

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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ISSUED: October 16, 1985

Forwarded to:

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Chairman
Lloyd's Register of Shipping
71 Fenchurch Street
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SAFETY RECOMMENDATION(S)

M-85-96

On July 30, 1984, the 689-foot-long United Kingdom tankship ALVENUS, owned by Lloyd's Leasing Limited of London, England, was delivering 53,616 metric tons of crude oil from Venezuela to the Continental Oil Company (CONOCO) at Lake Charles, Louisiana. About 0200 July 30, 1984, the master of the ALVENUS went to the bridge as the vessel approached the entrance fairway to Lake Charles. About 0930, the master took full navigational control from the officer of the watch as the vessel prepared to pick up a Calcasieu Ship Channel pilot at the entrance buoy to the Calcasieu Ship Channel. It was a clear, but hazy day with 10- to 20-knot winds from the southeast and 3- to 5-foot seas. 1/

With no other traffic in the channel, the ALVENUS proceeded in the center of the channel passing buoy 8 at 1209 and buoys 15 and 16 at 1227. At this time, the master had gone below to his office, leaving the second mate as officer of the watch. The helmsman was steering and a lookout was posted on the starboard bridge wing. The master stated that, about 1235, as the ALVENUS was passing buoys 19 and 20, "The vessel smoothly but quickly decelerated." Neither the pilot nor any crewmember felt or heard anything indicating to them that the vessel had grounded. However, the main deck and side plating in the way of the No. 2 port, starboard, and center tanks buckled and fractured, and the pilot and crew could see oil spewing onto the main deck and gushing out the sides of the tankship.

As the ALVENUS proceeded through the Calcasieu Ship Channel at 95 rpm, it would have experienced a phenomenon known as squat (sinkage and alteration of trim). As a vessel's speed is increased, the vessel's hull sinks deeper in the water. This sinkage is caused in part by the increase in relative velocity of the water as it flows under the vessel, and in part by the interaction of the bow and stern wave systems. Depending on the hull's form, a vessel may trim by the bow or by the stern. A conventional tankship, such as the ALVENUS, normally would trim by the bow. Sinkage and alteration of trim increases in shallow water where the proximity of the bottom causes increased relative velocity as the water flows under the vessel, and the bow and stern waves are more pronounced.

1/ For more detailed information read Marine Accident/Incident Summary Report--"United Kingdom Tankship ALVENUS, Gulf of Mexico, July 30, 1984" (NTSB/MAR-85/02/SUM).

In recent years, there have been numerous reports and studies regarding the minimum bottom (or underkeel) clearance necessary for the safe navigation of vessels in restricted waters. A 1983 report 2/ showed that a tankship of similar dimensions to the ALVENUS would experience about 4.5 feet of squat at 9.5 knots while inbound in the Calcasieu Ship Channel south of Cameron Louisiana. With the maximum draft of the ALVENUS (39 feet 9 inches) already exceeding the minimum channel depth (39 feet) recorded by the U.S. Army Corps of Engineers in the area where the tankship grounded, the sinkage and forward trim produced by the speed of the ALVENUS would have resulted in the vessel touching bottom and severe grounding forces. Even had the ALVENUS been operated at a slower speed, it still may have grounded but probably without the resulting massive structural damage and pollution. At a slower speed, squat would have been reduced and the soft channel bottom may not have inflicted any major damage. However, with almost 62,000 tons moving at about 10 knots, the resulting grounding caused large compressive fractures in the main deck and upper side plating even though the bottom plating showed no damage. If the ALVENUS had been operated at a slower speed or at a lesser draft, or at a combination of slower speed and less draft, it might not have had the massive structural failure.

The U.S. Coast Guard Merchant Marine Technical Branch in New Orleans, Louisiana, performed structural strength calculations 3/ to determine if the ALVENUS was loaded properly on July 30, 1984. The calculations showed that the ALVENUS was loaded within design limits. Metallurgical tests of selected portions of the vessel's damaged structure were conducted by a consultant. 4/ These tests indicated that the material met the specifications for Grade A steel (the required material) given in Lloyd's Rules and Regulations for the Construction and Classification of Steel Ships and that the structure had no significant corrosion wastage. Also, no evidence of a lack of adhesion or penetration was found in the welds between various structural members. Since the ALVENUS was loaded properly and there were no known defects in the structure of the No. 2 port, starboard, and center tanks, the Safety Board believes that the structural strength of the ALVENUS and vessels of similar design should be examined to determine their resistance to massive structural damage from grounding in soft channel bottoms and that modifications should be directed, if necessary.

Therefore, the National Transportation Safety Board recommends that Lloyd's Register of Shipping:

Determine the adequacy of the design of the ALVENUS and similar vessels to resist a massive structural failure in the event of a grounding on a soft channel bottom, and require modifications if necessary.
(Class II, Priority Action) (M-85-96)

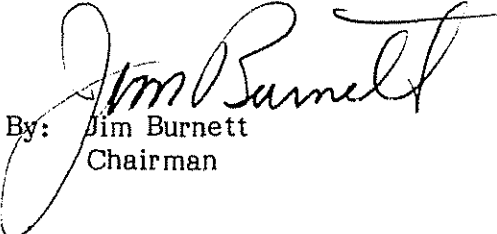
The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . . to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally 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 recommendation in this letter.

2/ Marine Board, Commission on Engineering and Technical Systems, National Research Council, "Criteria for the Depths of Dredged Navigational Channels," 1983.

3/ ALVENUS Structural Calculations Report, dated November 19, 1984.

4/ Technical Report by Lucius Pitkin, Inc., New York City, dated April 18, 1985.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member,
concurred in this recommendation.


By: Jim Burnett
Chairman