OTSI Office of Transport Safety Investigations

# FERRY OCCURRENCE: FACTUAL STATEMENT

## *OCEAN WAVE* LOSS OF CONTROL
## MANLY COVE, NSW
9 JUNE 2016

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# THE OFFICE OF TRANSPORT SAFETY INVESTIGATIONS

The Office of Transport Safety Investigations (OTSI) is an independent NSW agency whose purpose is to improve transport safety through the investigation of incidents and accidents in the rail, bus and ferry industries. OTSI investigations are independent of regulatory, operator or other external entities.

Established on 1 January 2004 by the *Transport Administration Act 1988 (NSW)*, and confirmed by amending legislation as an independent statutory office on 1 July 2005, OTSI is responsible for determining the contributing factors of accidents and to make recommendations for the implementation of remedial safety action to prevent recurrence. Importantly, however, OTSI does not confine itself to the consideration of just those matters that contributed to a particular accident; it also seeks to identify any transport safety matters which, if left unaddressed, might contribute to other accidents.

OTSI's investigations are conducted under powers conferred by the *Transport Administration Act 1988 (NSW)* and *Passenger Transport Act 1990 (NSW).* Additionally, all OTSI publications that are considered investigation reports are also conferred by these Acts. OTSI also conducts rail investigations on behalf of the Australian Transport Safety Bureau under the *Transport Safety Investigation Act 2003* (*Cwlth*). OTSI investigators normally seek to obtain information cooperatively when conducting an accident investigation. However, where it is necessary to do so, OTSI investigators may exercise statutory powers to interview persons, enter premises and examine and retain physical and documentary evidence.

It is not within OTSI's jurisdiction, nor an object of its investigations, to apportion blame or determine liability. At all times, OTSI's investigation reports strive to reflect our balanced approach to the investigation, in a manner that properly explains what happened, and why, in a fair and unbiased manner.

Once OTSI has completed an investigation, its report is provided to the NSW Minister for Transport and Infrastructure for tabling in Parliament. The Minister is required to table the report in both Houses of the NSW Parliament within seven days of receiving it. Following tabling, the report is published on OTSI's website at www.otsi.nsw.gov.au.

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# EXECUTIVE SUMMARY

On 9 June 2016, the Manly Fast Ferry (MFF) vessel *Ocean Wave* was travelling from Sydney to Manly Wharf with 13 passengers on board when it experienced an engine fault alarm. This alarm coincided with a reduction of main propulsion on both port and starboard engines. The Master and crew assumed there was a control failure and attempted to locate the fault, shutdown and restart both engines. Only the port engine coming back online, and only on reduced capacity.

The crew attempted to berth the vessel at Manly East Jetty but were unsuccessful due to reduced propulsion and manoeuvrability. The prevailing wind conditions caused the now unsecured vessel to drift towards a number of moored vessels at the eastern side of Manly Cove and it came to rest against a small recreational yacht. There were no reports of injuries and only minor damage to both vessels.

The loss of control was the direct result of an unintentional partial activation of an emergency stop button which had inadequate guards. While this did not trigger an emergency stop, it did create a system error which caused the engine management system to reduce the rpm of both engines. Subsequent diagnostic testing of the engine operations showed all systems operated as designed.

The crew's decision to attempt to berth, despite the prevailing environmental conditions and reduced maneuverability, instead of immediately securing the vessel against drifting, increased risk and reduced their opportunity to explore other recovery options available to them.

Appropriate remedial action is in hand to mitigate the risk of similar loss of control in MFF's fleet. MFF has issued instructions to ensure the location and operation of the emergency stop button is fully understood by all personnel required to operate the *Ocean Wave*. MFF has also considered strengthening their crewmember training framework around issues raised by this event.

This incident highlights that crewmembers must take care when moving within the somewhat cramped confines of an engine room. It also highlights that crewmembers; when confronted with a loss of control scenario, should take immediate action to secure the vessel before exploring recovery options.

