Australian Government
Australian Transport Safety Bureau

Propulsion failure of *Portland Bay*

Off Port Kembla, New South Wales on 4 July 2022

ATSB Transport Safety Report
Marine Occurrence Investigation (Defined)
MO-2022-006
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Addendum

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Interim Report

This interim report details factual information established in the investigation's early evidence collection phase and has been prepared to provide timely information to the industry and public. Interim reports contain no analysis or findings, which will be detailed in the investigation's final report. The information contained in this preliminary report is released in accordance with section 25 of the Transport Safety Investigation Act 2003.

Background

At 0824 local time on 19 June 2022, *Portland Bay* (Figure 1) arrived off Port Kembla, New South Wales (NSW) following a voyage from Susaki, Japan. The ship was loaded with a cargo of cement and anchored off the port to wait for a berth to discharge the cargo.

At 1606 on 21 June, *Portland Bay's* anchor was weighed and shortly after, a pilot boarded to conduct it to berth number 104 in Port Kembla's inner harbour. By about 1724, the ship was safely alongside (starboard side to) its berth and, by 1930, cargo discharge had commenced. On the same evening, 8 new crew members joined the ship, including the relieving master and chief engineer. A further 5 relieving crew members joined the next day.

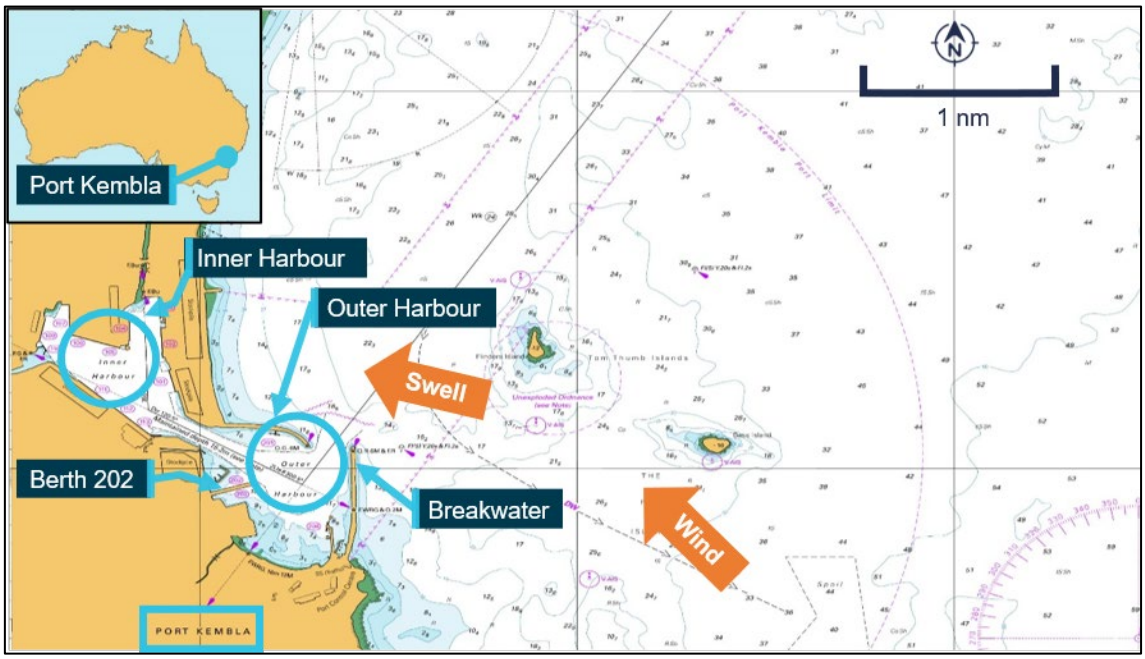
Figure 1: *Portland Bay*

Source: ATSB

By 2100 on 26 June, cargo discharge had been completed and *Portland Bay* departed Port Kembla the following day at 1240. The plan was to berth the ship in Port Kembla again on 2 July for cleaning of the upper parts of the cargo hold using shore labour. During the intervening period, the accessible areas of the cargo holds were to be cleaned by the ship's crew while at anchorage. The ship anchored briefly off the port before weighing anchor at about 1430. The ship then drifted off Port Kembla for about a day before anchoring again on 28 June for the crew to carry out the cargo hold cleaning.

