transducers, and lights have been lowered in profile. Mounting brackets have been redesigned to incorporate a "break-away" feature.

Nylon bolts are employed to attach necessary instrumentation to streamlined, low-profile brackets welded to the frame of the JOHNSON SEA LINK. A continuous load or pull will cause "cold flow" of the nylon bolt threads and separation. This system of "break-away" is currently employed on the JOHNSON SEA LINK.

Lay 4-43 DOT 1441

PROBABLE CAUSE

M-75-5 thru -8

The National Transportation Safety Board determines that the probable cause of the accident was the fouling of the starboard spring-loaded moused hook and other appendages on the submersible with a cable attached to the aftermost flagpole of the scuttled destroyer.

Contributing to the carbon dioxide fatalities was the inadequacy of the carbon dioxide absorbent system in the dive chamber, and the lack of suitable rescue equipment was a factor in the inability to provide a timely rescue.

Contributing to the fouling of the submersible were: (1) The position of the air conditioning unit in the pilot sphere which prevented the pilot from observing the area off the after starboard of the submersible; and (2) the absence in the JOHNSON SEA LINK operations manual of procedures to be followed by the pilot when operating in areas of possible entanglement.

RECOMMENDATIONS

The external alterations made to the JOHNSON SEA LINK are appropriate but do not sufficiently reduce the risk of entanglement. Therefore, the National Transportation Safety Board recommends that:

1. The owners of the JOHNSON SEA LINK utilize system safety techniques to establish operational guidelines to prevent the entanglement of the JOHNSON SEA LINK. These guidelines should be incorporated in the JOHNSON SEA LINK operations manual. (Recommendation No. M-75-5.)

MAR-75-2

2. The U. S. Coast Guard actively collect information concerning worldwide submersible search and rescue capabilities so that the most effective equipment needed for use in future underwater emergencies can expeditiously be made available. (Recommendation No. M-75-6.)

3. The U. S. Coast Guard acquire as soon as possible an underwater television unit capable of being deployed by aircraft or providing a descending line to a submerged vessel. (Recommendation No. M-75-7.)

4. The U. S. Coast Guard and the U. S. Navy collaborate in a research and development program to develop the capability for civilian submersible rescue operations within the Coast Guard. (Recommendation No. M-75-8.)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

Adopted this 15th day of January 1975:

John H. Reed, Chairman

Francis H. McAdams, Member

Louis M. Thayer, Member

[illegible], Member

William [illegible], Member