

engineroom-pumproom bulkhead. However, it appears unlikely that a leak in the pumproom of such proportion to create the head of gasoline required, would have gone unnoticed by the Chief Mate and the two pumpmen who inspected and secured the space following cargo operations. In addition, it appears highly improbable that all the other necessary elements were present.

The Board concludes that the probable cause of the accident was the explosion of gasoline vapors in the after pumproom. The source of ignition is unknown.

RECOMMENDATIONS

The National Transportation Safety Board concurs with the recommendations of the Marine Board of Investigation concerning the pumping of pumproom bilges, 1-A; operation of power ventilation, 1-A; ^{M-68-6} combustible ^(Pg 19) lifeboat falls, 1-B; additional escape units and berthing compartments, 1-C; ^{M-68-8} emergency power systems, 1-E; ^{Pg 19} and ^{M-68-9} CO₂ extinguishing systems, 1-F. ^{Pg 19}

With respect to Recommendation 1-A, the Board concludes that the practice of permitting liquid cargo to remain in pumproom bilges and securing the power ventilation systems in the pumprooms is extremely hazardous. Proper ventilation and pumping of pumproom bilges may be considered to be basic requirements of good seamanship and proper safety practices; nevertheless, the failure in this case to follow such practices resulted in a catastrophic accident. ^{M-68-4} For this reason the Board recommends that rules and regulations be promulgated requiring that the

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bilges be pumped as thoroughly as possible, immediately following a cargo transfer, to shoreside tanks or into one of the vessel's tanks suitable to receive such liquid.] Further rules should also be promulgated to provide that pumproom power ventilation blowers on all tank vessels remain in operation whenever there is any amount of liquid cargo present in the bilges.

[The facts of this accident clearly show that there should be an alternative means of escape from all berthing compartments on tank vessels. This should include manually operated airlocks of not less than 16 inches diameter and kickout panels.]

[The Board further recommends that consideration should be given in future design of tank vessels to provide for relief for the forces of explosion in spaces where explosive vapors may accumulate.]

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ Joseph J. O'Connell, Jr., Chairman

/s/ Oscar M. Laurel, Member

/s/ John H. Reed, Member

/s/ Louis M. Thayer, Member

/s/ Francis H. McAdams, Member

A. Incorporate in the Rules for Cargo Handling, subpart 35.35, a rule that, if any liquid other than plain water remains in the bilges of any tank vessel pumproom after loading or discharging are completed, as much as possible of such liquid shall immediately be pumped to a shoreside tank or into one of the vessel's cargo tanks suitable to receive it. Incorporate in these same Rules for Cargo Handling a rule that pumproom power ventilation blowers on all tank vessels shall remain in operation at all times while there is any amount of liquid cargo present in the bilges.

NTSB Rec
M-68-6

B. Restrict and reduce the use of combustible lifeboat falls.

C. Incorporate the principle that all berthing compartments on tank vessels shall have one other avenue of escape than exit into a passageway, and if such other avenue of escape is an airport, such airport shall be maintained openable by hand and shall have a clear inside diameter of the useable opening of not less than 16 inches. It is recommended that this principle be applied fully to all new construction and to the extent possible to existing vessels.

D. Require that the General Alarm System on all tank vessels be wired with two different circuits, each circuit to be installed as remote from the other as possible; with two different sources of battery power, each source to be as remote from the other as possible; and with at least two switches for activation of the entire system, with at least one such switch to be installed forward and one aft.

NTSB Rec
M-68-8

E. Require that on all tank vessels on which emergency generators are installed, there shall be an automatic starting and changeover relay fitted in such manner that the emergency generator will automatically start and will automatically pick up certain predetermined emergency loads whenever ship's power fails.

NTSB Rec
M-68-9

F. Require that all fixed CO₂ extinguishing systems on tank vessels be fitted with at least two independent sets of remote manual release controls, each set of controls to be as widely separated as possible from the duplicate set of controls for the same system.

2. It is also recommended that the Coast Guard institute a study of the advisability of continuing to permit the use of combustible substances in flexible joints or any other parts of sea connection devices on merchant vessels at such locations where destruction of such joint or part by fire could cause flooding of the hull.

3. It is recommended that the Masters and crews of the SS ATLANTIC PRESTIGE and the SS WESTERN SUN be issued an official recognition for their superior performance of duty in effecting the prompt rescue of all survivors of the GULFSTAG casualty.