# PART 1 CONTEXT

## The occurrence

At 0850[1] on 9 June 2016, the Manly Fast Ferry (MFF) vessel *Ocean Wave* was travelling from Circular Quay, Sydney to Manly Wharf with 13 passengers on board when it experienced an engine fault alarm. This alarm coincided with a reduction of main propulsion on both port and starboard engines. The Master and crew assumed they had a control failure and attempted to locate the fault, then shut down and restarted both engines. Only the port engine came back online, and only on a reduced capacity. As a result, the vessel now had reduced propulsion and manoeuvrability.

While this was taking place, the Master made contact with MFF's Operation Manager to seek advice. Concerned about causing any impediment to other ferry services using Manly Wharf, a decision was made to berth *Ocean Wave* at the nearby Manly East Jetty. The vessel could then disembark the passengers, make further attempts to overcome the fault and restart the engines.

However, initial attempts to berth at Manly East Jetty were unsuccessful. The prevailing wind conditions caused the now unsecured vessel to drift towards a number of moored vessels within an area of moorings[2] at the eastern side of Manly Cove. Shortly after, the *Ocean Wave* came to rest against a small moored recreational yacht (refer to *Photographs 1* and *2*)[3].


**Photograph 1: Positions of yacht, *Ocean Wave* and isolated danger mark**

1 All times referred to in this report are Australian Eastern Standard Time.

2 This area of moorings was located to the east of a navigational aid called an 'isolated danger mark'. Isolated danger marks show where there is an isolated danger that has navigable water all around it. Vessels are not to pass too close to this mark.

3 Images used on the Cover and in Photographs 1 and 2 were provided by third parties.

**Photograph 2: Final positions of the moored yacht and *Ocean Wave***

The Master directed the crew to secure the vessel to the mast of the yacht to prevent the vessel from drifting further into shallower water and other vessels. The MFF vessel *Ocean Surfer*[4] arrived shortly after and provided assistance to the *Ocean Wave* in manoeuvring away the yacht and berthing at Manly East Jetty.

Once the *Ocean Wave* was securely berthed, the passengers were able to disembark. There were no reports of injuries to any passengers or crewmembers.

The crew made several more attempts to restart the starboard engine and were eventually successful. Once the crew established that they had sufficient control of the vessel, it was driven to the MFF facility at Blackwattle Bay[5] and was taken out of service pending further examination.

[4] The *Ocean Surfer* is a sister vessel of the *Ocean Wave*.

[5] The Manly Fast Ferry facility is located in Blackwattle Bay, near the Sydney Fishmarkets in Pyrmont.

## Incident location

Manly Wharf and Manly East Jetty are both located within Manly Cove in Port Jackson (Sydney Harbour) (refer to *Figure 1* which shows the relative position of navigational markers and the vessel within the Cove).

