

Log M-194

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: MAY 14 1982

Forwarded to:

Captain N. H. Tracy  
General Manager  
Washington State Ferries  
Seattle Harbor Ferry Terminal, Pier 52  
Seattle, Washington 98104

SAFETY RECOMMENDATION(S)

M-82-24 through -31

At 1435 P.s.t., on January 13, 1981, the Washington State Ferries' (WSF) M/V KLAHOWYA, en route to pier 52, Seattle, Washington, and the outbound Liberian-flag freighter M/V SANKO GRAIN collided in dense fog in Elliott Bay, Puget Sound. There were no injuries to the ferry's passengers or the vessels' crews. The vessels sustained minor damage, estimated at a total of \$117,000, and both were able to continue operation. <sup>1/</sup>

At the time of the accident, the KLAHOWYA was operating on a temporarily scheduled ferry service between the Seattle Harbor Ferry Terminal (pier 52), Vashon Island, and Southworth in the Puget Sound. This temporary service was established after the Fauntleroy terminal ferry slip was damaged by a ferry on December 29, 1980. The KLAHOWYA departed Vashon at 1359, about 4 minutes late on its published schedule, with an undetermined number of vehicles and passengers, for pier 52, Seattle. There was a dense fog, and visibility at Vashon was about 1/4 nmi. The KLAHOWYA's pilot made a required movement report to the Puget Sound Vessel Traffic Center (VTC) at 1402, and he was advised by the VTC about vessel traffic along his route toward Seattle.

After clearing the slip, the pilot rang up full speed ahead (14 knots, according to the pilot) on the engine order telegraph (EOT) and then set the EOT on standby because of the fog. The pilot said that he did not consider 14 knots to be an excessive speed, considering the ferry's stopping capability, if no contacts were detected on radar, reported visually, or heard, and if the visibility was no less than an eighth of a mile.

The KLAHOWYA was equipped with two magnetic steering compasses, neither of which had been corrected since 1969. It had two radar sets, one in each pilothouse, which presented unstabilized, heading-upward, displays on the radarscopes. Neither radar set was suitable for rapid radar plotting on the radarscope, and the ferry's bridgewatch was not using rapid radar plotting sheets. The pilothouses had chart tables and navigation charts, but the charts were not in use. While en route to Seattle, the pilot was at the conn, and he assigned the mate to monitor the radarscope. The pilot occasionally switched positions with the mate to look at the radarscope, check the mate's observations, and observe the ferry's navigational progress.

<sup>1/</sup> For more detailed information, read Marine Accident Report—"Collision of the Washington State Ferry M/V KLAHOWYA and the Liberian Freighter SANKO GRAIN in Seattle Harbor, Washington, January 13, 1981" (NTSB-MAR-82-4).

After passing Alki Point, the KLAHOWYA crossed ahead of the ferry QUINAULT after exchanging a passing agreement on channel 79. While the KLAHOWYA was using channel 79 for maneuvering communications with the QUINAULT, it was unresponsive to the ferry SPOKANE, which was attempting to establish contact on channels 14 and 13, and was also unresponsive to the VTC efforts on channel 14.

The VTC was using electronically imposed radarscope "leadlines" to monitor ferry routes. The VTC watchstander observed that after the KLAHOWYA passed Alki Point, the ferry traveled considerably north of the normal Vashon ferries' leadline, almost into the leadline of the Winslow ferry route, before it changed course eastward toward Duwamish Head. The KLAHOWYA was about 1 nmi north of Alki Point when the pilot directed the mate to keep the ferry's course 1/2 nmi north of Duwamish Head.

While approaching Duwamish Head, the mate informed the pilot that there were "a lot of targets" on the radarscope. The pilot exchanged positions with the mate and briefly looked at the radarscope. He set the radar cursor on a contact at a relative bearing of 026° and then told the mate to "keep it on that bearing," referring to the radar cursor. Neither the pilot nor the mate recalled the radar range (distance) of the contact.

