



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: June 12, 2007

In reply refer to: M-07-3

Pilot commissions of 14 states
(list attached)

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 recommendation in this letter. The Safety Board is vitally interested in the recommendation because it is designed to prevent accidents and save lives.

The recommendation addresses the safety issue of pilot training in bridge resource management. The issue derives from the Safety Board's investigation of the April 15, 2006, grounding of the Hong Kong-registered container ship *New Delhi Express* in the Kill Van Kull waterway of New York Harbor and is consistent with the evidence we found and the analysis we performed.¹

At 0420 eastern daylight time on Saturday, April 15, 2006, the *New Delhi Express*, with a master, 21 crewmembers, 3 noncrewmember guests, a Sandy Hook pilot, and a docking pilot on board, was westbound in dense fog when it struck a submerged ledge near buoy 14 in the Kill Van Kull, took on water through a hull breach caused by the impact, and ran aground in the waterway. The docking pilot had the conn. Damages to the *New Delhi Express* were estimated at \$1.5 million. Two of the three tugs assisting the vessel were also damaged. No one was injured, and there was no water pollution.

The National Transportation Safety Board determined that the probable cause of the grounding of the *New Delhi Express* was the error of the docking pilot in not using all available resources to determine the vessel's position as he navigated the Kill Van Kull waterway. Contributing to the cause of the grounding was the failure of both pilots to practice good bridge resource management.

¹ For further information, see National Transportation Safety Board, *Grounding of Hong Kong-Registered Container Ship New Delhi Express, Kill Van Kull Waterway, New York Harbor, April 15, 2006*, Marine Accident Brief NTSB/MAB-07/02 (Washington, DC: NTSB, 2007). The report is available on the Safety Board's website <www.nts.gov>.

The *New Delhi Express* arrived at the entrance to New York Harbor about 0200 on April 15, after a transatlantic voyage that began in Gibraltar on April 8. The Sandy Hook pilot, who was licensed by both the U.S. Coast Guard and the state of New York, boarded the vessel at 0210. After exchanging information with the master, the Sandy Hook pilot assumed navigational control, and the vessel proceeded toward the Verrazano Narrows Bridge and the Lower Bay of New York Harbor. The weather was calm, with fair to poor visibility in passing fog patches.

At approximately 0342, one of two tugs that had been ordered for the transit to the Port Newark terminal came alongside to embark the docking pilot. The pilot, a 1978 graduate of the U.S. Merchant Marine Academy, had worked as a docking pilot in New York Harbor since 1989 and was licensed by the Coast Guard and by the state of New Jersey. The docking pilot's duties were to guide the vessel 3.8 miles through the dredged channel of the Kill Van Kull, under the Bayonne Bridge, around the turn at Bergen Point into Newark Bay, and to the vessel's intended docking site at the Port Newark terminal.

The docking pilot stated that he took the conn when the *New Delhi Express* left the Upper Bay and entered the Kill Van Kull. After receiving radio reports of reduced visibility near the Bayonne Bridge and into Newark Bay, the docking pilot ordered an additional tug. By the time the *New Delhi Express* reached buoy 10 in the Kill Van Kull, the fog was so dense that, according to the docking pilot, visibility "had dropped down to just about zero." At this point, the bridge team consisted of the two pilots, the master, the second mate, and the helmsman.

As the *New Delhi Express* passed under the Bayonne Bridge, the docking pilot had to maneuver between buoy 14 and the *Fractor*, a drill/dredge boat stationed nearby as part of an ongoing U.S. Army Corps of Engineers project to deepen the channels in New York Harbor. Because of the dredging project, the Coast Guard had designated the waterway in the accident area as a regulated navigation area. For approximately 0.75 mile on either side of the Bayonne Bridge, the channel was restricted to about half its normal width, and vessel movement was one way only. Buoy 14, on the north side of the channel, marks the start of the turn at Bergen Point and the limit of navigable water beside a submerged ledge where the water is 20 feet deep or less.

