



National Transportation Safety Board

Marine Accident Brief

Collision of Bulk Carrier *Mesabi Miner* and US Coast Guard Cutter *Hollyhock*

Accident no.	DCA14PM005
Vessels	<i>Mesabi Miner</i> and US Coast Guard cutter <i>Hollyhock</i>
Accident type	Collision
Location	Straits of Mackinac, Michigan 45° 51' N, 085° 15' W
Date, time	January 5, 2014 1042 eastern standard time (coordinated universal time – 5 hours)
Injuries	None
Damage	<i>Hollyhock</i> : est. \$244,145 <i>Mesabi Miner</i> : est. \$250,000
Environmental damage	No
Weather	Cloudy, good visibility at 9 miles, temperature 12°F, winds north-northwest 12 mph
Waterway information	Straits of Mackinac is a narrow waterway separating Michigan's upper and lower peninsulas and providing a vital shipping link between Lake Huron and Lake Michigan. Icebreaking conditions; ice cover est. 1 ft thick.

The US Coast Guard cutter *Hollyhock* was breaking through ice west of the Straits of Mackinac on the morning of January 5, 2014, to establish a path for six merchant vessels heading west into Lake Michigan when it ran into thicker ice and had difficulty continuing ahead. The 1,004-foot-long *Mesabi Miner*, the first merchant vessel in the convoy, was unable to slow quickly enough to avoid striking the stern of the *Hollyhock* at 1042. No injuries or pollution resulted from the accident. Both vessels sustained significant damage but remained operational.



Great Lakes bulk carrier *Mesabi Miner* under way.
(Photo courtesy www.duluthshippingnews.com)

Vessels and Personnel	2	As this casualty involved both public and private vessels with initial damage estimates exceeding \$75,000, the National Transportation Safety Board (NTSB) led the investigation. The parties to the investigation were Interlake Steamship Company, owner and operator of the <i>Mesabi Miner</i> , and the US Coast Guard.
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Vessels and Personnel

***Mesabi Miner*.** The *Mesabi Miner*, a self-unloading bulk carrier owned and operated by Interlake Steamship Company, has been engaged in coal and iron ore transport since its launch in 1977. The vessel was named for the Mesabi Iron Range in Minnesota, the source of 60 percent of US iron ore output from 1900 to 1980. With the depletion of iron ore reserves, University of Minnesota scientists developed a process to mine taconite, a low-grade ore that could be concentrated into pellets, and taconite became the *Mesabi Miner*'s primary cargo. The bulker is capable of carrying 63,300 gross tons of iron ore in seven holds.

The *Mesabi Miner* bridge team consisted of the master, the mate on watch, and the helmsman. The master, who held an unlimited credential as master on the Great Lakes, had worked with Interlake for 23 years, serving as master of several of the company's vessels for about 13 years and as master of the *Mesabi Miner* for more than 4 years.

***Hollyhock*.** The cutter *Hollyhock*, one of nine Coast Guard vessels capable of icebreaking operations in the Great Lakes, was launched in 2003 as a buoy tender maintaining and repositioning aids to navigation and performing search and rescue, environmental protection, and icebreaking operations. When not on maneuvers, the cutter is home ported on the St. Clair River in Port Huron, Michigan.



Coast Guard cutter *Hollyhock* returns to St. Ignace, Michigan, following collision with the bulk carrier *Mesabi Miner*. (Photo by Coast Guard)

As the morning's icebreaking operation got under way, the executive officer had the conn on the *Hollyhock* and was training a junior officer to become a qualified officer of the deck

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(OOD). Several other crewmembers also were on the navigation bridge and assisting in the maneuvers, including the vessel's commanding officer; a qualified junior officer serving as the OOD; two petty officers, one of whom was serving as the junior officer of the deck (JOOD); and a seaman serving as helmsman.

