, when "full astern" was rung, the engine speed was put to just under 70 rpm astern, where it remained until "dead slow astern" was rung immediately after the contact was felt.

According to the table of engine speeds contained on the vessel's manoeuvring characteristics data chart, displayed in the wheelhouse, the engine order/rpm values are:

Ahead		Astern	
Full Sea Speed	117		
Full Ahead	97	Full Astern	97
Half Ahead	68	Half Astern	68
Slow Ahead	59	Slow Astern	59
Dead Slow Ahead	35	Dead Slow Astern	35

No ranges of critical engine revolutions are indicated.

These details are also displayed at the main engine control station in the engineroom. However, at that station a different set of figures had been added by hand:

Ahead		Astern	
Full Ahead	85	Full Astern	70
Half Ahead	70	Half Astern	60
Slow Ahead	60	Slow Astern	50
Dead Slow Ahead	50	Dead Slow Astern	40

The engine-room table also carried the legends:

"Scavenge Air Limiter to be cut out when carrying out emergency or 'crash astern' manoeuvre" and

"Main engine should not be operated continuously between 71-84 RPM".

Critical speeds on marine engines are not uncommon and normally do not provide difficulties, either with engine control systems or manually manoeuvred ones. The reasons why the manoeuvring speeds were reduced aboard Chennai Nermai and whether they were officially approved by the vessel's owners, or were just the custom on board, were not determined.

The operational practice on board was to manoeuvre at the engine speeds as indicated by the hand-written details at the main engine control. Should the need arise for greater astern power, this would be indicated by a double "full astern" ring on the engine telegraph. The engineers would then cut out the Scavenge Air Limiter by overriding the governer and then quickly increasing the engine speed through the critical range to 97 to 100 rpm. According to the Chief Engineer, this could be achieved within 10 seconds.

The fact that the Master did not give a double ring "full astern" when the Pilot first asked for more power, at approximately 2020.5, was a crucial factor in the incident.

When the Pilot boarded, the Master did not provide him with a duly completed pilot card, or advise him that the vessel was not manoeuvred at the "normal" manoeuvring speeds, but full astern power could be obtained by a double ring astern, he merely advised him that the vessel did not have good astern power.

The Pilot did not request a pilot card or query the Master's statement, instead he relied upon his professional experience and expertise to conduct a safe operation. Neither did he discuss the port entry and berthing with the Master, other than to advise him that the vessel would berth stern first.

This lack of exchange of information resulted in the Master not knowing the details of the operations to be carried out and the Pilot not knowing fully the limitations and capabilities of the vessel.

Exchange of information

Regulation II/1 10, of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), Navigation with pilot embarked, states:

