M-102

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: September 6, 1979

Forwarded to:
Admiral John B. Hayes
Commandant
U.S. Coast Guard
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

M-79-88 through -97

On January 15, 1978, the U.S. motor tankship SEALIFT CHINA SEA rammed the Italian-registered cargo vessel LORENZO D'AMICO which was moored in Los Angeles harbor. The bow of the SEALIFT CHINA SEA penetrated about 15 feet into a cargo hold of the LORENZO D'AMICO. No deaths or injuries resulted from the accident; however, the LORENZO D'AMICO was damaged beyond economical repair and was declared a constructive total loss. The SEALIFT CHINA SEA was damaged slightly. 1/

The accident resulted when the pitch was applied in the wrong direction to the SEALIFT CHINA SEA's controllable-pitch propeller during a turning maneuver. The automated engine control system was inoperative and propeller pitch was being operated manually at the local control station. The pilot ordered half astern and full astern but the propeller was operated at half ahead and full ahead. The errors occurred through a misunderstanding of the hand signals used among three persons in the engineroom to transmit pitch orders to the local control station two levels below and about 50 feet aft of the engine control room.

Since the pitch percentage and direction indicators in the wheelhouse console and the pitch direction indicators on each bridge wing were integral features of the automated control system, they were inoperative. Therefore, an indication of the actual direction of thrust was not available on the bridge. Likewise, those indicators in the engineroom console were also inoperative. The actual direction of pitch and its percentage was displayed only on a mechanical scale of the pitch control rams at the local control station.

1/ For more detailed information, read "Marine Accident Report--U.S. Motor Tankship SEALIFT CHINA SEA Ramming of the Italian Motor Cargo Vessel LORENZO D'AMICO, Los Angeles Harbor, California, January 15, 1978" (NTSB-MAR-79-13).

The automated control systems on the SEALIFT CHINA SEA and the eight other ships of the class have failed many times. Those failures are significant in that the vessels have been operated in restricted waters on several occasions with no indication on the bridge regarding the actual direction of pitch. The Safety Board believes that to be an unacceptably risky situation, and that ships' bridges should be equipped with prominently displayed thrust indicators which operate regardless of the failure of the automated control systems.

The ship was designed for manual operation of the pitch in the event of automated system failure, but did not provide for a reliable method to relay thrust orders to the local control station. We believe that hand signals are an inadequate method, as demonstrated by this accident, and that appropriate equipment should be installed to preclude the use of hand signals. Furthermore, we believe that equipment should be installed so that persons in the wheelhouse, the engine control room and at the local control station can communicate reliably with each other.

The history of failures of the automated control system indicates that an adequate degree of maintainability had not been achieved. The investigation of this accident revealed that the technical manuals, spare parts, training of engineers, and shoreside support in combination have not been adequate. Therefore, the Safety Board believes these factors should be reanalyzed with a view toward identifying and eliminating the deficiencies, and to revising the equipment and manning requirements as necessary to achieve a satisfactory level of maintenance.

Finally, we believe that failures of thrust control systems should be reported to the Coast Guard before vessels enter restricted waters, which is now required in cases of certain other equipment failures.

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

Amend 46 CFR 113.30-5(a) to add propulsion local control stations to those locations required to be provided with an efficient means of communications in vessels equipped with automated control systems. (Class II, Priority Action) (M-79-88)

Amend 46 CFR 113.30-20(b) to permit propulsion local control station telephones to be installed on the same circuit as the telephone stations listed in 46 CFR 113.30-5(a), and to require such installations to meet the criteria of 46 CFR 113.30.25, with special emphasis on paragraphs (c) through (g) thereof in regard to noisy locations. (Class II, Priority Action) (M-79-89)

Amend 46 CFR 113.35-5 to require the installation of engine order telegraph systems between engineroom control stations and propulsion local control stations in vessels equipped with automated control systems if manual operation is an acceptable alternate means of control and the local station is not immediately adjacent to the engineroom control station. (Class II, Priority Action) (M-79-90)

Amend 46 CFR 113 to prescribe standards for thrust indicators similar to those prescribed by 46 CFR 113.40 for rudder angle indicators and by 46 CFR 113.35 for engine order telegraph systems. Regulations should require vessels of 1,600 or more tons to be equipped with thrust indicators which are: (1) separate and independent from such indicators provided by automated control consoles, (2) positioned prominently near the rudder angle indicator in the wheelhouse and bridge wings, and at the engineroom control station, (3) illuminated appropriately for effective day and night visibility, and (4) designed to display the exact shaft rpm and propeller pitch direction in either combined or individual instruments. (Class II, Priority Action) (M-79-91)

Initiate appropriate proposals to the Intergovernmental Maritime Consultative Organization for the establishment of international standards similar to those prescribed by 46 CFR 113 as revised pursuant to the preceding four recommendations. (Class II, Priority Action) (M-79-92)

Make a special evaluation, in coordination with the Military Sealift Command, to determine any deficiencies involved in maintaining the automated control systems of all nine vessels of the class, as measured by the criteria stated in NVC No. 1-69, and make the changes in manning and equipment requirements needed to achieve an acceptable degree of maintainability. (Class II, Priority Action) (M-79-93)

Revise and reissue NVC No. 1-69 to provide guidance for standards in consonance with those prescribed by 46 CFR 113 as revised pursuant to the first four preceding recommendations, and to reflect maintainability criteria related to the adequacy of manning, equipment design, instruction manuals, spare parts, and shoreside support for automated control systems and other factors, as determined to be needed by the recommended special evaluation. (Class II, Priority Action) (M-79-94)

Amend 33 CFR 164.35 to add illuminated shaft rpm indicators to the equipment required in the wheelhouse, and illuminated thrust direction indicators in the wheelhouse and on the bridge wings of vessels equipped with controllable-pitch propellers. (Class II, Priority Action) (M-79-95)

Amend 33 CFR 164.53(b) to add automated control systems and shaft rpm and thrust direction indicators to those equipments specifically required to be reported to the Coast Guard when they are not operating properly. (Class II, Priority Action) (M-79-96)

Amend 33 CFR 124.16 to enumerate specific conditions or inoperative equipment, including automated control systems and shaft rpm and thrust direction indicators, that are deemed to constitute abnormal conditions required to be reported to the Coast Guard. (Class II, Priority Action) (M-79-97)

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

By: James B. King
Chairman