July 9, 2024 MIR-24-16

Grounding of the Bulk Carrier *American Mariner*

On January 7, 2023, about 0734 local time, the bulk carrier *American Mariner* had begun transiting outbound in the Vidal Shoals Channel, near Sault Ste. Marie, Ontario, en route to Superior, Wisconsin, when the vessel grounded and sustained damage to three ballast water tanks (see figure 1 and figure 2).[1] No pollution or injuries were reported. Damage to the vessel was $600,000.

Figure 1. *American Mariner* underway at unknown date before the grounding. (Source: US Coast Guard)

[1] (a) In this report, all times are eastern standard time, and all miles are statute (0.87 nautical mile). (b) Visit ntsb.gov to find additional information in the public docket for this NTSB investigation (case no. DCA23FM013). Use the CAROL Query to search investigations.

Casualty Summary	
Casualty type	Grounding/Stranding
Location	St. Marys River, Sault Ste. Marie, Ontario 46°30.33'N, 084°23.20'W
Date	January 7, 2023
Time	0734 eastern standard time (coordinated universal time –5 hrs)
Persons on board	19
Injuries	0
Property damage	$600,000
Environmental damage	None
Weather	Visibility 10 mi, overcast, winds northeast 7 kts, seas calm, air temperature 17°F, water temperature 35°F, civil twilight 0746, sunrise 0812
Waterway information	Channel, width 475 ft, depth 24 ft

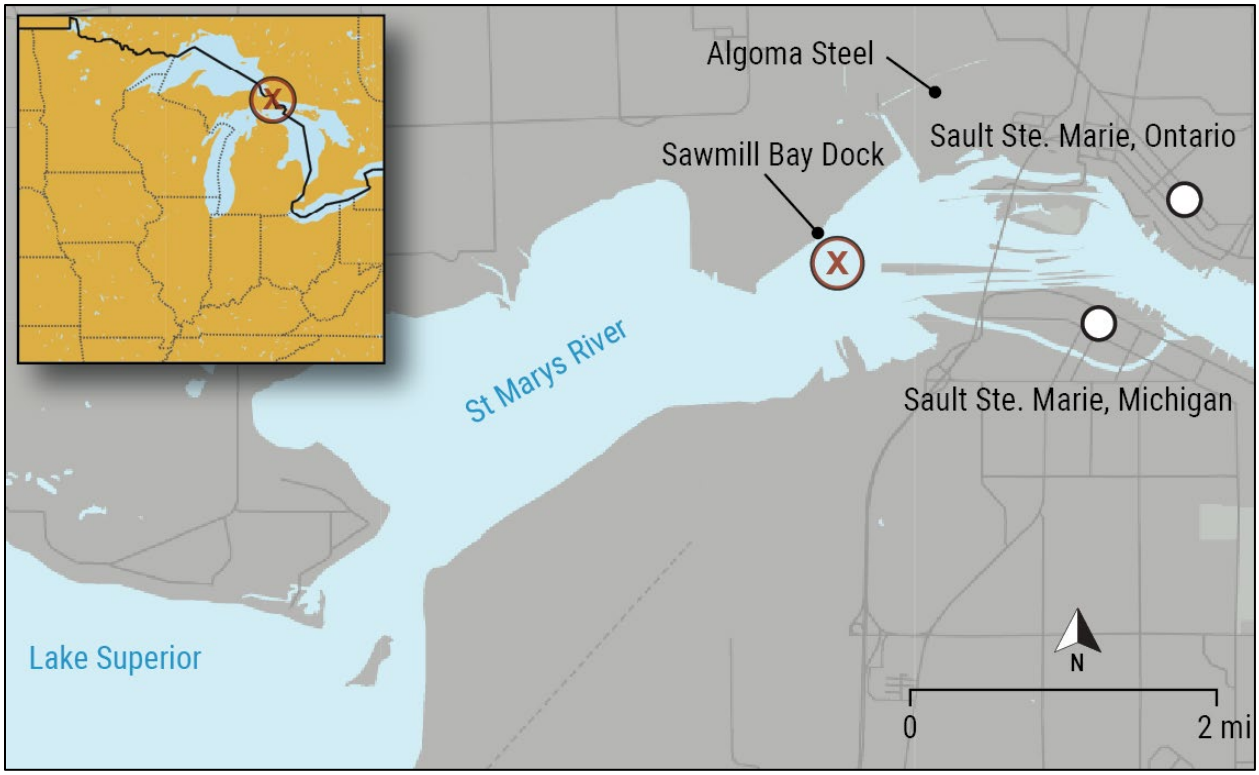

Figure 2. Area where the *American Mariner* grounded, as indicated by a circled *X*. (Background source: Google Maps)