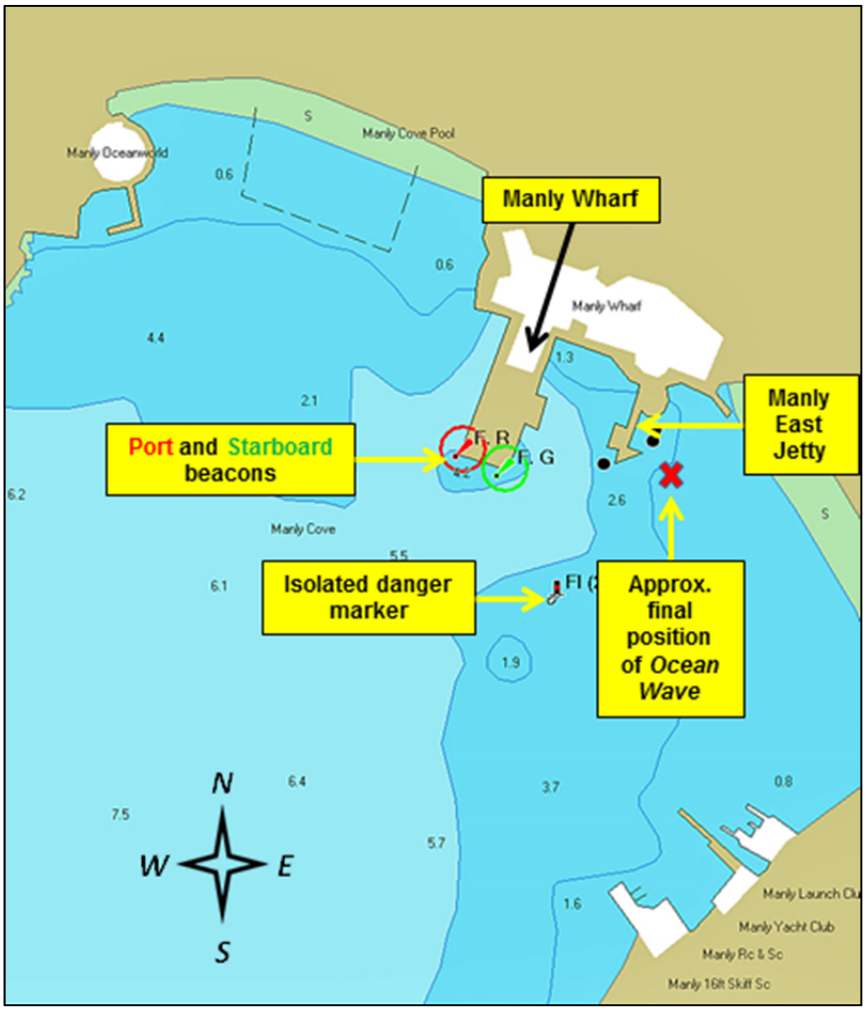


**Figure 1: Incident location.** Image courtesy of Garman® Bluechart

During normal operations, MFF berthed their vessels at Manly Wharf. However, during abnormal conditions they had previously utilised Manly East Jetty for temporary berthing. Unlike the larger Manly Wharf, which is constructed of concrete and enjoys a permanent suite of passenger facilities, Manly East Jetty is constructed of timber and provides a more modest or limited array of passenger facilities.

## Damage

The *Ocean Wave* received minor damage to the starboard hull, which was mainly confined to scrapes to the paintwork. The small moored yacht received minor damage confined to port topsides, stanchions, and rails.

MFF, concerned about the potential for damage or movement of the yacht's mooring, arranged for the mooring to be examined by a mooring contractor and to undertake any necessary repairs.

## The Vessel

The *Ocean Wave* was built in Tasmania in 2015 and was a 23.95 metre aluminium constructed catamaran style ferry. The vessel was approximately 8.1 metres wide and powered by two V12 'MAN' diesel engines. The vessel's main propulsion was provided through gearboxes attached to conventional drive shafts and propellers.

The vessel was in current survey with the Australian Marine Safety Authority (AMSA)[6].

## Crew competency

The crew consisted of the Master and two General Purpose Hands (GPHs). All crew members held the appropriate Certificates of Competency[7] issued by the AMSA and all were applicable to the operation of the *Ocean Wave*.

[6] AMSA is a statutory authority and Corporate Commonwealth Entity and was established under the *Australian Maritime Safety Authority Act 1990* (the AMSA Act). It is a legislative requirement that a domestic commercial vessel in Australia have a current survey applicable for its intended operations. The *Ocean Wave* was issued with certificate number ID 5610 and was certified to carry up to 263 passengers in Survey Class 1D (Passenger-carrying in partially smooth water operations) and up to 163 passengers in Survey Class 1C (Passenger-carrying in restricted offshore operations [within 30 nm of a safe haven or as specified by the local marine safety agency]).

[7] A Certificate of Competency issued by AMSA shows a seafarer's capability to master a vessel and its passengers. It is a legislative requirement that a seafarer have a Certificate of Competency before they can work on a domestic commercial vessel in Australia.

# PART 2 ANALYSIS AND FINDINGS

## Vessel examination

On 9 June 2016, the vessel was examined by an OTSI investigator, in company with representatives from MFF and MAN Diesel Engines (MAN). A diagnostic check was carried out on the onboard data logger. The data logger records and identifies the status of various equipment, including timing and activation of alarms and faults.

The diagnostic report revealed that the engine fault alarm for the starboard engine had activated when an emergency stop button was triggered (refer to *Photograph 3*).