On 1 July, *Portland Bay*'s local agent advised the ship's managers (Pacific Basin) of potential disruptions to its planned hold cleaning in Port Kembla due to heavy rain and a large north-easterly swell forecast for 3- 4 July. The advice noted that the ship might have to depart Port Kembla to avoid damage to both the ship and the wharf if the forecast swell eventuated. The ship's managers, however, decided to continue with the planned berthing and at 0154 on 2 July, the ship was all fast (starboard side to) at berth number 202 in the outer harbour (Figure 2).

Figure 2: Port Kembla Harbour (*Portland Bay* at berth 202; wind and swell at 1100, 3 July)



Source: Australian Hydrographic Office (AHO) and annotated by ATSB

At 0410, a Bureau of Meteorology (BoM) forecast was issued predicting gale force winds of up to 35 knots[1] and an easterly swell of 3- 4 metres for the seas off Port Kembla for the following day. Entries in the ship's logbook for 0500 recorded easterly winds at force 3 (7 to 10 knots).[2] At 1600 that day, a southerly wind at force 6 (22 to 27 knots) was recorded in the logbook.

At about 2243, *Portland Bay*'s agent notified the master of additional measures required by the Port Kembla vessel traffic service (VTS) for ships in the port in anticipation of the forecast heavy weather. These measures included the lowering of an anchor to the seabed and the use of additional mooring lines. Port Kembla VTS also advised that the port's anchorage was closed and that it required vessels drifting to remain at a safe distance off the coast (12 miles[3] or more).

The occurrence

On 3 July 2022, *Portland Bay* began to be affected by the swell at its berth in the outer harbour (Figure 2). At 1027, the terminal manager contacted VTS for an assessment by the duty pilot on whether it was safe for the ship to remain at its berth in the deteriorating weather conditions. At 1035, the ship's master requested and received permission from VTS to lower the port anchor to the seabed.

At about 1050, following a risk assessment by the duty pilot and the harbour master, VTS instructed the ship's master to prepare to depart to avoid damaging the wharf and the ship due to its movement in the swell. The master concurred with the decision and began preparing for departure. Pre-departure checks included the testing of the ship's steering gear and main engine (ahead and astern propulsion). A strong south-easterly breeze at force 6 (22 to 27 knots) was recorded in the ship's logbook at that time.

At 1235, a pilot boarded *Portland Bay* and, by 1300, the pre-departure checks and master-pilot information exchange had been completed with the main engine on stand-by. The ship departed

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1 One knot, or one nautical mile per hour, equals 1.852 kilometres per hour.

2 The Beaufort scale of wind force, developed in 1805 by Admiral Sir Francis Beaufort, enables sailors to estimate wind speeds through visual observations of sea states.

3 A nautical mile (mile) of 1,852 metres.

the berth at 1312 assisted by two tugs. The ship had maximum water ballast on board and its draught was 4.11 m forward and 5.30 m aft (aft draught for full propeller immersion was 5.1 m).

By 1334, *Portland Bay* had cleared the breakwater and the pilot disembarked. Due to the prevailing and forecast heavy weather, the engine room was kept manned with the engine on stand-by. The ship steamed east-north-east with the engine at manoeuvring full ahead (90 rpm). The ship experienced moderate to heavy rolling and pitching and the master recalled having difficulty maintaining a steady course and achieving a speed[4] of just 2- 3 knots.

At 1800, when *Portland Bay* was 14 miles east-north-east of Port Kembla, the master stopped the main engine to begin drifting. The weather had not improved with south-easterly force 7-8 winds recorded in the logbook. At about 1937, the main engine was restarted (probably to reduce rolling and pitching and arrest the ship's westerly drift). The engine order setting was gradually increased to manoeuvring full ahead. At midnight, east-south-easterly winds at force 7 (28 to 33 knots, near gale force) were recorded in the logbook. The third mate handed over the ship's navigation watch to the second mate and then conducted fire rounds[5] with nothing untoward reported.