1 Factual Information

1.1 Background

The 715-foot-long *American Mariner* was a steel-hulled bulk carrier constructed in 1980 by Bay Shipbuilding Company in Sturgeon Bay, Wisconsin, as the *Chicago* (the vessel was renamed before being launched). The ship was owned by American Steamship Company and operated by Grand River Navigation Inc. in the Great Lakes bulk trade. The vessel had 7 centerline cargo holds with 14 ballast water tanks outboard (port (P) and starboard (S)) adjacent to them (see figure 4).

The 1.5-mile-long Vidal Shoals Channel is the approach to St. Marys Falls, Ontario, Canada. The channel has a maintained depth of 24 feet (7.3 meters), a width of about 480 feet, and lies entirely in Canadian waters. Shoal waters, including Vidal Shoals, are located immediately outside the buoyed channel. The channel opens to a turning basin where the Algoma Steel Corporations Ltd. work boat facility is located. For the winter, the Canadian Coast Guard replaces the channel buoys with unlit ice spar buoys, which are used to replace conventional buoys when they may be endangered by ice; at the time of the casualty, the Canadian Coast Guard had replaced the channel buoys with unlit ice spar buoys.

1.2 Event Sequence

On January 4, about 2000, the *American Mariner* left Ashtabula, Ohio, on Lake Erie with 19 crew aboard, en route to the Algoma Steel facility at Sault Ste. Marie, Ontario. Two days later, at 1910 on January 6, the vessel arrived at the locks at Sault Ste. Marie. The vessel deballasted before entering the locks in order to arrive at Algoma as light as possible.

At 2224, the ship arrived at the Algoma Steel Sawmill Bay Dock, just south of the Algoma Steel facility along St Marys River. The master planned to enter the Vidal Shoals Channel downbound on departure, so, about 2300, he passed the facility and turned the vessel around north of Vidal Shoals before mooring the vessel starboard side to the dock. (The area offshore of the quay had been filled in with unintended overspill of cargo from loading and discharging operations over many years, so ships could not moor alongside—the captain estimated that the vessel was 48–60 feet off the dock throughout the offload.) At 2349, the crew started discharging cargo. The master instructed the crew to use only light ballast, and then retired for the evening.

At 0615 the next morning, 45 minutes prior to departure, depths in the channel were at 25 feet, 3 inches. At 0645, an able seaman woke the master. About 0652, the crew finished the cargo unloading. On departure, the master ordered the

engine room crew to add the normal ballast (15 feet) to the nos. 7P and 7S tanks, understanding that the ship would be clear of the channel before ballasting would be completed.[2] The *American Mariner* sailed at 0720 with drafts at 15 feet, 11 inches forward and 19 feet, 10 inches aft.

The first mate, who was on watch, was stationed on deck to supervise the unmooring and work boat operations. Three crewmembers went ashore by boat to cast off the mooring lines. The bosun and able seaman on watch were on the stern to handle lines with the mate. While the crew retrieved the work boat, the master proceeded to maneuver the vessel off the dock. According to the master, he expected current in the channel beginning at the north side (red) buoy (QM14), so he entered the channel with the bow thruster still on, traveling at 4 knots. He then turned the ship to starboard into the channel (see figure 3).

