



Australian Government

Australian Transport Safety Bureau

Breakaway of *Spirit of Tasmania II*

Station Pier, Port Melbourne, Victoria 13 January 2016

ATSB Transport Safety Report
Marine Occurrence Investigation
324-MO-2016-001
Preliminary – 18 April 2016

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
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Addendum

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Safety summary

The information contained in this Preliminary report is released in accordance with section 25 of the Transport Safety Investigation Act 2003 and is derived from the ongoing investigation of the occurrence. Readers are cautioned that new evidence will become available as the investigation progresses that will enhance the ATSB's understanding of the accident as outlined in this Preliminary report. As such, no analysis or findings are included in this report.

What happened

On the afternoon of 13 January 2016, the roll-on roll-off ship *Spirit of Tasmania II* was loading passengers and vehicles in Melbourne. At 1752, strong wind gusts blew the ship off the wharf and all but one of the ship's mooring lines (on the bow) parted. As it broke away, the stern swung around until the ship was 90 degrees to the wharf and parallel to the nearby public beach, in danger of grounding. Action was taken to arrest the swing and the ship was returned to the wharf without touching bottom.

Wharf cargo and vehicle loading infrastructure was seriously damaged. The ship suffered minor bow damage. No one was injured.

What the ATSB has found so far

Based on the preliminary information that ATSB obtained, it was apparent that a band of severe thunderstorms passed across the area, including the location of *Spirit of Tasmania II*, with comparatively little notice. As the ship's bridge was unattended throughout the port stay, none of the crew saw indicators of an approaching storm until immediately before the breakaway.

The ship's crew responded swiftly. The bridge was manned and machinery was operational by the time the ship had turned 90 degrees to the wharf. The ship's movement was then controlled using its thrusters and propulsion until it could be turned, with the assistance of a harbour tug, away from the beach and returned to the wharf.

Investigation direction

The investigation is ongoing and will focus on weather events in the Port of Melbourne area, and how the port and port users prepare for such events. This will include:

- The ship's managers' (TT line Company) preparations and procedures
- *Spirit of Tasmania II* preparations and procedures for port stays and weather events, including mooring arrangements and equipment
- Port of Melbourne procedures and actions
- Bureau of Meteorology weather forecasting and warnings
- distribution of weather information and warnings to and amongst port users.

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The occurrence

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At 0600¹ on 13 January 2016, the roll-on roll-off passenger ship *Spirit of Tasmania II* (Figure 1) berthed at Station Pier in the Port of Melbourne. The ship had just completed its usual, scheduled Bass Strait transit from Devonport, Tasmania to Melbourne, Victoria.

Figure 1: *Spirit of Tasmania II* alongside Station Pier after the incident



Source: ATSB

A 'strong wind warning'² for Port Phillip was in effect and had been re-issued at 0527 that morning. The master was aware of this warning, and also knew a cold front was expected to pass across the port at about 2100 that evening. As a precaution, he had instructed that two of the ship's four main engines be ready for manoeuvring at immediate notice from 1600. Departure was scheduled for 1930.

After the ship had berthed, unloading of cargo and passengers started and continued into the afternoon. As usual, *Spirit of Tasmania II* was to load freight and vehicles via its bow, using a lower and an upper vehicle ramp. At about 1600, unloading was completed and the loading of freight and vehicles started.

At 1630, the master, who had slept from 1330 onwards to rest for *Spirit of Tasmania II*'s evening sailing, awoke and attended to some administrative tasks. He also checked the Bureau of Meteorology (BoM) website and noted little change to the weather forecast. At about 1700, when he went to the navigation bridge, the situation appeared normal and as expected. At the time, the wind was 20 knots³ from the west and the weather was clear.

At about 1730, passengers began boarding – those with cars driving on board via the lower vehicle ramp while others boarded via the aft passenger access. The ship's managers and master had agreed to board the waiting passengers about 30 minutes earlier than usual because it had been a hot day (44°C).

At about 1750, the master returned to his cabin and again checked the BoM website. He saw that a 'severe thunderstorm warning'⁴ had been issued at 1737. The website indicated a series of thunderstorms approaching Station Pier from the southwest. The thunderstorms were about 13 miles off (Figure 2).