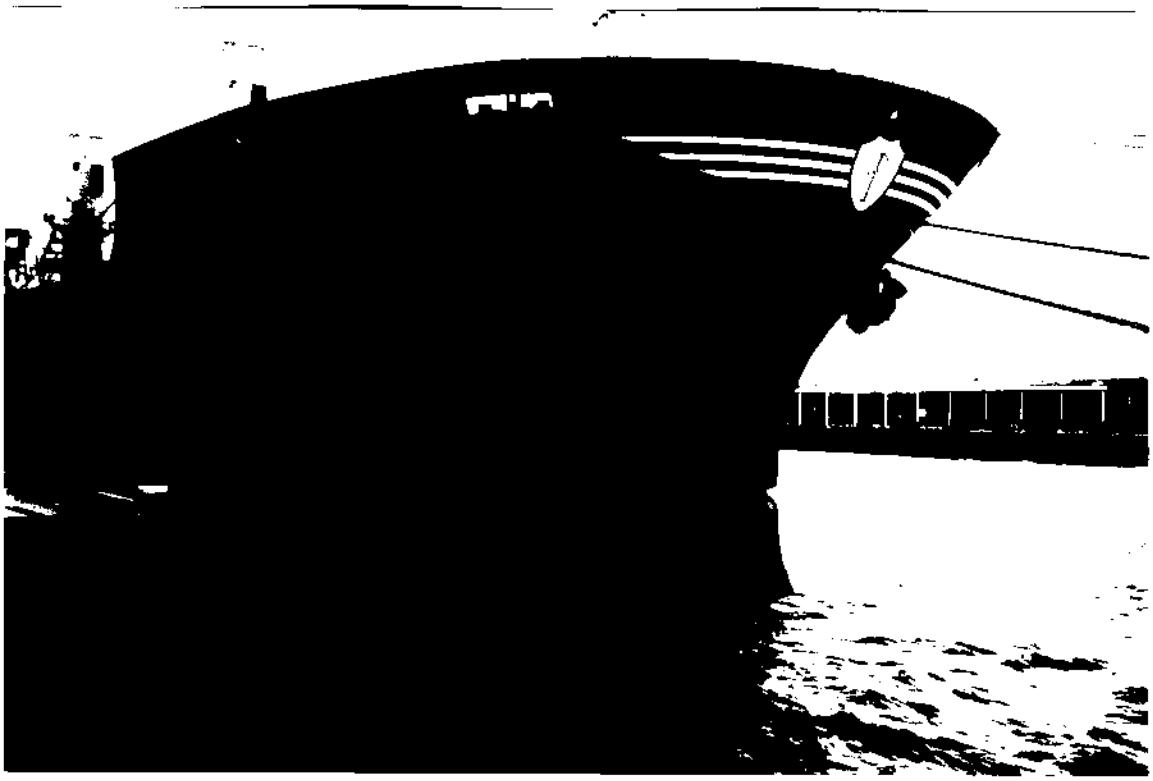
"Despite the duties and obligations of a pilot, his presence on board does not relieve the master or officer of the watch from their duties and obligations for the safety of the ship. * **The master and pilot shall exchange information regarding navigation procedures, local conditions and the ship's characteristics**. The master and officer of the watch shall co-operate closely with the pilot and maintain an accurate check of the ship's position and movement."