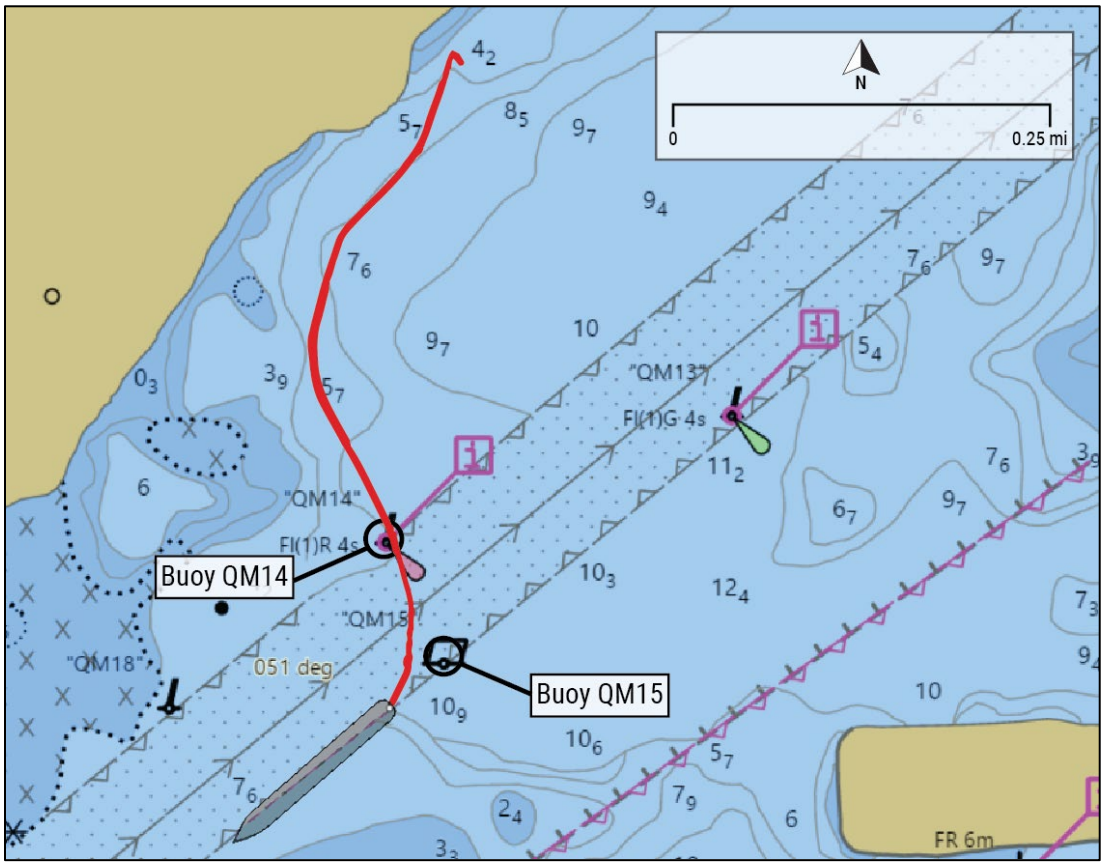

Figure 3. *American Mariner*'s AIS path after it left the facility, in relation to the buoys, channel, and shoal water (final vessel position shown is at 0730:55). Soundings are in meters; shoal water is indicated with darker blue. (Background sources: Made Smart and NOAA)

[2] All ballast tank levels in this report are *innages*, or the height of the surface of the ballast water from the bottom of the ballast tank.

As the master straightened the vessel to head outbound, he felt a "light shudder." He noted the fathometer read 13 feet (beneath the keel). The master had received reports of ice in the channel, which was common in this area during the winter, but he did not note any ice in the channel at the time. The first mate, on the stairs inside to the upper engine room, felt "a bump similar to coming up, up against a dock." Returning to the main deck and making his way to the stern, he noticed "stirred up mud and a little rock debris" in the water. He then went to the bridge and reported to the master that he had heard "a loud screeching noise" and thought the ship might have contacted a buoy. When the master trained a searchlight on the south side (green) buoy (QM15), he saw it was past and clear on the port quarter.