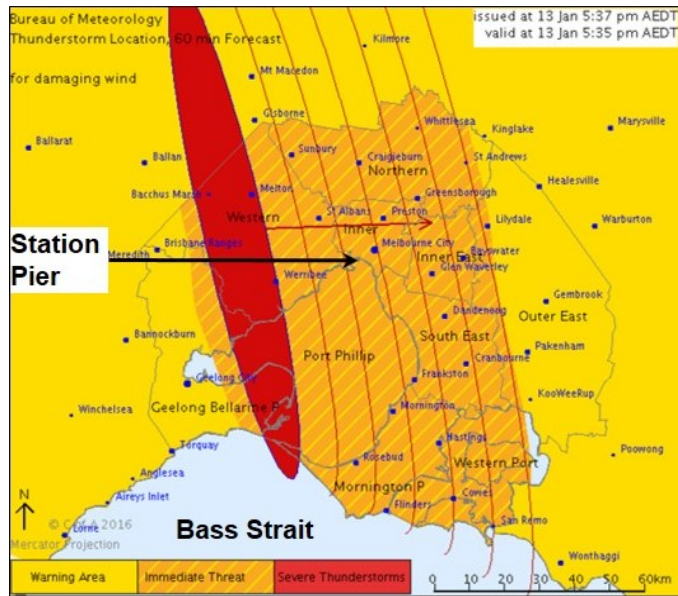
¹ All times referred to in this report are local time, Coordinated Universal Time (UTC) + 11 hours.

² The Australian Bureau of Meteorology (BoM) defines strong winds as those with a 10-minute average speed between 26 and 33 knots. <www.bom.gov.au>

³ One knot, or one nautical mile per hour, equals 1.852 kilometres per hour.

⁴ BoM defines a severe thunderstorm as one that produces, amongst other criteria, damaging wind gusts, generally exceeding 90 km/h (48.6 knots).

Figure 2: Thunderstorm map at 1737 on 13 January



Source: Bureau of Meteorology with annotations by ATSB

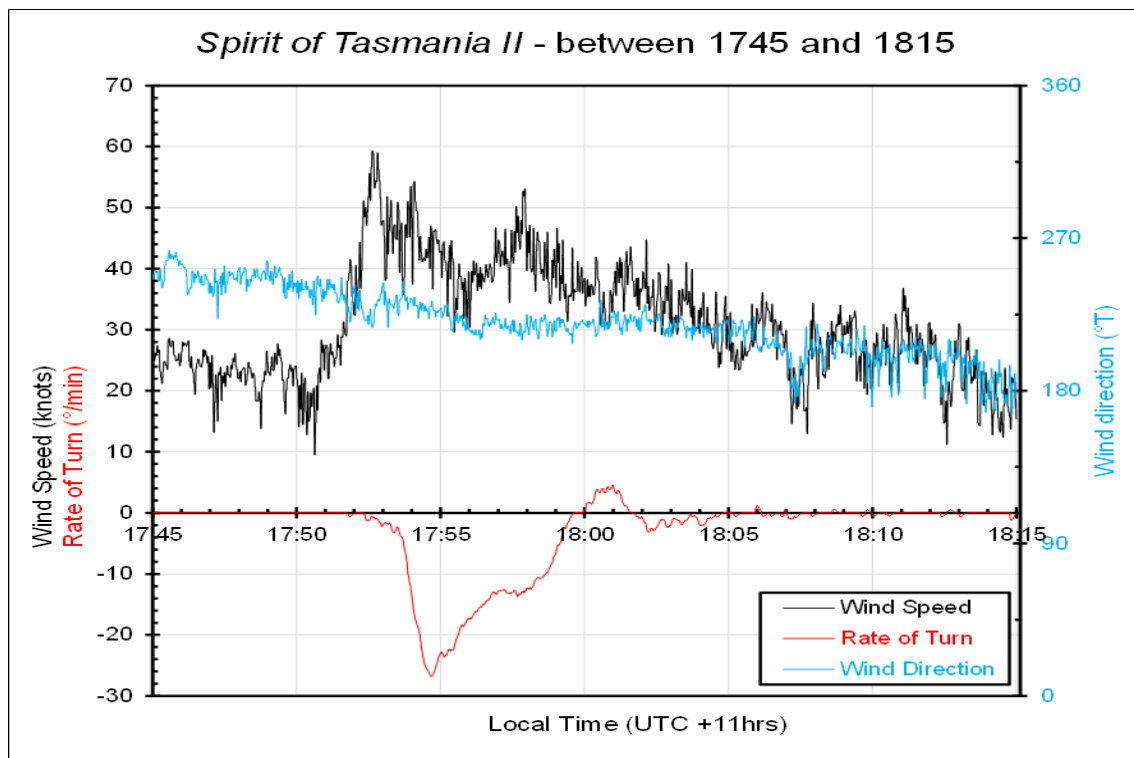
On the main vehicle deck, the duty officer, the second mate, was attending to loading of cars into the main and lower decks. Vehicle traffic had been halted on the landside of the ship's bow ramp as it had banked up in the vehicle deck.