Accident Voyage

The *Mesabi Miner* departed Two Harbors, Minnesota, late in the afternoon on December 31, 2013, with a load of 49,000 tons of taconite pellets and was bound for Gary, Indiana, to offload at the U. S. Steel docks. After sailing across Lake Superior, the *Mesabi Miner*'s log indicates the vessel became beset in ice at several locations. On January 3, after passing under the Mackinac Bridge between St. Ignace and Mackinaw City, Michigan, the bulker was able to travel about 13 miles west in 15 hours before again becoming beset in ice about 6 miles east of White Shoal Light. The *Mesabi Miner* remained at that location with five other vessels awaiting an escort from the Coast Guard cutter in the morning. (On the Great Lakes, distances are usually given in statute miles, and this brief follows that convention; short distances are given in yards. Speeds on the Great Lakes generally are reported in miles per hour, but the Coast Guard refers to speed in knots, and speeds in this report are given in knots.)

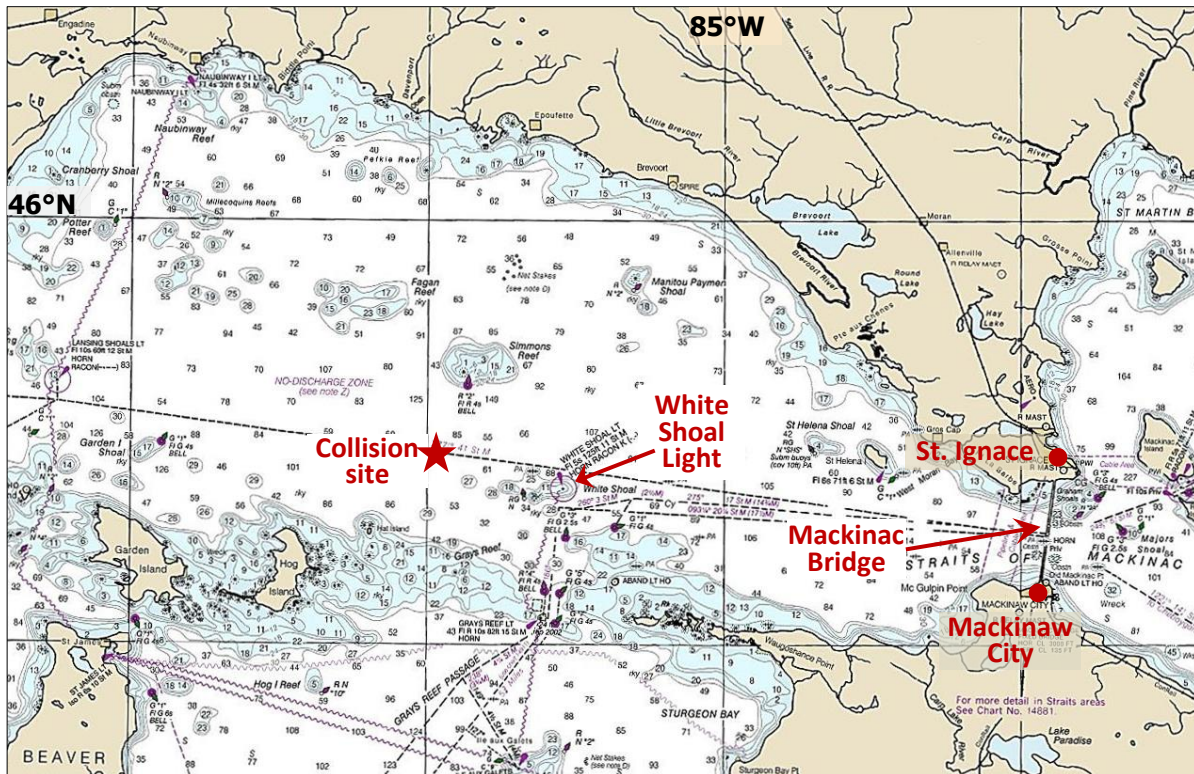


Location of the collision between the *Mesabi Miner* and Coast Guard cutter *Hollyhock*, west of the Straits of Mackinac, Michigan. Dotted red line depicts the *Mesabi Miner*'s approximate route from Lake Superior to Lake Michigan. (Background by National Geographic MapMaker Interactive)

The *Hollyhock*, which had been performing ice breaking operations in the area for a few days, was moored at the Coast Guard facility in St. Ignace on the evening of January 4. The following morning, the cutter got under way at 0709 to resume icebreaking in the Straits of Mackinac. Due to the severe winter cold, the *Hollyhock* was to organize a convoy of the six commercial vessels and escort them westward through the ice along the standard tracklines used by bulk carriers while transiting the Great Lakes. Four of these vessels, the *Mesabi Miner*, *Arthur*

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M. Anderson, *Hon. James L. Oberstar*, and *Stewart J. Cort*, were located west of the Mackinac Bridge, which spans the narrowest point of land between Michigan's lower and upper peninsulas. The other two vessels, the *Indiana Harbor* and *Joyce L. Van Enkevort*, were near Round Island, about 5 miles east of the Mackinac Bridge in Lake Huron, and joined the convoy after it was under way.