Meanwhile, the second assistant engineer was close to finishing ballasting the ship, loading nos. 7 and 8. At 0730, the first assistant relieved the second assistant engineer and noticed that tank no. 6S had 25 feet, but tank no. 6P only had 20 feet of water. The engineers attempted pumping water into no. 6P, but the water level did not increase. They then attempted to pump out tank no. 6P but could not drop the water level past 16 feet. They told investigators that they believed this indicated that the no. 6P tank was damaged (in effect, the tank was breached and communicating freely with the lake water).

After confirming that there was no other flooding in the vessel, the master reported to the vice president of operations at the operating company that the vessel had lost ballast water, and the ship proceeded to Fraser Shipyards, in Superior, Wisconsin, arriving on January 10, at 0118. The company and crew were not aware of the extent of the damage until the ship reached drydock.

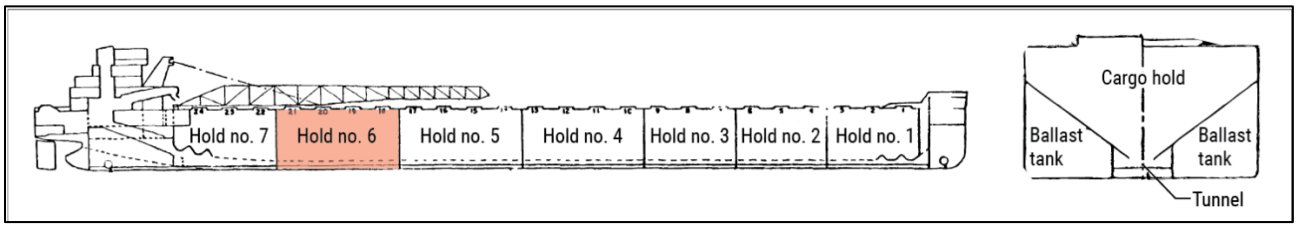

Figure 4. (*Left to right*) Inboard profile drawing of *American Mariner*. Section drawing of *American Mariner* showing the ballast tanks in relation to the cargo tanks, void, and fore and aft tunnel. The no. 6P tank, where the engineers detected flooding, is highlighted. (Background source: Grand River Navigation)

1.3 Additional Information

1.3.1 Damage

The *American Mariner* had an 80-foot-long hull indentation and holes in ballast tanks nos. 5P, 6P, and 7P at the bilge chine and in the outboard bottom plating (see figure 5). Repairs were completed during the winter lay-up and cost $600,000.

Figure 5. Damage to the port water ballast tanks. (Source: Coast Guard)

1.3.2 Personnel

The master had 12 years of industry experience and held a merchant mariner credential endorsed as Master, any gross tons, and first-class pilot. He had sailed as master for about two years, and he told investigators that he had maneuvered off this dock 10 to 15 times.

1.3.3 Navigation and Prior Port Calls

American Mariner was outfitted with a RosePoint electronic chart system (ECS) (see figure 6). The ECS was not configured to display the footprint of the vessel, according to the master, and safety depths were not programmed into the ECS.

Figure 6**.** *American Mariner*'s bridge and centerline conning station. (Source: Coast Guard)

The NTSB reviewed the *American Mariner*'s other port calls at Algoma in 2022 and 2023. In 2022, the *American Mariner* called on the Sawmill Bay Dock three times. In January 2022, the ship turned around and proceeded farther up the channel to the Algoma Steel dock. In September 2022, the ship moved astern about a ship's length when leaving the berth, giving the ship room to enter the channel outbound at a shallow angle and allowing for a safe passage in the center of the channel. In November 2022, *American Mariner* came ahead from the berth, turned to port, and entered the channel at a steep angle but clear and north of the red QM14 buoy, leaving room to straighten out and navigate the center of the channel (see figure 7).

