

Log # M-410B



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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Date: April 29, 1997

In Reply Refer to: M-97-39 and -40

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Within the last year, the Safety Board has investigated two fires on board cruise ships operating from U.S. ports in which a total of 6 crewmen died and 73 crewmembers and 4 passengers sustained injuries from smoke inhalation. In each accident, an officer sounded the general alarm within minutes of receiving a pilothouse alarm activated by a remote heat detector in an area near the fire. However, the time lapse between the fire breaking out and the temperature of the blaze causing a heat alarm to actuate allowed a tremendous amount of smoke to spread into living quarters, injuring crew and passengers.

The first fatal cruise ship fire occurred July 27, 1996, on board the Panamanian passenger ship *Universe Explorer*, which was en route from Juneau, Alaska, to Glacier Bay, Alaska, with 733 passengers and 274 crewmembers. A fire in the main laundry activated a heat detector alarm on the fire control panel in the wheelhouse at 0258. The master ordered the general alarm sounded about 0305; however, dense smoke and heat already had spread upward two decks to the crew accommodation quarters. The *Universe Explorer* was not required to have and was not equipped with automatic smoke alarms that sound locally in the crew accommodation area. Five crewmember died from smoke inhalation. Responders found the bodies of two crewmen in their staterooms and the bodies of three crewmen in the passageway. In addition, 67 crew and 2 passengers were injured; 27 persons were admitted to the hospital, 5 with critical injuries. All crew injuries were a result of smoke inhalation.

The most recent accident occurred April 6, 1997, on board the Bahamian passenger ship *Vista Fjord*, which was underway from Fort Lauderdale, Florida, to the Azores with 569 passengers and 422 crewmembers. A fire in a storage room adjacent to the laundry activated a heat detector alarm on the fire control panel in the wheelhouse at 0112, whereupon the duty officer immediately sounded the general alarm and the master shortly thereafter ordered the passengers and crew to their lifeboat stations.

The fire was isolated to its compartment of origin and duty officers shut down the ventilation system within 3 minutes of receiving the heat detector alarm. However, heavy, black smoke already had spread through the ship via the air ducts. Like the *Universe Explorer*, the

*Vista Fjord* was not required to have and was not equipped with automatic smoke alarms that sound locally in crew and passenger accommodation areas. Survivors stated that the heavy, black smoke filled the crew accommodation area to within 18 inches of the deck. One crewman testified that he and his roommate had to crawl on hands and knees toward an exit. He said that he was able to escape through a watertight door, but his roommate took a wrong turn. Emergency responders found the body of the disoriented crewman in another cabin. Although autopsy results have not yet been received, initial indications are that the cause of death was asphyxia from smoke inhalation. In addition to the one crewman who died, 6 crewmembers and 4 passengers sustained injuries from smoke inhalation. Three passengers required hospitalization.

Both of these cruise ship fires were relatively minor and were brought under control and extinguished by on-board fire fighting resources. In both cases, the fire started early in the morning when most people were asleep in their cabins. Further, all fatalities occurred in the crew accommodation area and resulted from smoke inhalation. The Safety Board is very concerned that the accommodation areas on passenger ships are not equipped to provide immediate local warning of the presence of smoke. Historically, most fire-related deaths do not result from burn injuries, but from smoke inhalation. When a fire breaks out on board a vessel, early warning is essential for escape because exit routes are through narrow passageways with no natural lighting. Smoke from a fire builds quickly, obscuring artificial lighting and making exit signs and exits hard to find. The debilitating nature of dense smoke, which causes difficulty in breathing and blinding due to tearing, frequently causes panic in people at the very time when they most need to think clearly.

The *Vista Fjord* and the *Universe Explorer* are typical of passenger ships on which heat and smoke detectors first sound an alarm in a central control center or in the pilothouse before a general alarm is sounded throughout the vessel. Crew and passenger accommodation spaces have no automatic, local-sounding smoke alarms. Both of the vessels mentioned above had a system in which the initial alarm to the pilothouse was triggered by a heat detector. Generally, heat detectors require more time than smoke detectors to actuate because a minimum level or minimum rate of heat must occur in the area of the device's heat sensor before the detector activates. If the sensor is on the overhead and the fire begins on or near the deck, the amount of time necessary for the heat to activate the sensor can be appreciable.

Having a system in which a remote smoke detector initially sounds an alarm in a central control center or in the pilothouse before a general alarm is sounded does not afford the maximum margin of safety to those on board. Any system that results in a warning delay reduces available escape time. The 1992 Amendments to the *Safety of Life at Sea (SOLAS)* require that cruise ships install smoke detectors in crew and passenger living spaces by October 1, 1997. However, the mandate does not require that the smoke detectors sound locally at the first indication of smoke.

The Safety Board believes that had local automatic smoke alarms sounded when smoke began to enter the accommodation areas, the victims in these accidents would have been alerted before conditions became life-threatening. Moreover, the number and severity of all injuries on the vessels may have been reduced. The fires in these two cases originated close to crew berthing

areas, which resulted in mostly crewmen dying or sustaining injuries. The number of passenger injuries due to smoke inhalation was limited to four. However, had the fires started in areas closer to passenger accommodations, the absence of a timely alert could have resulted in multiple passenger deaths as well. The Safety Board believes that all accommodation areas should be equipped with automatic smoke detectors that sound locally.

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

Propose that the International Maritime Organization require all passenger vessels to have automatic smoke alarms that sound locally in the crew berthing areas so that crews will receive immediate warning of the presence of smoke and will have the maximum available escape time during a fire. (M-97-39)

Propose that the International Maritime Organization require all passenger vessels to have automatic smoke alarms that sound locally in the passenger accommodation areas so that passengers will receive immediate warning of the presence of smoke and will have the maximum available escape time during a fire. (M-97-40)

Also, the Safety Board issued Safety Recommendations M-97-35 and -36 to Commodore Cruise Line and Cunard Lines, Ltd., and M-97-37 and -38 to the International Council of Cruise Lines.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:   
Jim Hall  
Chairman