

load of cargo and the fact that bilge keels were not reinstalled on the vessel after their removal in 1966 rendered the ship more responsive to wave forces.

5. The unusual severity of the storm which struck on December 26 and caused the ship to roll to 52°. The occurrence of the storm during darkness also made it difficult to see the direction of the oncoming waves and prevented conning the vessel to meet the waves head on.
6. The inability of Fleet Weather Central to forecast the storms of December 25 and 26.

The following contributed to the loss of life subsequent to abandoning ship:

1. The failure of the ship's and air-dropped liferafts to remain in the vicinity of the accident where the crewmembers could board them.
2. The failure of the lifeboat painter which deprived the crew of a means to shear the lifeboat away from the ship.
3. The falling of a 2,000-pound bomb into the lifeboat, killing or injuring some crewmembers and overturning the lifeboat.
4. The lack of better techniques to detect a person in stormy seas and to retrieve him.
5. The characteristic which allowed the lifejackets to slide upward and to push the head forward, tending to drown exhausted or unconscious survivors.

RECOMMENDATIONS

The National Transportation Safety Board recommends that:

1. The U. S. Coast Guard, with the assistance of the U. S. Navy and U. S. Army, develop a military explosives stowage criteria to meet specific vessel response to dynamic environmental conditions. These criteria should include shipboard measurable parameters of angles of roll and period of roll. This information needs to be provided the master of the ship so that he can determine the safety margin remaining in a threatening situation and select available options accordingly. M-71-32

This information is also important to the operational commanders and the weather routing service to permit a basis for weather routing or diversion to ports of refuge when sea state predictions exceed the design limits. ~~M-71-33~~

2. The U. S. Coast Guard, with the assistance of the U. S. Navy and U. S. Army, conduct a design study to develop, on an engineering basis, stowage design requirements in support of the criteria required above. These design requirements must not only be structurally adequate but should minimize the susceptibility of the stowage to a chain reaction from single-point failures and should minimize the dependence of the stowage to quality of workmanship resulting from prevalent custom-fitting of dunnage. The study must also recognize that the hull and bulkheads work somewhat in a seaway and, therefore, cannot be considered as providing rigid supports for blocking and bracing, particularly in heavy seas. M-71-33
3. The U. S. Coast Guard seek to remove the inconsistency of being legally responsible for vessel and port safety, while at the same time having no authority to require a Coast Guard inspection of the loading or unloading of a vessel at an Army or Navy facility. M-71-34
4. The Coast Guard include in its study of life preserver improvements, the reported tendency of lifejackets to slide upward and their failure to rotate a person to a face-up position. M-71-35
5. The Coast Guard study the means of improving embarkation methods and equipment, and procedures for controlling inflatable liferafts at embarkation stations. It is recognized that the regulations are being revised to provide this in the case of sea painters for liferafts. However, this is considered only one facet of the hazards existing with the problem areas cited. (This same recommendation was made by the National Transportation Safety Board after the loss of the SS PANOCEANIC FAITH on October 9, 1967). M-71-36
6. The Coast Guard study means for improving the retrieval of survivors from the sea by merchant vessels in rough seas. M-71-37

7. The Navy improve its 2,000-pound pallet design to reduce susceptibility of the banding to being struck and broken by external forces. M-71-38

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

Adopted this 21st day of October 1971:


John H. Reed, Chairman


Louis M. Thayer, Member


Isabel A. Burgess, Member

Laurel and McAdams, Members, were absent, not voting.