The second mate noticed a breeze coming in through the open ship's side, pilot access door. He called the chief mate via radio and noted that the wind had picked up, suggesting that the change in weather may have arrived. He closed the passenger door/ramp and pilot access door.

Shortly after, as the master left his cabin to go to the bridge, he saw the wind speed indicator outside his cabin indicated gusts of up to 59 knots. He hurried to the bridge.

At 1753, the wind at *Spirit of Tasmania II*'s location was nearly 60 knots from the southwest (Figure 3). By then, about 120 passengers had boarded and the ship's stern had moved off the wharf. With the violent storm force wind⁵ pushing the stern off, the ship's aft mooring lines failed in rapid succession. As the stern broke away from the wharf, the ship swung away and towards the shore (Figure 4).

Figure 3: Wind speed and direction, and the ship's rate of turn



Source: *Spirit of Tasmania II* voyage data recorder

⁵ The Beaufort wind scale defines violent storm force winds as 56 to 63 knots.

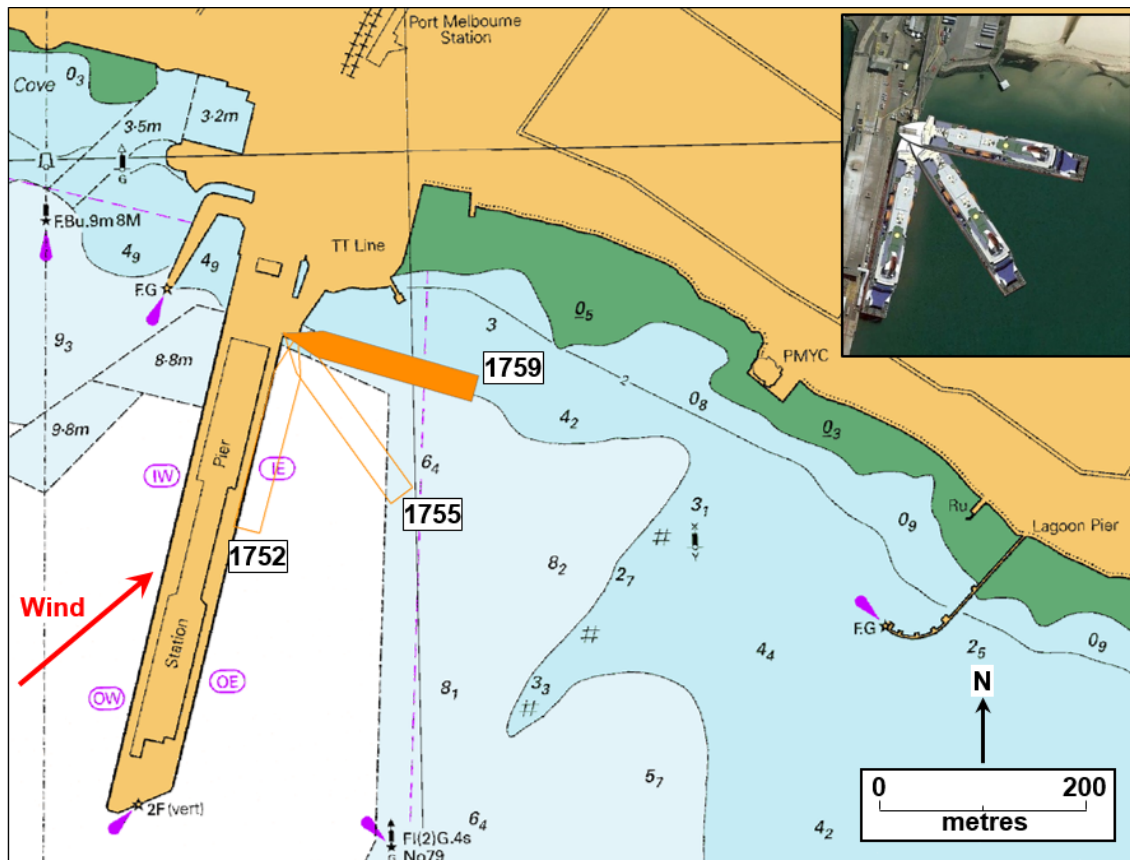
On the bridge, *Spirit of Tasmania II*'s master saw its stern move off the wharf. He telephoned the engine control room but received no response. He then broadcast a message over the ship's public address system asking an engineer to call the bridge and all crewmembers to go to their mooring stations. The senior engineer in the engine room heard the broadcast, returned to the engine control room, and called the bridge. The master asked for the bow and stern thrusters, followed by two main engines to be started as quickly as possible.