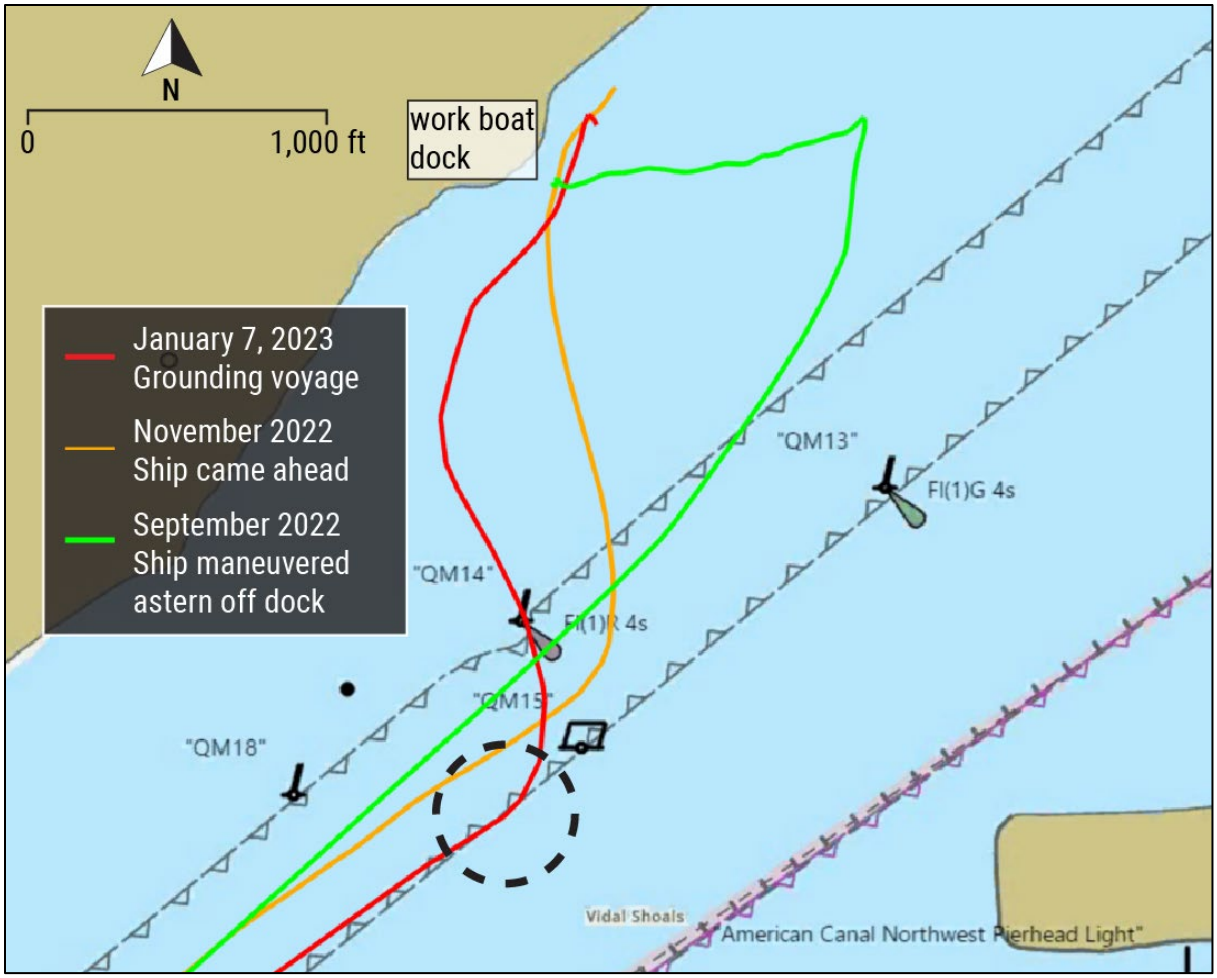

Figure 7. AIS tracklines of the *American Mariner* navigating into the channel from the facility. The area where the vessel's course took it near the edge of the channel is circled with dashes. (Source: Made Smart)

Following the grounding in 2023, the *American Mariner* called on the Sawmill Bay Dock three times; in all those cases, the ship maneuvered astern first when leaving.

2 Analysis

On January 7, before dawn, the bulk carrier *American Mariner* grounded after departing the Algoma Sawmill Bay Dock near Sault Ste. Marie, Ontario, and maneuvering into the Vidal Shoals Channel. The ship proceeded to a shipyard in Superior, Wisconsin, arriving on January 10.

