

Log M-220

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: September 7, 1983

Forwarded to:

Mr. William N. Johnston
Chairman and President
American Bureau of Shipping
65 Broadway
New York, New York 10006

SAFETY RECOMMENDATION(S)
M-83-62

About 0015 on June 16, 1982, the engineer on watch discovered an excessive amount of water in the engineroom bilges on the U.S. flag tankship OGDEN WILLAMETTE, which was en route to Bayway, New Jersey, from Puerto Armuelles, Panama, via the Panama Canal loaded with 150,000 barrels of Alaskan crude oil. The vessel was steaming at its normal sea speed of about 16.0 knots in the Caribbean Sea about 50 nmi southeast of Jamaica. He immediately ordered the engineroom bilge pump started and notified the chief engineer. The entry of water exceeded the capacity of the bilge pump, and when the water level reached the main circulating pump motors, the engineering plant was secured. Although the chief engineer closed the main circulating pump's high sea suction valve and the main condenser's overboard discharge valve, the water continued to rise, and the master ordered the crew to abandon ship. 1/

The engineroom flooded to about 6 feet below the main deck. The vessel remained afloat with its after deck awash. It was towed to the Cayman Islands, where the engineroom was pumped out and the cargo was transferred to another tanker. The OGDEN WILLAMETTE was later towed to New Orleans for repairs. The damage was estimated to be \$16 million.

While in the Cayman Islands, salvage divers began surveying the underwater hull in the way of the engineroom. After finding no visible damage, they rigged a patch over a seachest where they detected a surge of water. They also plugged the auxiliary condenser's overboard discharge line. Salvage pumps were set up, and by 1800 on June 29 the engineroom was pumped out, and the survey party entered the engineroom. The salvage master discovered that the water entered the engineroom through the auxiliary condenser's overboard discharge line. The U.S. Coast Guard inspector stated that, "the chief engineer was very distraught with himself in that he did not secure this valve when the casualty was discovered." While the salvage crew was pumping the engineroom, the plug in the discharge line became dislodged, and the water level started to rise. After the salvage crew closed the 12-inch-diameter gate valve to the discharge line, the water was

1/ For more detailed information, read Marine Accident Report—"Engineroom Flooding and Near Foundering of U.S. Tankship OGDEN WILLAMETTE, Caribbean Sea, June 16, 1983" (NTSB/MAR-83/06).

pumped out. When the pumps were secured, the auxiliary condenser's overboard discharge valve was opened slightly to allow seawater to enter the system to determine the location of the leak. A crack was discovered on the bottom of the 26-inch-diameter rubber expansion joint in the main low sea suction line inboard of the suction valve. The 12-inch-diameter inlet valve to the auxiliary condenser located over the inlet pipe to the main condenser also was found open. No other sources of water entry were found.

At the ship repair facility near New Orleans, Safety Board and Coast Guard inspectors examined in place the ruptured expansion joint which had been found on the OGDEN WILLAMETTE by the salvage master and noted its inaccessibility for inspection. The joint was located beneath a section of walkway close to the tank top in the forward end of the engineroom. Examination revealed a 17-inch-long crack in the exterior of the arch where the joint had ruptured. The carcass appeared to be rotted, and the tube was similarly cracked. The chief engineer, who had served aboard the OGDEN WILLAMETTE since it was new, said that the expansion joint was the original joint installed during construction of the vessel.

The expansion joint was manufactured in June 1968 by the Goodall Rubber Company of Trenton, New Jersey. It was a standard service spool-type, single-arch, rubber expansion joint. The inside diameter was 26 inches, the face-to-face dimension was 10 inches, and the 1-inch-thick flange had a 24-hole bolt circle, with each hole measuring 1 3/8 inch in diameter. It was manufactured with a red neoprene cover, a black neoprene tube, cotton fabric, and 0.035-inch by 15-strand by 7/16-inch-wide steel bead wire.

The OGDEN WILLAMETTE had completed a U.S. Coast Guard drydock inspection on March 20, 1982, in Jacksonville, Florida. This inspection included the underwater portion of the hull, rudder, propeller, tail shaft, sea valves, seachests, strainers, anchors and chains, and cargo tanks. This inspection is required every 2 years. The sea valves installed in the OGDEN WILLAMETTE were of the butterfly type except for the auxiliary condenser's 12-inch-diameter overboard discharge valve, which had been changed during the drydocking to a gate valve. During the inspection of the sea valves in the engineroom, a visual inspection of the expansion joints adjacent to the sea valves was made by a Coast Guard inspector.

While in Jacksonville, the OGDEN WILLAMETTE, at the owner's request, was attended by an American Bureau of Shipping (ABS) surveyor who conducted a drydocking survey, annual classification survey, annual load line inspection, intermediate survey/protected saltwater ballast tank examination, boiler survey, tailshaft survey, and inspection of hull and machinery repairs, and piping alterations. An ABS drydocking survey is conducted biennially. The surveyor's report of the drydocking survey stated that, "Non-metallic expansion pieces in the main sea water circulating system were examined internally and externally and considered satisfactory."

The attending surveyor testified at the hearing that he personally inspected the main condenser's low sea suction rubber expansion joint on the OGDEN WILLAMETTE in the following manner:

...with the light and the hammer, I went around the entire external area of the joint itself, the flange bolt area, the rubber material itself. Then I went on the drydock, was into the seachest with the valve opened, and examined the internal of it through the seachest and the valve, as best can be done.


The inspection of the joint after removal from the vessel revealed that the inner fabric or carcass was deteriorated. This condition apparently developed over an extended period as water leaked into the carcass through an unknown crack or puncture. The configuration of the arch as it was installed in the vessel did not permit the water to drain even when the cooling system was drained. The manufacturer recommends replacement of the joint if the arch feels soft, which indicates the loss of adhesion between fabric plies. The location of the joint in the pipe inboard of the butterfly valve did not permit the interior of the joint in the arch to be so inspected. Although many expansion joints in cooling water systems have been in service for long periods of time, those that are found suspect during inspections are replaced, as was done with the six expansion joints replaced in the engineroom of the OGDEN WILLAMETTE during the last overhaul. Scheduled periodic replacement of rubber expansion joints would eliminate any doubt as to the condition of those joints in areas where complete inspection is not possible.

Coast Guard regulations (46 CFR 56.60-25(e)) require that the design of short nonmetallic expansion joints shall "provide a burst pressure of not less than four times the maximum allowable working (rated) pressure." However, there is no provision for periodic replacement or pressure testing. The Safety Board believes that nonmetallic expansion joints installed in such a manner that precludes their complete inspection in place should be replaced periodically.

Therefore, the National Transportation Safety Board recommends that the American Bureau of Shipping:

With the cooperation of the manufacturers of nonmetallic expansion joints and the U.S. Coast Guard, establish guidelines for the periodic replacement of expansion joints in main seawater circulating systems, particularly in areas where a complete internal examination is not possible without removal of the expansion joint from the system.
(Class II, Priority Action) (M-83-62)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and McADAMS, BURSLEY, and ENGEN, Members, concurred in this recommendation.


By: Jim Burnett
Chairman