At 1432, the KLAHOWYA was abeam of Duwamish Head and passed at least 1/2 mile off, but neither the pilot nor the mate were sure about the exact distance. The mate changed the radar from the 6-mile range radar scale to the 1 1/2-mile and 3/4-mile range to get a larger picture of the harbor area while the ferry was off Duwamish Head. The mate then reported to the pilot that the radar contact at 026° had been on a closing steady bearing for over 2 miles. The pilot, after viewing the radarscope, ordered the helmsman to change course 5° to the left so that he could get "better [radar] resolution in the harbor." The pilot said that he did not see any vessel moving from the Elliott Bay anchorages, and he was not sure which vessel in the anchorage area was the SANKO GRAIN. The helmsman said that when he got the 5° left course change order, the ferry was then heading 055° rather than 060°, so he steadied on a compass course of 050°.

A Puget Sound pilot boarded the SANKO GRAIN at 1300 to deliver it to Port Angeles, Washington, and then Victoria, Canada. After boarding, the pilot checked both of the bridge radar sets, which he said were working properly. He discussed the fog with the master, and neither had any qualms about getting underway. They estimated that the visibility was varying from 200 yards to 1 nmi.

The pilot, taking control of the vessel's movements, set the EOT on standby at 1410. At 1415, the pilot radiotelephoned the VTC on channel 14 to report that the SANKO GRAIN would be departing the Elliott Bay East anchorage for Port Angeles, and that he would advise when the vessel was clear of the anchorage. The VTC acknowledged the pilot's call. At 1417, the VTC advised the ferries KITSAP and KLAHOWYA of the SANKO GRAIN's pending departure from its anchorage. At 1423, the pilot ordered slow ahead (6.2 knots) on the EOT. The anchor was aweigh, the navigation lights were turned on, and the vessel began sounding fog signals automatically by 1425. A half-minute later, the pilot directed the helmsman to steer 300° by gyrocompass, and he ordered half ahead (8.9 knots) on the EOT.

As the SANKO GRAIN left the anchorage, the master was on the navigation bridge, the third mate was operating the EOT and maintaining the bellbook, and the second mate was plotting the vessel's movements on the chart. An experienced seaman was at the helm, and an ordinary seaman was posted as a lookout on the portside bridgewing. The boatswain was stationed on the bow with another seaman, both serving as lookouts. The pilot said that he positioned himself at the radar, as was his practice when conning in thick fog, and that the radar set was adjusted to the 6-mile range scale.

At 1427, the pilot attempted to call the VTC on channel 14 but he experienced difficulty receiving. He established contact at 1430 and reported that the SANKO GRAIN had just departed its anchorage and was proceeding "at a speed of 9 knots for Port Angeles 2000". At 1431, the VTC advised the SANKO GRAIN that "The HYAK will be westbound shortly from Pier 52, the KLAHOWYA is off Duwamish Head, eastbound, followed by the SPOKANE eastbound." The SANKO GRAIN's pilot acknowledged receipt of the VTC message. The pilot and master both observed, on radar, that a contact off Duwamish Head was on a steady radar bearing and proceeding on a course which would cross the SANKO GRAIN's intended track. The radar contact was the KLAHOWYA.

At 1433, the SANKO GRAIN's pilot radiotelephoned the "eastbound vessel off Duwamish Head" on channel 13. The KLAHOWYA's pilot immediately answered, "this is the ferry KLAHOWYA. We're eastbound off Duwamish into pier 52. Over." The SANKO GRAIN's pilot then informed the KLAHOWYA's pilot that, "We observe you less than 1 mile away, you're crossing our bow, we are outbound." When the KLAHOWYA had closed to 1/2 mile, the SANKO GRAIN's pilot realized that the vessels were on collision courses because the KLAHOWYA was closing on a steady relative radar-cursor bearing of 30° on the port bow. The SANKO GRAIN's pilot stopped the SANKO GRAIN's engine at 1434. At 1434, the KLAHOWYA's pilot responded, "We hold you on our starboard bow. We will come hard right and make it port to port. Over." There was no VTC radiotransmission tape evidence of a direct response from the SANKO GRAIN's pilot to the KLAHOWYA's transmission, but seconds later, the SANKO GRAIN broadcast on channel 13 that, "We are in stop position now, maintaining a course of 300°. There is a vessel coming across our bow one-half mile away."

