SP-20
Log VM-287

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: August 21, 1985

Forwarded to:

Admiral James S. Gracey
Commandant
U.S. Coast Guard
Washington, D. C. 20593

SAFETY RECOMMENDATION(S)

M-85-57 through -61

About 2300, on August 20, 1984, a fire erupted in the auxiliary machinery (generator) room and spread to adjoining spaces of the Bahamian registered passenger ship SCANDINAVIAN SUN shortly after it docked at the Port of Miami, Miami, Florida. It had just completed a daily 14-hour round trip cruise to Freeport, Bahamas, with 530 passengers and 201 crewmembers on board. One passenger and one crewmember died as a result of smoke inhalation, 4 persons received minor injuries, and 58 persons were treated for smoke inhalation. Damage and repair cost was estimated to be $2.3 million. 1/

With the exception of the smoke detection system in the lower trailer hold, the fire detection system on the SCANDINAVIAN SUN consisted of ionization and heat detectors with an aural alarm and indicating lights in the pilothouse. The detectors in the vicinity of the fire functioned properly and registered fire in the pilothouse detector panels. The pilothouse was unmanned and a qualified person was not in position to take immediate action to close the automatic fire doors and to stop ventilation immediately upon activation of alarms in the detection panels. By the time the master arrived on the bridge, 14 of the 45 fire alarm zones on the fire detection panels already were indicating fire conditions. Although he secured the ventilation and closed the fire doors immediately upon assessing the situation, the flames already had entered the stair tower at the Bimini Deck and spread fire and smoke up to the top of the stair tower as well as outside the stair tower on the Andros and Nassau Decks where passengers were gathering to disembark. Therefore, the effectiveness of the system was diminished because no one was on hand to take immediate action to isolate the fire and secure ventilation. The local closure of the automatic fire doors in the lobby by crewmembers prevented flame spread and greatly reduced the damage in the lobby. The Safety Board believes that in order to protect the ship and the passengers, the pilothouse should be manned continuously to monitor the alarm systems at least so long as there are passengers still on board. Alternatively, the automatic/manual switch should be placed in the automatic position when the watch is moved from the pilothouse to the gangway. The Board believes also that the U.S. Coast Guard (USCG) should urge the International Maritime Organization (IMO) to require an automatic/manual fire control system for fire door closing and ventilation stops on all passenger ships, regardless of other built-in fire safety devices.

1/ For more detailed information, read Marine Accident Report--"Fire Aboard the Bahamian Passenger Ship M/V SCANDINAVIAN SUN, Port of Miami, Miami, Florida, August 20, 1984" (NTSB/MAR-85/08).

Automatic fire doors should be closed quickly in the event of a fire to prevent fire spread. A heat or smoke detector should be made part of the release switch on fire doors which could close the door in the event that the detector is activated and could quickly seal off the fire. The individual door switch should be in addition to any other fire door closing system on the ship. Closing a fire door in this manner would be accomplished quickly without depending upon manual or automatic remote operation of the door from the bridge after fire has been detected. This would pose no additional hazard to persons caught behind a door as a person can exit through a fire door that has been closed by turning the latch handle to open the door. The door will automatically close itself after the person has exited.

Because the SCANDINAVIAN SUN makes short international voyages, passengers are not required to participate in any emergency drills and there is no requirement to brief the passengers in emergency procedures. The only safety information provided to passengers on the SCANDINAVIAN SUN is that displayed on posters throughout the ship, that set out on the boarding card, and that incorporated in the welcoming announcement on the public address system. On its daily trips, the SCANDINAVIAN SUN can carry up to 1,100 passengers, or up to 34,100 passengers per month. On a longer international voyage, passengers would participate in a drill soon after sailing. Because the hazards which may arise on a short international voyage are no different, passengers should receive some type of safety orientation similar to, if not the same as, that given to passengers on longer international voyages. Because a drill or safety orientation was not required or held, the deceased passenger may not have been aware of the actions to take in case of a fire on board a ship. Attendance at a drill or safety orientation might have provided her with information that could have saved her life. An orientation similar to that given on commercial aircraft would not seem to be too burdensome in cruise operations. It would not need to be extensive or time consuming but should include a demonstration of the wearing of life preservers, a description of evacuation or disembarkation routes, the function of the automatic fire doors, and actions to take in the event of a fire. The Safety Board believes that passengers on short international voyages should receive a more thorough safety orientation than that which is printed on the boarding pass, announced over the public address system, or posted throughout the vessel. As the U.S. representative to IMO, the USCG should propose adoption of a requirement for additional safety orientation for passengers on ships engaged on a short international voyage.