Crewmembers reported a sound and "shudder" while the master was maneuvering the vessel into the Vidal Shoals Channel; they then discovered that one of the vessel's ballast tanks appeared to be communicating with the lake, and therefore was likely damaged. Although the master stated the ship was in the channel, the shoals were located immediately outside the buoyed channel and the AIS data from that time showed the vessel on the far (southeast) side of the channel. After the vessel was drydocked, damage to three ballast tanks at the bilge chine along the port side was found—including breaches of the hull to hold no. 6. Given the crew reports, damage to the port chine and bottom plating, and the vessel's position at the southeast edge of the channel, the *American Mariner* grounded on Vidal Shoals at the edge of the channel.

When departing the Algoma Sawmill Bay Dock, the ship had to avoid shoal water south of the dock (marked by buoy QM14). The NTSB reviewed data for two years of port calls at the dock. Four of the seven times *American Mariner* left the facility, including all three times after the grounding, the vessel moved astern about a ship's length, where there was more room to maneuver, before coming ahead and entering the channel at a shallow angle and lining up on the centerline. On the casualty voyage, the master did not leave enough room between the ship and this shoal water, forcing a hard port turn once underway. The heading and position from that turn resulted in the ship entering the channel at a steep angle, which required a sharp turn to starboard to stay within the channel and avoid the shoals at the opposite side of the channel. Therefore, the master's initial angle of departure from the dock and close approach to the shoal water by buoy QM14 positioned the vessel at a poor angle to successfully maneuver into the channel, which resulted in the vessel overshooting the turn and grounding on the shoals on the opposite side of the channel.

At the time of the grounding, it was dark and the seasonal channel buoys were unlit, which would have made it more difficult for the master to see the channel. Rose Point ECS software, which the master was using to navigate, allows users to overlay the footprint of the vessel on the chart display. (Without this, the ship appears as a dot or small icon at the position of the GPS antenna or at an offset reference point.) According to the master, this vessel footprint overlay feature was not used. Additionally, the captain was alone on the bridge (there was no regulatory or

company requirement for additional bridge watchstanders), having to multi-task the navigation, steering, and lookout duties as the vessel departed the dock and attempted to enter the channel. Without additional personnel on the bridge, the master had to split his concentration between these tasks, which, in conjunction with the darkness, unlit buoys, and not using the ECS footprint feature, likely compromised his ability to successfully navigate the vessel into the channel.

3 Conclusions

3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the grounding of the bulk carrier *American Mariner* was the master maneuvering the vessel away from the dock and into the channel while alone on the bridge, which required him to multitask (navigation, steering, and lookout duties) and resulted in the vessel overshooting the turn into the channel and running aground on the shoals on the opposite side of the channel.

3.2 Lessons Learned

Determining Bridge Team Staffing

While maneuvering in confined waters, it is difficult for a single bridge crewmember to effectively drive, lookout, and monitor and use available bridge equipment. The composition of a bridge team may vary based on the complexity of the maneuver or operation being carried out. Typically, maneuvers like docking or undocking, transiting in or out of port, or operating in areas of high traffic density require additional personnel to handle navigation-related duties. Owners, operators, and vessel masters are responsible for ensuring that bridge teams are staffed with a sufficient number of certified/credentialed mariners who are familiar with all bridge navigation equipment and able to independently take immediate action. Additionally, the effective use of all available resources by a bridge team, including visual scanning, radars, electronic charts, and an automatic identification system, increases collective situational awareness and contributes to a safe navigation watch.

Vessel Particulars

Vessel	*American Mariner*
Type	Cargo, dry bulk
Owner/Operator	American Steamship Co./Grand River Navigation (Commercial)
Flag	United States
Port of registry	Wilmington, Delaware
Year built	1980
Official number (US)	619736
IMO number	7812567
Classification society	N/A
Length (overall)	714.8 ft (217.9 m)
Breadth (max.)	78.0 ft (23.8 m)
Draft (casualty)	19.8 ft (6.0 m)
Tonnage	15,396 GRT
Engine power; manufacturer	2 × 3,500 shp; EMD diesel engines

NTSB investigators worked closely with our counterparts from **Coast Guard Sector Sault Ste. Marie** (renamed Sector Northern Great Lakes in 2023) throughout this investigation.