At 1434, the SANKO GRAIN, with its engine stopped, was moving forward through the water on its 300° gyrocompass course and, aboard the KLAHOWYA, the pilot ordered the helmsman to "come right." The helmsman said that he applied about 10° right rudder until he was ordered to use hard right rudder, which he applied immediately. The helmsman said that the KLAHOWYA's heading had changed between 50° and 60° to starboard when the mate jumped to the EOT and ordered stop and then full astern on the engines. At the same moment, the KLAHOWYA's pilot broadcast on channel 13, "we're backing full." The KLAHOWYA's engineroom logbook showed that the engines were put full astern at 1436.

About 1435, the SANKO GRAIN's pilot saw the KLAHOWYA and immediately ordered the freighter's engine to full astern. The KLAHOWYA and the SANKO GRAIN had their engines backing full astern when they collided at 1435. The SANKO GRAIN's pilot immediately notified the VTC over channel 14 that the "SANKO GRAIN has just had a collision with the KLAHOWYA." He stopped the freighter's engine at 1436. The KLAHOWYA struck the SANKO GRAIN's port bow at a collision angle of 35° to 40°. The impact of the collision was described as light.

In its analysis of the accident, the Safety Board determined that because a navigation chart of the area was not in use, neither the pilot nor mate could readily check the KLAHOWYA's geographic position and, because they were not plotting radar contacts, they could not evaluate the effect of their vessel's movements relative to those of the SANKO GRAIN. The ferry's pilot was conning, making intermittent brief radar observations and using those observations to mentally assess his vessel's movements, all while proceeding at full speed in dense fog.

The Safety Board believes that the KLAHOWYA's pilot used excessive speed in the dense fog. If he had slowed the ferry when the risk of collision became apparent, he would have had more time to evaluate radar contacts, plot them as necessary, and take proper maneuvering action. Because both the pilot and mate shared the same radar set, neither was able to use it effectively. Consequently, the KLAHOWYA was allowed to reach a close-quarters situation without either the pilot or mate being fully aware of their predicament.

The Safety Board also concluded that the ferry scheduling was too short for the KLAHOWYA's cruising speed. Attempting to maintain such a tight schedule day or night in dense fog is not a safe practice. Considering the frequency and persistence of fog when it does occur in the Puget Sound area, the Safety Board believes that the WSF should consider alternative ferry scheduling allowing greater time latitude during periods of restricted visibility.

After the Fauntleroy terminal was damaged and it became necessary to use pier 52 as a terminal, the ferries assigned to this service used the most direct water route past Alki Point and Duwamish Head to pier 52. The temporary ferry route, however, cut obliquely across the established Vessel Traffic Service's traffic separation scheme (TSS) for the Puget Sound waterway, contrary to the TSS rules. The Safety Board believes that although the KLAHOWYA's failure to observe TSS routing did not contribute to this accident, the failure to do so reduced the effectiveness of the TSS and, consequently, the safety of the system.

The Safety Board noted that none of the Puget Sound navigation charts show any portion of the extensive ferry routing system, despite the large number of ferries employed and the high volume of automobile and passenger traffic. The Safety Board believes that because of the potential for a significant loss of life in the event of an accident, pilots of vessels crossing or proceeding along ferry routes should observe more caution near ferries and, conversely, ferry pilots should use more caution near large, less maneuverable vessels. The Safety Board has recommended that all regularly established ferry routes should be conspicuously illustrated on navigation charts with special graphic emphasis, and include a special precautionary note. The subject of ferry crossings was discussed in the Safety Board's report of a ferry accident in 1976 on the Mississippi River, 2/ and in the Safety Board's recommendation M-79-36 to the Coast Guard.

