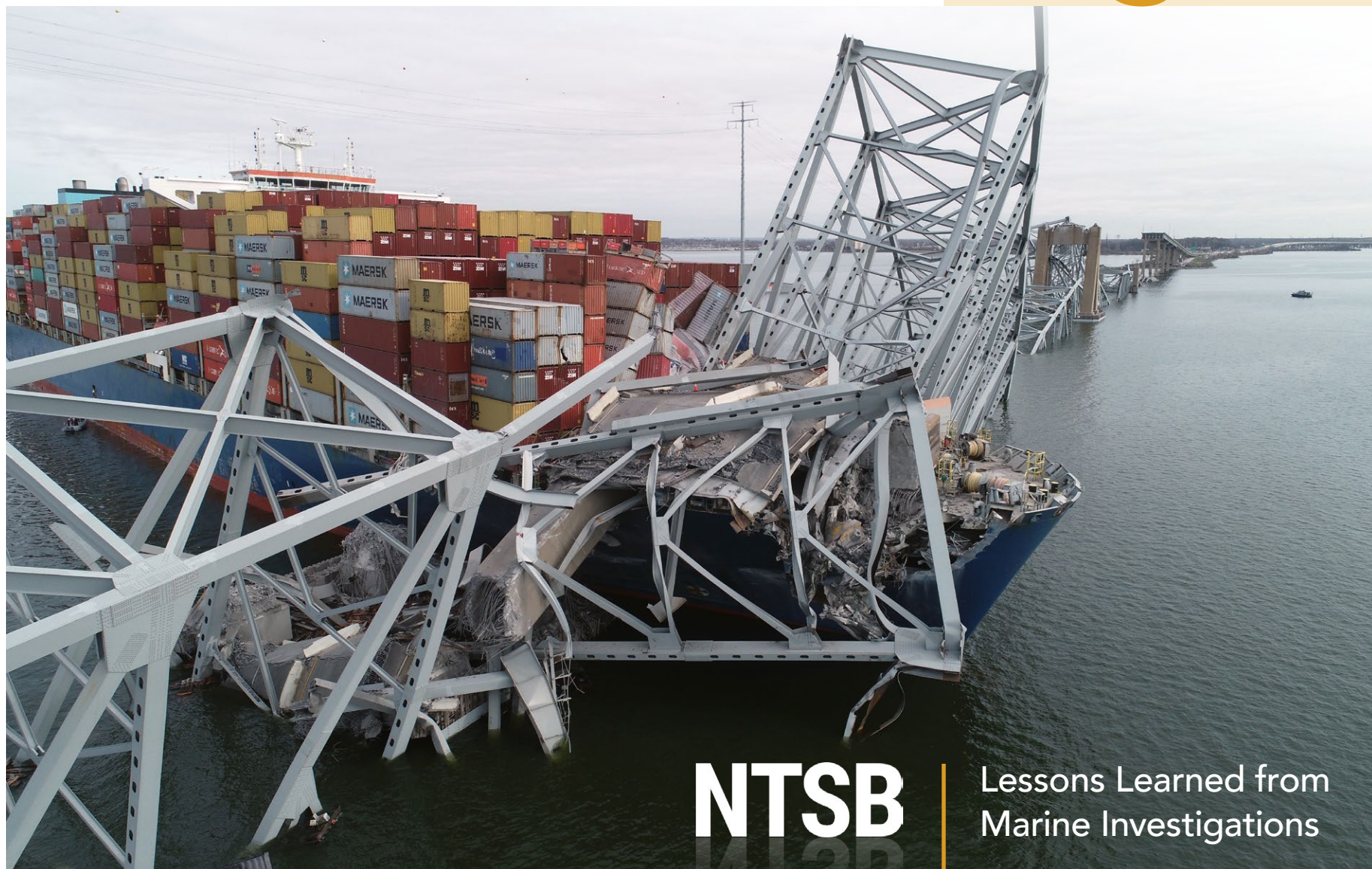


NATIONAL TRANSPORTATION SAFETY BOARD

2025

SAFER SEAS

Digest



NTSB

Lessons Learned from
Marine Investigations

Who We Are and What We Do

The **National Transportation Safety Board** (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in the other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space.

We determine the probable causes of the accidents and events we investigate and issue safety recommendations aimed at preventing future occurrences.

In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate.

We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

Our Mission

Making transportation safer. We carry out our mission by—

- **Maintaining** our congressionally mandated independence.
- **Conducting** objective, thorough investigations and safety studies.
- **Deciding**, fairly and objectively, appeals of enforcement actions by the FAA and US Coast Guard and certificate denials by the FAA.
- **Advocating** implementation of safety recommendations.
- **Assisting** victims and survivors of transportation disasters and their families.





A Message from the Chairwoman

I am proud to present the *Safer Seas Digest* on behalf of the NTSB. This publication encapsulates lessons learned from the 49 investigations completed by the NTSB Office of Marine Safety in 2025. It is our sincere hope that others will apply the knowledge uncovered by our world-renowned investigators to prevent future marine casualties and save lives.

The 2024 contact of the containership *Dali* with the Francis Scott Key Bridge and subsequent bridge collapse near Baltimore, Maryland, is a painful reminder that we must proactively safeguard vessel systems and marine infrastructure against risk. Six construction workers who were on the bridge when it collapsed died—a tragic loss of life that may have been prevented had the bridge owner conducted a vulnerability assessment and acted to mitigate the risk for catastrophic collapse from strikes by large ocean-going vessels. Our investigation led to nearly two dozen safety recommendations, including several urgent recommendations to safeguard 68 bridges over navigable waterways frequented by ocean-going vessels that had an unknown level of risk of collapse.

Similarly, the 2023 hull failure and implosion of the *Titan* submersible, which claimed the lives of all five people on board, demonstrates the need to implement proactive safety measures. For example, we found the *Titan* failed to meet necessary strength and durability requirements because the operating company's engineering process was inadequate. The operator neither tested the vessel adequately, nor did it follow applicable guidance for emergency response plans, which recommends "appropriate rescue facilities" be ready in case of disaster. Even though a rescue was not possible in this case, the *Titan* would have been found sooner if the company had emergency response assets standing by, saving time and resources. As a result of our investigation, we issued four new recommendations to the US Coast Guard, aimed at improving guidance and regulations applicable to passenger-carrying submersibles.

Establishing emergency procedures, continuously reassessing and updating them, and routinely training crews and other personnel on procedures can greatly reduce the impact of an accident. Sadly, that is not what happened before the 2023 fire aboard the roll-on/roll-off container vessel *Grande Costa D'Aorio* in Newark, New Jersey. The land-based firefighters who attempted to extinguish the fire lacked both the necessary emergency procedures and training to respond to a vessel fire. These factors resulted in an ineffective response that contributed to the fire's spread—and the death of two firefighters, as well as injuries to six additional emergency responders. We issued 11 new recommendations to address the gaps uncovered by our investigation.

These tragedies are just a few examples of our investigations and the lessons learned contained in the pages that follow. While each marine casualty is unique, our investigators uncovered some notable commonalities that all mariners should consider. These include the following:

- Performing maintenance effectively
- Effective voyage planning and management
- Detecting and containing vessel fires
- Assessing the condition of waterfront infrastructure
- Ensuring watertight integrity
- Accounting for bank effect
- Combating fatigue and distraction
- Properly securing and monitoring lithium-ion batteries
- Mitigating the risks of a loss of electrical power
- Planning and training for emergencies
- Operating in strong currents or heavy-weather conditions
- Operating equipment and machinery systems as designed

The US Coast Guard is an integral partner to all NTSB marine investigations. Our relationship with them is a shining example of government collaboration focused on saving lives and improving safety. My sincere thanks go out to every member of the Coast Guard who assisted us this year. The Coast Guard units that worked with the NTSB in 2025 are listed on page 130.

For every investigation we lead, our mission is to determine exactly how it happened, why it happened, and, most importantly, issue evidence-based recommendations to prevent it from ever happening again. It is in pursuit of this mission that the NTSB issued safety recommendations to all parts of the marine industry in 2025. However, stakeholders at all levels can voluntarily implement the lessons learned from our investigations to ensure safety. I hope the pages that follow inspire you to do just that.

Sincerely,

Jennifer L. Homendy
NTSB Chairwoman

About Safer Seas Digest

The *Safer Seas Digest*, issued annually by the **NTSB Office of Marine Safety** (OMS), summarizes by casualty type the OMS investigations completed in the previous year. Developed specifically for the marine community, the digest shares the circumstances and probable cause of each casualty and the lessons learned discovered during our investigations.

The OMS casualty types you will find in this year's *Safer Seas Digest* include:

Casualty Type	Number of Casualties
Capsizing/Listing	2
Collision	5
Contact	16
Fire/Explosion	11
Flooding/Hull Failure	5
Grounding/Stranding	7
Machinery Damage	1
Ship/Equipment/Cargo Damage	1
Other	1

For a deeper dive, the full investigation reports and dockets for each casualty can be found on our website at [ntsb.gov](https://www.ntsb.gov). Search by using either the investigation report number or the accident ID listed in the casualty summary's data table.

Note: The data tables found at the beginning of each casualty summary also list "**estimated damages**." These damages typically include repair and loss costs for vessels and other property. Estimated damages are accurate as of the report's issue or adoption date.



ON THE COVER: The containership *Dali* with portions of the collapsed Key Bridge across its bow (page 46).



BACK COVER: The submersible *Titan* (page 88), cargo vessel *Genius Star XI* (page 80), and Ro/Con *Grande Costa D'Avorio* (page 64).



Scan the code to view **PAST ISSUES** of the *Safer Seas Digest* at [ntsb.gov](https://www.ntsb.gov).

Abbreviations

Abbreviation	Definition
AASHTO	American Association of State Highway and Transportation Officials
AIS	automatic identification system
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
BESS	battery energy storage system
BMS	battery management system
CCTV	closed circuit television
CEO	chief executive officer
CFR	<i>Code of Federal Regulations</i>
CO ₂	carbon dioxide
DBDO	double bottom diesel oil
DG	diesel generator
ECS	electronic charting system
EDG	emergency diesel generator
EDR	engine control room
ENC	electronic navigation chart
EPIRB	emergency position indicating radio beacon
FHWA	Federal Highway Administration
FU	follow-up
GPS	global positioning system
HR	high voltage step-down transformer breaker
HV	high voltage
IEC	International Electrotechnical Commission
IENC	inland electronic navigation chart
IMO	International Maritime Organization
ISM Code	International Safety Management Code
ITB	integrated tug and barge
LARS	launch and recovery system
LR	low voltage step-down transformer breaker
LV	low voltage

Abbreviation	Definition
MCR	machinery control room
MDTA	Maryland Transportation Authority
mt	metric ton
NMFS	National Marine Fisheries Service
NTSB	National Transportation Safety Board
NOAA	National Oceanic and Atmospheric Administration
NVIC	Navigation and Vessel Inspection Circular
NWS	National Weather Service
OSHA	Occupational Safety and Health Administration
OSV	offshore supply vessel
PIT	powered industrial truck
PMS	power management system
PVDF	polyvinylidene fluoride
PVHO	pressure vessel for human occupancy
RCC	response coordination center
RMC	remote monitoring center
Ro/Con	roll-on/roll-off container vessel
ROV	remotely operated vehicle
SMS	safety management system
SOLAS	<i>International Convention for the Safety of Life at Sea</i>
STS	ship-to-shore
THC	tetrahydrocannabinol
TSMS	towing safety management system
USGS	US Geological Survey
VDR	voyage data recorder
VGM	verified gross mass
VHF	very high frequency
VLCC	very large crude carrier

Vessel Group Key and Subtypes

Vessel Group Key	Vessel Subtypes Included in this Digest
 Cargo, Dry Bulk	Bulk carrier – 6
 Cargo, General	Containership – 3 General cargo vessel – 3 Multi-purpose carrier – 1 Ro/Con – 1
 Cargo, Liquid Bulk	Tanker – 2
 Fishing	Fish tender (Industrial vessel) – 1 Fishing vessel – 4
 Military/Combatant	<i>None to report</i>
 Offshore	Offshore supply vessel – 1
 Passenger	Ferry – 1 Coastal cruise ship – 1 Small passenger vessel – 1
 Towing/Barge	Barge – 3 Crane barge – 1 Freight barge – 1 Hopper barge – 1 Tank barge – 1 Towing vessel – 19 Tugboat – 2
 Yacht/Boat	Recreational vessel – 1 Yacht – 3
 Specialty/Other	Dredging vessel – 1 Submersible – 1