Excerpt from NOAA chart 14902 showing the Straits of Mackinac area and site of the collision on Lake Michigan, about 5 miles west of White Shoal Light.

The *Mesabi Miner* and the *Arthur M. Anderson* were beset in ice, requiring that the *Hollyhock* maneuver around the vessels to break them free. The OOD on board the *Hollyhock* radioed the *Hon. James L. Oberstar*, *Stewart J. Cort*, *Arthur M. Anderson*, and the *Mesabi Miner* to brief the vessels' crews on the intentions of the *Hollyhock* and to begin organizing the convoy. The OOD instructed the four vessels that he intended to lead the convoy at 8–10 knots, the first ship in the convoy should stay about 1,000 yards astern of the *Hollyhock*, and the navigational team on each of the remaining vessels was responsible for maintaining a safe following distance from the ship ahead.

As the *Hollyhock* bridge team communicated with the merchant ships while in transit to their position, the crew of the *Mesabi Miner* was warming up the engines and preparing to get under way. The *Hollyhock* made passes through the ice around all four vessels to ensure they would be able to depart, and with the *Mesabi Miner* on its starboard side, the cutter took up position to lead the vessels westward through the ice. All vessels' personnel were communicating via VHF radio channel 8. The *Mesabi Miner* was the first vessel behind the *Hollyhock*, with the *Arthur M. Anderson*, *Stewart J. Cort*, and *Hon. James L. Oberstar* following. After the initial convoy was established and under way, the *Indiana Harbor* joined the procession of vessels through the ice around 0838, and *Joyce L. Van Enkevort* followed at 0943.

After getting up to speed, the *Mesabi Miner* maintained an interval of 800–1,200 yards from the *Hollyhock*. The *Mesabi Miner* master used the throttles of the twin screw vessel for

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direct control of the 16,000-hp engines. The mate on watch estimated the bulker was traveling 7–9.8 miles per hour (6–8.5 knots). The sky was cloudy and visibility was good.

During interviews, both the commanding officer of the *Hollyhock* and the master of the *Mesabi Miner* described a fluid operation demanding close cooperation between the vessel operators in coordinating speeds and distances. Both felt comfortable with the scenario that day and agreed nothing seemed out of the ordinary or extreme about the day's icebreaking operations.

The *Hollyhock* and the six vessels in the convoy proceeded along a track the icebreaker had established several days earlier. The commanding officer stated that conditions along this route included refrozen 6- to 8-inch-thick accumulations of ice fragments, known as brash ice.

After the convoy began, the *Hollyhock* experienced a high water temperature alarm on its no. 2 main diesel engine. This situation was conveyed to the other vessels by VHF radio, and the convoy slowed to 4–6 knots while Coast Guard engineers troubleshooted the alarm. They concluded the alarm was caused by a faulty temperature sensor, so the *Hollyhock* resumed speed to 8–10 knots and the rest of the convoy followed.

At about 1025, the *Hollyhock*'s commanding officer and executive officer departed the navigation bridge, and the qualified OOD assumed control of the vessel as well as responsibility for the junior officer under training by the executive officer. The convoy was traveling 8–9 knots, with the *Mesabi Miner* 1,000–1,200 yards astern.

At 1039, the *Hollyhock* entered an area of the waterway where the OOD said the ice appeared thicker with several brash ice piles. The *Hollyhock*'s speed was reduced to 3.4 knots, and the OOD contacted the *Mesabi Miner* to ask that the bulker's speed also be reduced. The *Mesabi Miner* bridge acknowledged, and the master said he brought both main engines to zero pitch, or neutral position. At that time, the *Mesabi Miner* was 959 yards astern of the *Hollyhock* and traveling at 8.4 knots, according to recorded data from the *Hollyhock*'s ECPINS (Electronic Chart Precise Integrated Navigation System).