By 1755, the ship was at an angle of approximately 45 degrees to the wharf and turning away from it (negative rate of turn in Figure 3) at 27°/min.

At 1756, an additional diesel generator was running and the thrusters were available for use. The engineers then started necessary pumps and by 1758½, the two main engines were also ready.

Spirit of Tasmania II's purser and hotel staff were assisting passengers on board when the ship broke away. The purser became aware of the situation when she heard, and then saw, the aft mooring lines parting and the stern moving off the wharf. She followed the developments and response by listening to the ship's internal radio traffic. She and her staff assisted passengers, distributed food, drinks and provided reassurance and information as it became available.

Figure 4: Section of navigational chart AUS154 showing the ship's breakaway



Source: Australian Hydrographic Service with annotations by ATSB (Inset: Google Earth)

As the ship's stern came off the wharf, all the aft mooring lines and all except one of the forward lines parted. The ship pivoted about the bow, its bow ramp slid across and dropped off the wharf leaving it hanging over the bulbous bow. As the ship continued to turn, the end of the bow ramp swung under the wharf, damaging two wooden piles below the wharf apron.

The upper vehicle ramp detached from the ship's bow and jammed between the bow bulwarks. As the ship continued to turn, this ramp twisted away from the bow and hung down from its elevated roadway base.

By 1759, *Spirit of Tasmania II* was lying at right angles to Station Pier, parallel to the nearby public beach. By then, the stern thruster was being used to control the movement of the ship's stern.

The Port of Melbourne's vessel traffic service (VTS) had been aware of the strong wind warning issued by BoM and had had two tugs on standby throughout the day. One tug was at nearby Webb Dock as a precaution to assist a car carrier there. The duty VTS officer directed the tug's master to proceed to Station Pier to assist *Spirit of Tasmania II*.

By 1800, the ship's stern was being held off the beach using two main engines and the bow and stern thrusters. At 1805, the other two main engines were also running and available for use.