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CAPSIZING/LISTING

Capsizing and Sinking of Towing Vessel *Baylor J. Tregre*

VESSEL GROUP

Towing/Barge

LOCATION

Gulf of America, 23 nm south of Galveston, Texas

CASUALTY DATE

May 13, 2024

ACCIDENT ID

DCA24FM038

INJURIES

1 minor

ESTIMATED DAMAGES

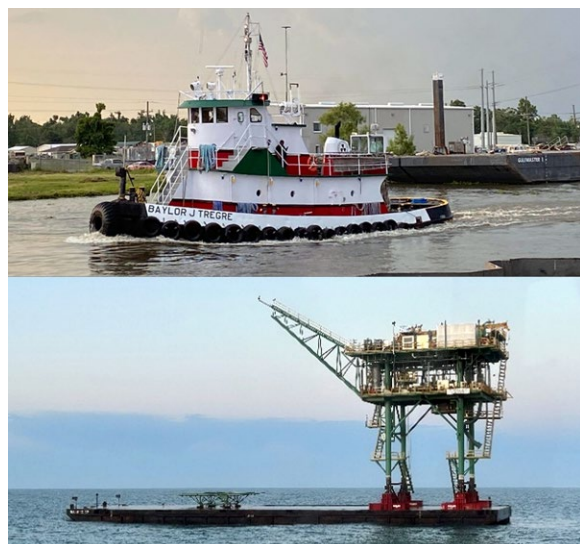
\$2 million

REPORT NUMBER

MIR-25-21

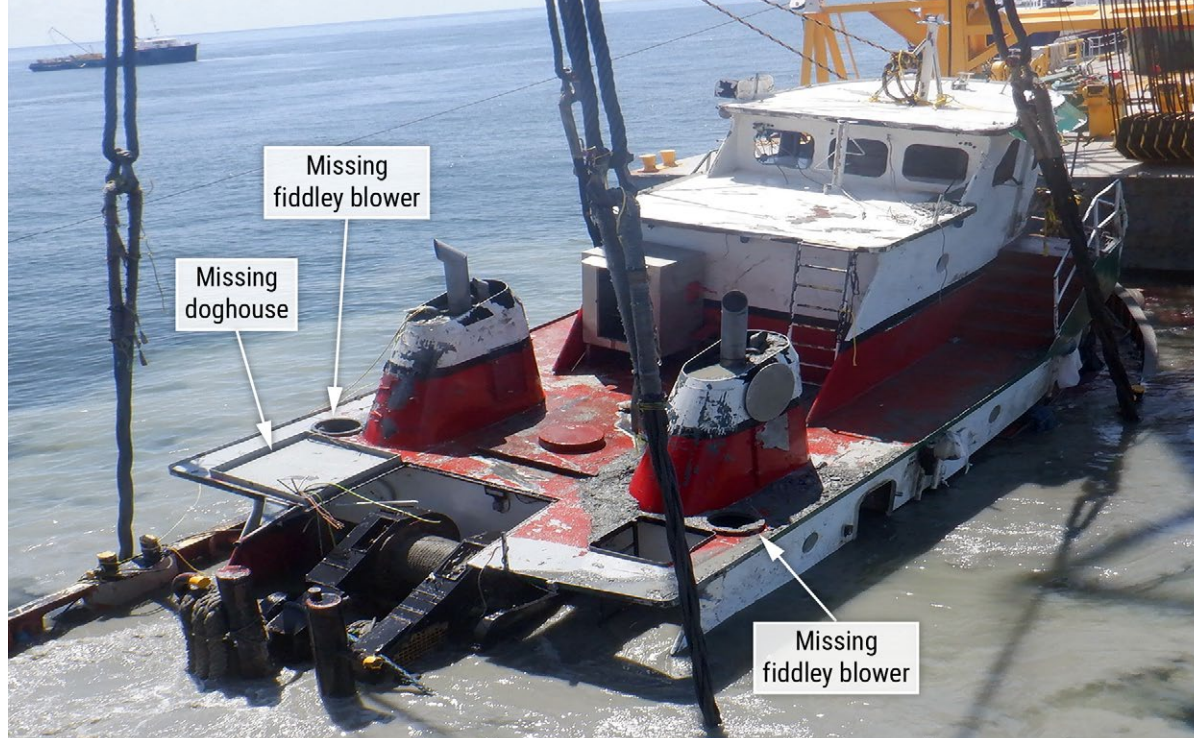
ISSUED

May 15, 2025



From top: Towing vessel *Baylor J. Tregre* at unknown date, and ocean barge *MARMAC 27* after the casualty.

SOURCE: TRINITY TOWING LLC.



Baylor J. Tregre after salvage, showing the doghouse and fiddley blowers missing.

BACKGROUND SOURCE: COAST GUARD.

On May 13, 2024, about 1657 local time, the towing vessel *Baylor J. Tregre* was towing the ocean barge *MARMAC 27* in the Gulf of America, about 23 nautical miles south of Galveston, Texas, when the towing vessel capsized and sank. All four crewmembers abandoned the vessel and were rescued by the Coast Guard. One crewmember sustained minor injuries. There was no pollution reported. Damage to the towing vessel was estimated at \$2 million.

Earlier that day, about 0340, the 67-foot-long *Baylor J. Tregre* departed Houma, Louisiana, with the 260-foot-long barge *MARMAC 27* in tow astern, en route to an oil and gas lease block in the Gulf of America. The *MARMAC 27* was loaded with a production platform and helideck. The *Baylor J. Tregre* crew included a captain, a mate, and two deckhands. Once offshore, the *Baylor J. Tregre* proceeded on a westerly course along the coastline of Louisiana.

While the tow was underway, the crew received daily weather reports from the operating company. According to the mate, who was on watch when

the daily weather report came in on May 13, about noon, the forecast included a possible chance of thunderstorms throughout the day into the evening. However, a few hours later, the NWS issued a series of Special Marine Warnings forecasting severe thunderstorms and urging mariners to “move to safe harbor.” The *Baylor J. Tregre* mate did not recall hearing any updated weather forecasts over VHF radio and thus was unaware of the warnings. However, even if the crew had received the warnings, they would not have been able to avoid the storm, given the vessel’s speed (about 4–5 knots), the tow’s position at the time (about 17 nautical miles from Galveston and surrounded by storms), and the speed of the storm’s advance.

The weather deteriorated quickly as the vessel transited west-southwest in the Gulf of America, approaching the oncoming storm. The captain estimated winds were about 85–100 mph (about 74–87 knots), and the closest NWS location (22–27 nautical miles from the casualty site) reported winds gusting up to 48–62 knots. Between 1647:04

and 1654:20, the vessel's speed dropped from 4.0 knots to 0.6 knots—almost a full stop—likely from the increased winds acting on the barge and, to a much greater degree, the production platform fixed to the barge.

Unable to avoid the storm, the mate attempted to steer the *Baylor J. Tregre* so that the tow would be downwind. However, the storm quickly overtook the tow, and the mate lost sight of the barge. The force of the wind on the *MARMAC 27* pushed the barge south of the *Baylor J. Tregre*, causing the towline to exert force on the stern of the tugboat, pulling the stern, and essentially halting the tugboat's forward motion, which affected the crew's ability to steer the tugboat. The crew stated that the towline was off the tug's port beam "tight as a banjo string" and that the barge was dragging the tug "sideways and backwards at 3.5 knots." The crew also stated the tug heeled to port 45°.

When the *Baylor J. Tregre* captain arrived in the wheelhouse, the vessel was listing to port, and the main deck stern bulwarks were underwater, indicating the deck edge was already immersed. Additionally, the crew had to climb out of the wheelhouse through the starboard door because the port wheelhouse door was almost in the water. Deck edge immersion is often associated with the maximum righting arm for a vessel, meaning the vessel is more susceptible to a loss of stability (capsizing) if subjected to further heeling forces. The captain and mate could not change the tugboat's heading to bring the towline directly off the stern instead of over the port bulwark, and the vessel continued to heel and capsize.

Releasing the tow could have reduced the risk of the vessel capsizing. However, there was no emergency release function in the *Baylor J. Tregre* wheelhouse, nor was one required. Instead, to release the towline, a crewmember would need to start the winch engine in the upper engine room, and another crewmember would need to operate the winch controls located in the doghouse, aft on the second deck. The mate attempted to reach the doghouse to release the tow, but the doghouse was inaccessible because it was partially submerged.

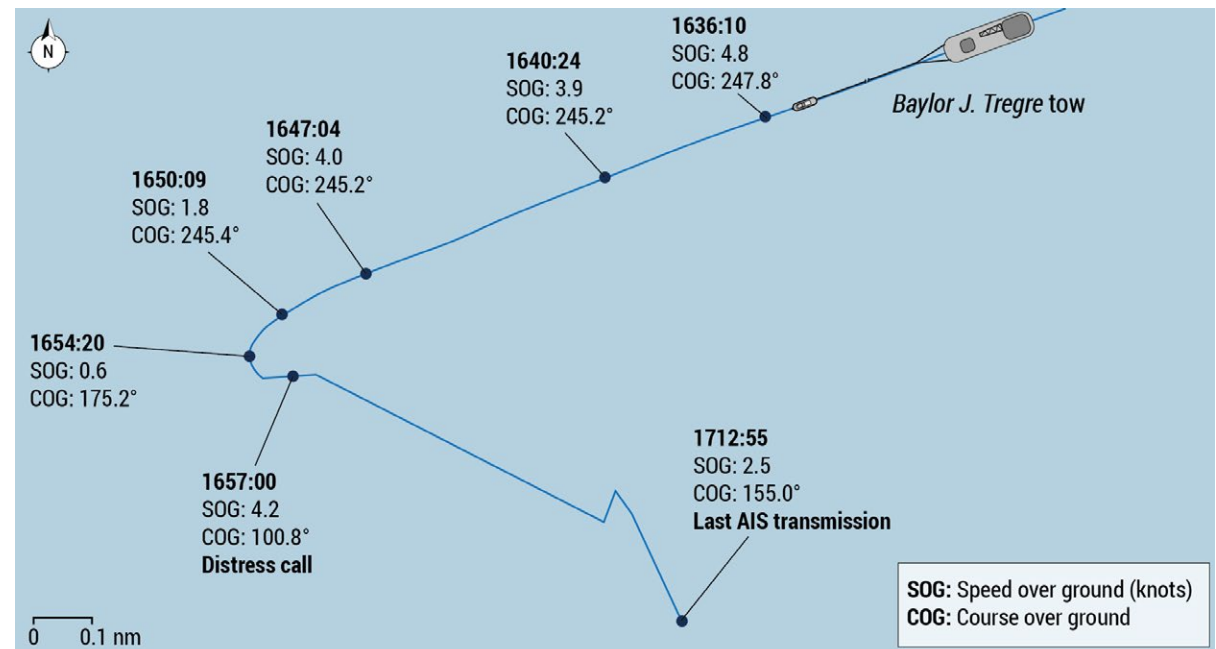
After the vessel lost stability and was laid over to port, it would have flooded through any openings, including the fiddley blowers (on the second deck); windows, which blew open during the storm; or, to a lesser degree, exterior doors. These openings would have allowed water to flood the vessel's interior spaces, causing it to eventually sink.

THE PROBABLE CAUSE of the capsizing and sinking of the towing vessel *Baylor J. Tregre* was the mate's inability to maneuver the tow into the wind due to the overwhelming towline force generated by the towed barge during the sudden onset of severe weather, resulting in unrecoverable heeling.



Abrasion markings and scarring on the vessel's port quarter bulwarks.

BACKGROUND SOURCE: COAST GUARD.



Baylor J. Tregre tow trackline leading up to the last AIS transmission (tow not to scale).

BACKGROUND SOURCE: MADE SMART.

CAPSIZING/LISTING

Listing and Partial Sinking of Yacht **Lovebug**

VESSEL GROUP

Yacht/Boat

LOCATION

West River, Chesapeake Bay, north of Shady Side, Maryland

CASUALTY DATE

July 27, 2024

ACCIDENT ID

DCA24FM053

INJURIES

1 minor

ESTIMATED DAMAGES

\$8 million

REPORT NUMBER

MIR-25-29

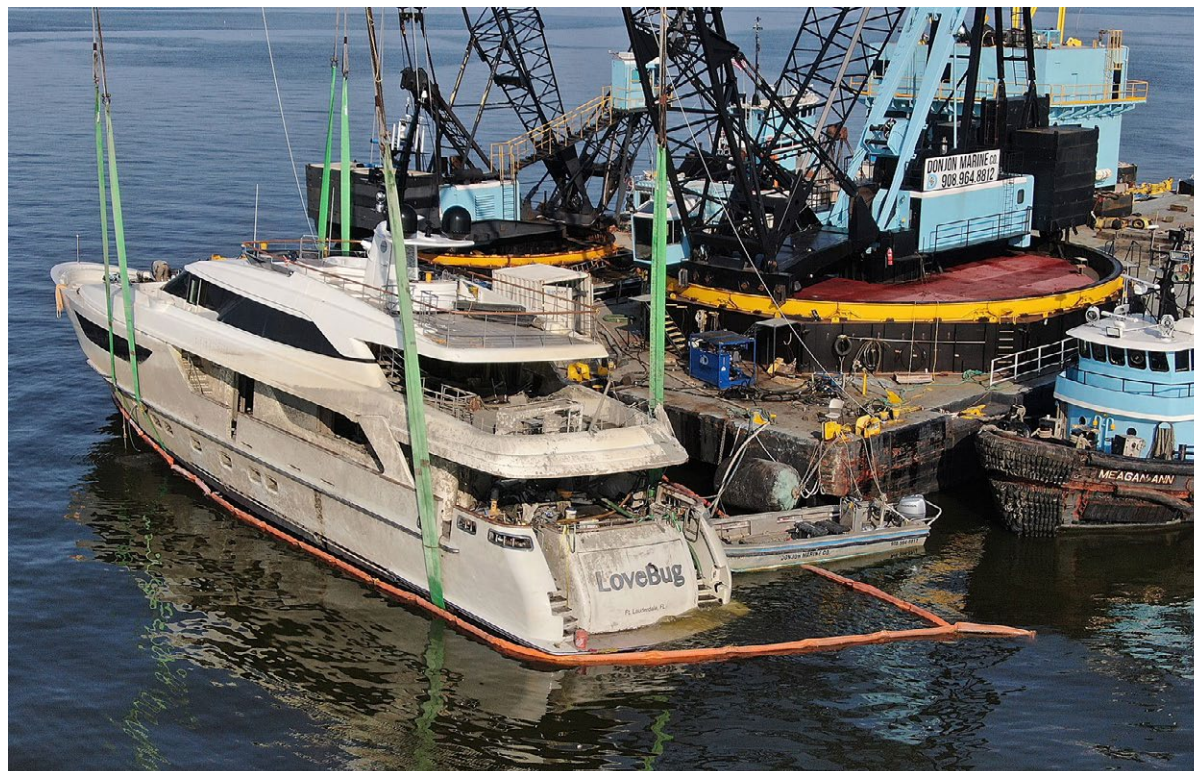
ISSUED

July 15, 2025



The Lovebug on unknown date before the casualty.