Before reaching the Bayonne Bridge, the docking pilot, with the Sandy Hook pilot's concurrence, ordered the rudder set at starboard 20°, setting the vessel's course toward the shallow ledge. Once informed that he was too far right in the channel, the docking pilot ordered "port 20" and issued orders to avoid the buoy. He had the lead tug push the vessel south, away from the buoy, and asked the tug on the port bow to go half astern. The tug did not, however, have a line on the *New Delhi Express*.

The Sandy Hook pilot estimated that the starboard side of the *New Delhi Express* passed buoy 14 within 50 feet. As its bow swung left into the channel, the vessel began listing to starboard. None of the bridge team, including the pilots, had felt the vessel touch the submerged ledge. The list quickly increased to approximately 10° to starboard as the pilots maneuvered the *New Delhi Express* away from the ledge and into deeper water. Sounding of the tanks revealed that the vessel had a hole in the No. 4 fuel oil tank, which was empty, and in the No. 5 water ballast tank and was taking on water. The weight in the empty fuel oil tank and the list to starboard caused the vessel to come to rest on the bottom in the center of the Bergen Point West

Reach. The *New Delhi Express* refloated on the incoming tide at approximately 0630. By 0800, the vessel had docked in Port Newark.

The Safety Board's investigation of the *New Delhi Express* accident indicated that effective bridge resource management was not practiced in the events leading up to the grounding. Bridge resource management can be defined as the use by a vessel's bridge team of all available resources—information, equipment, and personnel—to safely operate the vessel. The concept was developed to help mariners recognize and correct operational and human errors before they lead to an accident. The Safety Board has investigated numerous marine accidents in which bridge resource management was an issue, and as discussed in the *New Delhi Express* accident brief, has issued a series of recommendations on the issue. All those recommendations are now closed.

One element of effective bridge resource management is the development of a detailed passage plan, in which “particular attention is paid to high traffic areas, shallow waters, or pilotage waters where the plan incorporates appropriate margins of safety and contingency plans for unexpected incidents.”² The conversations recorded on the *New Delhi Express*'s bridge indicate that neither the master nor the Sandy Hook pilot had been informed of the docking master's intended course under the Bayonne Bridge, which required passing safely between the drill/dredge boat *Fractor* and the shallow ledge near buoy 14. Before visibility worsened, the docking pilot should have informed the other members of the bridge team about his intended course for navigating safely past the obstacles (for example, where he would pass under the bridge and how he would maneuver between the shallow ledge and the drill/dredge boat). If he had done so, the master and the Sandy Hook pilot, who were monitoring the port and starboard radar images, might have alerted him that he was too far right in the channel as he approached the bridge to avoid the ledge near buoy 14. The docking master himself appeared to have lost his bearings as the container vessel passed under the bridge, when he said, “We've got another buoy to go around?”

Another element of bridge resource management is the sharing of information between master and pilot. The required exchanges of information between master and pilot were brief and lacking in detail (as were the exchanges between the pilots when the docking pilot boarded the vessel). The International Maritime Organization recommends the following as the minimal information that should be included in master-pilot exchanges:³

1. Presentation of a completed Standard Pilot Card. In addition, information should be provided on rate of turn at different speeds, turning circles, stopping distances, and, if available, other appropriate data.
2. General agreement on plans and procedures, including contingency plans, for the anticipated passage.

² “Bridge Resource Management Guide,” *Focus on Bridge Resource Management*, Washington State Department of Ecology Spill Prevention, Preparedness, and Response Program, publication 99-1302, rev. December 2003 <www.ecy.wa.gov/pubs/991302.pdf>, p. 2.

³ International Maritime Organization, IMO Pilotage Resolution 960 (Resolution A.960 [23], December 5, 2003), Annex 2, section 5, “Master-Pilot Information Exchange.”

3. Discussion of any special conditions such as weather, depth of water, tidal currents and marine traffic that may be expected during the passage.
4. Discussion of any unusual ship-handling characteristics, machinery difficulties, navigational equipment problems or crew limitations that could affect the operation, handling or safe manoeuvring of the ship.
5. Information on berthing arrangements; use, characteristics and number of tugs; mooring boats and other external facilities.
6. Information on mooring arrangements.
7. Confirmation of the language to be used on the bridge and with external parties.

