



REASSESSMENT OF THE RESPONSE TO TSB RECOMMENDATION M17-01

Risk management of passenger vessel operations on the west coast of Vancouver Island

Background

On 25 October 2015, at approximately 1500 Pacific Daylight Time, the passenger vessel *Leviathan II* was on a whale-watching excursion with 27 people on board when it capsized off Plover Reefs in Clayoquot Sound, British Columbia. The subsequent rescue operation recovered 21 survivors, which included 18 passengers and 3 crew members. There were 6 fatalities. As a result of the capsizing, approximately 2000 litres of fuel leaked into the water.

The Board concluded its investigation and released report M15P0347 on 14 June 2017.

TSB Recommendation M17-01 (June 2017)

Although the predominant swell direction at Plover Reefs during the tourist season is from the west, effectively sheltering the area south of the reefs, there can be no certainty that this will be the case on any given day. Given the tidal effects and water depths of the area around Plover Reefs, when exposed to offshore swell, there is the potential for steep, breaking waves to form. The consequences of exposure to this type of wave could be catastrophic for small shallow-draft vessels, as they were in this occurrence as well as the occurrence involving the *Ocean Thunder* in 1998.

The nature of the sea and the processes that combine to form breaking waves in shallow areas are so unpredictable that it is not feasible to precisely forecast the height and steepness of waves coming from offshore at Plover Reefs. It is also not feasible to predict the response of a vessel to a breaking wave.

While vessels may encounter such hazardous waves only occasionally, the consequences could be catastrophic. Therefore, the level of risk associated with this hazard was determined to be high for the *Leviathan II* as well as for its passengers and crew. Accordingly, it is necessary to implement operational measures to mitigate this risk, such as by

- approaching the reefs from the sheltered side or, if the conditions are not favourable, avoiding the area altogether;
- keeping a vigilant lookout and ensuring the vessel maintains a safe angle of encounter with oncoming swell to minimize its effect on the vessel's stability; and
- ensure that the vessel has a safe route away from the hazardous area.

In this occurrence, the measures taken by the company did not mitigate the risks associated with the hazard posed by sea conditions in the area of operation.

There are approximately 9 whale-watching companies operating out of Tofino and Ucluelet, all of which operate in the same area as the *Leviathan II* and may be exposed to similar hazards. Two other passenger vessels, in addition to the *Leviathan II*, have been overcome by hazardous waves in the area of Clayoquot Sound and Barkley Sound since 1992, resulting in 10 fatalities. Beyond that, passenger vessels operating along the west coast of Vancouver Island may also be in areas that pose similar hazards.

The first vessel, a 5.8 m open recreational boat rented by a group of 4 people on a whale-watching trip, was overturned by a very high, breaking wave while off Mara Rock, Barkley Sound, British Columbia. All 4 occupants were thrown into the water, and there were 2 fatalities. The TSB investigation determined that the vessel had capsized when overwhelmed by a high, breaking wave.

The second vessel, *Ocean Thunder*, departed Tofino, British Columbia, with 3 passengers and an operator (coxswain) on board for a 3-hour trip to watch marine life in the vicinity of Plover Reefs. While in that area, a large swell swamped and broached the vessel, throwing all of the occupants into the turbulent water and resulting in 2 fatalities. The TSB investigation determined that one factor contributing to the occurrence was that the operator did not fully appreciate the dangerous conditions the vessel would meet at the time and location of the accident.

The formation of these hazardous waves depends on the combination of sea conditions and other factors, so the safety of operations in these areas must be managed systematically by the authorized representative in conjunction with the vessel's master. This management is achieved by continuously monitoring the conditions before and during the voyage, and by clarifying actions to mitigate the hazards of breaking waves in conditions favourable to the formation of these waves.

However, any encounter with such a hazardous wave has the potential for catastrophic outcome. Although measures to improve survivability must still be considered and implemented, the risk would be most effectively mitigated by reducing the likelihood of encountering the wave entirely.

Voyage planning is one such mitigation process; it consists of taking into account elements such as weather, tides, and navigation dangers, and making a contingency plan and sail plan before setting off on a voyage. The degree of voyage planning necessary for small vessels depends on the size of the vessel, its crew, and the length of the voyage.

In this occurrence, the company had not established guidelines to address the potential formation of breaking waves. Instead, it relied on individual masters' experience and judgment to mitigate this inherent risk. If companies that operate passenger vessels off the west coast of Vancouver Island do not implement risk management processes to identify and address environmental hazards in their area of operation, such as the potential formation of breaking waves, then there is a risk of a similar capsizing and loss of life.

Therefore, the Board recommended that

The Department of Transport ensure that commercial passenger vessel operators on the west coast of Vancouver Island identify areas and conditions conducive to the formation of hazardous waves and adopt practical risk mitigation strategies to reduce the likelihood that a passenger vessel will encounter such conditions.

TSB Recommendation M17-01

Transport Canada's response to Recommendation M17-01 (March 2018)

TC agrees with the recommendation. The CSA 2001, s. 106 requires the authorized representative of a Canadian vessel [to] develop procedures for the safe operation of the vessel. Marine Safety inspectors are providing specific warnings on vessel inspection certificates which include such directions as "the Master is to be mindful of the effects of tidal current, wind, swell and reflective waves in shoaling waters near the shore."