SOURCE: YACHTCHARTERFLEET.



The Lovebug, with garage door visible at the stern, as it was raised out of the water after it partially sank.

SOURCE: CAPITAL GAZETTE.

On July 27, 2024, about 1235 local time, the yacht **Lovebug** was transiting the Chesapeake Bay in the West River north of Shady Side, Maryland, when the vessel started listing heavily to starboard. The four crewmembers and one owner on board abandoned the vessel and were rescued by nearby vessel crews. The yacht partially sank in about 12 feet of water. There was one minor injury. An oil sheen, visible around the vessel, was contained with a boom. Damage to the vessel was estimated at \$8 million.

The vessel departed the Annapolis Yacht Basin about an hour earlier, bound for Shady Side. At 1148, the vessel entered the Annapolis Harbor Channel in the Severn River heading southeast at 7–10 knots. At 1203, the captain changed course to starboard. The deckhand took the watch as the captain completed

a round of the engine room spaces when the yacht was near the Thomas Point Shoal Light. The captain did not find anything out of the ordinary on his round, estimating it took about 15 minutes.

About 1235, when the yacht was near the West River Entrance Light 2, the captain noticed the **Lovebug** had developed a starboard list. He checked the steering, rudder indicators, and stabilizers from the bridge and found no problems. He did not hear any alarms. The list rapidly increased. About a minute after the vessel started listing, the vessel, which had been powered by its starboard generator, lost power. The captain backed off the throttles, and the vessel's speed dropped to about 4 knots.

The captain ordered the deckhand to prepare to lower the anchor. Before the deckhand could

deploy it, the captain ordered everyone to abandon the vessel because the list had become significant. The deckhand, chef, steward, and owner jumped into the water. The captain broadcast a distress call on VHF channel 16, verified that all personnel had egressed, and then also abandoned the vessel. From the time the vessel started listing until the owner and crew were in the water, less than 4 minutes had elapsed. The yacht had listed over about 45–50° and grounded in the mud, visibly down by the stern.

Nobody on board observed flooding in the short time before they abandoned the vessel. Additionally, after the yacht was raised from the water and towed to a shipyard, a marine surveyor and NTSB investigators did not find any visible hull breach or indication of a source of water ingress. However, before the *Lovebug* was raised from the water, during dive operations, salvors found that the external garage door on the stern was partially open. Because the door's lower edge was situated at the waterline and no other

potential source of water ingress was identified, it is likely that water entered the yacht via the partially open garage door.

Salvors also found the watertight door between the garage and engine room compartment open. Water in the garage would have decreased the yacht's draft aft, accelerating water ingress. If the water level in the garage space reached the lower edge of the open watertight door, seawater would have flooded into the engine room compartment.

Failure to maintain the integrity of a vessel's watertight envelope can reduce a vessel's overall stability should unintentional flooding occur. If minor flooding goes unnoticed, the gradual reduction in initial stability may go unnoticed by operators.

Stability is the tendency of a vessel to return to its original upright position when a disturbing force is removed. The *Lovebug* was unable to return to an upright position at a certain point because it was no longer stable.



The partially sunken *Lovebug* at 1342.

SOURCE: MARYLAND NATURAL RESOURCES POLICE.

Flooding causes a vessel to sink lower in the water, which typically reduces its stability due to a reduction in righting energy. It also tends to lower the range of a vessel's stability as seawater can enter any openings and downflow into compartments at lower angles of heel. With a reduction in stability, and slack water in the garage and engine room compartment, an induced heeling moment on the vessel from an external force such as wind, waves, wake from another vessel, or a turning moment would have likely induced a list. As the vessel first heeled to starboard, the free movement of the liquid would have shifted floodwater weight in the direction that the vessel was heeling, and its overall stability would have been further reduced due to this free surface effect. The combination of the weight of floodwater, increasing the vessel's draft, and the free surface effect, created by the flooding of the garage and full-beam-width engine room compartment, likely resulted in a condition of neutral stability, with little righting energy to resist severe heeling or capsize.

THE PROBABLE CAUSE of the listing and partial sinking of the yacht *Lovebug* was undetected flooding through an open watertight door, resulting in the vessel losing stability.



The *Lovebug* on July 27, 2024, at 1238:48 and 1241:45, shortly after the owner and crew abandoned the vessel.

SOURCE: LOVEBUG OWNER.

COLLISION

Collision between Fishing Vessel **Papa Rod** and Anchored Bulk Carrier **Appaloosa**

VESSEL GROUPS

 Fishing +  Cargo, Dry Bulk

LOCATION

Gulf of America, east of Southwest Pass, 25 nm south of Venice, Louisiana

CASUALTY DATE

May 2, 2024

ACCIDENT ID

DCA24FM036

INJURIES

None

ESTIMATED DAMAGES

\$223,000

REPORT NUMBER

MIR-25-12

ISSUED

April 1, 2025



Left to right: Fishing vessel *Papa Rod* and bulk carrier *Appaloosa* before the collision.

SOURCES: BLACK PEARL FISHING FACEBOOK PAGE AND RICO VOSS, SHIPSPOTTING.COM.



Bow damage to the *Papa Rod* and *Appaloosa* hull breach (circled). Inset shows ballast water leaking from the breached hull. SOURCE: COAST GUARD.

On May 2, 2024, about 0930 local time, the fishing vessel *Papa Rod* was underway in the Gulf of America, 25 nautical miles south of Venice, Louisiana, when it collided with the bulk carrier *Appaloosa*, which was anchored east of the entrance to Southwest Pass. There were no injuries, and no pollution was reported. Damage to the *Papa Rod* and the *Appaloosa* was estimated to be about \$223,000.

The day before, about 1230, the *Papa Rod* departed Bayou La Batre, Alabama, with three crewmembers—a captain and two deckhands—on board. The *Papa Rod*, primarily a shrimping vessel, was bound for fishing grounds to the southwest with a partner shrimper, the *Evening Tide*. The captain was on watch (there was no set watch schedule for the crew).

About 0400, on May 2, deckhand 1 relieved the captain. After making a turn near the entrance to South Pass, the *Papa Rod* steadied on a course of 248° and speed of about 9 knots. The vessel was being steered by autopilot, which was set to maintain the vessel's heading.

Between 0830 and 0900, deckhand 1 woke deckhand 2, who was in the bunkroom, to take the watch. Deckhand 2 told investigators that deckhand 1 “had to holler at [him] two or three times” to wake him up because he was tired. (Deckhand 2 reported getting about 7 hours of rest before assuming the watch; the deckhand’s work/rest history for the 3 days before boarding the vessel indicated only that he was ashore.)

Upon arriving in the fishing vessel’s wheelhouse, the deckhands completed a brief watch turnover, and deckhand 2 assumed the navigation watch. Deckhand 1 went below to sleep. According to deckhand 2, a short time after assuming the watch, he fell asleep at the controls as the vessel continued the transit in autopilot (the *Papa Rod* wheelhouse was not equipped with a watch alarm).

An able seafarer was on duty on the 590-foot-long bulk carrier *Appaloosa*, which was anchored about 4 nautical miles east of the entrance to Southwest Pass, when, between 0918 and 0923, he saw the *Papa Rod* off the port bow. The vessel was

heading directly toward the *Appaloosa*. The able seafarer informed the second mate, who called the master and the chief officer and sounded the *Appaloosa*'s horn. However, the *Papa Rod* continued on its course toward the *Appaloosa*, and about 0928, the *Papa Rod*'s bow collided with the port bow of the *Appaloosa*. The *Appaloosa*'s hull was breached about 4.5 feet above the waterline on the bulkhead of a ballast water tank, which was full of treated ballast water at the time.

After the collision, the *Appaloosa* crew were tested for alcohol, with all results negative. The *Papa Rod* crew were tested for alcohol and other drugs on May 3. Deckhand 2's urine test was positive for methamphetamine and amphetamine—each at more than 10,000 nanograms per milliliter—as well as THC metabolite carboxy-THC. The high levels of methamphetamine and its metabolite amphetamine in deckhand 2's urine generally increase the likelihood that methamphetamine had been abused. However, this is not definitive, and urine toxicology results generally cannot be used to determine the precise

timing of last drug use or the details of associated impairment. Therefore, whether deckhand 2 was impaired at the time of the collision by the effects of his methamphetamine or cannabis use could not be determined.

Effects from methamphetamine abuse follow a typical pattern, dominated by central nervous system stimulation in the early phase, with features of central nervous system depression emerging later as initial drug effects wear off. Such features of central nervous system depression may include sleepiness, which can be intense. Additionally, methamphetamine and amphetamine use may also interfere with proper sleep, causing sleep loss, which can lead to fatigue. Similarly, cannabis use can contribute to drowsiness in some individuals, either through acute drug effects or interference with restful sleep. Investigators could not determine the amount of sleep deckhand 2 received before joining the *Papa Rod*. His difficulty awakening and his drowsiness when deckhand 1 roused him to take over the watch could have been an effect of his drug use or a related sleep debt. However, whether

deckhand 2's drug use increased his drowsiness at the time of the collision could not be determined.

Watch alarms, while not mandatory on uninspected commercial vessels like the *Papa Rod*, are commonly used on vessels to wake the watchstander or alert the crew if the watchstander falls asleep. They require the operator to reset an alarm at preset time intervals to prevent the operator from falling asleep. The *Papa Rod* was not equipped with a watch alarm. Therefore, when the deckhand fell asleep at the helm, there was no mechanism to wake him or alert the other crewmembers.

THE PROBABLE CAUSE of the collision between the fishing vessel *Papa Rod* and the anchored bulk carrier *Appaloosa* was the on-watch deckhand falling asleep while operating the *Papa Rod*. **POSSIBLY CONTRIBUTING** to his drowsiness were effects of his drug use or a related sleep debt.



The *Papa Rod* colliding with the *Appaloosa* and moments after. SOURCE: COAST GUARD.



Damage to *Papa Rod*'s bow. SOURCE: COAST GUARD.

COLLISION

Collision of **William B Klunk** Tow with Moored Barges

VESSEL GROUP

Towing/Barge

LOCATION

Lower Mississippi River, mile 227,
Baton Rouge, Louisiana

CASUALTY DATE

April 17, 2024

ACCIDENT ID

DCA24FM033

INJURIES

1 minor

ESTIMATED DAMAGES

\$810,000

REPORT NUMBER

MIR-25-26

ISSUED

June 24, 2025



William B Klunk underway at unknown date before the collision.

SOURCE: AMERICAN COMMERCIAL BARGE LINE.



Screenshot from the onboard image recorder system at 1658 showing the **William B Klunk** tow beginning to break apart after the initial collision. SOURCE: AMERICAN COMMERCIAL BARGE LINE.

On April 17, 2024, about 1655 local time, the towing vessel **William B Klunk** was pushing 22 barges downbound on the Lower Mississippi River at mile 227, near Baton Rouge, Louisiana, when the tow collided with moored barges at a fleeting area. Thirteen barges broke away from the **William B Klunk** tow, and three barges broke away from the fleeting area, resulting in damage to the barges, a fleet crew boat, and two mooring dolphins. There was one minor injury, and no pollution was reported. Total damages were estimated to be \$810,000.

Earlier that day, at 1530, the 170-foot-long **William B Klunk** got underway and proceeded downriver. At the helm was a pilot who had boarded at 1330 to relieve the departing pilot. Before joining

the vessel, the pilot had been off for 28 days. On the day of the casualty, he woke up about 0030 to drive from his home in Tennessee to Baton Rouge. The pilot departed about 0200. He expected the drive to take 7 hours; however, due to severe weather and traffic, he did not arrive until 1245, 10 hours 45 minutes after he left home.