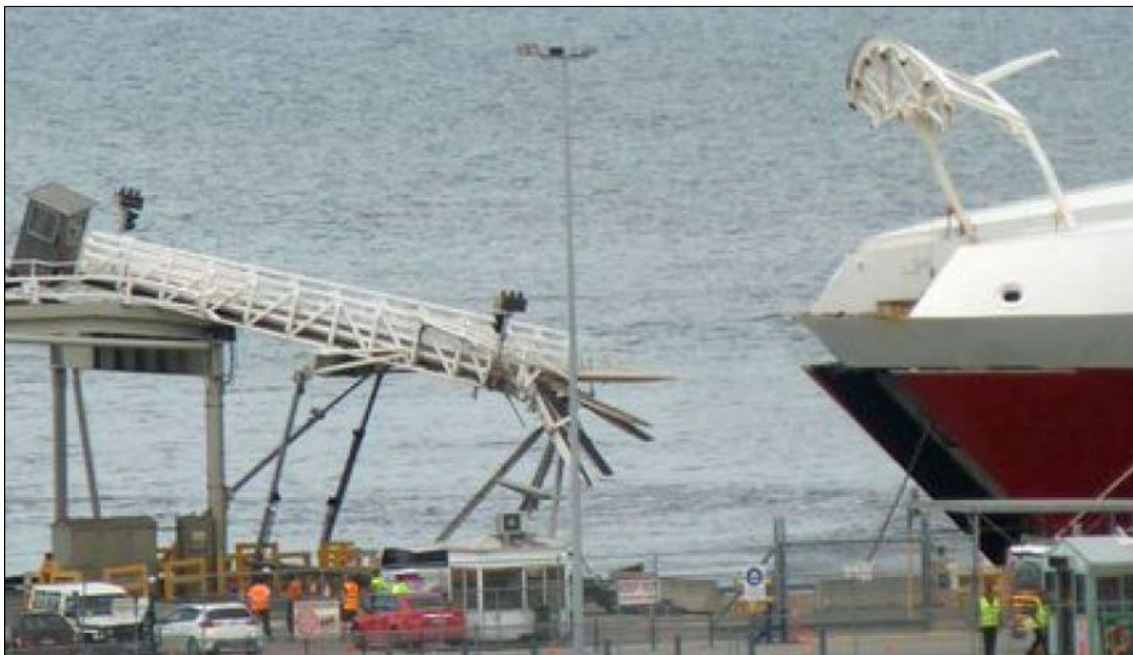
At 1809, the tug arrived off *Spirit of Tasmania II* and was made fast to the ship's stern. Another tug (the second one on standby) arrived at 1826 and began assisting. By 1900, the wind speed, which had peaked at 1752, was around 10 knots from the south.

By 1905, *Spirit of Tasmania II* had again been made fast, with its port side alongside Station Pier.

Later in the evening, passengers were allowed access onto and off the ship. Many passengers were accommodated on board for the night while damage assessments and investigations started. Access to unload vehicles and freight became available the following day.

When *Spirit of Tasmania II* had turned off the wharf, its starboard bow door had come to rest against the wharf structure. Weight had then come onto it and pushed it against the bow ramp, resulting in damage to a number of its door operating components. The hydraulic system used to operate the doors and ramp was not damaged. The upper vehicle ramp suffered extensive damage (Figure 5) requiring it to be removed from the wharf and taken away for repairs.

Figure 5: Photograph showing damaged upper vehicle ramp near *Spirit of Tasmania II*'s bow



Source: Debbie Storz via www.abc.net.au/news

Inspections and repairs were undertaken to the satisfaction of the ship's flag State and classification society. On 17 January, 4 days after the incident, *Spirit of Tasmania II* returned to service.

