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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:

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Commandant
U.S. Coast Guard
Washington, D.C. 20593

SAFETY RECOMMENDATION(S)

M-85-29 through -35

A few minutes before 1920, on March 9, 1984, a fire was discovered in a room occupied by two crewmen aboard the Bahamian registered cruise ship SCANDINAVIAN SEA. The vessel, which was on a daily 11-hour cruise out of Port Canaveral, Florida, with 744 passengers and 202 crewmembers aboard, had been anchored about 7 miles off the coast of Florida, near Cape Canaveral and had just gotten underway. It proceeded to its berth at the Port Canaveral Cruise Terminal while the vessel's firefighting team proceeded to fight the fire. After the vessel berthed at 2057, the passengers were disembarked, and Coast Guard and local firefighters boarded the vessel to fight the fire. Meanwhile the fire, although it was contained within the forward vertical fire zone, spread through the upper decks. The fire was extinguished on March 11, 1984. There were no injuries or loss of life. The vessel was declared a constructive total loss. It was valued at $16 million. 1/

When the officer-in-charge of the Port Canaveral U.S. Coast Guard (USCG) Station arrived at the scene, he had the plans of the SCANDINAVIAN SEA sent over to the vessel from his files to provide some information to the shoreside firefighters about the layout of the vessel. The lack of coordination of the firefighting efforts during the early stages of the operation resulted in the complete disregard of the early information furnished by the USCG. The information conveyed in the April 1982 meeting held aboard the SCANDINAVIAN SEA to discuss the procedures that were to be followed in the event of emergencies, such as a fire, apparently had been forgotten by the local firemen who had attended. When the officer-in-charge of the Coast Guard Station withdrew his men from the vessel because he felt it was unsafe, the local firemen's perception of the effectiveness of the Coast Guard was seriously compromised. Therefore, it was only when the officer-in-charge called for the officers and crew of the USCG Cutter DILIGENCE to furnish a Rescue and Assistance team, supplemented by station personnel, that the Coast Guard's authority became a factor. Although units such as the USCG Station Cape Canaveral primarily are search and rescue units, their personnel are likely to be the first to respond to local port emergencies where there are no Captain of the Port (COTP) units.

1/ For more detailed information, read Marine Accident Report--"Fire Aboard the Bahamian Passenger Ship M/V SCANDINAVIAN SEA, Atlantic Ocean, Off the Florida Coast, March 9, 1984" (NTSB/MAR-85/03).

Because persons requesting USCG assistance look to any USCG unit to have expertise in all marine matters, regardless of the mission of the particular unit, confusion can result, and accordingly, the USCG role in the maritime activities of the port should be expanded to include the COTP functions wherever there is substantial marine activity.

When the Commanding Officer of the DILIGENCE assumed the role of onscene commander until COTP personnel could arrive from Jacksonville, he established a timely USCG presence that carried the necessary authority to provide much needed coordination. It was fortuitous that the DILIGENCE was in port at the time; it could have been at sea. Response by other USCG units although rapid, could not have provided an immediate USCG presence with authority and expertise for a major emergency. The Safety Board believes that with the planned expansion of the port and the projected increase in the number of ships calling, especially passenger ships, the USCG should evaluate the need for on-going COTP representation in Port Canaveral.

Under its control verification program, the USCG reviews a foreign vessel's plans and conducts limited examinations of the vessels, but it relies mostly on certification by the government of the ship's registry to assure compliance with SOLAS requirements. The intent of the program is to insure that foreign passenger vessels carrying U.S. citizens as passengers from U.S. ports are constructed and maintained to the minimum standards required by the International Convention for the Safety of Life at Sea (SOLAS) 74 convention to which many nations, including the Commonwealth of the Bahamas are parties. The Passenger Ship Safety Certificate issued by the Norwegian Classification Society Det Norske Veritas (DNV) on behalf of the Bahamian Government does not state specifically that the SCANDINAVIAN SEA complied with the fireproof construction standards of SOLAS 74. Although the USCG examination of the SCANDINAVIAN SEA in Miami in January 1984 included a fire and lifeboat drill, the Board is concerned about the adequacy of the examination as a whole. The examination, although by design not as stringent as those given to U.S. flag passenger vessels, nevertheless should fulfill the intent of the program. The USCG inspector stated that he checked five hoses on the car deck, one of which failed, but did not check any hoses from the accommodation areas. It is not certain whether the car deck hoses were the only hoses of the 147 fire stations aboard the vessel that were checked at each of the USCG verification examinations or whether others were included. With the failures of several hoses in "A" deck forward during the fire, it is doubtful that hoses in the area were among those tested during a recent examination. The Safety Board believes that when fire hoses are examined for adequacy under the control verification program, the USCG inspector should select a number of hoses from areas throughout the vessel, not just from an area that is convenient for the crew.