The pilot only received about 4 hours of continuous sleep in the 36 hours before the collision. Although he took a 1.5-hour nap break during the lengthy drive, his sleep quality was likely poor given that he was sleeping in a vehicle. The reported 4 hours of continuous sleep were about half of what the pilot typically received in each of the preceding days, representing an acute sleep debt. The pilot had

been awake for almost 14 hours when he reported on board and nearly 18 hours at the time of the collision. Research has shown that extended wakefulness exceeding 16 hours can affect an operator's alertness and performance and add to an individual's fatigue level, especially when there is existing sleep debt.

The operating company expected the pilot to report on board fit for duty and well rested. According to the company's TSMS, because the pilot's drive was over 150 miles, he was offered a hotel room, but he declined. The pilot was truthful with the captain about driving through the night, but he presented himself as fit for duty; the captain also assessed the pilot as fit for duty. Although the captain recommended that the pilot not get the tow underway during his first watch, he ultimately left the decision up to the pilot. While the pilot may have felt well-rested enough to get underway, research has shown that self-assessment of fatigue is problematic due to the noted impacts of fatigue on judgment and decision-making. These impacts result in a diminished ability of the fatigued individual to detect when their performance is declining.

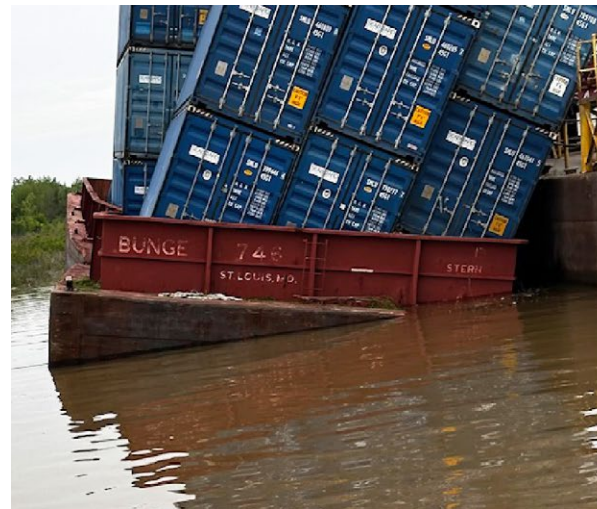
While navigating, the pilot engaged in nonoperational, secondary tasks. At 1625, he received a call on the company phone from a company safety officer. The 15-minute call was unrelated to the ongoing navigational task, and while on the phone, the pilot did not respond to a passing arrangement proposal from the upbound tanker *Pennsylvania* until 15 minutes after the *Pennsylvania* operator started hailing him. The pilot on the *Pennsylvania* noted that the movement of the *William B Klunk* during this time was "out of the ordinary." The *Pennsylvania* pilot's observation and the *William B Klunk* pilot's delay in responding to the proposed passing arrangement suggest that the pilot was distracted by the phone call.

The pilot reported using his personal cell phone during the transit—this was intermittently captured by the onboard image recorder system. In the almost 6 minutes leading up to the collision, the pilot did not make any rudder or throttle adjustments but was moving around near the operating console, indicating that he was not asleep. About 40 seconds before the

collision, footage showed the pilot using a cell phone and not monitoring the tow's position.

When the tow collided with three moored barges at a fleeting area on the left descending bank, the pilot believed that the *William B Klunk* had lost steering. However, after reviewing the onboard image recorder system footage, investigators found that the rudder angle indicators responded appropriately to the pilot's steering inputs before the collision. Additionally, postcasualty evaluations of the steering system by the *William B Klunk* chief engineer and a third-party technician found no issues that indicated a steering failure.

THE PROBABLE CAUSE of the collision of the towing vessel *William B Klunk* and tow with moored barges was the *William B Klunk* pilot becoming distracted due to cell phone use in the minutes leading up to the collision. **CONTRIBUTING** was the pilot's fatigue due to limited sleep the night before the casualty, which decreased his attentiveness and vigilance while operating the vessel.



Fleeting area container barge **BUNGE 746** listing after the collision and fleeting area crew boat **Mr. Bubba** being recovered after it sank. SOURCE: COAST GUARD.

LESSONS LEARNED

DISTRACTION DUE TO CELL PHONES

Use of cell phones and other personal electronic devices by on-duty crewmembers in safety-critical positions has been a factor in casualties and accidents in all transportation modes. Using cell phones can be visually, manually, and cognitively distracting. Use of cell phones, including company cell phones (particularly for nonoperational conversations), should never interfere with a watchstander's primary task to safely navigate a vessel and maintain a proper lookout. To reduce the risk of cell phone distraction, operating companies should establish protocols regarding both personal and work-related cell phone use, and vessel personnel should understand the importance in following them.

COLLISION

Collision of
Multi-Purpose Carrier
BBC Africa with
Bulk Carrier
Common Faith

VESSEL GROUP

▣ Cargo, General + ▣ Cargo, Dry Bulk

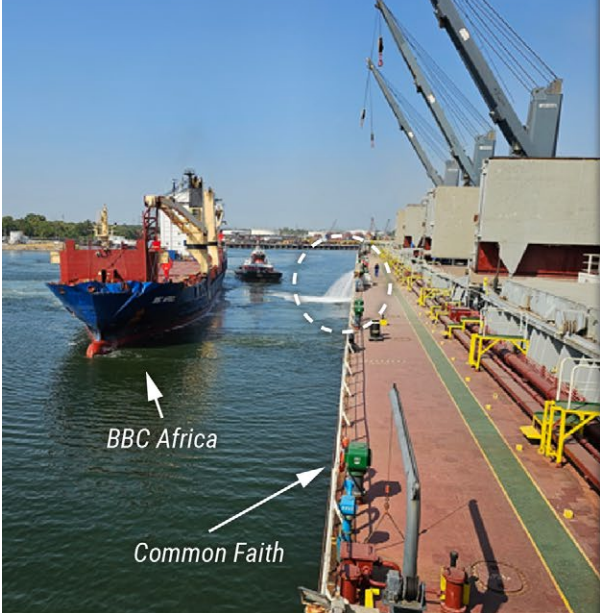
LOCATION

Buffalo Bayou, Houston Ship Channel,
Houston, Texas

CASUALTY DATE	ACCIDENT ID
August 25, 2023	DCA23FM048
INJURIES	ESTIMATED DAMAGES
None	\$1.1 million
REPORT NUMBER	ISSUED
MIR-25-33	August 15, 2025



BBC Africa at Manchester Terminal after the collision.



BBC Africa and Common Faith after the collision and ballast water spilling from Common Faith punctured port ballast tank (circled at left). SOURCE: COMMON FAITH MASTER.



On August 25, 2023, about 1012 local time, the multi-purpose carrier **BBC Africa** lost primary steering as it was departing the Manchester Terminal on the Houston Ship Channel in Houston, Texas, and struck the moored bulk carrier **Common Faith**. There were no injuries, and no pollution was reported. Damage to the vessels was estimated at \$1.1 million.

The day before, on August 24, at 0045, the 390-foot-long **BBC Africa** arrived at berth E at the Manchester Terminal from Veracruz, Mexico, to offload cargo. The following day, about 0130, the **BBC Africa** completed discharging cargo.

The crew completed all predeparture checklists and tests from the bridge and engine room and did not find any issues with the steering control systems. A Houston pilot and an apprentice boarded the vessel and met the master, chief officer, and second officer on the bridge (the helmsman was also on the bridge), and by 1003, the vessel was underway.

The vessel transited outbound on the Sims Bayou at 1.9 knots with the tug **Leighton K** trailing on the vessel’s starboard quarter. As the vessel approached Buffalo Bayou, steering was functioning from the port bridge wing. However, soon after steering control

was transferred to the bridge’s center helm using the in-command FU button at the center helm, the rudder swung hard to port, contrary to the pilot’s orders and the helmsman’s subsequent actions.

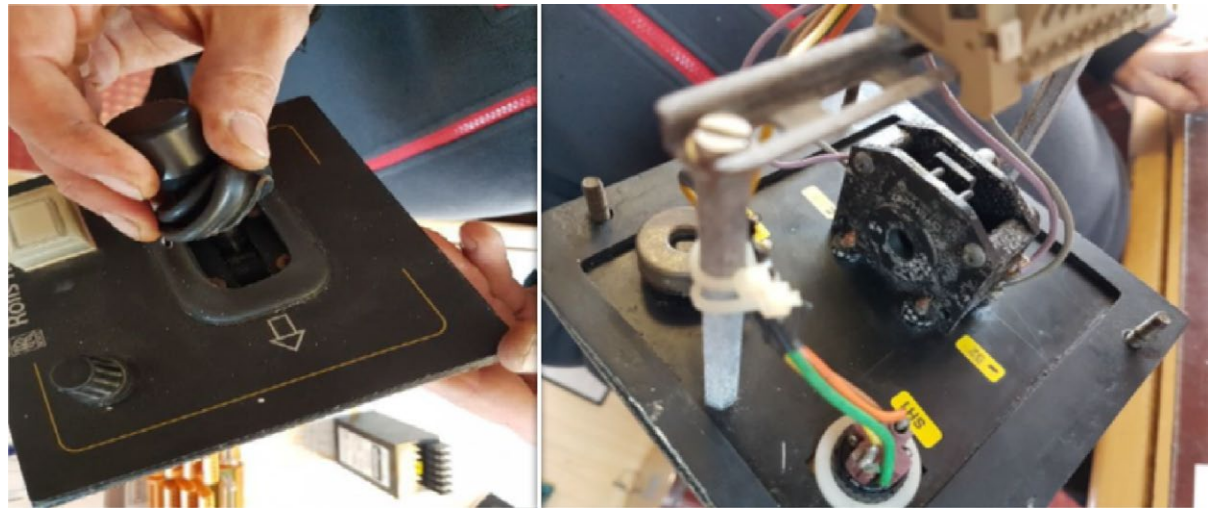
The chief officer attempted to regain control by re-pressing the in-command FU button, without success. After about a minute, the master activated the steering control system’s emergency override mode. Although he was able to regain control of the rudder, it was too late to sufficiently turn the vessel before colliding with the 623-foot-long moored bulk carrier **Common Faith**.

Following the collision, technicians from the manufacturer and investigators inspected and tested the mechanical and electrical components of the three control stations and control system panels. None of the procedural tests replicated the same loss of steering scenario experienced by the crew. However, tests identified three components that could have led to the steering failure: the port bridge wing tiller, the power supply transformer in the control cabinet located behind main bridge, and the push button relays to take “in command” status when requesting control. The operator replaced all three components following the collision, so investigators were not able to examine them further (the company also replaced these

components on two other vessels with similar steering control systems). Additionally, after the collision, the steering gear manufacturer released a Safety Bulletin on switch failures in the bridge wing tillers. The bulletin specifically noted that micro switch failure could lead to unintended rudder movements. Therefore, based on the rudder's movements and the postcasualty testing and inspection, the steering control failure was likely due to the bridge wing tiller micro switch failing.

After the chief officer first noticed that the rudder was not responding correctly, he made several unsuccessful attempts to regain primary steering control by re-pressing the FU button; finally, after about a minute, the master regained rudder control by using the emergency override function. Had the crew more quickly identified the issue or initiated the override function, they would have gained control of the rudder earlier.

THE PROBABLE CAUSE of the collision of the multi-purpose carrier *BBC Africa* with the bulk carrier *Common Faith* was the *BBC Africa*'s loss of the primary steering control system due to a steering control system component failure. **CONTRIBUTING** to the collision was the delayed response from the ship's crew to implement the emergency steering procedure from the bridge.



***BBC Africa* non-follow up steering tiller of the port wing control station showing damaged rubber boot and corroded/defective micro switch.** SOURCE: KONGSBERG SERVICE REPORT.

LESSONS LEARNED

TRAINING FOR STEERING CONTROL SYSTEM FAILURES

Steering control system failures can result in damaging consequences. In channels or during maneuvering, where immediate hazards (grounding, traffic, objects) are in proximity and therefore response time is critical to avoiding a casualty, steering system failure contingencies require immediate crew response. Training in steering recovery procedures, including scenario-based drills for bridge and engine teams, is critical to ensure crews can respond in the shortest possible time.