At 0200 on the following day, 4 July, *Portland Bay's* main engine was stopped, and the ship resumed drifting in a position 24 miles east-north-east of Port Kembla (15 miles from the nearest coastline). Although the south-easterly wind strength had reduced to force 5 (17 to 21 knots), the swell generated earlier by the stronger winds persisted. At about 0330, the ship surged[6] and rolled heavily, after which, the second mate restarted the main engine at dead slow ahead (42 rpm). By 0337, the engine order setting had been increased to half ahead (about 80 rpm) and, and by 0344, to full ahead (90 rpm).

Shortly after 0400, the second mate handed over the watch to the chief mate. The wind at the time was recorded as south-easterly, force 6-7. The second mate then completed fire and safety rounds and found nothing unusual. During those early hours of the morning, the BoM wave rider buoy off Sydney recorded waves with a significant wave height[7] of 5.04 m and a maximum wave height[8] of 8.44 m from the east-south-east.

At 0450, an alarm on the ship's bridge fire detection panel alerted the chief mate to the activation of two fire detectors in the starboard side of the lower engine room. The second engineer, who was on watch in the engine control room and the chief engineer (also in the control room) found that the smoke from the main engine auxiliary blower no.2 had activated the fire detectors. A minute later, the second engineer returned to the engine control room, called the bridge and asked the chief mate to reduce main engine speed, and stopped blower no.2.

The chief mate began slowing down the main engine and, by 0453, when the master arrived on the bridge, the engine was set at slow ahead (58 rpm). At 0507, the engine setting was reduced further to dead slow ahead. Shortly after, various engine orders up to half ahead (80 rpm) were tried, but the master noted that the maximum rpm achieved was only 42.

At 0600, the master notified the ship's managers of the 'main engine failure' and the ship's situation. Shortly after, the engine was stopped and by 0624, the ship was displaying 'not under command' (NUC)[9] signals. The status of the disabled ship was also updated to NUC on its

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4 Unless stated otherwise, all speeds in the report are over the ground.

5 Fire and safety rounds conducted in the ship's accommodation spaces at regular intervals, especially in hours of darkness, to check for fire hazards or other hazards, such as unsecured equipment and open watertight doors.

6 Surge is the forward and aft motion of the vessel due to rapid acceleration and deceleration.

7 Significant wave height is traditionally defined as being the average height of the highest one-third of the waves experienced over time. It is also referred to as 'total wave height'. About 14% or one in every 7 waves will be higher than the significant wave height.

8 Maximum wave height (H_{max}) can be up to twice the significant wave height.

9 Not Under Command (NUC) – A vessel, which due to exceptional circumstances is not able to manoeuvre as required by the rules under Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREGs), and is therefore unable to keep out of the way of another vessel.

'automatic identification system' unit.[10] At 0635, the engineers operated the main engine from the local emergency controls (adjacent to the main engine) in an attempt to increase rpm sufficiently for the turbo charger to take over, but their efforts were unsuccessful.

At 0658, *Portland Bay's* master notified Port Kembla VTS on very high frequency (VHF) radio channel 16 that the ship's main engine had 'failed', that it was drifting towards the coast and requested tug assistance. Port Botany VTS, which was also monitoring channel 16 (and in contact with Port Kembla VTS), began sourcing available tugs in the area to assist the ship.

At 0716, when *Portland Bay* was 11 miles south of Botany Bay, and 5.8 miles from the nearest coastline, the master broadcast an 'urgency'[11] message on channel 16. Marine Rescue New South Wales (Port Kembla) acknowledged this urgency message. At about 0730, Marine Rescue NSW suggested to the master that the ship be anchored. However, in the adverse weather conditions and the relatively deep water where the ship was, the master decided against anchoring.