The International Maritime Organization's Resolution A.601(15), "Provision and display of manoeuvring information on board ships", contains recommendations for information to be contained on a pilot card and that to be contained on a ship's particulars/ manoeuvring data poster to be displayed in the wheelhouse.

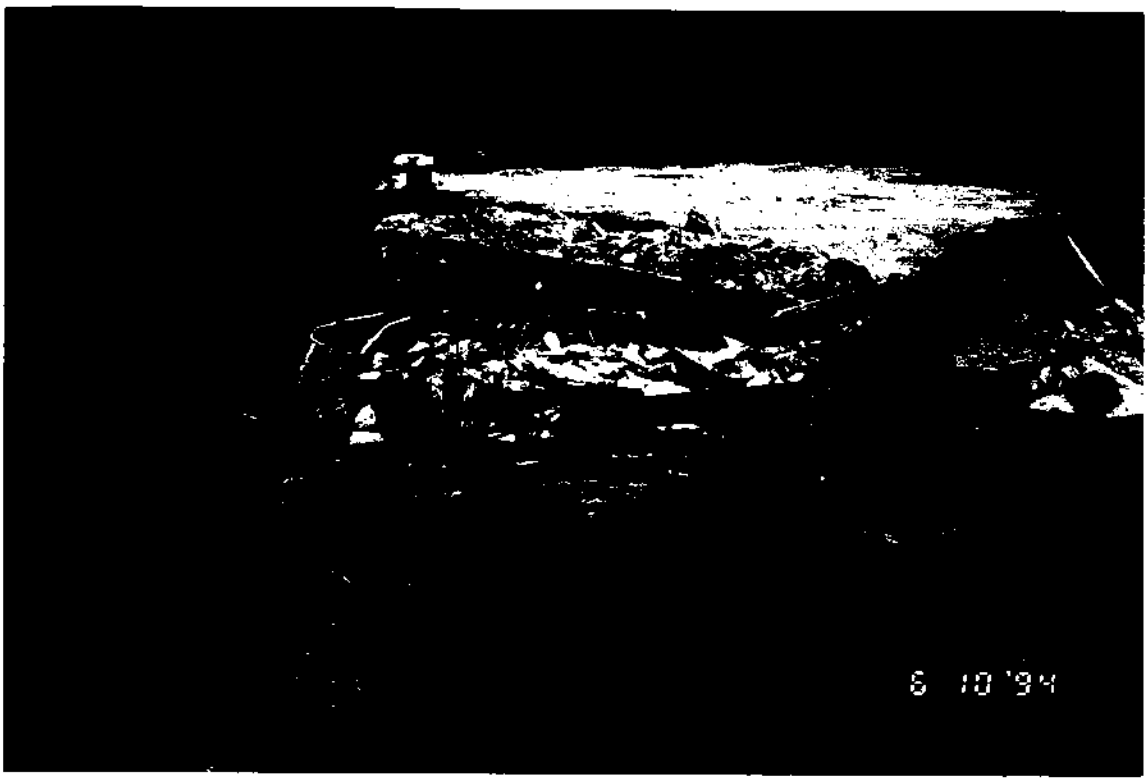
The International Chamber of Shipping's (ICS) "Bridge Procedures Guide" reflects the STCW Convention and IMO resolution in Part A, "Guidance to Masters and Navigating Officers". Sub-paragraph 2.2.2, under "Pilotage and Passage Planning", states:

"After his arrival on board, the pilot, in addition to being advised by the master of the manoeuvring characteristics and basic details of the vessel for its present condition of loading, should

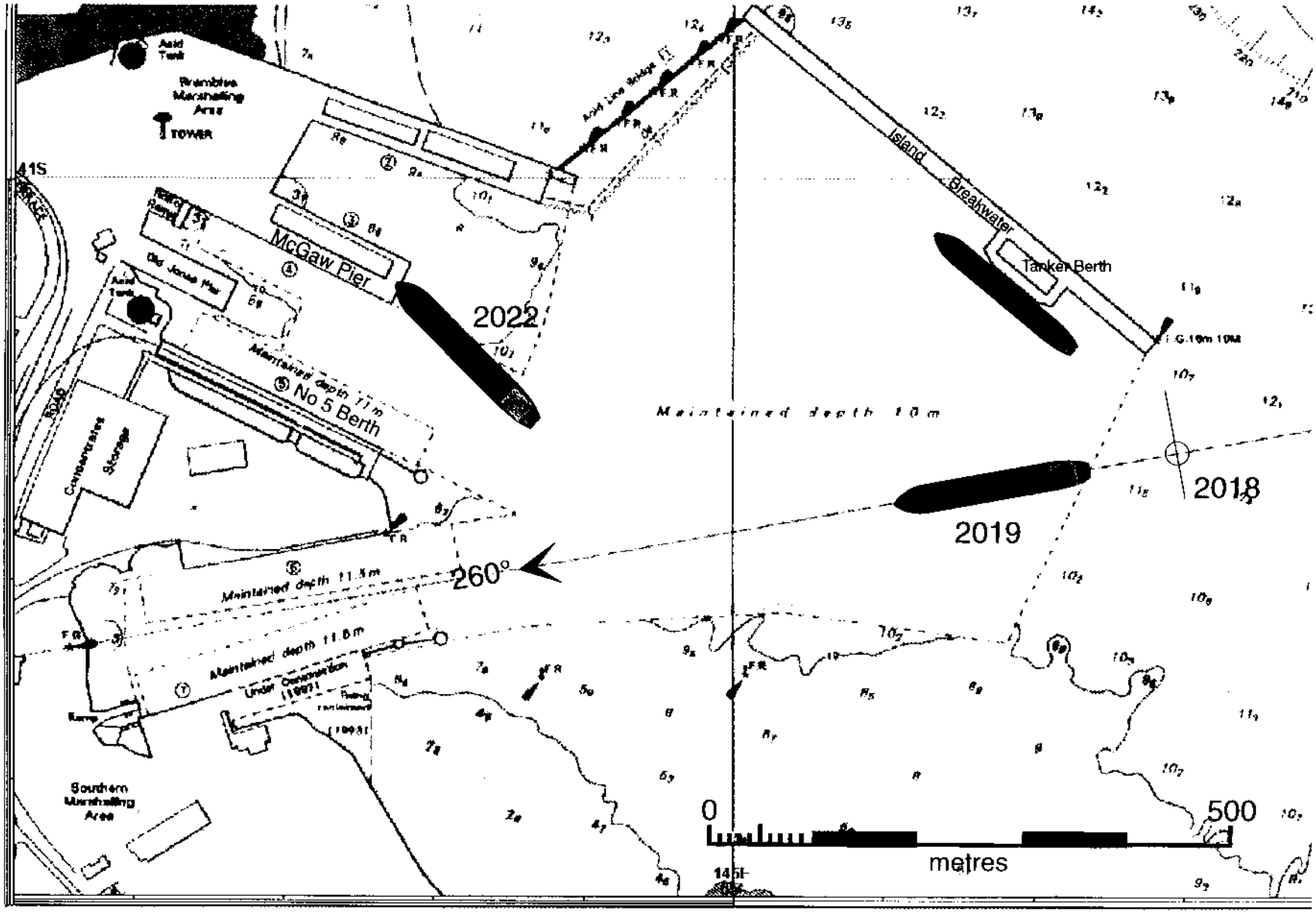
* Inspector's emphasis



Damage to Chennai Nermai's stem and plating



Damage to McGaw Pier



Portion of chart Aus 163 - Port of Burnie
Showing position of Chennai Nermai

indicate the passage plan he intends to follow. The general aim of the master should be to ensure that the plan is safe and the expertise of the pilot is fully supported by the ship's bridge personnel."

Sub-paragraph 3.10.2, under "Navigation with a Pilot Embarked", states:

"The master should inform the pilot of the ship's characteristics using a pilot card. An example of a pilot card recommended internationally is produced at Annex 1. This card should be completed as directed by the master and handed to the pilot on boarding. The master should request information from the pilot regarding local conditions and his navigational intentions. This information should be in a form to enable the master or officer of the watch to monitor the planned passage."

The full exchange of information and discussion of operations is of utmost importance. It is vital, to ensure safe operations, that the master of a vessel advises the pilot fully of any facts that affect the vessel's manoeuvrability, or the pilot's reasonable expectations of how the vessel should manoeuvre and which may require the pilot to adjust his plan.

Similarly, it is essential that a pilot fully explains his plan of operation to the master and duty officer of a vessel, so that they are fully aware and therefore able to carry out their duties and obligations.

Pilotage aspect

From the vessel's chart, the end of the breakwater was abeam of the wheelhouse at 2018. At this point the distance of the bow from McGaw Pier, measured along the approximate track of the vessel, was 640m, a little under 3.5 ship's lengths. The time of the contact with the pier was recorded both on the bridge and in the engineroom as 2022. The average speed required to cover the distance in four minutes is 5.18 knots, therefore, Chennai Nermai's speed on passing the breakwater had to be somewhat in excess of that speed.

The second order of "dead slow ahead, hard to port", although counter productive to both stopping the vessel and making the turn to starboard, was necessary, under the prevailing wind conditions, to prevent Chennai Nermai from veering towards, and possibly making contact with the tanker Mawson, berthed alongside the tanker berth.

Use of tugs

Spring Cove is a fixed propeller tug and as such not very manoeuvrable. Made fast on the port side, abreast of No.5 hatch, it was virtually being towed by Chennai Nermai and being held alongside, therefore it was of no assistance in turning the vessel around to starboard. If anything, the drag effect on the port side may have been counter-productive to a turn to starboard.