COLLISION

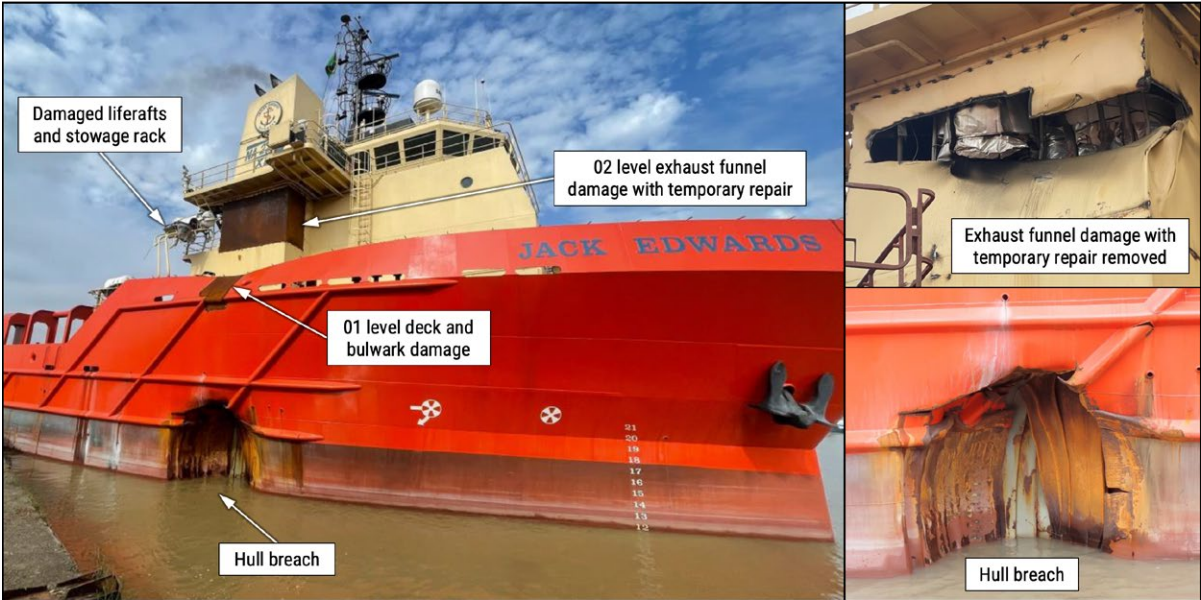
Collision between
Offshore Supply Vessel
Jack Edwards and
Cargo Vessel **Julie C**

VESSEL GROUP	
Offshore supply vessel +	Cargo, General
LOCATION	
Atlantic Ocean, about 3 nautical miles northeast of Georgetown, Guyana	
CASUALTY DATE	ACCIDENT ID
March 17, 2024	DCA24FM030
INJURIES	ESTIMATED DAMAGES
Two minor	\$1.025 million
REPORT NUMBER	ISSUED
MIR-25-42	December 8, 2025



From top: Jack Edwards arriving at a repair shipyard in April 2024 after the collision, and the Julie C at an unknown date before the collision.

SOURCES: EDISON CHQUEST OFFSHORE; THE CSL GROUP INC.



Jack Edwards external damage. SOURCE: EDISON CHQUEST OFFSHORE.

On March 17, 2024, at 2253 local time, the OSV *Jack Edwards* was in the Atlantic Ocean transiting inbound to Georgetown, Guyana, when it veered to port and collided with the outbound general cargo vessel *Julie C*. After the collision, the *Jack Edwards* continued to Georgetown under its own power. The *Julie C* returned briefly to Georgetown before proceeding on its intended voyage. Two crewmembers on the *Jack Edwards* sustained minor injuries. As a result of the collision, an estimated 2,200 gallons of diesel fuel were released into the water from the *Jack Edwards*. Damages to the *Jack Edwards* and *Julie C* were estimated at \$1.025 million.

About 2 weeks earlier, the 278-foot-long *Jack Edwards* got underway from Louisiana, bound for Guyana after completing a major drydocking maintenance period. Throughout the vessel’s transit to Guyana, numerous steering system alarms sounded. On the day before arrival in Guyana—2 days before the accident—the chief mate noticed that the *Jack Edwards*’s steering was erratic, and the

autopilot was “working harder” than he expected it to. In the watch turnover checklist for that day, the chief mate logged that “the vessel’s steering system seems to be off” and that it required 8° of starboard rudder to maintain course. However, no action was taken to address the steering problems because the degradation to the system had become normalized. Had the discrepancies observed with the steering system been reported to the chief engineer, the system could have been examined and repaired before the collision occurred.

The *Jack Edwards* arrived in Guyana without incident following the voyage from Louisiana. A day later, the OSV got underway to conduct a brief sea trial for the vessel charterer. As the *Jack Edwards* made its way inbound to Georgetown after the sea trial, the second mate had difficulty steering the vessel. The second mate’s difficulty with steering led him to turn over control to the chief mate, who likewise encountered steering difficulties. Both of the mates reported that the OSV tended to veer to port, requiring significant corrective rudder to starboard.



Jack Edwards starboard steering gear as found immediately after collision.

BACKGROUND SOURCE: EDISON CHOUEST OFFSHORE.

Company RMC and VDR data showed that the second mate and chief mate used predominantly starboard rudder throughout the transit and the starboard rudder consistently lagged behind the port rudder when turning to starboard. Immediately after the collision, the captain and chief engineer found the starboard steering gear leaking large amounts of black hydraulic oil. The starboard steering gear was likely degraded throughout the casualty voyage. The cause of the degradation in the starboard steering unit was not determined, but was possibly due to a faulty repair, oil breakdown or contamination, or a combination of these factors.

To assist with steering the vessel, the chief mate ordered the second mate to bring the ship's thrusters online. RMC data showed that, as the second mate was attempting to bring the thrusters online, control of the *Jack Edwards's* rudders and engines shifted to the aft console, where it remained for 57 seconds.

Once control was taken away from the chief mate at the forward console, the *Jack Edwards* veered to port—as was its tendency to do—crossing in front of the 453-foot-long *Julie C*. Although the chief mate regained control about a minute after the shift, the shift in propulsion and steering control prevented him from taking immediate action to avoid a collision with the *Julie C*. Consequently, the *Julie C's* bow struck the starboard side of the *Jack Edwards*.

The second mate's erroneous shifting of propulsion and steering to the aft bridge console led to the final loss of control of the vessel. The second mate likely intentionally pressed one of the takeover buttons or selected takeover on the touchscreen display without understanding what he was doing. When considered with other factors, such as his inability to locate the general alarm when the collision was imminent and his unfamiliarity with the *Jack Edwards's* touchscreen controls, the second mate's actions suggest that he was not adequately trained for the duties and responsibilities he was expected to perform.

Investigators found that the management

and crew of the *Jack Edwards* did not test or replace hydraulic oil in the vessel's steering system in accordance with the manufacturer's procedures. The crew did not accurately assess the steering gear in accordance with the critical equipment checklist and did not align the vessel's thrusters for entry into port in accordance with the SMS and master's standing orders. Had any of these procedures been properly followed, it is unlikely that the collision would have happened.

THE PROBABLE CAUSE of the collision between the OSV *Jack Edwards* and the cargo vessel *Julie C* was the normalization of degradations to the vessel's steering system, which reduced the ability to effectively steer the vessel and led to a mistaken transfer of steering and engine controls from the primary navigation station as the *Jack Edwards* prepared to meet the outbound *Julie C*, resulting in a temporary loss of vessel control.

LESSONS LEARNED

REPORTING ISSUES

Maintenance issues and other conditions affecting the safe operation of a vessel should be promptly reported to senior officers and the operating company. Reporting systems should provide specific guidance regarding critical equipment, hull integrity, and operational safety. A robust reporting system should also include procedures for company oversight to ensure that crews are reporting issues and that the operating company is tracking and promptly addressing them.

ADHERING TO WRITTEN PROCEDURES

This accident illustrates the potential safety hazards of failing to follow the written procedures for maintenance and operations. Mariners should review manufacturer manuals, the SMS, and the planned maintenance system on a regular basis to ensure conformance with recommended maintenance and operations plans and procedures. Without proper maintenance, equipment cannot be relied on to perform as designed. Operational procedures are designed to provide maximum safety and efficiency for various situations, such as transits through restricted waters. Not following these procedures increases the risk of casualties.

COLLISION

Collision between
Towing Vessel
William E Strait and
Moored Barges at
Shell Norco Refinery
Dock

VESSEL GROUP
Towing/Barge

LOCATION
Lower Mississippi River, mile 126,
Norco, Louisiana

CASUALTY DATE	ACCIDENT ID
December 10, 2023	DCA24FM012
INJURIES	ESTIMATED DAMAGES
None	\$501,000
REPORT NUMBER	ISSUED
MIR-25-43	December 9, 2025

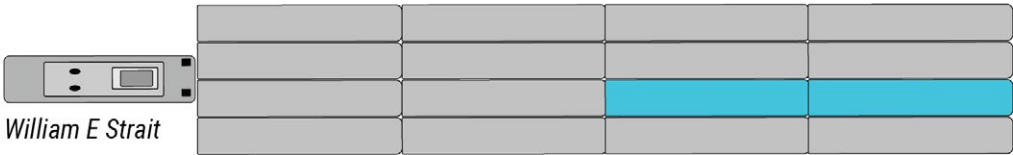


William E Strait underway at unknown date before the casualty. SOURCE: JEFF L. YATES.

Arrival at mile 126



Departure from mile 126



Removed to Upper St. Rose fleeting area Repositioned

William E Strait towing arrangement on arrival and departure from mile 126.

BACKGROUND SOURCE: *WILLIAM E STRAIT* MATE.

On December 10, 2023, about 0139 local time, the *William E Strait* tow was pushed in to the bank on the Lower Mississippi River near Norco, Louisiana, when the towing vessel *Steel Skipper*, which was reconfiguring the tow, pushed the tow astern, and the *William E Strait* collided with two moored barges upstream at the Shell Norco Refinery dock, damaging the barges and dock. There were no injuries, and no pollution was reported. Damage to the moored barges and facility was estimated at \$501,000.

On November 30, 2023, the 184-foot-long *William E Strait*, with a crew of nine, got underway southbound on the Lower Mississippi River, from mile 953 at Cairo, Illinois. Over the next 9 days, the crew picked up and dropped off barges at various locations while en route to the Gnats fleeting area at mile 118 in St. Rose, Louisiana.

On the night of December 9, about 2350, the tow arrived at mile 126.8 and pushed in along the left descending bank to drop off barges, just downriver of the Shell Norco Refinery in Norco, Louisiana. At the time, the vessel was pushing 19 barges, configured in five strings of four barges each, with a notch (an empty spot) on the starboard string at the head.

Aft of the tow, the unmanned 192-foot-long crane barge *Cajun Courage* and 195-foot-long deck barge *CDB02* were moored at the nearby Shell Norco Refinery dock no. 3. The barges were lit by a spotlight from the dock.

The fleeting tug *Steel Skipper* was tasked with moving three barges from the *William E Strait* tow to the Upper St. Rose fleeting area, which was near mile 126 on the right descending bank, across the river from the Shell Norco Refinery dock. Operations began at

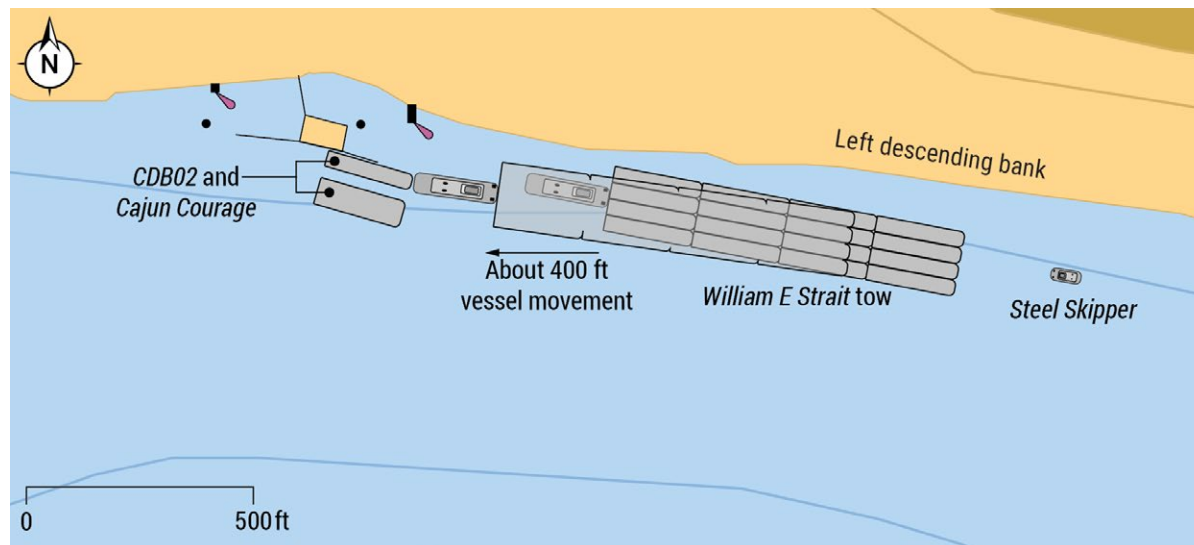
0100, with the *Steel Skipper* taking one barge on the first trip, then the remaining two barges on the next trip.

Once the transfer of the 3 barges to the Upper St. Rose fleeting area was completed, the *Steel Skipper* returned to the *William E Strait* tow on the left descending bank and began to reposition the remaining two barges in the starboard string to the newly created space in the center string (from the barges moved to the Upper St. Rose fleeting area). This would create four strings of four barges each for the next leg of *William E Strait*'s voyage. The mate of the *William E Strait* said that, about 0210, he felt the vessel begin to move astern in the direction of the Shell Norco Refinery dock as the fleeting tug moved the last two barges into position at the head of the tow. The *William E Strait*'s engines were not engaged.

While the fleeting tug *Steel Skipper* was repositioning barges, the vessel pushed the *William E Strait* tow astern about 400 feet upriver, and the stern of the *William E Strait* collided with the two moored barges at the dock. The two barges were pushed into the dock, damaging it.