Subsequently, at 0744, Port Kembla VTS notified the Australian Maritime Safety Authority's (AMSA) Joint Rescue Coordination Centre (JRCC) that the ship was drifting towards the coast and at risk of grounding in about 1.5 hours. Meanwhile, Port Botany VTS received confirmation from Engage Marine, a harbour tug provider in Port Botany on the availability of tug *SL Diamantina*. Soon after, JRCC coordinated with Port Botany VTS to dispatch *SL Diamantina* to *Portland Bay*'s location.

At about 0800, JRCC also started planning for a possible evacuation of *Portland Bay*'s crew in the event that the ship stranded on the rocky coastline, endangering the crew. The planning involved coordinating with others including the Australian Defence Force and NSW Police and the State's Helicopter Rescue and Ambulance Services.

At 0815, *Portland Bay's* master, after consultation with the ship's managers, broadcast distress alerts on maritime satellite communication systems and marine radio frequencies. At 0830, the master sounded the ship's general emergency alarm and mustered the crew, contemplating abandoning the ship.

Meanwhile, in the worsening situation, the Port Authority of NSW had assumed the role of 'combat agency'[12] in accordance with NSW State Emergency Management Plan and the National Plan for Maritime Environmental Emergencies and established an incident management team (IMT). *SL Diamantina* left Botany Bay at 0848 and was expected to arrive at *Portland Bay*'s location 90 minutes later. Shortly after 0900, 3 rescue helicopters tasked by JRCC to evacuate non-essential crew arrived at the ship's location. However, the helicopters had to abandon their winching attempts due to the ship's unpredictable heavy rolling and pitching, which increased the risk of the winching cable being fouled by structures or fittings on the ship's deck.

At 0917, when the ship was about 1 mile from the nearest coastline and in water depths of about 45 m (Figure 3 and Figure 4), the master anchored the ship, using both the anchors to arrest its drift towards the coast.

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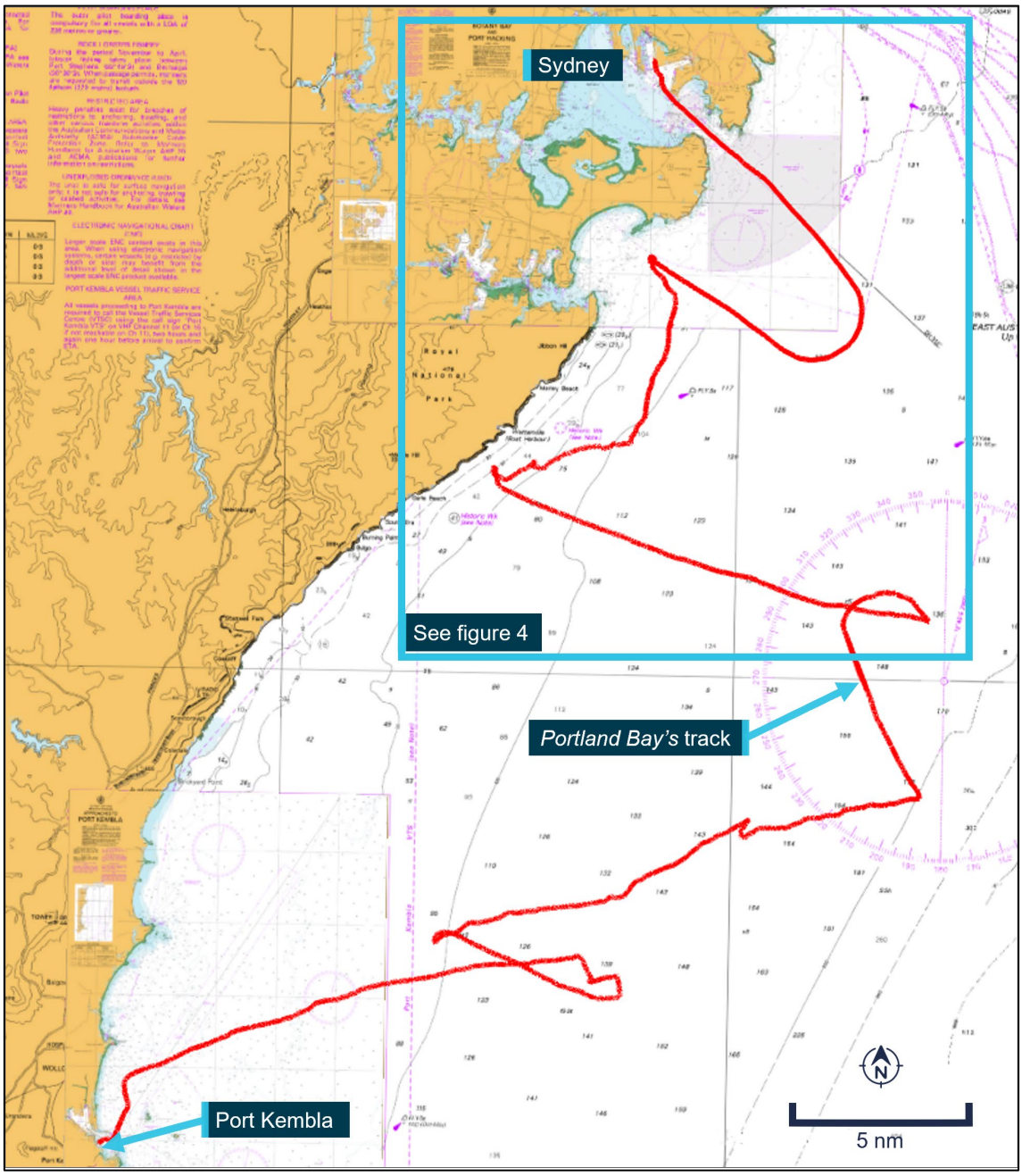
[10] The automatic identification system (AIS) is a very high frequency (VHF) radio broadcasting system which enables AIS equipped vessels and shore-based stations to send and receive identifying information.