Under the Port and Tanker Safety Act, the Coast Guard is authorized to control vessel traffic. The location of the anchorages south of the pier 52 ferry terminal creates a traffic condition wherein large inbound and outbound vessels frequently cross the ferry lanes. Because of scheduled frequency of ferries using pier 52, the probability of cross-traffic vessels meeting at the ferry lanes is high and can be reasonably expected to increase. The ferries are required to initiate a radiotelephone report to the VTC within 5 minutes of each departure from the terminal. Large vessels such as the SANKO GRAIN are not scheduled. Large vessels are less maneuverable than ferries and, after building up speed, they need considerable distance to stop or turn. Therefore, close-quarters crossing situations between ferries and large vessels should be avoided. Consequently, it would be safer for the Coast Guard to control the flow of vessel traffic when large vessels are maneuvering in the proximity of the ferry lanes in Elliott Bay during periods of restricted visibility. In this instance, the more maneuverable KLAHOWYA could have been directed by the VTC to hold position en route until the SANKO GRAIN had crossed clear of the ferry traffic lanes.

2/ Marine Accident Report—"Ferry M/V GEORGE PRINCE Collision with the Tanker SS FROSTA (Norwegian) on the Mississippi River, Luling/Destrehan, Louisiana, October 20, 1976" (NTSB-MAR-79-4).

The VTC personnel stated that close vessel passing situations are not uncommon in Elliott Bay and that vessel radar contacts frequently merged on the radarscope even though vessels were passing as far as 400 yards apart. Consequently, the radar watchstanders did not become concerned as the close-quarters crossing situation of the KLAHOWYA-SANKO GRAIN developed on the radarscope.

The electronically imposed radarscope "leadlines" used by the VTC to identify the courses normally followed by the ferries on the several ferry routes serving pier 52 simplified VTC radar monitoring of the ferry movements. Leadlines can be used to delineate two-way directional vessel traffic flow, and could serve as extensions of the Puget Sound TSS to define inbound and outbound ferry movements. If the leadlines were tailored to the regular ferry routes and the routes were permanently plotted on navigation charts so that the ferry pilots could follow such established routing, traffic safety would be improved.

The Safety Board believes that the WSF and the Coast Guard should establish prescribed ferry routing, that VTC leadlines should be developed for such routing and also plotted on ferry navigation charts, and that the WSF should require its pilots to operate their vessels in conformance with such routing. The Safety Board believes that if these procedures were adopted, the VTS could improve coordination with pilots and also improve traffic flow control.

When the KLAHOWYA and the QUINAULT were maneuvering in the crossing situation off Alki Point, their radio communications concerning maneuvering were being transmitted on channel 79. While the KLAHOWYA and the QUINAULT were exchanging radio communications on channel 79, the SPOKANE was attempting on channel 14 to contact an unidentified northbound vessel off Alki Point, and requesting the vessel to switch to channel 13. If the KLAHOWYA and the QUINAULT had used channel 13 for their maneuvering communications, the SPOKANE's pilot should have been able to identify the vessel it was calling as the KLAHOWYA. Evidently the ferries' bridgewatches had problems with monitoring three radiotelephone channels in the pilothouse, and there was improper use of designated navigation and commercial frequencies.

The Safety Board notes that radio communications has been a critical safety factor in most of the marine collision accidents it has investigated. Problems with radiotelephone communications have been more frequently related to improper or inefficient use, rather than malfunctioning, of the equipment. Because of the increasing use of the radiotelephone, it is becoming more important that designated radio channels be used for their intended purpose, that proper calling procedures be employed in a standard format, and that communications be as limited, clear, and concise as possible. The Safety Board believes that more attention should be given to the indoctrination, training, and examination of mariners required to use radiotelephone equipment for communications.

The Navigation Safety Regulations, 33 CFR Part 164, specify the charts, publications, and equipment to be carried and used for safe navigation, and the procedures to be observed by masters or persons in charge of selfpropelled vessels of 1,600 gross tons or more when operating in U.S. navigable waters. These regulations are applicable to several of the WSF ferries, but the Coast Guard has authorized several deviations concerning 33 CFR 164.11, 164.35(d), and 164.41 for those ferries. The KLAHOWYA, because it was less than 1,600 gross tons, was not required to comply with these regulations in any respect. Yet, the KLAHOWYA was providing essentially the same service as the larger ferries, and it could be used on any of the several scheduled ferry routes without being subject to the additional requirements.