According to the *William E Strait* mate, the two moored barges did not have deck or running lights and were only lit by a spotlight from the dock. Additionally, a dense fog advisory was in effect at the time, which the mate said reduced visibility. Because of the reduced visibility, the mate, who was on the bridge at the time, did not recognize that his vessel was in danger of colliding with the moored barges and dock aft of the tow, and therefore did not use his engines to attempt to avoid them.

THE PROBABLE CAUSE of the collision between the towing vessel *William E Strait* and moored barges at the Shell Norco Refinery dock was the *William E Strait* mate not recognizing the proximity of the unlit barges astern of his towboat as the vessel was pushed astern by an assisting fleeting tug while repositioning barges. **CONTRIBUTING** was the dense fog and rain, which obscured visibility during the operation.



William E Strait astern movement toward moored barges, resulting from the push by the Steel Skipper during barge repositioning. BACKGROUND SOURCE: NOAA ENC US5LA52M AS VIEWED ON ROSE POINT.

CONTACT

Contact of
Yacht **Atlantis** with
Floating Dredge Pipe
Pump-Out Cube

VESSEL GROUP	
Yacht/Boat	
LOCATION	
Atlantic Ocean, about 1.5 miles east of St. Augustine Beach, Florida	
CASUALTY DATE	ACCIDENT ID
May 25, 2024	DCA24FM042
INJURIES	ESTIMATED DAMAGES
1 minor	\$2 million
REPORT NUMBER	ISSUED
MIR-24-36	November 19, 2024



Atlantis in undated photo before the contact.
SOURCE: ATLANTIS OWNER.



Atlantis on May 25, 2024, following the contact. SOURCE: FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION.

On May 25, 2024, about 1130 local time, the yacht **Atlantis** was transiting north in the Atlantic Ocean about 1.5 miles east of St. Augustine Beach, Florida, when the vessel struck a floating dredge pipe pump-out cube associated with a beach renourishment project. The contact compromised the hull, causing the yacht to flood and eventually sink. There was one minor injury, and no pollution was reported. The damage to the pump-out cube was estimated at \$20,000. The **Atlantis**, with an estimated value of \$2 million, was declared a total loss.

About 0650, the 80-foot-long Sunseeker Predator 80 yacht **Atlantis** departed Port Canaveral, Florida, and headed north toward Fernandina Beach, Florida, with two persons (operator and spouse) on board. They had made this trip about 40 times. The operator was following previously used navigation tracks for the route, which were displayed on the chart plotter located at the helm.

At 1129, the vessel was proceeding north at 24 knots on autopilot (to maintain the vessel’s heading), with good visibility and calm seas. The operator was at the helm. About this time, his spouse, who was also on the bridge, went below.

A minute later, about 1130, the vessel jolted “as if it had hit a wall.” Shortly after, “the alarm sensor for water in the forward bow was on.” The operator did not visually see what the vessel had impacted.

The operator immediately checked on his spouse, who had bumped her head, then checked the vessel for damage. He went to the forwardmost space, opened

a hatch to the area beneath the space, and observed water “just pouring in” through a hole in the hull.

At 1137, the operator notified the Coast Guard via VHF radio of the emergency. The Sector Jacksonville Command Center requested the operator activate the vessel’s EPIRB (which he did), and then coordinated rescue efforts with the Coast Guard, the local fire department, and nearby vessels.

Both persons on board donned lifejackets, and the operator deployed one of the vessel’s two liferafts, but they remained on the vessel while awaiting rescue. About 1215, St. Johns County Fire Rescue personnel arrived on scene and evacuated the operator and spouse. The **Atlantis** drifted and eventually sank.



Atlantis sinking. SOURCE: FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION.



Hull damage to the *Atlantis*.

SOURCE: ST. JOHNS COUNTY FIRE RESCUE.

Following the casualty, responders informed the operator and spouse that the vessel had impacted a floating dredge pump-out cube (mooring cube) located about 1.5 miles offshore from St. Augustine Beach. The pump-out cube was part of a Corps of Engineers project to renourish St. Augustine Beach. The contractor managing the project operated a dredge that collected sand and was connected to a floating hose that attached to the pump-out cube of the dredge pipeline. After the dredge was connected to the floating hose, it would pump the sand/water mixture to the shore through an underwater metal dredge pipe lying on the bottom. The pump-out cube dimensions were 10 feet by 11 feet (equivalent in size to a small boat) with an approximately 3-foot freeboard, and the float hose with a connector was 200 feet in length. The underwater dredge pipe that transported the sand/water mixture toward the beach was about 9,000 feet long.

The Coast Guard had approved the installation of the pump-out cube, floating hose, and dredge pipeline, and they had been in place for several months before the contact. Six buoys marked the underwater dredge pipe, three flashing lights were on the floating hose, and a radar-reflective warning sign and two red lights marked the pump-out cube. In addition, investigators confirmed that the location of dredging operations for the St. Augustine Beach renourishment project had been listed in all weekly editions of the District Seven (now known as Southeast District) Local Notice to

Mariners leading up to the casualty. Therefore, the required markings and notifications were in place to warn mariners of the dredging associated with the beach renourishment project.

The operator, who had been alone on the bridge, had maintained the vessel's speed at 24 knots on autopilot as he unknowingly approached the pump-out cube. He stated that he had been keeping an attentive lookout due to their proximity to the St. Augustine Inlet and the possibility of increased boat traffic. He had several navigation tools available to him, including two chart plotters, GPS, and radar, to assist him during the transit. However, the vessel's speed of approach

and pronounced bow (limiting visibility forward to the horizon beneath the bow while running at a trim on plane) reduced the amount of time the operator would have had to see the pump-out cube. Nevertheless, given the conditions (calm seas, clear skies, good visibility), the operator should have been able to see the pump-out cube.

THE PROBABLE CAUSE of the contact of the yacht *Atlantis* with a floating dredge pipe pump-out cube was the operator not maintaining an effective lookout.

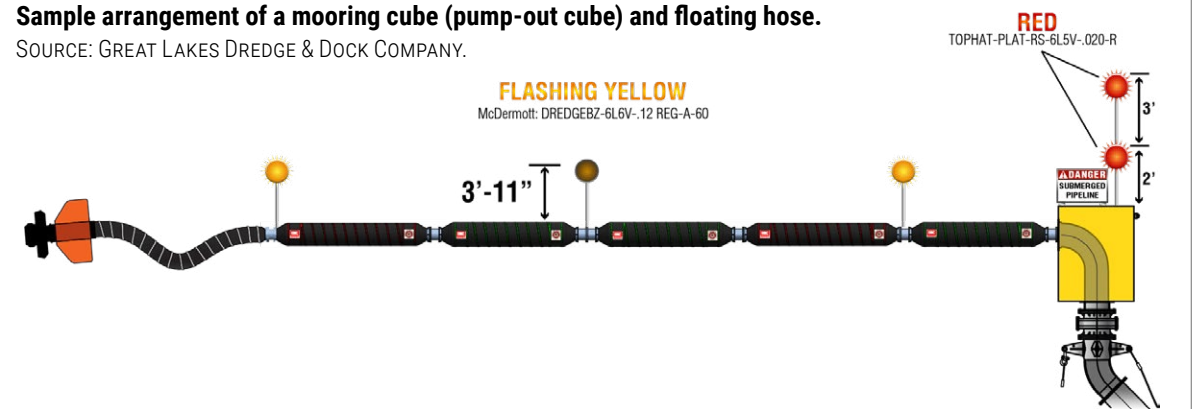


From left: The dredge pipeline pump-out cube and floating hose from a distance, after the casualty. The pump-out cube with damaged sign and the area where the *Atlantis* made contact (circled).

SOURCE: FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION.

Sample arrangement of a mooring cube (pump-out cube) and floating hose.

SOURCE: GREAT LAKES DREDGE & DOCK COMPANY.



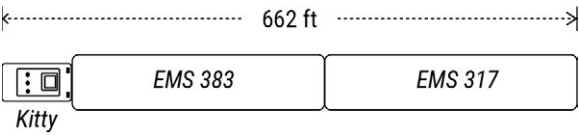
CONTACT

Contact of *Kitty* Tow
with Algiers Lock Gate

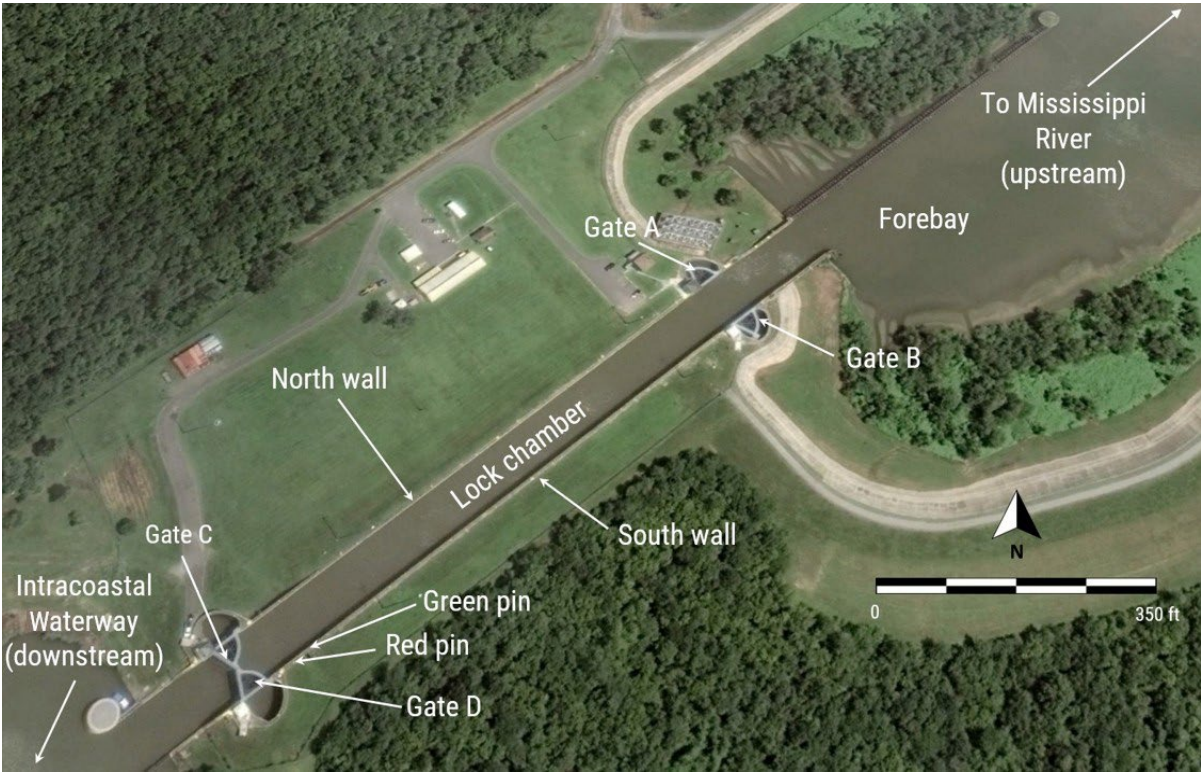
VESSEL GROUP	
Towing/Barge	
LOCATION	
Algiers Lock, near mile 88.4, Lower Mississippi River, New Orleans, Louisiana	
CASUALTY DATE	ACCIDENT ID
July 4, 2023	DCA23FM038
INJURIES	ESTIMATED DAMAGES
None	\$2 million
REPORT NUMBER	ISSUED
MIR-25-01	January 14, 2025



The *Kitty* after the casualty.



Kitty towing arrangement.



Algiers Lock with the lock gates in the position they were in at the time of the casualty.

BACKGROUND SOURCE: GOOGLE EARTH.

On July 4, 2023, about 1808 local time, the towing vessel *Kitty* was pushing two loaded tank barges through the Algiers Lock near mile 88.4 on the Lower Mississippi River in New Orleans, Louisiana, when the lead barge, *EMS 317*, struck one of the lock gates. There were no injuries, and no pollution was reported. Damage to the barge was negligible, while damage to the lock gate was about \$2 million.

Earlier that day, about noon, the 68-foot-long *Kitty*, with six crew on board, departed a refinery at mile 88.7 on the Lower Mississippi River, pushing two loaded tank barges (*EMS 317* and *EMS 383*), en route to a terminal in Beaumont, Texas. For the voyage, the *Kitty* was to briefly transit the Mississippi River, pass through the Algiers Lock, and then proceed west through the Gulf Intracoastal Waterway.

The two tank barges, owned and operated by Enterprise Marine Services, LLC, were strung out with the *EMS 317* at the head of the tow and the *Kitty* faced up to the *EMS 383* at the rear of the tow. Each barge was 297 feet long by 54 feet wide and loaded with about 24,000 barrels of light cycle oil. The deepest draft of the tow was the loaded barges (10 feet). The overall length of the tow was 662 feet, and the maximum width was 54 feet.