[11] The urgency signal consists of the words 'PAN PAN' and indicates that the station sending it has a very urgent message to transmit concerning the safety of a vessel, aircraft, or person.

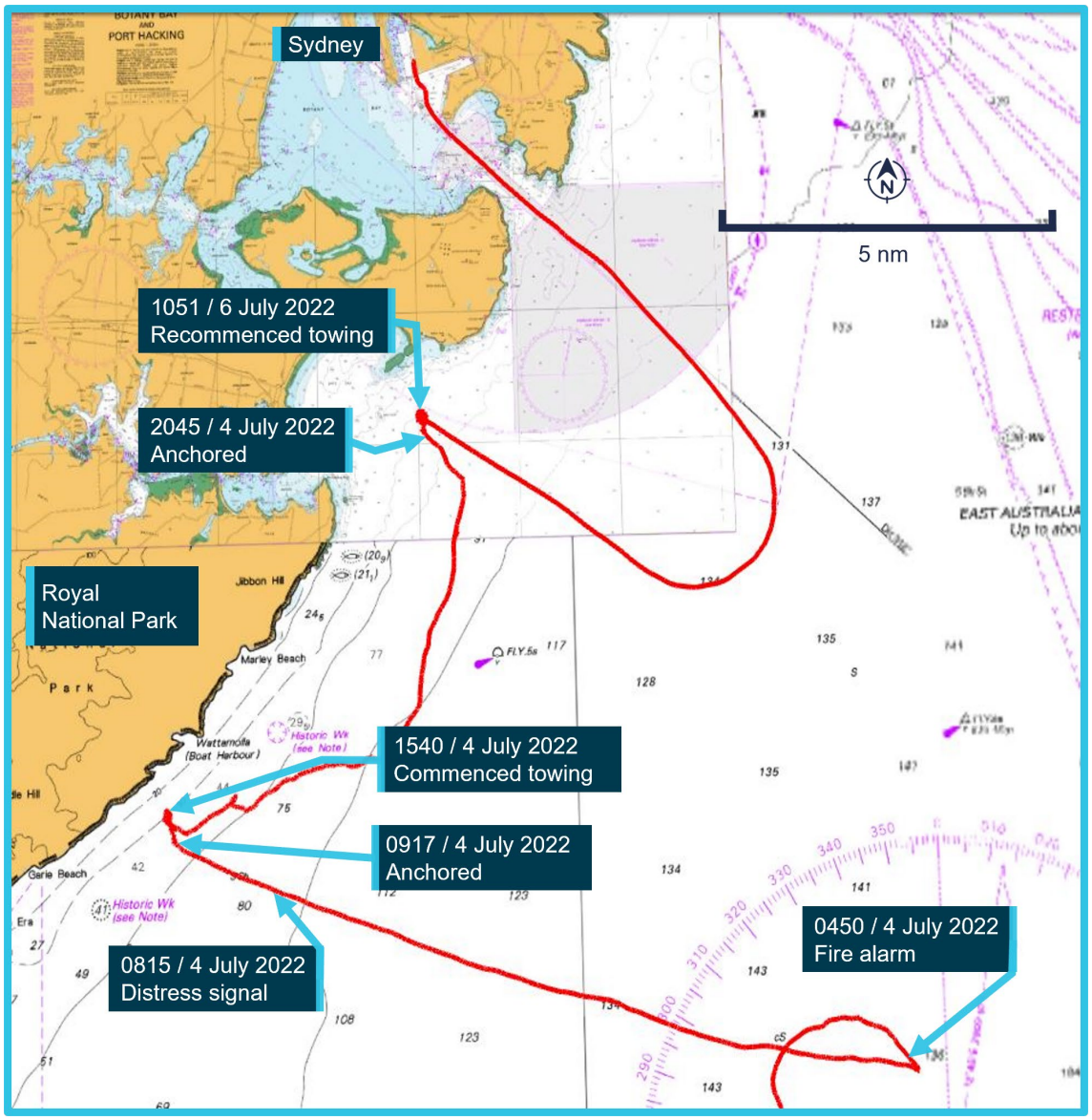
[12] A Combat Agency is the agency identified in State and/or Commonwealth emergency management plans as the agency primarily responsible for controlling the response to a particular emergency.

Figure 3: *Portland Bay's* movements from 3- 6 July



Source: AHO and annotated by ATSB

Figure 4: *Portland Bay's* track showing key events



Source: AHO and annotated by ATSB

At about 1000, when *SL Diamantina* arrived near *Portland Bay*, the salvage company, United Salvage, had been appointed to direct Engage Marine and its tugs. Shortly after, the master agreed to connect *SL Diamantina*'s towline under a standard salvage agreement. At 1055, after several unsuccessful attempts, the towline had been connected. The ship's engineers then removed the damaged auxiliary blower impeller and fitted a blank on the blower trunk.

At 1051, JRCC issued an 'on-task direction' for the emergency towage vessel (ETV) for the NSW 'area of operations' under the National Plan[13] to assist *Portland Bay* (*Svitzer Glenrock*, based in Newcastle, was the ETV identified for this area in AMSA's emergency towage capability map). A few minutes later, *Bullara* (operated by Svitzer Australia) and located in Port Jackson, Sydney (closer to the ship's location) departed the port. Shortly after, another Engage Marine tug, *SL Martinique*, departed White Bay, Sydney, to join the response.

Meanwhile at the ship's location, *SL Diamantina*'s tow line parted at 1158. Over the next hour, the line was reconnected twice only to part again. *Portland Bay*'s master then asked the tug master

[13] The National Plan for Maritime and Environmental Emergencies (National Plan) includes arrangements for emergency towage capability based around the Australian coast and is managed by AMSA.

not to attempt reconnecting it. Weather conditions at the time were near gale force south-south-easterly winds with a heavy south-easterly swell (estimated to be 9 m by the tug master).

At about 1410, the tugs *Bullara* and *SL Martinique* arrived on the scene and connected tow lines to *Portland Bay's* starboard and port shoulder,[14] respectively. By 1430, a new impeller had been fitted to auxiliary blower no.2 and the ship's managers notified AMSA that the ship's main engine was operable at limited rpm (up to half ahead).