Because millions of U.S. citizens are carried on foreign passenger ships out of U.S. ports each year, ships should be examined as thoroughly as possible within the context of the SOLAS conventions. The 1966 and 1967 Amendments to SOLAS 60 establish a single method of construction (essentially fireproof) which most closely resembles SOLAS 60 Method I construction with the addition of fire detectors. Since there is only one method of construction authorized for passenger ships built to the 1966 and 1967 Amendments to SOLAS 60 and the SOLAS 74 convention, the method of construction is not specified on the SOLAS certificate issued by the ship's government of registry. Because the SCANDINAVIAN SUN was built to the SOLAS 60 standards, including the 1966 and 1967 Amendments, the USCG examination records did not need to specify a method of construction for the SCANDINAVIAN SUN. However, the examination records variously indicated all three of the SOLAS 60 methods of construction for the ship although none of them, in fact, was applicable. This inconsistency is indicative of possible confusion on the part of the inspectors and suggests a need for additional guidance and training. The USCG should provide guidance to the inspection offices to upgrade the inspector's knowledge of passenger ship construction and in reviewing plans and conducting control verification examinations.

Shipboard fires typically produce a lot of smoke. Dense smoke reduces visibility and in unfamiliar surroundings, passengers, firefighters, and even the ship's crew can become disoriented. This may have been the situation with the deceased passenger. Once the ventilation is stopped and the amount of fresh oxygen is reduced, the fire becomes oxygen limited and tends to produce more smoke. The amount, density, and spread of smoke are primary factors which make shipboard fires so difficult to fight. Inhalation of smoke containing carbon monoxide and other toxic agents can be fatal. More fatalities result from smoke inhalation than from thermal burns.

Lubricating oil was the initial combustible and smoke producer in this fire. The lubricating oil, the melamine bulkhead veneer, and the wool carpeting contributed to the smoke and flame spread on the SCANDINAVIAN SUN. Melamine is a product of formaldehyde and urea and is mixed with cellulose or wood flour or stone powder depending upon its application. Two possible toxicants produced are hydrogen cyanide and carbon monoxide. Wool carpeting also can produce these by-products. Control of smoke is imperative, and reducing the combustibility and smoke production of materials used on ships would improve the safety margin that passengers and crew need in a ship fire to avoid injury and to be able to leave a ship safely. There is no limiting international smoke standard for shipboard materials. The U.S. has standards for testing for smoke development for interior materials but not for furniture, draperies, or electrical insulation.

As a result of its investigation of the fire on the SCANDINAVIAN SEA, the Safety Board made the following recommendation to the U.S. Coast Guard:

> Propose to the International Maritime Organization (IMO), modification of the fire standards of SOLAS 74 to include criteria (1) to limit smoke generation as well as flame spread of bulkhead paneling for passenger vessels, (2) to reduce the fuel loading in passenger and crew accommodations, and (3) to standardize the testing of combustible materials used in construction. (Class II, Priority Action) (M-85-32)
>
> Status: The USCG has not had the opportunity to respond to this recommendation which was issued on May 24, 1985.

The August 20, 1984, accident continues to point to the need for measures to limit smoke generation in shipboard construction and furnishing materials. Safety Recommendation M-85-32 is therefore reiterated.

Further, as a result of its investigation, the National Transportation Safety Board recommends that the U.S. Coast Guard:

> Direct inspectors conducting control verification examinations to stress to the ships' officers the need to close fire doors and to stop ventilation immediately upon detection of a fire. (Class II, Priority Action) (M-85-57)
>
> Provide inspectors additional training and guidance in passenger ship control verification examinations, including the correct determination of the fire safety method of construction of a vessel as the basis for an appropriate and thorough inspection. (Class II, Priority Action) (M-85-58)

Propose to the International Maritime Organization an amendment to SOLAS 74 to require that passenger ships on short international voyages conduct drills or safety orientations for passengers at emergency muster stations immediately upon departure from port. Safety orientation briefings should include a demonstration on the donning of life preservers, evacuation or disembarkation routes, information concerning the function of automatic fire doors, and actions to take in the event of a fire or other emergency. (Class II, Priority Action) (M-85-59)

Propose to the International Maritime Organization an amendment to SOLAS 74 to require that heat or smoke detectors be made a part of each automatic fire door release switch on passenger ships so that the door will close when the detector is activated. (Class II, Priority Action) (M-85-60)

Propose to the International Maritime Organization an amendment to SOLAS 74 to require that all passenger ships carrying more than 36 persons on international routes have an automatic/manual fire control system in the pilothouse that integrates the fire detectors, the automatic fire door controls, the ventilation system controls, and the general alarm into a unified system. (Class II, Priority Action) (M-85-61)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.

By: Jim Burnett
Chairman