At 1722, after receiving clearance from the lock operator, the captain steered the tow into the forebay and toward the lock. The captain told investigators that he had planned to have the steersman maneuver the tow into the lock. However, because “at this kind of river stage, it [the water] surges a lot,” he opted to do it himself, explaining what to expect and look out

for when entering the lock at that river stage, with the steersman observing. The river gage at Algiers Lock was 1.7 feet, constituting extremely low water conditions.

About 1741, the *Kitty* tow entered the forebay. Two crewmembers prepared lines and bumpers on the barges to enter the lock and then moved to the head of the tow. About 1749, the head of the tow began to enter through the open lock gates at 2 mph and decreasing.

While the *Kitty* tow was entering or in the Algiers Lock, three loaded ships (two moving southbound at about 13–14 knots and one moving northbound at about 10 knots) had transited the Mississippi River near the lock within about 10 minutes' time. The size of a wake caused by a vessel and the volume of water displaced is proportional to the vessel's speed, displacement, draft, trim, beam, and hull form, as well as the water's depth and the width of the area the vessel is moving through. The size, speed, and frequency (each within about 5 minutes of each other) of the three loaded ships transiting near the lock would have produced wakes that affected the forebay and lock chamber.

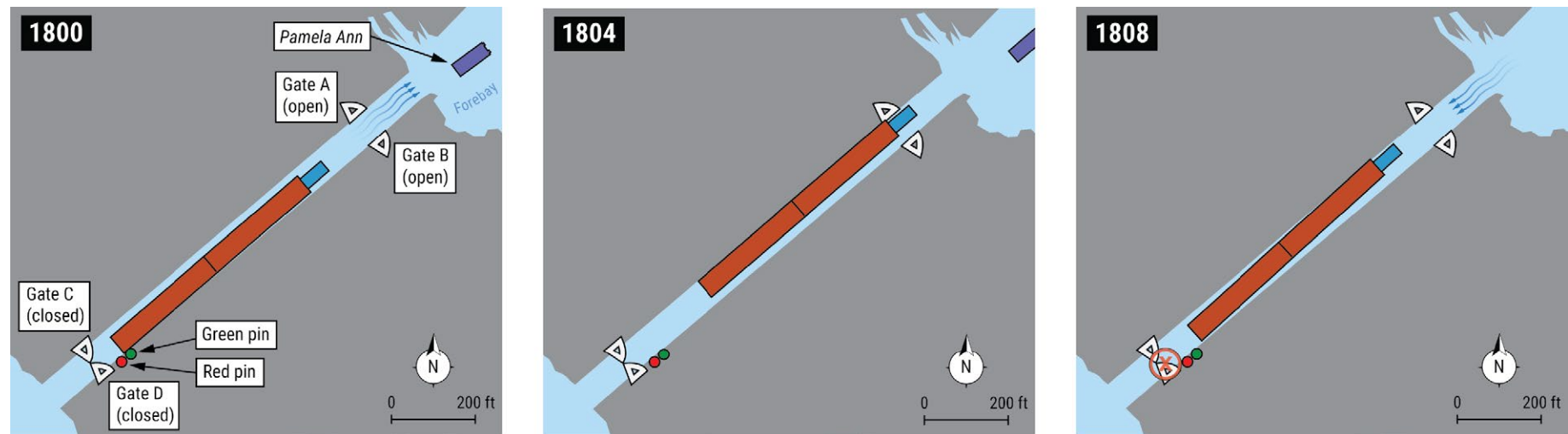
Surging waters within the lock chamber affected the *Kitty* tow while it was in the lock. The *Kitty*, without any action from the captain at the controls, began to move out of the lock. The tow then began to advance forward into the lock. The captain put the engines to full astern, but there was no effect on slowing the tow's advance. At 1808, the lead barge, *EMS 317*, struck Algiers Lock Gate D.

The effects of water displacement from a deep-draft vessel's wake can increase when that water pushes into and recedes from narrow and/or smaller water bodies, such as shallow areas and lock chambers. With the river, and therefore forebay water level, at a much lower level than normal, the size (volume of water) and surface area in the forebay would have been reduced. The forebay narrowed to the lock chamber, and surges in the lock had been witnessed before (although only about a foot).

The crew of the *Kitty* described the variance of water in the lock chamber during the casualty as 3–6 feet. A postcasualty video study conducted by the NTSB found the lower limit of the actual water level variations (minimum change in the lock chamber

water level) to be 3.4 feet. The captain of the *Kitty* described that the tow was pulled out of the lock, which is consistent with the movement of receding water. Following that, the tow was pushed back into the lock chamber, consistent with rising water. Neither of these conditions occurred when there were no ships transiting in the river nearby. Thus, it is likely that wake effects from deep-draft ships, transiting the Mississippi River adjacent to the Algiers Lock forebay during extremely low water conditions, moved water in and out of the forebay and lock chamber, causing the *Kitty* tow in the lock to surge.

THE PROBABLE CAUSE of the contact of the barge *EMS 317* with Algiers Lock Gate D was surging water within the lock chamber, which was likely caused by the wakes from three deep-draft ships passing the lock forebay in quick succession during extreme low water conditions on the Mississippi River.



The positions of the *Kitty* tow at 1800, 1804, and 1808. Direction of water movement in and out of the lock is indicated by wavy arrows, and the contact area is indicated by a red X.

CONTACT

Contact of Crane on Deck Barge **BMI 209** Towed by **Nickelena** with Mackinac Bridge

VESSEL GROUP

Towing/Barge

LOCATION

Straits of Mackinac, Mackinaw City, Michigan

CASUALTY DATE

May 7, 2023

ACCIDENT ID

DCA23FM032

INJURIES

None

ESTIMATED DAMAGES

\$665,000

REPORT NUMBER

MIR-25-02

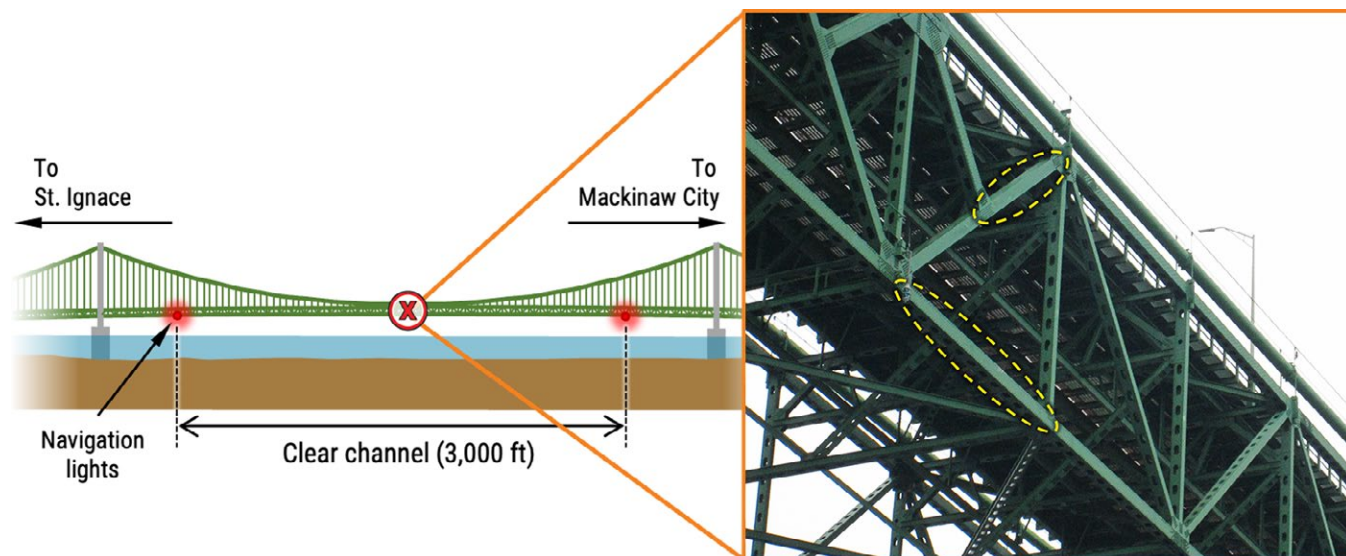
ISSUED

January 16, 2025



The **Nickelena** on an unknown date before the contact, and the crane aboard the **BMI 209**, as seen from the **Nickelena** during the voyage and before the contact.

SOURCES: COAST GUARD AND BASIC TOWING INC.



Area of west elevation of the Mackinac Bridge damaged by the contact with the crane boom aboard **BMI 209**, indicated by an X. Inset shows the location of the impacted stiffening truss bottom chord and upper diagonal truss (highlighted in yellow). INSET SOURCE: MACKINAC BRIDGE AUTHORITY.

On May 7, 2023, about 0213 local time, the towing vessel **Nickelena** was transiting the Straits of Mackinac while towing the deck barge **BMI 209**, transporting a crawler crane, when the crane boom struck the main span of the Mackinac Bridge. The contact bent the crane boom backwards, causing the boom to eventually collapse onto the aft end of the barge. There were no injuries, and no pollution was reported. Damage to the Mackinac Bridge was estimated at \$145,000; damage to the crane was estimated at \$665,000.

The previous day, on May 6, a crawler crane with a 160-foot-long boom and a 5-foot “rooster” sheave attachment was loaded on the **BMI 209** in Escanaba, Michigan. It was secured in place with four shackles (two on each side of the crane). The boom was secured to the forward deck of the barge via two steel wires. The 102.7-foot-long **Nickelena** was scheduled to depart with the loaded barge in tow later that day.

Before departure, managers from the towing vessel operating company visually estimated the angle of the boom to be between 50° and 60° and believed

that, with its 5-foot rooster sheave attached, the boom was 145 feet in length (the boom was 160 feet long). Using their visual estimation of the crane’s boom angle and their boom length estimate, both of which were incorrect, they believed that the boom was at a safe height for the transit. The managers told the **Nickelena** captain “everything’s secured, ready to go.”

The vessel owners told investigators that they had a TSMS (in accordance with Subchapter M regulations). Procedures like voyage planning would have been included in a TSMS, and the TSMS would have required documentation of this planning once completed. However, there was no documentation that a navigation assessment, including consideration of “air draft relative to overhead obstructions for the intended route,” was conducted before departure. The captain, who was responsible for ensuring that the vessel was safe to transit the intended route, did not confirm the crane boom height or verify the bridge’s vertical clearance before departure. Instead, he relied upon the erroneous estimates provided by his managers. The company managers, who should have been providing

oversight and ensuring that effective voyage planning occurred, may have undermined this process by telling the captain that the crane on the deck barge was ready for the transit. A functional TSMS, when properly implemented with effective oversight, would have ensured both company managers and the captain collaborated to ensure effective voyage planning prior to departure.

At 1400, the *Nickelena* got underway towing the deck barge *BMI 209* astern, heading east towards Sault Ste. Marie.



Infrared footage of the *Nickelena* towing the deck barge *BMI 209* with the crane on board at 1226 the night of the contact.

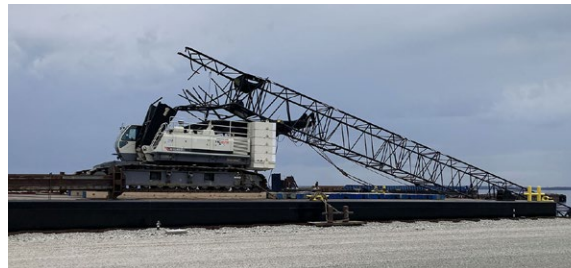
SOURCE: ENBRIDGE STRAITS MARITIME OPERATIONS CENTER.

Early the next morning, about 0213, shortly after passing eastward under the main suspension span of the Mackinac Bridge, the crew discovered that the crane they were towing 500 feet astern aboard deck barge *BMI 209* had struck the bridge and collapsed onto the barge.

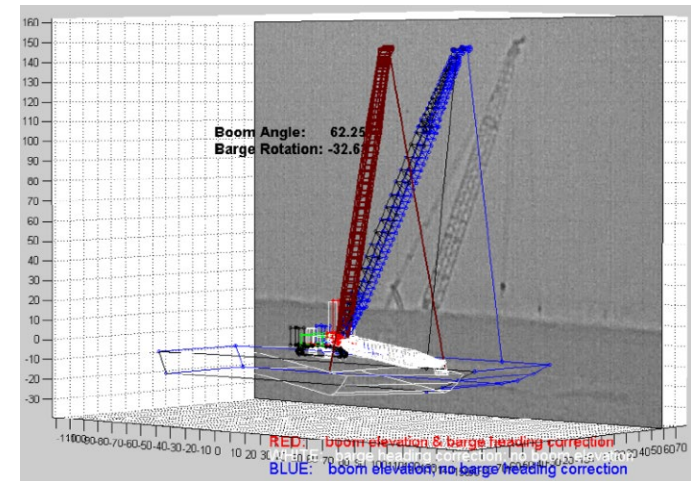
The damage to the Mackinac Bridge structure indicated that the first contact was to the stiffening truss below the roadway, at the top of the truss's bottom chord (about 155 feet above the water). Given the configuration of the crane, the wires securing the crane boom would have hit first, and when they parted, the boom would have contacted the top of the chord. As the barge continued forward, the boom would have been pushed backwards and its angle and height above the water would have increased, leading to damage higher up on the bridge. At some point, the boom contacted the upper diagonal truss, about

183 feet above the water, before folding back and collapsing on the barge.