On board the *Hollyhock*, the OOD increased the throttle to full power for a forward speed of about 5.5 knots just before the cutter came into contact with ice that brought the vessel to a complete stop. The OOD stated he radioed the *Mesabi Miner* to say the *Hollyhock* was beset in the ice, but he did not recall hearing an immediate acknowledgement. The *Mesabi Miner* third officer alerted the master to the *Hollyhock*'s loss of forward progress, and the master placed both engine controls in full astern. Recorded ECPINS data from the *Hollyhock* indicate the *Mesabi Miner* had closed to 821 yards astern and was still traveling about 8.4 knots. The mate and master said they did not hear a second message from the *Hollyhock* informing them the cutter had stopped due to the ice.

On the *Hollyhock*, the commanding officer and executive officer returned to the navigation bridge after noticing the cutter's reduction in speed. About 1040, the commanding officer assumed control from the OOD and issued a command to back and ram the ice patch. This maneuver is normally performed by bringing the vessel to full astern for two to three ship's lengths and then back to full ahead before hitting the ice. Crew on board the *Hollyhock* stated they informed the *Mesabi Miner* bridge of this action via radio. Because of the proximity of the *Mesabi Miner* to the *Hollyhock*'s stern, the commanding officer was able to bring the *Hollyhock* astern only about one ship's length, then full ahead at about 1.3 knots. The maneuver was unsuccessful in breaking up the ice that beset the *Hollyhock*. According to ECPINS data from the *Hollyhock*, the *Mesabi Miner* had closed to 465 yards astern and was traveling at 7.1 knots, and the commanding officer determined a collision was imminent.

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Although the *Hollyhock*'s throttle was at full ahead, the cutter was nearly stationary when the commanding officer ordered left full rudder to direct the vessel outward and to the port side of the *Mesabi Miner* on contact. He then directed the crew to sound the vessel's collision alarm. About 15 seconds later, at 1042, the bow of *Mesabi Miner* made contact with the stern of the *Hollyhock*.



Mesabi Miner seen from the stern of the *Hollyhock* after the collision.
(Photo by Coast Guard)

The commanding officers of both vessels estimated the *Mesabi Miner*'s speed at impact was just under 2 knots. The force of the impact, combined with the left full rudder and full ahead turns, freed the *Hollyhock* from the ice patch that had beset the vessel. The cutter was brought to a stop about 300 yards off the port bow of the *Mesabi Miner*.

Damage

Damage to the *Hollyhock* was estimated at \$244,145, and the cutter was lost to icebreaking duties for a few weeks while repairs were completed. Damage included structural framing at the stern and port quarter in the steering gear room, aft laundry, stern thruster space, fantail, and railing. The hull was punctured in two small areas about 20 feet above the waterline.

Repairs to the *Mesabi Miner* were reported to cost about \$250,000. Damage included inset of the hull plate at the bow, distortion of internal framing in the forepeak, and some minor buckling of the main deck forward. The hull had a 12-inch crack about 4 feet above the waterline.



Damage to the left side of the cutter *Hollyhock*'s stern, where the steel was inset and displaced by the force of the collision with the bow of the *Mesabi Miner*.

Discussion

In interviews, the master of the *Mesabi Miner* and the commanding officer of the *Hollyhock* both confirmed that the operation involved a close working relationship between the icebreaker and the convoy, particularly with the lead merchant ship. Convoy instructions were conveyed from the cutter to the *Mesabi Miner*.

On the day of the accident, the *Mesabi Miner* was to follow the cutter while traveling up to 8 knots. The distances between vessels following the *Mesabi Miner* were to be determined by the judgment of each vessel's command regarding the comfort level with the speed and separation distance. Interviews with the operators revealed, however, that effective icebreaking can require closely coordinated interaction between the icebreaker and the lead escorted ship at closer stopping distances than typically dictated by a vessel's design. In addition, the icebreaker's bridge command is likely to ask the first vessel in a convoy to speed up or close in to facilitate the operation and avoid again becoming beset by ice.