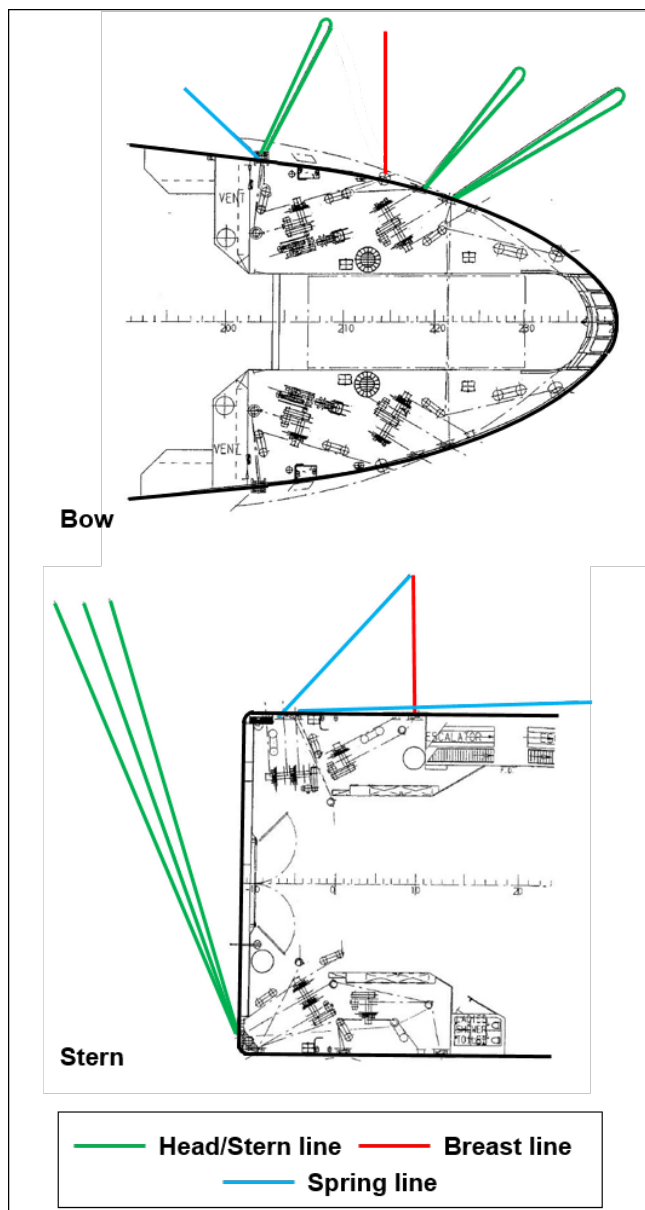
Context

Spirit of Tasmania II

At the time of the incident, *Spirit of Tasmania II* was registered in Australia, and owned and managed by TT Line Company, Australia (TT Line). The ship was classed with the American Bureau of Shipping (ABS).

Spirit of Tasmania II's standard mooring arrangement had been developed for the Station Pier berth. This consisted of three head lines, a spring line and a breast line at the bow, and three stern lines, two spring lines and a breast line at the stern (Figure 6). All mooring ropes were 64 mm diameter KapaFlex 24 (24 strand, 40 percent polyester, 60 percent polypropylene/polyethylene) mixed rope, each with a breaking load of 82 t.

Figure 6: *Spirit of Tasmania II*'s mooring arrangement



Source: TT Line Company with annotations by ATSB

In Melbourne, the ship loads freight and vehicles via its bow, using a lower and an upper vehicle ramp. The lower ramp is part of the ship's equipment and, when deployed, extends out from the

main vehicle deck, through the bow doors and onto the wharf. The upper ramp, also known as the sky bridge, extends from a raised roadway above the wharf onto the ship's bow. The sky bridge attaches to the ship's bow via a ball hitch arrangement that accommodates movement of the ship. This provides vehicular access into the upper vehicle decks through the foredeck cargo door.

The ship had a crew of 70 Australians. The master held an Australian master class 1 certificate of competency and a pilotage exemption for the Port of Melbourne (which includes Port Phillip Bay). He first went to sea as a cadet in 1981, and had sailed as master since 1994. He had sailed on board *Spirit of Tasmania II* and its sister ship *Spirit of Tasmania I* since 2002. He first sailed as master of *Spirit of Tasmania II* in 2004. He joined the ship about 3 weeks before the incident.

TT Line Company

The TT line Company (TT Line) has been operating a passenger and vehicle ferry service across Bass Strait since 1985. The sister ships *Spirit of Tasmania I* and *Spirit of Tasmania II* began service in 2002. The ships maintain year round daily sailings with double sailings (two Bass Strait crossings by each ship, one in either direction, each day) during the peak summer period. Each ship can carry 1,400 passengers and 500 vehicles. In the 2014-15 financial year, the company's ships carried 384,501 passengers and 102,309 containers.

Weather

The Australian Government's Bureau of Meteorology (BoM) provides weather forecasts, warnings and observations for marine users in coastal and local water areas and high seas off Australia. Weather warnings are issued whenever strong winds, gales, storm-force or hurricane-force winds are expected. The initial warnings aim to provide 24-hour lead times, and are updated every 6 hours.

The warnings are broadcast via VHF radio channels 16 and 67 at 0718 and 1918 every day and are available on the BoM website. The warnings are also transmitted at 0400 and 1600 daily as enhanced group calling (EGC) messages via the maritime satellite communication network. Normally these messages are automatically received and printed on board ships.