During the lifeboat drill conducted for the USCG inspectors, the SCANDINAVIAN SEA was berthed starboard side to the pier. The starboard lifeboats were not tested in a fashion similar to the port boats. The configuration of the sideports (starboard side only) dictates that the vessel usually berths starboard side to the pier. This berthing procedure did not permit the starboard boats to be tested in the presence of the USCG inspectors and it could not be determined whether any USCG inspector had ever seen the starboard boats tested. The USCG inspector who conducted the examination in January 1984 stated that, although he did not actually see the starboard boats lowered, he checked the vessel's logbook and that he determined that the ship held a lifeboat drill weekly. If the SCANDINAVIAN SEA had been a U.S. flag passenger ship, each lifeboat would have been subjected to a thorough and comprehensive inspection by the USCG.

As a result of its investigation of the fire aboard the passenger ship ANGELINA LAURO 2/ on March 30, 1979, the Safety Board recommended that the USCG:

> Develop and implement more stringent requirements for conducting fire drills on passenger vessels operating under its control verification program to determine the crew's familiarity with shipboard fire protection features and their firefighting preparedness. (M-80-107)

Status: On October 7, 1981, the USCG Marine Safety Manual (Section 32-2-30) was changed to add emphasis to advance planning for coordination of resources in the event of a fire aboard a moored vessel. The revised second paragraph of the section reads:

> As appropriate, emergency drills aboard foreign passenger vessels should be conducted as a prerequisite to the issuance of Form CG-4504, 'Control Verification for Foreign Vessel' and at quarterly reexaminations. At each fire drill, the Coast Guard inspector shall insure that the vessel crew has included in its contingency planning necessary procedures to conduct a firefighting operation while moored. Emphasis should be placed on simulated hookups to shoreside water pressure through the international shore connection and a plan to provide necessary interpreters to facilitate English language communication and coordination with shoreside firefighting personnel and resources.

Although the meeting in April 1982 between SCANDINAVIAN SEA personnel and representatives of the local fire department, the USCG, and the port authority was to provide for the coordination of the available firefighting personnel and resources (in addition to other types of emergencies) with ship's organization and procedures, only a limited number of the items agreed upon were actually implemented. The instructions in the Marine Safety Manual direct the USCG inspectors, during control verification examinations, to insure that the vessel's contingency plan for shipboard firefighting while moored include such coordination. The Safety Board urges the USCG to emphasize to its inspectors who conduct control verification examinations aboard foreign passenger vessels the importance of this section of the Marine Safety Manual.

The increased passenger ship traffic calling at Port Canaveral and the addition of new cruise ship berths and associated terminal facilities, together with the lessons learned from the SCANDINAVIAN SEA fire, necessitates that the Canaveral Port Authority formulate a contingency plan for the port. The Port Director agreed that there is a need for written contingency plans.

The COTP from Jacksonville, Florida, when responding to questions about the USCG's role in contingency planning for Port Canaveral, stated "contingency planning and immediate responsibility would not be considered." The Safety Board questions whether the USCG representative's assertion that he would not consider contingency planning for Port Canaveral is a correct reflection of USCG policy. The USCG Safety Manual, Part 86-6, Paragraph 5 states in part:

2/ For more detailed information read "Marine Accident Report—Fire Onboard the Italian Passenger Ship ANGELINA LAURO, Charlotte Amalie Harbor, St. Thomas, U.S. Virgin Islands, March 30, 1979" (NTSB-MAR-80-16).

