

4-131

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: September 10, 1980

Forwarded to:

Mr. William N. Johnston
President
American Bureau of Shipping
65 Broadway
New York, New York 10006

SAFETY RECOMMENDATION(S)

M-80-62

About 2140 c.s.t. on April 19, 1979, the Liberian tankship M/V SEATIGER, which had suspended pumping seawater ballast into its cargo tanks because of electrical storms in the area, exploded, burned, and sank at a berth at the Sun Oil Terminal, at Nederland, Texas. The SEATIGER was severely damaged in the area of its cargo tanks. Two crewmembers were killed. The total losses resulting from the explosion were estimated to be \$35 million. The terminal berth was out of service for 180 days. ^{1/}

The cargo tanks of the SEATIGER were neither inerted nor in a gas-free condition. The tanks were vented into a common line that led to the vertical vent pipe attached to the port kingpost located just aft of the cargo manifold. Highly explosive vapors were allowed to vent to the atmosphere through the vent pipe. Discharging was completed about 1630 on April 19 and ballasting began at 2050 with the vent system still open. The top of the vent pipe was fitted with a flame arrester with a hinged cover. Inspection of the flame screen after the accident revealed that it had been improperly installed. It had been placed upside down so that four small positioning tabs extending from one end were not placed down in the vent pipe. With the flame screen incorrectly installed, the clearance around the edge between the screen and the cover was improper, and the hinged cover could not be secured correctly to provide a tight closure. In addition to the vapors passing through the mesh of the flame screen, they rose vertically and passed out around the edge of the hinged cover. When lightning struck the top of the vent mast, the vapors on the vent exterior ignited, the flame traveled through the improperly installed flame screen, down the mast through the vent pipes on deck, and ignited the vapors in the tanks, which resulted in the explosion.

Flame arresters that are designed for flame quenching in a vent pipe system are found in various configurations. The cylindrical, double-mesh screen type installed on the SEATIGER was apparently repaired, when required, by the ship's crew. It could not be determined whether the original dimensions were adhered to when the screen was rebuilt, or whether the fit would have been proper if the screen had been installed correctly. The location on top of the mast discouraged inspection and maintenance although it almost insured that it would be one of the first parts of the vessel struck by lightning. The design of flame screens having only one manner of installation in a flame arrester would probably prevent occurrences such as this.

^{1/} For more detailed information, read "Marine Accident Report—Liberian Tankship M/V SEATIGER Explosion and Fire, Sun Oil Terminal, Nederland, Texas, April 19, 1979" (NTSB-MAR-80-12).

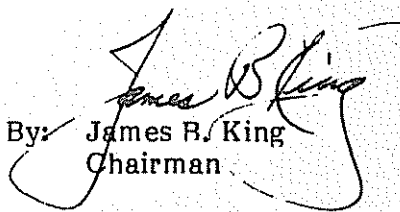
The SEATIGER had undergone an inspection on October 20, 1978, in Philadelphia, Pennsylvania, by a National Cargo Bureau surveyor representing the Marine Safety Department of the Liberian Bureau of Maritime Affairs. It included such items as navigational instruments, charts, publications, weather instruments, fire equipment, and lifeboats including the condition of the lifeboat falls. As this was a "nontechnical" inspection, the hull, machinery, and pipe lines were not included in the inspection, nor were the cargo vent and inert gas systems, or the flame arrester.

The SEATIGER, a diesel-powered tankship of steel construction, was built by the Mitsubishi Heavy Industries, Ltd., Hiroshima, Japan, in 1974. It was constructed according to the American Bureau of Shipping (ABS) Rules for Building and Classing Steel Vessels. Acting for the Republic of Liberia and under the provisions of the International Convention for the Safety of Life at Sea - 1960 (SOLAS 60), the ABS had conducted a 5-year special survey of the vessel in 1978 and issued a Cargo Ship Safety Construction Certificate on October 19, 1978. Under the section for surveys after construction, the ABS rules state that "air vent and sounding pipes including pressure-vacuum valves and flame screens" are to be generally examined annually and placed in satisfactory condition. It could not be determined whether inspection of the flame arrester is normally included in the annual survey. The Safety Board believes that inspections of flame arresters should be included in every survey of tank vessels conducted by classification societies and regulatory agencies on a routine basis.

Therefore, the National Transportation Safety Board recommends that the American Bureau of Shipping:

Instruct surveyors who conduct annual surveys of tank vessels to examine all flame screens, including those installed in flame arresters, regardless of location, and have them placed in satisfactory condition as necessary.
(Class II, Priority Action) (M-80-62)

KING, Chairman, McADAMS and BURSLEY, Members, concurred in this recommendation. DRIVER, Vice Chairman, and GOLDMAN, Member, did not participate.

By: 
James B. King
Chairman