By 1540, *Portland Bay*'s anchors had been weighed and the tugs began towing it away from the coastline. Soon after, the master informed JRCC that the main engine could not be operated at a rpm greater than slow ahead.

Later during the afternoon, the engine had to be stopped on 2 occasions due to high temperatures caused by scavenge space fires.[15] At 1842, *Bullara*'s tow line parted and, with only *SL Martinique* connected, *Portland Bay* again began closing with the coastline.

At 1957, JRCC tasked *Svitzer Glenrock* to depart Newcastle to join the response. Subsequently, the tug's crew arrived onboard and conducted storing in preparation for their voyage.

At 2010, *Portland Bay*'s master decided to anchor the ship again (*Bullara* was unable to actively assist due to its broken tow line). By 2045, the master had deployed both anchors, the ship was 1.4 miles from the coast and maintaining its position. The average and maximum swell recorded off Sydney at the time were 5.03 m and 8.63 m, respectively. At about 2110, *SL Diamantina* was stood down by the salvors as it was low on fuel and instructed to return to Port Botany.

At 2227, after completion of pre-departure and towing gear checks, *Svitzer Glenrock* departed Newcastle in weather conditions that remained rough with gale force southerly winds and a heavy swell of about 8 m.

At about 1300 the following day, 5 July, when *Svitzer Glenrock* arrived at *Portland Bay*'s location, the swell was still estimated to be about 8 m. United Salvage then asked *Bullara*'s master retrieve the broken tow line to allow *Svitzer Glenrock* to be made fast. By 1515, once *Svitzer Glenrock* was made fast, JRCC dismissed *Bullara*.

At 1550, AMSA issued a direction[16] to the ship's owner and master to proceed under tow to a suitable berth in Port Botany. Port Authority of New South Wales and United Salvage were also directed to facilitate the tow and the ship's berthing in Port Botany. Later that afternoon, in response to AMSA's direction, United Salvage prepared a towage plan for the passage to the berth.

At 0722 on 6 July, tug *SL Fitzroy* arrived at *Portland Bay's* location to assist with the towage and subsequent berthing of the ship. Following the arrival of the pilot vessel at 0845, *SL Fitzroy* made fast to the ship and, by 0954, 2 harbour pilots, representatives from the salvor, including an engineer, had boarded. Shortly after 1000, the master started weighing the anchors and by 1051, with both anchors home, the tugs (*Svitzer Glenrock*, *SL Martinique* and *SL Fitzroy*) began towing the ship. The ship's main engine was used at its minimum setting of dead slow ahead as needed to assist the tow.

At 1228, the ship entered Port Botany port limits and by 1312, tug *SL Diamantina* also made fast for the berthing in accordance with the plan. By 1454, *Portland Bay* was safely alongside at the

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[14] A shoulder is the area where a ship's hull form changes from the bow shape to the parallel mid body.

[15] Scavenge space fire is fire of flammable mixture (cylinder oil, unburnt fuel and carbon) which can collect in the scavenge space of an engine. Fire in the scavenge air space can be extinguished by steam, water mist or CO_2

[16] The Protection of the Sea (Powers of Intervention) Act 1981 provides AMSA powers to take measures and issue directions to prevent or respond to pollution of the sea by oil or other substances.

berth in Hayes Dock. Subsequently, AMSA officers boarded and, following initial inquiries, detained[17] the ship on grounds that it was unseaworthy due to its unreliable main engine.

On 7 July, an AMSA port state inspection identified deficiencies related to the ship's main engine and other machinery. Over the following days, inspections and maintenance of all cylinder units of the main engine, auxiliary blower no.2 and charge air cooler were completed in accordance with the engine manufacturer's recommendations.

On 13 July, following repairs, while the ship was still alongside, the main engine was tested to the satisfaction of the ship's classification society surveyor and the engine manufacturer's representative with an AMSA surveyor in attendance. The ship was then released from detention, and later that day, it departed Port Botany for Gisborne, New Zealand.