> District commanders, captains of the port and commanding officers of other units as directed by the district commander, are required to insure that ports within their jurisdiction have current and effective contingency plans, supported by the port community, to provide adequate response by the available Federal, state, municipal and commercial resources to fires and other accidents.

and enclosure (1) to COMDTNOTE 16000, dated 21 November 1983, Firefighting, USCG Policy states, in part:

> Under this policy, Coast Guard Captains of the Port work with port authorities and local governments within their areas of jurisdiction to maintain current and effective contingency plans, to ensure coordination of port community resources that will respond to fires and other incidents. Coast Guard units conduct regular unit drills adapted to the needs of local contingency plans and mutual agreements. Normally, the Coast Guard will not assume control of the overall firefighting efforts when appropriate local authorities are present.

No reference is made to geographical distances or locations with regard to the USCG's participation in local contingency plans. The Safety Board, therefore, urges the Canaveral Port Authority and the USCG to develop a contingency plan for Port Canaveral with special consideration given to emergencies aboard passenger ships and the effects of any future expansion of the port's cruise facilities. The Safety Board has learned that, based upon the SCANDINAVIAN SEA accident, the Canaveral Port Commissioners have formed a committee to look into the preparation of a contingency plan for Port Canaveral.

The Safety Board is concerned that foreign vessels, like the SCANDINAVIAN SEA, which operate regularly out of U.S. ports and carry thousands of U.S. citizens as passengers each year, are not examined as thoroughly as U.S. passenger vessels are in the course of examinations between their periodic inspections. U.S. citizens aboard these foreign vessels should be afforded the maximum protection under existing U.S. and international regulations. The USCG control verification examinations may not provide adequate assurance that the lifesaving and fire protection safeguards of foreign passenger vessels which embark U.S. citizens at U.S. ports are in compliance with the SOLAS 74 convention which became effective internationally on May 25, 1980. Based on the test reports of the samples of material used in construction, the overhead paneling did not comply with the international requirements, which indicates that the USCG, using present procedures, cannot be certain that foreign passenger vessels built before the SOLAS 74 treaty do, in fact, meet the 1974 requirements.

The material used in the construction of the SCANDINAVIAN SEA, while conforming to the requirements of Method I construction, nevertheless eventually burned and destroyed the subdivision in the lower decks of the forward zone. The asbestos cement paneling used for bulkheads and overheads, asbestos sheets covered with a thin veneer of Micarta or Formica 3/ a melamine type of material, was heated until the veneer ignited and burned, although the panels contained the fire on "A" deck for a considerable length of time. The tests conducted on samples of the same panel material from the vessel indicate, that with some exceptions, the original construction satisfied the requirements of the fire safety standards of SOLAS 60 for fire restrictive construction. The various test results indicate, however, that there is a need to standardize the testing

3/ Trade names.

procedures for materials used in construction of passenger vessels built to SOLAS requirements. The furniture and bedding installed at the time of construction were not made of fire retardant materials, or required to be. The high fuel loading generated the heat necessary to ignite the panel veneer. If the furnishings and materials placed in the accommodation areas were included in the amount of combustibles permitted by the SOLAS convention, the duration of the original fire would have been reduced and the fire probably would have been confined to a few rooms. The furnishings and materials used in accommodations on existing passenger vessels should be modified to meet the standards of SOLAS 74.

Although the insulation on the original electric cables aboard the vessel was self-extinguishing when tested in a single cable configuration, this test had little significance for cables installed in bundles. Such configuration can be expected to propagate fire. The shipboard cable flammability problem was addressed internationally by IMO which adopted a resolution in 1975 that became effective on September 1, 1984, that states: "All electric cables shall be at least of a flame retardant type and shall be installed so as not to impair their original flame retardant properties." Unfortunately, IMO failed to identify a flammability test method in the amendments to SOLAS 74.