The *Mesabi Miner* master stated that in his experience it was not uncommon to hear an icebreaker bridge issue requests to speed up, slow, or stop to facilitate cutting a path through the ice and preventing it from closing up again. The *Hollyhock* commanding officer confirmed that a vessel as large and maneuverable as the *Mesabi Miner* served well as the first ship following an icebreaker as it could widen the lead in the ice made by the smaller cutter.

Investigators confirmed that Interlake Steamship Company maintained no specific written procedures dealing with convoy ice operations. The practice had been handed down by experienced operators, from master to junior officers, basically as on-the-job training.

While preparing for maneuvers that morning, the Coast Guard navigation team discussed the planned operations and decided to deviate from several operational risk mitigation measures in the standing orders because the commanding officer of the *Hollyhock* stated he did not feel that certain elements were applicable or in the best interest of performing a multiple-vessel

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convoy. Specifically, the team did not ask for the particulars of each vessel, including stopping distance and turning radius, because they felt they were familiar with the ships' physical characteristics from their previous experience with them in the same area of operations.

The *Hollyhock* is fitted with an amber light to indicate when it is operating astern during icebreaking operations, but the cutter's officers elected not to use it because in prior escorts over the previous week, other vessels being escorted had reported difficulty seeing this light.

The *Hollyhock* crew also did not pass along emergency maneuvering information, including the expectation that in an emergency the *Hollyhock* would turn to starboard and the vessel following would turn to port. The commanding officer stated that he did not want to confuse multiple ships in a convoy about which ship was required to turn which way. He also said he did not have full confidence in these evasive maneuvers because ice conditions did not always allow ships to turn in the predetermined direction.

The *Mesabi Miner* crew's lack of recollection of the second call from the *Hollyhock* stating the cutter was stopped may have been due to the crewmembers being busy with the process of stopping their own ship or not hearing the call when it came. Crewmembers from another vessel in the convoy confirmed during interviews that the *Hollyhock* crew did make a second radio call indicating the cutter had stopped. A procedure calling for confirmation and acknowledgement of radio calls during icebreaking operations could have improved the effectiveness of communications among all vessels in the convoy, particularly when standard minimum distances could not be maintained due to the nature of the icebreaking.

Probable Cause

The National Transportation Safety Board determines the probable cause of the collision between the United States Coast Guard cutter *Hollyhock* and the bulk carrier *Mesabi Miner* was the lack of effective communications between the two vessels' bridge teams during icebreaking operations, which resulted in an insufficient amount of time to take action to avoid a collision.

Vessel Particulars

Vessel	<i>Mesabi Miner</i>	<i>Hollyhock</i>
Owner/operator	Interlake Steamship Company	US Coast Guard
Port of registry	Wilmington, DE	Port Huron, MI
Flag	United States	United States
Type	Bulk carrier	Public vessel
Builder, year	American Shipbuilding Company Lorain, Ohio 1977	Marinette Marine Corporation Marinette, Wisconsin 2003
Official number (US)	581479	—
Construction	Steel	Steel
Length	1,004 ft (306 m)	225 ft (69 m)
Beam/width	105 ft (32 m)	46 ft (14 m)
Draft	29 ft (8.84 m)	13 ft (4 m)
Tonnage	34,728 gross tons	2,000 gross tons
Engine	16,000 hp (11,931 kW) 2 Pielstick diesel engines 2 controllable pitch propellers	6,200 hp (4,600 kW) 2 Caterpillar diesel engines Controllable pitch propeller
Persons on board	22	50

For more details about this accident, visit <http://www.nts.gov/investigations> and search for NTSB accident ID DCA14PM005.

Adopted: April 8, 2015

The NTSB has authority to investigate and establish the probable cause of any major marine casualty or any marine casualty involving both public and nonpublic vessels under 49 *United States Code* 1131. This report is based on factual information either gathered by NTSB investigators or provided by the Coast Guard.

The NTSB does not assign fault or blame for a marine casualty; rather, as specified by NTSB regulation, “[NTSB] investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person.” 49 *Code of Federal Regulations*, Section 831.4.

Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by conducting investigations and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. 49 *United States Code*, Section 1154(b).