



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: May 2, 2008

In reply refer to: M-08-3 and -4

Captain Ted Thompson
Senior Vice President, Technical and Regulatory Affairs
Cruise Lines International Association
2111 Wilson Boulevard, 8th Floor
Arlington, Virginia 22201

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge you to take action on the safety recommendations in this letter. The Safety Board is vitally interested in the recommendations because they are designed to prevent accidents and save lives.

The recommendations address watchkeeper training in two areas: the operation of integrated navigation systems and emergency ship-handling. These safety issues derive from the Safety Board's investigation of the July 18, 2006, heeling accident on the cruise vessel *Crown Princess* and are consistent with the evidence we found and the analysis we performed.¹

An hour and a half before the accident, the Bermuda-registered *Crown Princess*, operated by Princess Cruises, departed Port Canaveral, Florida, for Brooklyn, New York, its last port on a 10-day round-trip voyage to the Caribbean. The vessel had been in service about a month. After the crew engaged the trackpilot (autopilot) function of the vessel's integrated navigation system, the vessel's heading began to fluctuate around the set heading. In response to an alarm indicating that the rudder had reached its set limit of movement (5°), the staff captain increased the rudder limit setting to 10°. Shortly afterward, the captain and staff captain left the bridge, leaving the second officer in charge of the navigation watch. The vessel was traveling at nearly full speed, about 20 knots, by that time.

When the instrument panel showed a high rate of turn to port, the second officer became concerned, disengaged the trackpilot, and took manual control of the vessel's steering system. He turned the wheel first to port and then between port and starboard several times, eventually

¹ For further information, see *Heeling Accident on M/V Crown Princess, Atlantic Ocean Off Port Canaveral, Florida, July 18, 2006*, Marine Accident Report NTSB/MAR-08/01 (Washington, DC: NTSB, 2008). The report is available on the Safety Board's website at <<http://www.nts.gov/publictn/2008/MAR0801.htm>>.

causing the vessel to heel at a maximum angle of about 24° to starboard. The heeling caused people to be thrown about or struck by unsecured objects, resulting in 14 serious and 284 minor injuries to passengers and crewmembers. The vessel incurred no damage to its structure but sustained considerable damage to unsecured interior components and to cabinets and their contents.

The National Transportation Safety Board determined that the probable cause of the *Crown Princess* accident was the second officer's incorrect wheel commands, executed first to counter an unanticipated high rate of turn and then to counter the vessel's heeling. Contributing to the cause of the accident were the captain's and staff captain's inappropriate inputs to the vessel's integrated navigation system while the vessel was traveling at high speed in relatively shallow water, their failure to stabilize the vessel's heading fluctuations before leaving the bridge, and the inadequate training of crewmembers in the use of integrated navigation systems.

The Safety Board concluded that the errors of the captain and staff captain in operating the integrated navigation system resulted from inadequate training. Neither the U.S. Coast Guard nor the International Maritime Organization requires licensed mariners to complete formal instruction before using an integrated navigation system. In addition, completing training does not assure mastery because students are not required to demonstrate proficiency at the completion of many formal training programs. There is also no requirement that mariners who have completed instruction in integrated navigation systems take courses thereafter. Given the amount of information an integrated navigation system can present and its many control and display options, a crewmember who completes training and then does not use the system for several years may not remember the class material or be able to apply it.

Allowing users to interact with an integrated navigation system without adequate training increases the likelihood that crewmembers will commit errors related to the system. Consequently, the Safety Board is recommending that the Coast Guard urge the International Maritime Organization to make training in integrated navigation systems mandatory for watchkeepers on vessels equipped with such systems. However, the Board recognizes that it will take time for the International Maritime Organization to mandate the recommended training. Therefore, the Safety Board believes that until the International Maritime Organization makes training in integrated navigation systems mandatory, the Cruise Lines International Association should recommend to its members that they voluntarily provide initial and recurrent training in integrated navigation system operation to crewmembers having watchkeeping responsibilities on vessels equipped with such systems, and should include in that training a requirement for a demonstrated level of proficiency.

Despite the experience of the *Crown Princess* captain and staff captain, the circumstances of the accident suggest that the officers, while familiar with the phenomenon of squat,² did not recognize that high vessel speed in shallow water could also adversely affect the precision of the ship's steering. In addition, the second officer's actions indicate that he lacked the emergency ship-handling skills that would have allowed him to respond effectively to the vessel's

² Squat is a complex hydrodynamic phenomenon that increases a ship's draft in proportion to its speed while operating in relatively shallow water.

unexpected behavior. The Safety Board is concerned that other officers in charge of the navigational watch may also be unprepared for serious, unexpected incidents such as a vessel heeling. Therefore, the Safety Board believes that the Cruise Lines International Association should, through its website, publications, and conferences, inform its members about the circumstances of this accident and urge them to incorporate into their safety management systems and training programs for officers in charge of the navigational watch (1) information about the effects on vessel performance of high-speed vessel operations in shallow water and (2) initial and recurrent training for emergency ship-handling scenarios based on the lessons learned from serious marine incidents and accidents.

Therefore, the National Transportation Safety Board recommends that the Cruise Lines International Association take the following action:

Until the International Maritime Organization makes training in integrated navigation systems mandatory, recommend to your members that they voluntarily provide initial and recurrent training in integrated navigation system operation to crewmembers having watchkeeping responsibilities on vessels equipped with such systems, and include in that training a requirement for a demonstrated level of proficiency. (M-08-3)

Through your website, publications, and conferences, inform your members about the circumstances of this accident and urge them to incorporate into their safety management systems and training programs for officers in charge of the navigational watch (1) information about the effects on vessel performance of high-speed vessel operations in shallow water and (2) initial and recurrent training for emergency ship-handling scenarios based on the lessons learned from serious marine incidents and accidents. (M-08-4)

As a result of its investigation of the *Crown Princess* accident, the Safety Board also issued recommendations to the U.S. Coast Guard, SAM Electronics, and Sperry Marine. The Board would appreciate a response from you within 90 days, addressing actions you have taken or intend to take to implement its recommendations. In your response, please refer to Safety Recommendations M-08-3 and -4. For additional information, you may call (202) 314-6174.

Vice Chairman SUMWALT and Members HERSMAN and HIGGINS concurred with these recommendations. Chairman ROSENKER and Member CHEALANDER concurred with Safety Recommendation M-08-3 and subsection (1) of Safety Recommendation M-08-4 but disapproved subsection (2) of Safety Recommendation M-08-4.

[*Original Signed*]

By: Mark V. Rosenker
Chairman