

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: October 1, 1980

Forwarded to:

Rear Admiral Herbert R. Lippold  
Director, National Ocean Survey  
National Oceanic and Atmospheric  
Administration  
6001 Executive Boulevard  
Rockville, Maryland 10852

SAFETY RECOMMENDATION(S)

M-80-89

About 2140 e.s.t., on November 22, 1979, while approaching Silver Bay, Minnesota, the U.S. Great Lakes bulk cargo vessel SS FRONTENAC ran aground during a heavy snow squall on shoals extending from Pellet Island. The use of the vessel's engine, rudder, and bow thruster to free the vessel was insufficient to overcome the effects of the wind and sea. Wind and sea actions held the vessel on the shoals and eventually caused the vessel to swing around to the left while pivoting near the midship section of the hull. The vessel sustained heavy damage to the underwater hull and keel. The No. 3 cargo hold was punctured, resulting in flooding of the hold, with some progressive flooding into the No. 2 cargo hold and heavy flooding into the No. 4 cargo hold. The FRONTENAC was declared a constructive total loss since the estimated repair cost exceeded the value of the vessel. <sup>1/</sup>

About 1945, the vessel was approximately 15 miles northeast of Silver Bay. Visibility was good, the wind was northeasterly at about 20 to 25 mph, and the seas were 6 to 8 feet. The vessel was riding easily with the following wind and seas; however, the master was concerned that the vessel might roll heavily when the vessel entered Silver Bay.

To assess the sea and wind conditions in the immediate vicinity of the entrance to Silver Bay, the master passed the harbor entrance. About 2045, while passing the entrance, the visibility was good and many of the harbor lights, especially the red and green lighted buoys marking the harbor entrance, could be seen clearly. The green navigation light on Pellet Island and the red navigation light on Beaver Island were not observed, but since they were of substantially less intensity than the lights on the buoys, the master did not expect to see them at his distance of about 1 1/2 miles out.

After observing the conditions at the harbor, the master brought the vessel approximately 3 miles south-southwest of Silver Bay. He then reversed the course to return to the Silver Bay entrance and headed for a point 1/2 mile from Pellet Island. Sometime after the turn, the master reduced the vessel's speed to slow ahead. Since

<sup>1/</sup> For more detailed information, read "Marine Accident Report--Grounding of the SS FRONTENAC in Lake Superior, Silver Bay, Minnesota, November 22, 1979" (NTSB-MAR-80-13).

the vessel was now taking the wind and sea on her starboard bow, the master estimated that speed made good was about 3 mph. He continuously took ranges of the shore off the vessel's port beam and ranges and bearings of the Pellet Island land mass to determine the vessel's position and to gage its progress toward the 1/2 mile distance from Pellet Island.

Somewhere along the 3-mile return track to Silver Bay, snow began to fall lightly. Snow had been forecast and was a common occurrence in this area at this time of year; hence, it was not unexpected, nor was it a cause for alarm to the master. The snow did not appreciably hinder the master's ability to see the lights on shore, which he had been using to gage the vessel's forward progress, or his ability to see Pellet Island using the vessel's searchlight.

By the time the FRONTENAC had arrived about 1 mile from Pellet Island, the master felt that he could maneuver closer to the island than the 1/2-mile distance off for which he had been maneuvering. Accordingly, he ordered various courses that would allow the vessel to pass about 0.2 mile from the island. When the vessel was approximately 1,000 feet southeast of Pellet Island, there was a slight increase in wind velocity and a heavy snow squall abruptly caused Pellet Island and all lights on shore to be obscured. Moreover, the heavy snow return masked the radar screen in the vicinity of Pellet Island and the shore. The master estimated that his heading and speed were adequate to pass Pellet Island, probably at a ship length or greater distance off the island, and that there was time to wait and assess the conditions and decide whether to continue on into the harbor or turn and return to the Lake. His estimate of the vessel's position was based upon visual observation of the radar, followed by noting his approximate position on the chart with the aid of a set of dividers. However, the master did not plot any positions or course lines or record any times to confirm his estimates. His estimate of the effects of wind and seas was either not accurate or not appropriate to the conditions encountered closer to the harbor entrance, and after 5 or more minutes in the heavy snow squall, without a determination of the FRONTENAC's position, the vessel grounded on the shoals around Pellet Island.

The Safety Board recognizes that the estimate of the effects of currents could have been greatly improved through plotting the vessel's track as it approached Silver Bay. Also, 33 CFR 164, Navigation Safety Regulations, require that the vessel's fixes be plotted on a chart. The only chart available to the mariner for such a plot into Silver Bay is National Oceanic and Atmospheric Administration (NOAA) Chart No. 14967, and this chart is not designed for plotting an approach course into the harbor. The chart scale is 1:120,000, which is appropriate for navigating near the harbor, but it does not show sufficient detail for the final approach course into the harbor. At this scale, Silver Bay appears as a small 1/2-inch excursion in the coastline. The scale is inadequate to depict the true shape of the harbor or even to show the buoys at the harbor entrance. At this scale, the nearest charted sounding to Pellet Island, the site of the grounding, is nearly 1 mile away.

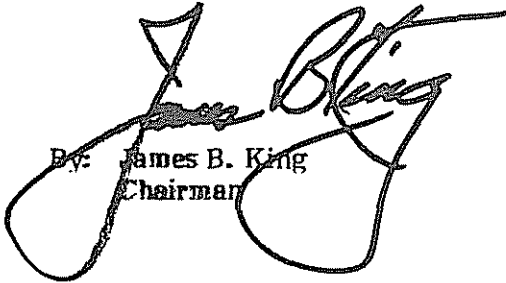
The inset chart of Silver Bay at the top of NOAA Chart No. 14967 is scaled at 1:10,000 and provides a detailed presentation of the harbor and navigation aids. However, this inset does not include enough of the approaches to the harbor. A vessel making a direct approach to the harbor from an easterly or southeasterly direction, near the track recommended by the Lake Carriers Association, would not be on this chart until it was less than 1/2 mile from the buoys marking the harbor entrance. The lack of approach data including the shoreline adjacent to the harbor, navigation aids, and charted soundings greatly limits the usefulness of the inset chart for piloting or radar navigation by a vessel approaching the harbor, especially during conditions of reduced visibility. A course line could be drawn to the harbor entrance but only the navigation aids and objects appearing

within the small inset chart could be used to fix the vessel's position. Furthermore, the lack of approach information on the inset chart resulted in virtually no sounding data being available south of Pellet Island along the FRONTENAC's intended track.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the National Ocean Survey, National Oceanic and Atmospheric Administration (NOAA):

Modify the large scale inset charts of all prominent harbors, such as Silver Bay shown on NOAA Chart No. 14967, by including approaches extending at least 1 mile from the harbor entrance.  
(Class II, Priority Action) (M-80-89)

KING, Chairman, GOLDMAN, and BURSLEY, Members, concurred in this recommendation. DRIVER, Vice Chairman, and McADAMS, Member, did not participate.

  
By: James B. King  
Chairman