



Log M-374 B

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: September 6, 1991
In reply refer to: M-91-25

President
World Pioneer, S.A.
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Piraeus, Greece

On May 26, 1990, the Bahamian-registered cruise ship REGENT STAR was nearing the end of its voyage from Montego Bay, Jamaica, to Philadelphia, Pennsylvania, where its passengers were to disembark. The vessel had 469 crew and 882 passengers (1,351 total) on board. About 2248, a Delaware State marine pilot boarded the REGENT STAR off Cape Henlopen at the entrance of Delaware Bay to guide the vessel to its berth in Philadelphia. The master informed the pilot that the vessel was propelled by two controllable-pitch propellers and steered by a single rudder and that the bridge watch had control of main engine speed and propeller pitch. When the pilot boarded the vessel, visibility was approximately 6 to 8 nmi, wind was from the northeast at 20 to 25 mph, and tide at the Delaware Bay entrance was flooding.

About 2250, the cruise ship began inbound passage of Delaware Bay and River, proceeding at 16 knots toward the shipping channel and, ultimately, Philadelphia. The pilot noted that wind force on the cruise ship's superstructure created a list of several degrees to port. To maintain an ordered heading, the helmsman used about 10 degrees of port rudder to counter the ship's tendency to head into the wind.

Less than 2 hours later, at 0040 on May 27, the cruise ship suddenly experienced a total loss of electrical power. According to the staff captain, when the electrical power failed, power failure alarms for the gyrocompass, sprinkler system, fire alarms, and the smoke detectors sounded on the navigation bridge. Then the main engines, all lights, radars, and the steering gear stopped operating. Because the rudder was hydraulically held, steering inputs from the helm were no longer effective. Propulsion ceased. The navigation watch could do little except drop anchor. The master, who had returned to the bridge shortly after the power loss, sent the chief officer forward to the bow to standby to release the anchor on command. Meanwhile, the pilot used his hand-held VHF radio (VHF channel 13--bridge-to-bridge channel) to alert any river traffic of the REGENT STAR's situation.

The REGENT STAR was on a course of about 335° True and the ship's starboard side was about 65 yards from the shallow boundaries of the shipping channel when the power loss occurred. The pilot observed that even though the rudder was held at 10 degrees of port, the vessel was swinging to

starboard and heading into the wind toward channel marker No. 32, an ice-resistant structure mounted on steel pilings. The pilot advised the master not to let go of the anchor yet, because, "If we let the ship run, she may get enough current set to miss the structure or just hit it a glancing blow. If we drop the anchor at this speed, we will increase the turn and I think we will either hit it broadside, putting a hole in the ship, or get our anchor tangled in it and pull it down."

From the navigation bridge, the master and pilot watched as the marker passed from sight under the cruise ship's starboard bow, scraping the vessel for about 300 feet along the starboard side. As soon as the ship cleared the marker, the master ordered the anchor dropped to halt the vessel's forward momentum, but the cruise ship had already touched bottom. At 0046, just 6 minutes after the power loss, the REGENT STAR was firmly aground on the soft bottom of Delaware Bay. The cruise ship suffered only minor damage (\$20,000) from running aground. The hull was not penetrated nor was the bay polluted. No persons were injured or killed.

In the main engine room just before the power loss, the maneuvering watch engineer, the chief engineer, and the chief electrician were among the crew members in the enclosed engineering control room where the ship's main switchboard was located. Generated electrical power flowed through a single electrical busbar to the main switchboard through which the ship-service electrical power was distributed. Four of the vessel's five ship-service diesel generators were operating, providing electrical power via the main switchboard throughout the cruise ship.

The chief electrician heard a chattering noise and saw sparking coming from behind the center door of the No. 2 ship-service generator's switchboard panel (each vertical panel has three doors). At the direction of the chief engineer, the chief electrician attempted, but failed on his first try, to disconnect the No. 2 generator circuit breaker. Then the chief electrician loosened the panel door screws to allow the panel to swing open and expose the circuit breaker. He observed electrical arcing at the circuit breaker, fire on the power cables, and thick black smoke from burning insulation. The fire appeared to be spreading along the cables to other sections of the main switchboard. On the second attempt, the electrician was able to disconnect the No. 2 generator.