The Pilot stated that normally the wash from the propeller going astern was sufficient to push Spring Cove out from a vessel, so that it was positioned so as to be able to either push or pull should it be necessary. However, with Chennai Nermai, the wash was not sufficient to have that effect.

With a single, fixed propeller and a bollard pull of only 28 tonnes, it is considered that Spring Cove is somewhat under-powered and not sufficiently manoeuvrable for the task of handling the larger vessels calling at the port of Burnie.

External effects

Tide

Chennai Nermai entered the harbour six minutes after predicted high water, therefore the tide would have virtually been slack. Regardless of this, according to the Pilot, the state of the tide has no effect on manoeuvring vessels within Burnie harbour.

With the tide at 3m above datum, Chennai Nermai, at a draught of 7.5m even keel, would have had an underkeel clearance of 5.5m, sufficient not to adversely affect manoeuvrability.

Wind

The wind, as recorded by the Port of Burnie Authority anemograph, was from the north-east at 18 knots, gusting to 28 knots. As Chennai Nermai entered on the leads (260°), the wind would have been on the starboard quarter, which would have had the tendency to cause the stern to drop down-wind and the bow to swing to starboard, as indeed experienced by the Pilot and a factor he intended to make use of when turning the vessel to starboard. The wind would have assisted the turn until well forward of the starboard beam, but would also have caused a south-westerly drift, towards the wharves.

Time of day

Sunset at Burnie on 1 October was at 1921, with civil twilight at 1949 and nautical twilight at 2022, the time of the contact with McGaw Pier. The turn was being carried out during the period of last daylight, but there should have been sufficient light for the Pilot to gauge distances and speeds reasonably accurately. Also, both berthing and unberthing are conducted at the port during hours of darkness and therefore the encroaching darkness is not considered to have been likely to affect the pilot's judgement.

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.

It is considered that the contact with McGaw Pier, brought about by Chennai Nermai not stopping and swinging as the Pilot expected, was primarily the result of three factors:

1. The on-board practice of manoeuvring the vessel at engine speeds lower than the speeds indicated in the vessel's manoeuvring data.

2. The fact that the Master did not give a double ring "full astern" to obtain full astern power when the Pilot first asked for more power.

3. The lack of communication between the Master and the Pilot, in that:

   a. The Master did not provide the Pilot with a duly completed pilot card and did not explain the on board practice of manoeuvring at lower than listed engine speeds, but that "normal" "full astern" could be readily and quickly achieved by a double ring astern.

   b The Pilot did not request a pilot card or seek clarification of the poor astern power and did not discuss the port entry, vessel swing and berthing operations with the Master.

It is further considered that:

4. The drag effect of the tug Spring Cove, towed alongside to port, may have been a contributing factor to Chennai Nermai being slow to turn to starboard and not swinging clear of McGaw Pier.

5. The underkeel clearance of 5.5m in the turning area was sufficient not to adversley affect manoeuvrability.

6. The encroaching darkness was unlikely to have affected the Pilot's judgement.

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 the 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 report was sent to the Master and Owners of Chennai Nermai and to the Pilot.

A submission was received from the Pilot and the text of the report has been amended where considered appropriate.

Subsequent action

After the incident, the Burnie Port Authority replaced the tug Spring Cove with the more powerful and more manoeuvrable twin screw, 1954kW Fullerton Cove, which has a bollard pull of 40 tonnes.

Details of vessel

Name	Chennai Nermai
Flag	Indian
Lloyd's Number	8128092
Year of build	1983
Type	Geared bulk carrier, five holds
Owner	South India Shipping Corporation Ltd
Builder	Hyundai Heavy Industries, Ulsan, Korea
Classification	Lloyd's Register
Length overall	190.13m
Breadth	28.45m
Summer draught	11.183m
GRT	23991
NRT	13042
Summer deadweight	37940
Engines	B&W 2SA 5 cylinder 6804kW
Crew	43 Indian