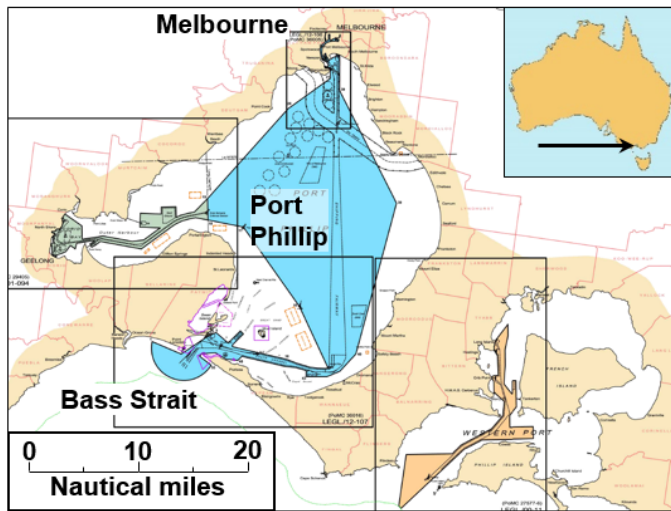
On 13 January, BoM issued local waters forecasts for Port Phillip at 1041 and 1640. These forecasts included a strong wind warning for Port Phillip with squalls up to 45 knots possible.

At 1715, a severe thunderstorm warning was issued for the Melbourne area. This warning indicated that severe thunderstorms with damaging winds had been detected southwest of Melbourne and were heading to the southeast.

At 1737, the severe thunderstorm warning was re-issued for Melbourne with the storms now moving in an easterly direction. This warning indicated that a band of severe thunderstorms with winds up to 100 km/hr (about 51 knots) was moving toward Melbourne from the southwest. The storms were expected to affect Melbourne City by 1805. The warning included a map showing the band of storms and its expected movement (Figure 2).

The preamble in all BoM warnings cautions that wind gust speeds can be 40 per cent higher than the average wind speed, and stronger gusts are likely near showers, thunderstorms and frontal systems.

Figure 7: Port Phillip Bay, Victoria



Source: Port of Melbourne Corporation and ATSB

Port of Melbourne

The Port of Melbourne is Australia's largest container and automotive port. The Port of Melbourne Corporation manages the port, which is located at the north end of Port Phillip Bay (Figure 7).

The port has 36 commercial berths for all types of cargo. In the 2014-15 financial year, the port recorded 3,023 ship visits and handled 87 million tonnes including over 2.58 million containers and 350,000 new motor vehicles.

Melbourne vessel traffic service (VTS) operates 24-hours a day, seven days a week, to coordinate the port's maritime operations.

Investigation direction

The investigation is ongoing and will focus on weather events in the Port of Melbourne area, and how the port and port users prepare for such events. This will include:

- The ship's managers' (TT line Company) preparations and procedures
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General details

Occurrence details

Date and time:	13 January 2016 — 1753 AEDT (UTC +11)	
Occurrence category:	Serious incident	
Injuries	Nil	
Primary occurrence type:	Breakaway	
Location:	Inner East berth, Station Pier, Melbourne, Victoria	
	Latitude: 37° 50.61' S	Longitude: 144° 55.93' E

Ship details

Name:	<i>Spirit of Tasmania II</i>
IMO number:	9158434
Call sign:	VNSZ
Flag:	Australia
Classification society:	American Bureau of Shipping
Ship type:	Passenger / Roll on – Roll off
Builder:	Kvaerner Masa-Yards, Turku Finland
Year built:	1998
Owner(s):	TT-Line Company
Manager:	TT-Line Company
Gross tonnage:	29,338
Deadweight (summer):	5,651 t (1,400 passengers, 113 crew, 110 trailers, 140 cars)
Summer draught:	6.440 m
Length overall:	194.30 m
Moulded breadth:	25.00 m
Moulded depth:	9.10 m
Main engine(s):	4 x Wartsila NSD, Sulzer 16ZA40S
Total power:	42,240 kW
Speed:	33.0 knots
Damage:	Ship: Parted mooring lines (10) and minor damage to bow ramp and doors. Shore: Extensive damage to elevated roadway and ramp arrangement on wharf and minor damage to wharf structures.

Sources and submissions

Sources of information

On 14 January 2016, investigators from the Australian Transport Safety Bureau (ATSB) attended *Spirit of Tasmania II* while the ship was in Melbourne, Victoria. The master and directly involved crewmembers were interviewed and each provided their account of the occurrence. Photographs of the ship and copies of available, relevant documents were obtained.

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.