The Safety Board believes that regulations should provide ferry passengers the equivalent degree of safety regardless of the vessel's gross tonnage. Beyond that, it seems inconsistent to allow U.S. passenger ferries deviations from safety regulations that are imposed on foreign-flag vessels which carry no passengers. Although the Safety Board generally concurs with the Coast Guard that regulation deviations may be appropriate for ferries on limited routes when compliance may involve onerous or unnecessary burdens, such deviations must be carefully weighed to insure that passenger safety is not diminished.

Considering the availability of highly accurate navigation and collision avoidance equipment, the Safety Board believes that more accurate, advanced navigation equipment should be required by the Coast Guard not only aboard WSF ferries, but on all ferries that carry passengers for hire on U.S. navigable waters. The equipment carried should, at a minimum, include a gyrocompass and, in the case of ferries operating in areas where reduced visibility is common, a stabilized radar which provides a more accurate collision-avoidance capability. Shipboard navigation equipment should be routinely checked and maintained by vessel officers insofar as they are qualified to do so, and the WSF should insure through regular inspections that discrepancies beyond the capability of a vessel's crew are promptly corrected through shoreside support.

The KLAHOWYA was certified to carry 1,140 passengers but there was no count made of the actual number of passengers aboard at the time of the accident. Many ferry passengers normally stay in their vehicles while en route; in this instance, it is not known how many did so. The Safety Board suggests that passengers should be dissuaded from remaining in their vehicles en route if other ferry accommodations are adequate because of the possibility that they will be trapped in the event of an accident.

The ferry's passengers received no warning that a collision was about to occur. The KLAHOWYA did not have a public address system with which to alert the passengers to don lifejackets or otherwise prepare for the collision. Although the ferry crews are regularly exercised in various emergency drills, the commuting passengers are not involved in such drills. The small crew of the KLAHOWYA would undoubtedly have had considerable difficulty in instructing and assisting passengers at the last moment in obtaining and donning lifejackets if the collision had been more serious and the launching of lifeboats had been required. Because of the large number of passengers and few crewmembers on ferries, and the probability that time may be critical in an emergency, passengers should be given the earliest possible warning to prepare for an emergency.

The Safety Board believes that, despite the impressive WSF safety record to date, realistic contingency plans that consider various environmental conditions and ferry crew limitations regarding passenger assistance should be developed. Additionally, consideration should be given to informing passengers by such means as posters, placards, and models at ferry terminals so that passengers may become more aware of ferry safety features, equipment, emergency signals, emergency procedures, and survival precautions which they can take.

Therefore, the National Transportation Safety Board recommends that the Washington State Ferries:

Require ferry pilots to have area navigation charts on the chart desk ready for immediate use while underway. (Class II, Priority Action)  
(M-82-24)

Develop and provide the U.S. Coast Guard with ferry routing information to be used for inclusion on Puget Sound navigation charts and for Vessel Traffic Service radar leadline development, and require ferry pilots to conform to such ferry routes except when it becomes unsafe to do so. (Class II, Priority Action) (M-82-25)

Develop ferry maneuvering information, as described under 33 CFR 164.35(g), and have such information posted in the ferry pilothouses for pilot use. (Class II, Priority Action) (M-82-26)

Establish a program for making periodic magnetic compass adjustments and require that ferry pilots regularly make and record compass observations so as to detect changes in deviations. (Class II, Priority Action) (M-82-27)


Provide ferries that are not equipped with radarscopes having direct plotting capability with rapid radar plotting sheets, conveniently mounted so that they can be readily used, day or night; and require that the bridgewatch regularly use this means for plotting the relative movement of closing radar contacts. (Class II, Priority Action) (M-82-28)

Require that ferry bridgewatch personnel, who regularly use radiotelephone equipment, observe proper vessel identification and communications procedures and also include course and speed information when exchanging communications with other vessels during close maneuvering encounters. (Class II, Priority Action) (M-82-29)

Review schedules on ferry routes and consider the feasibility of instituting special schedules that allow for reduced speeds during periods of restricted visibility. (Class II, Priority Action) (M-82-30)

Establish a program to inform ferry passengers of the action they should take in various types of emergencies, and make the information readily available by suitable means at ferry terminals and onboard the ferries. (Class II, Priority Action) (M-82-31)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations. McADAMS, Member, did not participate.

  
By: Jim Burnett  
Chairman