To ensure that authorized representatives are reminded of their obligations Transport Canada (TC) will issue a Ship Safety Bulletin (SSB) regarding the development of procedures for the safe operation of their vessels with topics such as weather, waves and dealing with the emergencies.

TSB assessment of Transport Canada's response to Recommendation M17-01 (March 2018)

Transport Canada indicates that it agrees with this recommendation. While posting warnings on inspection certificates that masters need to be mindful of weather conditions is a step in the right direction, it is also important that TC ensures that commercial passenger vessel operators are aware of these warnings and take action to mitigate these hazards in their operations. A similar approach is required for commercial passenger vessels carrying 12 or less passengers that are not inspected and therefore do not have inspection certificates.

The proposed Ship Safety Bulletin (SSB) reminding authorized representatives (ARs) of their obligation under section 106 of the *Canada Shipping Act, 2001* would be helpful, but it also needs to be supplemented by a means to verify that ARs are fulfilling their responsibilities onboard passenger vessels operating off the west coast of Vancouver Island.

Until all commercial passenger vessel operators off the west coast of Vancouver Island identify and address environmental hazards in their area of operation, such as the potential formation of hazardous waves, there is a risk of similar capsizing and loss of life. Therefore, the response to the recommendation is considered to be **Satisfactory in Part**.

Transport Canada's response to Recommendation M17-01 (January 2019)

TC agrees with the recommendation. Ship Safety Bulletin (SSB) 09/2018 (*Safe operation of commercial passenger vessels*) was issued in June 2018 to remind vessel owners, authorized representatives and operators of commercial passenger vessels that they must develop procedures for the safe operations of the vessel and for dealing with emergencies. More specifically, authorized representatives were reminded to identify areas and conditions conducive to the formation of hazardous waves.

During inspection of passenger vessels, marine safety inspectors are required to complete a checklist in accordance with the instructions of the FlagState.net 06-2018, issued in September 2018. One element on this checklist is the verification of safety procedures. Transport Canada will use the information collected during these inspections to assess the level of compliance with the requirements highlighted in Ship Safety Bulletin 09/2018 and determine if further action is needed.

TSB reassessment of Transport Canada's response to Recommendation M17-01 (March 2019)

The Board notes that TC has issued SSB (09/2018), which reminds vessel owners, authorized representatives, and operators of commercial passenger vessels of their obligation to develop procedures for the safe operations of the vessel and for dealing with emergencies, including identifying areas and conditions conducive to the formation of hazardous waves.

TC has indicated that it will use information gathered during inspections to assess compliance. TC states that, during inspections, inspectors are required to complete a checklist and that one of the items on the checklist is "verification of safety procedures." However, it is not clear whether inspectors are simply verifying the presence of safety procedures or whether they are verifying the contents of them (i.e. to determine if they identify areas and conditions conducive to the formation of hazardous waves and provide practical risk mitigation strategies). Further, TC has not indicated the number of inspections carried out since inspectors began using a new checklist in September 2018 requiring them to verify safety procedures, nor has TC indicated the level of compliance by authorized representatives. This information could assist the Board in assessing the actions taken to reduce the risk.

The Board considers the response to the recommendation to be **Satisfactory in Part**.

Transport Canada's response to Recommendation M17-01 (January 2020)

Transport Canada agrees with the recommendation. During inspection of passenger vessels, marine safety inspectors continue to complete a checklist while inspecting passenger vessels in accordance with the instructions of the FlagStateNet 06/2018, issued in September 2018. One element on this checklist is the verification of safety procedures. Transport Canada will use the information collected during these inspections to assess the level of compliance with the requirements highlighted in Ship Safety Bulletin 09/2018. The information is reviewed periodically (e.g. every quarter), and may subsequently be used in planning inspections, such as a Concentrated Inspection Campaign, in providing additional instructions to inspectors (e.g. Flag State Net) or in providing education/awareness to industry (e.g. Ship Safety Bulletins). When a specific vessel is found non-compliant, immediate action is taken. The verification and assessment of the content of safety procedures remains the full responsibility of the owner/operator.

TSB reassessment of Transport Canada's response to Recommendation M17-01 (March 2020)

Transport Canada (TC) has indicated that marine safety inspectors will continue to inspect passenger vessels in accordance with the instructions of the FlagStateNet 06/2018. One of the elements on the checklist used during inspections is verification of safety procedures. TC will use the information collected during these inspections to assess the level of compliance with the requirements highlighted in Ship Safety Bulletin 09/2018.

The Board is encouraged that TC plans to review the information collected periodically, in accordance with the instructions of FlagStateNet 06/2018, and may subsequently use this in planning inspections, such as a Concentrated Inspection Campaign, in providing additional instructions to inspectors (e.g. Flag State Net) or in providing education/awareness to industry (e.g. Ship Safety Bulletins).

However, TC has put the onus of verification and assessment of the content of safety procedures on the owner/operator. The Board is concerned that this means there will be no external oversight to determine if the safety procedures identify areas and conditions conducive to the formation of hazardous waves and provide practical risk mitigation strategies. Further, TC has not indicated the number of inspections carried out since inspectors began using the new checklist in September 2018 requiring them to verify safety procedures, nor has TC indicated the level of compliance by authorized representatives.

The Board considers the response to the recommendation to be **Satisfactory in Part**.

Next TSB action

The TSB will continue to monitor action taken by TC.

This deficiency file is **Active**.