Context

Portland Bay

Portland Bay was owned by Uhland Shipping, classed with Nippon Kaiji Kyokai (Class NK) and managed and operated by Pacific Basin Shipping, Hong Kong. The Hong Kong registered 169 m bulk carrier was built in 2004 by Imabari Ship Building Company, Japan.

At the time of the incident, *Portland Bay* had a crew of 21, of which 13, including the master and chief engineer, had joined the ship in Port Kembla on 21 and 22 June 2022, about 12 days before the incident.

The master had about 23 years of seagoing experience with about 18 years in the rank of master. The master joined Pacific Basin shipping in 2017 as chief mate before gaining command on its ships. The incident voyage was the master's first assignment on *Portland Bay*..

The chief engineer had about 30 years of seagoing experience. The chief engineer joined Pacific Basin shipping in 2016 and was promoted to chief engineer in 2021. The incident voyage was the second assignment as chief engineer after joining *Portland Bay* for the first time.

Machinery

Portland Bay's propulsion was provided by a Makita Mitsui MAN-B&W 6S42MC engine, delivering 5,850 kW at 129 rpm, driving a single, fixed-pitch, four-bladed, right-handed propeller. The ship had a service speed of about 14 knots at 85% 'maximum continuous rating'[18], which was 122 rpm (full sea speed).

The main engine was fitted with 2 auxiliary blowers, which generally operated in automatic mode providing air for the engine at low engine speeds. The blowers were designed to cease operation at higher engine speeds when the exhaust gas driven turbocharger could meet the engine's air demand.

Further Investigation

A team of ATSB investigators attended *Portland Bay* in Port Botany to collect relevant documentary and recorded electronic evidence, and interviewed the master and the chief engineer. The ATSB also obtained relevant evidence from Pacific-Basin Shipping, AMSA, Port Authority of New South Wales, Engage Marine, Svitzer Australia and BoM.

The investigation is continuing and will include a review and assessment of:

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[17] A detention is an intervention action taken by the port State when the condition of the ship or its crew does not correspond substantially with the applicable conventions. The action is taken to ensure that the ship will not sail until it can proceed to sea without presenting a danger to the ship or persons on board, or without presenting an unreasonable threat of harm to the marine environment, whether or not such action will affect the scheduled departure of the ship.

[18] Maximum Continuous Rating (MCR) is the maximum output power for the engine running continuously under safe conditions.

- *Portland Bay*'s activities and movements in relation to calling at Port Kembla
- further analysis of data from the ship's voyage data recorder to verify key event times
- the ship's main engine maintenance and performance, including auxiliary blower operation
- the incident reporting and emergency response on board the ship
- the emergency response by authorities with respect to the State and National Plans.

General details

Occurrence details

Date and time:	4 July 2022 – 0658 local time (UTC+10 hours)	
Occurrence class:	Incident	
Occurrence categories:	Machinery failure	
Location:	Off Port Kembla, New South Wales	
	Latitude: 34º 12.1' S	Longitude: 151º 14.4' E
Persons on board:	Crew – 21	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Damage:	None	

Ship details

Name:	*Portland Bay*	
IMO number:	9276200	
Call sign:	VRHR2	
Flag:	Hong Kong	
Classification society:	Nippon Kaiji Kyokai	
Departure:	Port Kembla	
Destination:	Port Kembla	
Ship type:	Bulk/Lumber Carrier	
Builder:	Imabari Shipbuilding Company, Japan	
Year built:	2004	
Owner(s):	Uhland Shipping, British Virgin Islands	
Manager:	Pacific Basin Shipping, Hong Kong	
Gross tonnage:	16,960	
Deadweight (summer):	28,446 t	
Summer draught:	9.778 m	
Length overall:	169.26 m	
Moulded breadth:	27.20 m	
Moulded depth:	13.60 m	
Main engine(s):	Makita Mitsui MAN-B&W 6S42MC (Mark VI)	
Total power:	5,850 kW	
Speed:	14 knots	
Injuries:	Crew – 0	Passengers – 0
Damage:	None	