**Photograph 3: Emergency stop button for the starboard engine**

When the emergency stop button was fully activated by being depressed, the starboard engine would stop. However in this case, partial activation by partial depression triggered the engine management system to raise an alarm and reduce the rpm of the starboard engine. As a precaution, the system automatically reduced the rpm of the port engine as well. The reason for this was twofold:

- to preserve the unaffected (port) engine from being overloaded; and
- to prevent the sudden reaction on vessel handling of having one engine shutdown, with the other remained on full power and propulsion.

Examination of this emergency stop button mounting revealed that it was fitted with two guards on either side. The guards were designed to protect the button itself and act as a defence against unintentional operation. However, in its normal position the top of button protruded approximately 6mm beyond the guards. The button could therefore be inadvertently damaged or partially activated, despite the presence of the guards, by something coming in close proximity to the button.

Further examination was undertaken of the movements of crewmembers within the engine room around the time of the alarm activation. A crewmember said that they were undertaking a routine inspection of the engine room around the time that the engine fault alarm activated. This account was confirmed by an examination of the vessel's internal CCTV footage. The footage revealed that a crewmember was moving around the starboard engine room and was observed passing the emergency stop button at a time which coincided with alarm activation time from the data logger. It is therefore highly likely that it was this crewmember inadvertently activated that emergency stop button when passing that location.

Full diagnostic testing of the operation of both engines confirmed all systems operated as designed.

## Contributing safety factors

The loss of control was a direct result of an unintentional activation of an emergency stop button, which triggered the engine management system to reduce the rpm of both engines.

The partial depression of the emergency stop button occurred as a result of a crewmember unintentionally coming into contact with the button for the starboard engine. This occurred while conducting a routine maintenance check of the starboard engine room.

The crew's decision to attempt to berth with the prevailing environmental conditions and with reduced maneuverability, rather than immediately anchor and secure the vessel against drifting, increased risk and reduced their opportunity to explore other recovery options available to them once the vessel was secure.

## Other safety factors

The decision to commence routine checks or maintenance in the engine rooms whilst in service was accepted practice. However, this action increased the possibility of crew members performing an unintentional action which affected the operation of the vessel, such as inadvertently disengaging critical equipment or, in this case, triggering an emergency stop button.

## Key Findings

Subsequent diagnostic testing of the engine operations showed all systems operated as designed.

The design of the emergency button and guards were such that the outer face of the button in its normal position protruded approximately 6mm higher than the guards. This meant that the guards were an ineffective defence, as the button could still be inadvertently damaged or partially activated by anything moving in close proximity.

# PART 3 CONCLUSION

The loss of control was a direct result of an unintentional activation of an emergency stop button. The crew then attempted to berth with the prevailing environmental conditions and with reduced maneuverability, rather than immediately secure the vessel against drifting. These actions increased risk and reduced their opportunity to explore other recovery options available to them. The design of the emergency button and its guards were such that top of the button in its normal position, protruded approximately 6mm higher than the guards. This meant that the guards were an ineffective defence against accidental damage or partial activation of the button by anything moving in close proximity to the button.

Appropriate remedial action is in hand to mitigate the risk of similar loss of control in Manly Fast Ferry's fleet. MFF has issued instructions to ensure the location, operation and effect of the emergency stop button is fully understood by all personnel required to operate the *Ocean Wave*. MFF has also considered strengthening their crewmember training framework around loss of control scenarios to incorporate:

- Identifying when (in the journey) would be the appropriate time to initiate routine engine room entry, checks and maintenance;
- how best to safely move around the engine room and avoid unintentional contact with emergency stop buttons and critical equipment more generally;
- training drills which incorporate similar 'loss of control' scenarios, especially recognising the fault, understanding the reaction of the engines and decision making on the optimal process to rectify the fault, reset the engine/s after failure and regain control of the vessel; and
- how best to secure a vessel with reduced manoeuvrability in the prevailing conditions.

## Acknowledgements

OTSI would like to acknowledge the assistance of Manly Fast Ferry representatives following this incident.

Cover photograph, photographs 1 and 2 and Figure 1 were used with permission.