

SP-20
M-266

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: January 16, 1985

Forwarded to:

Mr. Ralston Hayden
Executive Secretary
International Association of
Classification Societies
c/o American Bureau of Shipping
65 Broadway
New York, New York 10006

SAFETY RECOMMENDATION(S)

M-85-12 and -13

About 0006 P.s.t. on March 19, 1984, the fully loaded 618-foot-long United States tankship SS MOBIL OIL experienced a steering gear malfunction and grounded in the Columbia River on the right ascending bank about 1 mile upstream from Saint Helens, Oregon. There were no injuries to the 36 persons aboard, but five cargo tanks and the forepeak tank were ruptured, and more than 170,000 gallons of oil polluted the river and its shores. The cleanup cost of the oil spill was estimated to be \$3 million, and the cost of the repair to the ship was estimated to be \$5 million. ^{1/}

The steering gear system installed on the MOBIL OIL had been aboard since the ship was built in 1959 and had no history of repeated failures. The system is of a common design still found in over 500 ships, which provides redundancy with separate electrical and hydraulic steering control systems with a common power source.

At the time of the accident, the port and starboard main steering gear pumps were both operating in the followup control mode. The steering system failure probably was caused by the movement of the clevis pin out of the link which connects the crosshead of the starboard main steering pump to the differential control linkage. The pin movement probably resulted from the hunting and interrupted motion of the steering gear pumps in simultaneous operation and from heavy vibration in the ship's stern when the clearance between the keel and the river bottom averaged only about 10 feet.

^{1/} For more detailed information read Marine Accident Report--"Grounding of the United States Tankship SS MOBIL OIL in the Columbia River near Saint Helens, Oregon, March 19, 1984" (NTSB/MAR-84/09).

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The need for thorough inspection of these cotter pins was made apparent by this accident. When the MOBIL OIL was in the shipyard for overhaul in June 1983, the American Bureau of Shipping (ABS) surveyor noticed just before the shipyard's final post-repair test that the four aft clevis pins had no cotter pins to secure them. The test was run without the cotter pins installed, and no one caught the error. Even after cotter pins were installed, no one checked them for size, for how they were fitted, or to insure that all four had been installed. It was only after the failure on March 19, 1984, that the three remaining cotter pins were discovered to be undersized and with the split ends not completely bent to 180 degrees. No cotter pin or pieces of a cotter pin, which may have come from the dislocated clevis pin, were found, leaving doubt that the cotter pin was ever installed.

The "Protocol of 1978 Relating to Safety of Life at Sea 1974 (SOLAS '74) of the Tanker Safety and Pollution Prevention (TSPP) Conference of 1978" emphasized the importance of checks and tests of steering gear by including in the Safety of Navigation chapter a regulation that within 12 hours before departure the ship's crew should make a visual inspection of the steering gear and its connecting linkage. The ABS and the U.S. Coast Guard presently have general instructions to the surveyors and inspectors in the field on steering gear inspections. However, the Safety Board has recommended that the ABS should expressly require in the instructions on inspection of steering gear a check that cotter pins or other similar fastenings are of the proper size and are installed properly.

The MOBIL OIL met the present alarm requirements for a power failure to the steering gear, but in this accident there was no loss of power so the alarm did not sound. Rather, a mechanical connection in the linkage from the differential to the starboard pump separated when the clevis pin near the pump vibrated out of position. There is no requirement for an alarm for this type of failure, which could sound in the same locations as the power failure alarm, and alert the persons on watch to the failure and to carry out the necessary casualty control. The bridge watch on the MOBIL OIL was aware of a steering problem but was not alerted immediately that the steering gear had failed mechanically because they heard no alarm. The engineers learned of the steering gear failure through a telephone call from the bridge after the ship had gone aground.

This accident emphasizes the need for a visual/audio steering gear pump control failure alarm for all pumps to alert both the bridge and engineering watchstanders of a failure. The steering failure alarm required by 46 CFR 113.43 would partly satisfy this need, because it is activated when the actual position of the rudder differs by more than 5 degrees from the rudder position ordered by the followup control system. When the MOBIL OIL's starboard steering pump was jammed at 25 degrees right, the helmsman at first came as much as 25 degrees left on the steering wheel to compensate; this was more than enough discrepancy to have actuated the steering failure alarm after 23 seconds, had it been installed. In this case the helmsman on the MOBIL OIL knew quickly that he was experiencing a steering failure, and this device would not have been necessary to inform him of this. However, the Safety Board believes that all existing vessels of 1,600 gross tons or more should have a steering gear pump control failure alarm. A steering failure alarm, if installed, would have alerted persons on watch of a steering failure but not which steering gear pump had the casualty. The steering gear pump control failure alarm would have directed the engineers quickly to the failed equipment even in the single steering gear pump mode of operation.

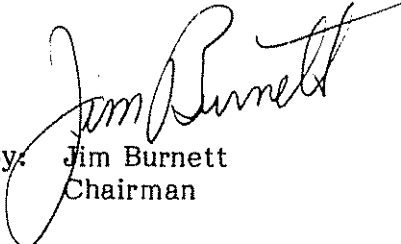
Therefore, as a result of this investigation, the National Transportation Safety Board recommends that the International Association of Classification Societies:

Advise member societies of the circumstances of the accident involving the U.S. tankship SS MOBIL OIL on March 19, 1984, and urge them to require expressly in their instructions on inspection of steering gear, a check that cotter pins or other similar fastenings are of the proper size and are installed properly. (Class II, Priority Action) (M-85-12)

Urge member societies to require all self-propelled vessels of 1,600 gross tons or more to have an audio/visual alarm in the wheelhouse, the engineroom, and the steering gear room to indicate a steering gear pump failure caused by an interruption in the control linkage of the operating steering gear pump or of a particular pump if more than one is in operation. (Class II, Priority Action) (M-85-13)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . . to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.


By: Jim Burnett
Chairman