The smoke generated during the fire was not confined to the forward main vertical zone. With some of the fire doors in the zone boundary partially or fully open during some stage of the fire to allow access into the zone by firefighting teams and equipment, smoke escaped from the zone and eventually permeated the remainder of the vessel. Firefighter's efforts to deal with the smoke accounted for much of the damage that contributed to the (constructive total) loss of the vessel. Some smoke probably passed through the ventilation and air-conditioning ducts even though the fire dampers were reported closed. The fire retardant bulkhead paneling, although classified as "Very Low Flame Spread" by a British testing laboratory and acceptable under the present SOLAS standard, did not meet the U.S. requirements for limited smoke generation. There is no internationally agreed upon smoke emission limitation for materials to be used in vessel construction, despite the fact that the predominant personnel hazard associated with fire is smoke inhalation. The USCG has developed and published a flammability and smoke requirement for "interior finish" materials in 46 CFR 164.012 (10), (based on the ASTM test E-84 (tunnel test)) which states that flame spread shall not exceed 20 and smoke shall not exceed 10. These flame spread and smoke requirements are quite stringent. The USCG should urge IMO to modify the fire safety standards in the SOLAS 74 treaty to add criteria to address the quantity of smoke generated as well as flame spread to the existing requirements for paneling used in passenger vessels, and also to standardize material testing procedures.

Although sprinklers are not required in the accommodation areas under current regulations for passenger vessels which meet fireproof construction standards, the fire on the SCANDINAVIAN SEA would have been quickly extinguished if a sprinkler system had been installed. The USCG should consider requiring sprinkler systems in the accommodation areas of passenger vessels, regardless of the type of construction, thereby reducing the dependency on personnel response. When the fire was first discovered, the fire doors and fire dampers were closed, and the ventilation systems were stopped, sealing the forward main vertical zone which effectively isolated it from the remainder of the vessel. The use of cooling water on the decks and bulkheads forming the zone boundary also aided in preventing any lateral spread of the fire into the adjacent vertical fire zone. The heat and smoke damage which extended beyond the forward vertical zone was due to both ship and shoreside firefighters having left open various openings, mainly fire doors, for personnel access or for fire hoses to be led through the opening. Inspection of the vessel after the fire showed that the fire hoses at the fire stations within the forward

main vertical zone were not used to fight the fire, but that hoses were dragged in from the adjacent main vertical zone into the vertical stair column aft of frame 153 and left in the fire doors, preventing them from fully closing. If hose ports had been installed in the fire doors into the forward main vertical zone, the zone could have been sealed off more effectively, restricting the air supply to the fire. Such ports are described in U.S. regulations for passenger vessels in 46 CFR 72.05-25(a)(6) but are not permitted to be installed in fire doors of main vertical zone boundaries by 46 CFR 76.10-10(d); the USCG should consider amending the regulation to require such installation. Further, the USCG should propose to IMO that fireproof construction standards in the SOLAS treaty be amended to require the installation of hose ports in fire doors on passenger vessels, including those in class A bulkheads of main vertical zones and stair columns to permit fire hoses to be passed through closed fire doors.

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

> Direct the Captain of the Port, Jacksonville, Florida, to participate in establishing a port contingency plan for Port Canaveral with the Canaveral Port Authority and local jurisdictions in the port community. (Class II, Priority Action) (M-85-29)
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> Through its various means of communications, i.e. Coast Guard publications and local notices to mariners, periodically provide the maritime industry with a clear statement of the Coast Guard's policy and capabilities concerning firefighting in United States ports and waterways. (Class II, Priority Action) (M-85-30)
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> Under the Control Verification Program for foreign passenger ships calling at United States ports and embarking U.S. citizens as passengers, conduct more comprehensive examinations of the fire and emergency equipment and safety procedures aboard vessels. (Class II, Priority Action) (M-85-31)
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> 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)
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> Amend U.S. regulations and seek international agreement to require passenger ships to be provided with hose ports in all fire doors so that they may be fully closed when fire hoses have to be led through fire doors. (Class II, Priority Action) (M-85-33)
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> Expedite U.S. rulemaking and seek international agreement to require all passenger vessels to have a sprinkler system installed in accommodation areas regardless of the type of fireproof construction used. Class II, Priority Action) (M-85-34)

Evaluate the need for an increased level of Captain of the Port representation in Port Canaveral, Florida. (Class II, Priority Action) (M-85-35)

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

By: Jim Burnett
Chairman