The chief engineer stated that he was concerned that the entire main switchboard was in danger of heat damage. To prevent the fire from spreading and damaging other parts of the main switchboard, at 0040 the chief engineer opened the main switchboard circuit breakers for each of the operating generators, cutting off ship-service electrical power to the electrical busbar and to the entire vessel. Pumps providing fuel oil, lubricating oil, and cooling water to the diesel main engines and the diesel generators stopped, in turn stopping the main engines and generators. The chief engineer said he was reasonably sure that cutting the power supply did not pose a danger of collision because he had been on the navigation bridge just 5 minutes before the electrical problem occurred and noticed that the REGENT STAR was in the middle of the shipping channel and that no other vessels, piers, or bridges were in the vicinity.

Concurrent with actions by personnel in the control room to determine the cause of the power loss and to contain the fire, the second engineer and the second electrician reported to their emergency duty assignment in the emergency diesel generator room and started the emergency diesel. The chief engineer had instructed the emergency team not to connect the emergency generator output to the emergency switchboard until ordered. The emergency team started the emergency generator as instructed and called the engine control room to report, but no one answered. All personnel in the engine control room had evacuated because of the fire. The chief engineer stated that he heard the telephone ringing as he was leaving the control room.

The REGENT STAR was equipped with an emergency battery system designed to provide 30 minutes of electrical power for emergency lighting immediately upon the loss of main electrical power. In the case of this power loss, emergency lighting did not come on because the switch connecting the emergency batteries to the emergency lighting circuit was not an automatic switch, but a manual switch, which was in an alternate position.

About 20 minutes after the power loss, the second electrician, using a flashlight for illumination, went behind the emergency switchboard in the emergency generator room, located the unlabeled battery switch, and closed it. Emergency lighting came on in the main passageways, stairwells, engineering and navigation control stations, lifeboat stations, and at exits.

Even with emergency lighting, thick smoke in the control room reduced visibility to nearly zero. After donning oxygen breathing apparatus stowed in the main engine room, personnel re-entered the smoke-filled control room and extinguished the fire using portable CO₂ units at 0108, about 30 minutes after the fire was discovered.

Electrical arcing in the No.2 generator circuit breaker had created a temperature so high that the circuit breaker's heavy copper electrical components and the fittings in contact with the breaker were melting and dripping behind the switchboard. The chief engineer's concern centered on the "dead ship" switchboard panel located next to the No. 2 generator panel on the main switchboard. The "dead ship" panel, connected by circuitry and breakers to the emergency switchboard, could not be easily isolated from the main switchboard. The chief engineer feared that melting copper had dripped on and closed the main switchboard's open switches and that putting the emergency generator on-the-line would further damage the main switchboard through the "dead ship" panel. The chief engineer directed his crew to isolate the No. 2 generator panel from the main switchboard, restart the remaining diesel generators, and then remove the failed circuit breaker.

About 0155, 1 hour and 15 minutes after the chief engineer had shut down the vessel's main electrical power, crew members restarted the ship-service generators and restored electrical power. Two days later, following the debarkation of all passengers by ferry, the vessel was refloated and proceeded under its own power to Penn's Landing in Philadelphia.

While at pierside, the main and emergency switchboards were examined

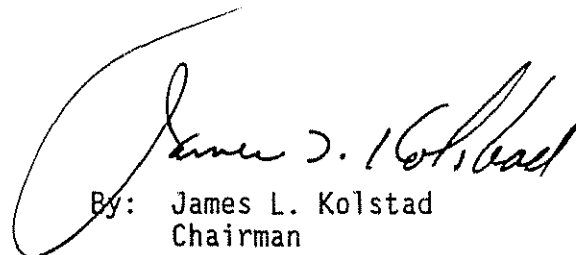
thoroughly, both physically (disassembly) and by infrared camera (thermograph). Examination revealed the circuit breaker and connections in the main and emergency switchboards were loose and dirty. Loose and dirty connections to the No. 2 circuit breaker in the main switchboard caused the electrical arcing and the extreme temperatures. Scheduled examination and maintenance of the main and emergency switchboards and their electrical components and connections would have resulted in detection and correction of the problem and avoidance of the No. 2 generator circuit breaker failure. Following the postaccident examination, personnel cleaned and tightened the connections and installed a new circuit breaker for the No. 2 ship service generator. As a result of its investigation of this accident, the Safety Board recommends that Regency Cruises:

Develop and implement for your fleet of ships a planned maintenance program for the main and emergency switchboards and their components and connections. (Class II, Priority Action) (M-91-25)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, we would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation M-91-25 in your reply.

Also, the Safety Board issued Safety Recommendations M-91-23 to the U.S. Coast Guard and Safety Recommendation M-91-24 to the International Association of Classification Societies.

Chairman KOLSTAD, Vice Chairman COUGHLIN, and Members LAUBER, HART and HAMMERSCHMIDT concurred in this recommendation.



By: James L. Kolstad
Chairman