The master and Sandy Hook pilot briefly discussed the *New Delhi Express*'s handling characteristics and speed, the berthing arrangements, and that visibility was "up and down" in the harbor. The initial exchange between the pilots was casual and included no discussion of the dredging work in the Kill Van Kull or of the navigation obstacles near the Bayonne Bridge. A pilot card (which conveyed vessel particulars and handling characteristics) was available to the pilots, but the voyage data recorder (VDR) information indicates that the pilots may not have paid close attention to the card. For example, after the grounding, the Sandy Hook pilot is heard reminding the docking pilot that the vessel had a bow thruster. The Sandy Hook pilot's reminder to the docking pilot demonstrates the kind of bridge teamwork that should have been exhibited before the accident.

A further element of effective bridge resource management is clear, effective communication. Clear communication is vital for the bridge team to maintain its situational awareness and make the adjustments necessary to maintain a safe passage. Early in the transit, the docking pilot properly called for a third tug when visibility deteriorated. However, the pilot did not give clear instructions to the tug *Turecamo Girls* after he called for it, saying that the tug could "just drift on out this way." After the docking pilot gave the tug a position order, "You will be on the port bow with a rope," the VDR recorded no acknowledgment from the tug, and the docking pilot did not make certain that the tug had received his instructions. Later in the transit, when the *Turecamo Girls* master indicated that he was looking for a place to put a line on the *New Delhi Express*, the docking pilot did not appear to recognize that the *Turecamo Girls* was not yet secured to the *New Delhi Express*. Instead of instructing the tug to put a line on the *New Delhi Express*, the pilot asked the tugmaster for help in looking out.

Good bridge resource management also requires that roles and responsibilities be clear, and that those on the bridge clearly understand how decisions and instructions are made, responded to, and challenged.⁴ In the conversations recorded on the VDR, the docking pilot repeatedly deferred to the Sandy Hook pilot's judgment, despite having piloted over 3,000 ships

⁴ Section B-VIII/2, part 3-1, of the Seafarers Training, Certification and Watchkeeping Code (STCW code, an adjunct to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers adopted in 1978 by the International Maritime Organization and revised in 1995) lists the principles of bridge resource management. Item 3 states: "Duties should be clearly and unambiguously assigned to specific individuals, who should confirm that they understand their responsibilities." Item 4 states: "Tasks should be performed according to a clear order of priority."

around Bergen Point. This pattern indicates that the pilots did not have a clear and unambiguous understanding of their duties or of how decisions should be made.

In addition, the VDR record shows that in the conditions of restricted visibility that prevailed before the grounding, the docking pilot did not make effective use of all resources available to him. Rather than obtaining information about reference points and the *New Delhi Express*'s progress through the water from the vessel's navigation equipment, the docking pilot relied on the tugmasters to supply that information. The Safety Board considers that the *New Delhi Express* would have been better served had the docking pilot relied more strongly on the vessel's radar to navigate the vessel through the waterway in the restricted visibility. The images from the vessel's starboard radar captured every 15 seconds by the VDR show a clear picture of the area around the Bayonne Bridge and give a true indication of the vessel's position and motion through the water. In the Safety Board's opinion, the radar images were sufficient to have guided the pilot safely through the Kill Van Kull.

In light of the deficiencies in bridge resource management identified in its investigation of the *New Delhi Express* grounding, the National Transportation Safety Board recommends that your pilot commission take the following action:

Require your harbor and docking pilots to take part in recurrent joint training exercises that emphasize the concepts and procedures of bridge resource management. (M-07-3)

The Safety Board has also issued recommendations to the U.S. Coast Guard and to the pilot commissions of 13 other states. The Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation. Please refer to Safety Recommendation M-07-3 in your reply. If you need additional information, you may call (202) 314-6174.

Chairman ROSENKER, Vice Chairman SUMWALT, and Members HERSMAN, HIGGINS, and CHEALANDER concurred in this recommendation.

[Original Signed]

By: Mark V. Rosenker
Chairman

Grounding of Hong Kong–Registered Container Ship *New Delhi Express*
Kill Van Kull Waterway, New York Harbor, April 15, 2006

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