

Adopted: 10/10/90

Log# M-366



# National Transportation Safety Board

Washington, D.C. 20594  
Safety Recommendation

DCA 89 MM 036

Date: November 6, 1990

In reply refer to: M-90-78 through -80

Admiral J. William Kime  
Commandant  
U.S. Coast Guard  
Washington, D.C. 20593

On the morning of March 7, 1989, a fire broke out in the engineroom of the 645-foot-long U.S. tankship CHARLESTON while it was en route to Wilmington, North Carolina, with a partial load of No. 6 fuel oil. While trying to close a valve to a lube oil pressure gauge on the No. 1 turbogenerator, a crewmember fractured a pipe nipple, which allowed a stream of lube oil to spray onto the hot steam turbine casing and ignite. The fire quickly enveloped the turbogenerator and spread upward to the top of the engineroom. The crew started fighting the fire with CO<sub>2</sub> extinguishers, but the intensity of the fire increased. When one of the engineers attempted to shift the electrical load to the other turbogenerator, that generator became disabled. The main engine and the boilers were secured, and the engineroom was evacuated.<sup>1</sup>

After all 29 crewmembers were accounted for, the CO<sub>2</sub> fire extinguishing system was activated. However, the fire continued to burn for almost 2 hours. None of the crewmembers were injured. Because the fire had damaged some of the control and monitoring wiring, the emergency diesel generator could not be started until the engineers isolated the damaged circuits.

The emergency diesel generator on the CHARLESTON was designed to start automatically if there was a power failure. Since the No. 1 turbogenerator continued to run and supply electric power for a period of time after the fire started, the emergency generator would not have started automatically. However, when both turbogenerators stopped, the emergency generator should have started automatically but failed to do so. When the chief engineer tried to start the emergency generator, he was unaware that the wiring in the diesel alarm relay to the engineroom was damaged and was giving an erroneous stop signal to the diesel engine control circuits which prevented the diesel from starting. After a number of unsuccessful attempts to start the diesel engine, he turned off the alarm relay switch. This allowed the engine to start. There was almost a 2-hour delay in bringing the emergency generator

<sup>1</sup>For more detailed information, read Marine Accident Report--"Engineroom Fire Aboard the U.S. Tankship CHARLESTON in the Atlantic Ocean, About 35 Miles off the South Carolina Coast, March 7, 1989" (NTSB/MAR-90/06).

on the line because the chief engineer did not realize that the alarm relay system was damaged and, therefore, prevented the emergency diesel from starting.

The Safety Board questions the installation of an alarm relay circuit wiring from the emergency generator room to the engineroom. U.S. Coast Guard regulation 46 CFR Part 112.05-5(f) prohibits the installation of any wiring from the emergency switchboard to the engineering spaces, except to connect the equipment in the engineroom or boilerroom to the emergency switchboard, including the visible indicator required by 46 CFR Part 112.45-1(b), so that a casualty in these spaces will not render the emergency generator inoperative. The intent of the regulation is to ensure that the emergency generator is a self-contained unit capable of operating independently of the engineering spaces. The damaged alarm relay circuit, although not connected directly to the emergency switchboard, did introduce a fault in the circuit provided to protect the emergency diesel generator. However, the regulation concerning the monitoring of the diesel engine operation failed to address the probability that the monitoring circuit, if incorrectly connected to an alarm in the engineroom, could also introduce a fault in the system that would stop the diesel engine.

The alarm relay circuit aboard the CHARLESTON and aboard any other company vessels that have similar circuits should be modified so that if the alarm relay circuit is grounded or damaged for any reason, it should not disable the emergency diesel generator. U.S. Coast Guard regulations 46 CFR Part 112.50-1(i) should be amended to state that if a fault or ground occurs in the diesel engine monitoring circuit, it will not render the emergency generator inoperative. In the interim, the Coast Guard should instruct its marine inspectors to check the installation of the monitoring circuits of emergency diesel generators so that damage to the wiring does not introduce a fault in the circuit that would render the diesel engine inoperative.

Therefore, the National Transportation Safety Board recommends that the U.S. Coast Guard:

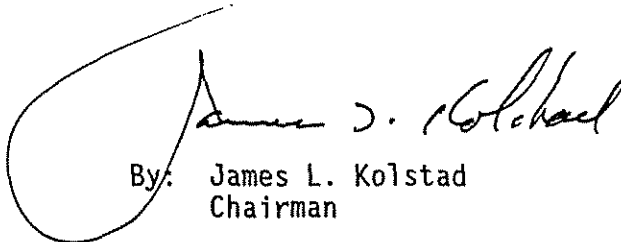
Instruct Coast Guard marine inspectors to check the location of the monitoring circuits of emergency diesel generator installations to ensure that damage to such circuits does not render the diesel engine inoperative. (Class II, Priority Action) (M-90-78)

Amend 46 CFR Part 112.50-1(i) concerning the electrical requirements for monitoring the low oil pressure and high cooling water temperature of the emergency diesel engine so that a fault or ground in the monitoring system does not render the diesel engine inoperative. (Class II, Priority Action) (M-90-79)

Disseminate to the marine industry the information contained in this accident report through the various Coast Guard publications and notices. (Class II, Priority Action) (M-90-80)

Also, the Safety Board issued Safety Recommendations M-90-81 through -84 to the Apex Marine Corporation.

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER, BURNETT, and HART, Members, concurred in these recommendations.



By: James L. Kolstad  
Chairman