An NTSB study used video of the crane barge on the day of contact to determine that a boom elevation angle for the crawler crane over about 55° would contact the truss bottom cord of the bridge with the barge near the center of the channel. The study determined that the boom angle during the voyage and before contact with the bridge was about 62°, corresponding to a boom height of 162.3 feet above the water. Similarly, a postcasualty Coast Guard analysis determined that if the boom angle was 60° (the high end of the towing company managers' estimate), the end of the 160-foot-long boom with an attached 5-foot rooster sheave would have been about 165 feet above the water level. Given the vertical clearance of 153 feet for the Mackinac Bridge at the time of the contact, the crane was about 10 feet too high to transit under the bridge (not including an additional safety margin).



The boom bent backwards over the cabin after striking the bridge.



Infrared footage of the crane on board the deck barge *BMI 209* at 1226, with the NTSB simulation overlay of the boom angle at 62.2°. BACKGROUND SOURCE: ENBRIDGE STRAITS MARITIME OPERATIONS CENTER.

THE PROBABLE CAUSE of the contact of the *Nickelena*'s towed crane on deck barge *BMI 209* with the Mackinac Bridge was the captain's and barge company managers' ineffective voyage planning, which did not identify the crane being towed was too high to pass safely under the bridge.

LESSONS LEARNED

VERIFYING NAVIGATION RISKS WHEN VOYAGE PLANNING

For vessels and tows with high air drafts, such as crane barges, bridges pose a risk of overhead contact. Operators should ensure they have the most accurate and objective data about the crane and bridge heights before getting underway. Appropriate navigational resources such as the *US Coast Pilot* or navigational charts should be consulted by owners and operators when developing voyage plans to assess navigation risks and hazards, including the air draft relative to bridge vertical clearances along the intended route.

CONTACT

Contact of
Small Passenger Vessel
Columbia Gorge with
Pedestrian Bridge and
Tribal Fishing Platforms

VESSEL GROUP
Passenger

LOCATION
Columbia River, mile 150, Cascade Locks, Oregon

CASUALTY DATE	ACCIDENT ID
January 13, 2024	DCA24FM017
INJURIES	ESTIMATED DAMAGES
None	\$430,000
REPORT NUMBER	ISSUED
MIR-25-07	January 31, 2025



Columbia Gorge moored at its dock at the Cascade Locks Marina in May 2015.
SOURCE: TRIPADVISOR.COM.



Left to right: The stern of the *Columbia Gorge* under the Thunder Island pedestrian bridge as seen from the mainland; damage to the stern and the support columns for the upper deck of the *Columbia Gorge* (circled); and the vessel in the lock with broken moorings visible (circled). BACKGROUND SOURCE: JETTYLIGHT LLC.

On January 13, 2024, about 0815 local time, the small passenger vessel *Columbia Gorge* broke away from its mooring on the south side of the Columbia River in Cascade Locks, Oregon, during high winds. There was no one on board the vessel at the time. The *Columbia Gorge* drifted downriver and eventually struck the Thunder Island pedestrian bridge and three tribal fishing platforms. There were no injuries and no pollution was reported. Damages to the vessel, the pedestrian bridge, and adjacent fishing platforms were estimated at \$430,000.

Two days earlier, on January 11, strong east winds, estimated to be 30–40 knots, were forecasted, with blizzard conditions possible. In anticipation of these conditions, crewmembers shifted the 145-foot-long *Columbia Gorge* at its dock at mile 149.2 in Cascade Locks to face into the weather. They turned the vessel from its typical mooring arrangement (port side to, with the bow facing downriver in a southwesterly direction) to an upriver bow mooring (starboard side to, with the bow in a northeasterly

direction). In addition, they increased the number of mooring lines from six to eight and added a galvanized chain. The bow line was tight, and crewmembers estimated there was less than a foot of slack in the breast lines and the chain. The vessel was uncrewed while docked, and, in the days before the breakaway, the crew checked the vessel's mooring a few times a day.

While the vessel was moored, the winds picked up to more than twice what was forecasted, increasing the wind load (force) acting on the *Columbia Gorge*. This force, just off the starboard bow, would have strained the mooring lines and chain holding the ship to its dock. As a result, all eight mooring lines and the chain failed. The *Columbia Gorge*, with no one aboard, broke free from its mooring and drifted about 475 yards downriver into a historic lock. The vessel damaged tribal fishing platforms mounted on the lock walls before its stern became wedged beneath the Thunder Island pedestrian bridge, which spanned the lock. Once notified of the breakaway, the crew responded quickly and secured the vessel.



The area where the destroyed fishing platform had been mounted and damage to one of the platforms on the opposite side of the lock (circled).

BACKGROUND SOURCE: PORT OF CASCADE LOCKS PORT COMMISSION.

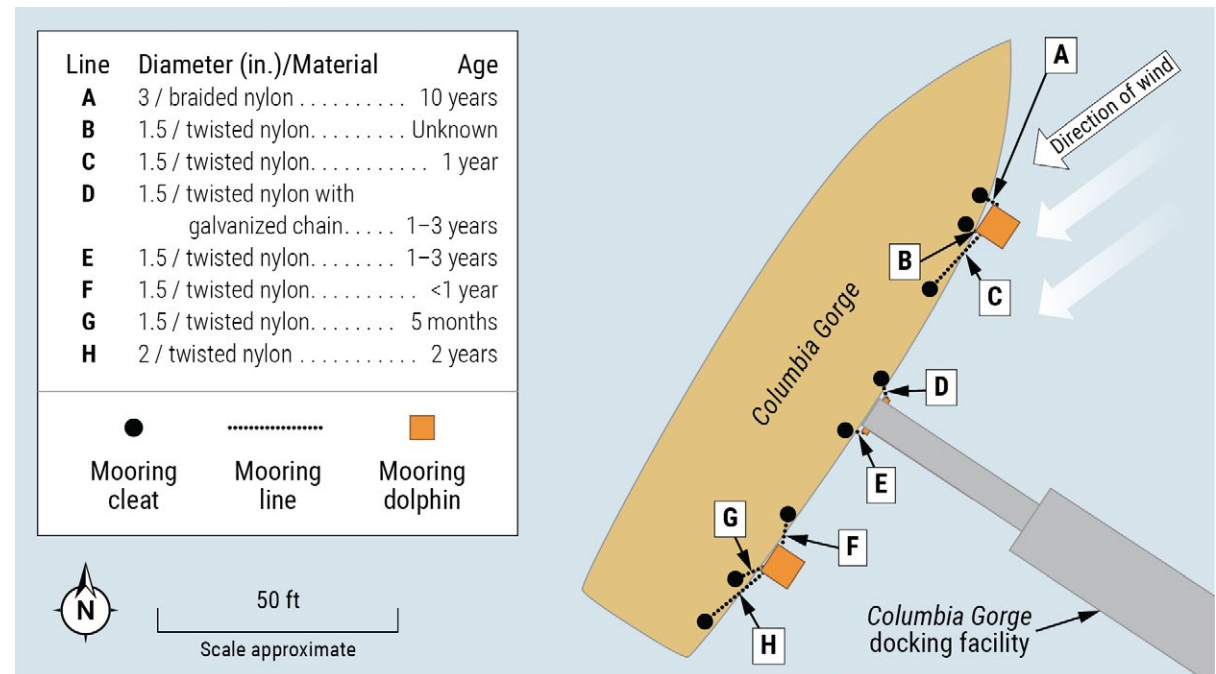


Damage to the pedestrian bridge deck and railing (circled) and displacement of the deck. BACKGROUND SOURCE: PORT OF CASCADE LOCKS PORT COMMISSION.

The vessel operator had no plan in place for regularly examining the vessel's mooring lines or replacing them before failure, and the ages of the *Columbia Gorge*'s mooring lines ranged from less than 1 year to 10 years, with the age of some lines either unknown or not definitively known. The Port of Cascade Locks Port Commission Root Cause Analysis Team, which was formed 3 days after the casualty to investigate the breakaway, found that the mooring arrangement and nylon lines used would have been adequate to keep the vessel moored during the adverse weather conditions the morning of the casualty if the lines had been new or in good condition.

Because none of the lines were new and the vessel operator did not have a life cycle management program to regularly examine the condition of the lines, it is possible that some of the mooring lines used to secure the *Columbia Gorge* during the adverse weather event had become degraded, which led to the mooring lines breaking. As a result of the casualty, the operating company required mooring lines to be replaced annually.

THE PROBABLE CAUSE of the contact of the small passenger vessel *Columbia Gorge* with the pedestrian bridge and tribal fishing platforms was the high winds acting on the vessel, which exceeded the mooring arrangement, leading to the vessel breaking away and drifting downriver.



Columbia Gorge mooring arrangement on January 13, 2024, including the diameters of and materials comprising each mooring line.

LESSONS LEARNED

ASSESSING CONDITION OF MOORING LINES

Conducting regular visual assessments to verify the condition of mooring lines and identify issues or defects is a prudent practice that is useful as a part of a vessel's preventative maintenance plan. In addition to a line's age, multiple factors affect the service life of a mooring line, including mooring design and the usual line arrangement, position of the line, mooring frequency, and environment. Mooring lines should be examined regularly for damage or excessive wear—regardless of a line's age.

CONTACT

Contact of
Crane on board
Royal Engineer Tow
with Terminal Cargo
Crane

VESSEL GROUP
Towing/Barge

LOCATION
North Charleston Terminal, Cooper River,
North Charleston, South Carolina

CASUALTY DATE	ACCIDENT ID
January 4, 2024	DCA24FM014
INJURIES	ESTIMATED DAMAGES
None	\$4.5 million
REPORT NUMBER	ISSUED
MIR-25-09	March 13, 2025



Royal Engineer underway before the contact.
SOURCE: LISA KOLIBABEK.



Mooring configuration at North Charleston Terminal similar to the Celsius Nicosia's when the crane on the Royal Engineer tow contacted the STS crane. (The beam of the vessel shown is 25 feet wider than the Celsius Nicosia.).

On January 4, 2024, about 1620 local time, the towing vessel **Royal Engineer** was transiting the Cooper River near North Charleston, South Carolina, while pushing the crane barge **Stevens 1471** when the barge crane contacted an STS crane at the North Charleston Terminal. There were no injuries, and no pollution was reported. Damage to the terminal's crane was estimated to be over \$4.5 million.

The **Royal Engineer** had gotten underway from the Nexans Charleston facility along the Cooper River about 2 hours earlier, pushing the crane barge **Stevens 1471**. According to the towboat's voyage plan, the air draft of the crane barge was 145 feet.

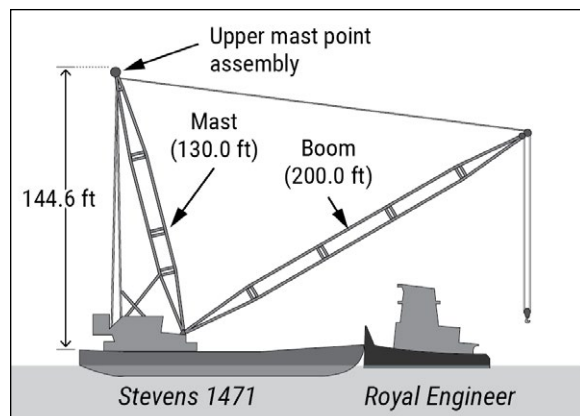
Along the **Royal Engineer** tow's route, the **Brunswick**, a 315-foot-long dredge and barge, was dredging the Cooper River channel adjacent to the North Charleston Terminal. The **Brunswick's** floating discharge pipeline extended eastward across the Cooper River channel, where dredge spoils were discharged near the eastern bank, effectively blocking the channel to traffic moving north and south. The dredging operation was published in the Local Notice to Mariners, along with a request for vessels to arrange safe passage when transiting nearby.

At the North Charleston Terminal, the 784-foot-long, 106-foot-wide containership **Celsius Nicosia** was berthed and terminal employees were conducting cargo operations with two of the terminal's STS cranes. The **Brunswick** was working about 300 feet east of the northern end of the North Charleston Terminal seawall, close to where the **Celsius Nicosia** was berthed.

On the **Royal Engineer**, the mate was on watch in the wheelhouse. He was aware of the dredging operations along the tow's transit route. The day before the contact, on January 3, he had transited the area between the dredge and the North Charleston Terminal, but there was no containership berthed at the terminal. The mate told investigators that, on the day of the contact, he attempted twice to contact the dredge crew early—first an hour and then 45 minutes before he reached the dredge—to make passing arrangements. However, the mate could not establish communications with the dredge crew until about 15 minutes before the **Royal Engineer** tow reached the dredging area.

The mate told investigators that his original intention was to request that the dredge "break the pipeline" so that the tow could pass to the east of the dredge. In this scenario, the tow would have proceeded

down the middle of the channel, where there was plenty of open water. It was not unusual for the dredge to break down the discharge pipeline to allow vessel traffic to pass. However, the dredge captain informed the mate of his preference for the tow to pass to the west of the dredge, and they agreed the tow would proceed through the narrow area between the dredge and the containership *Celsius Nicosia*.



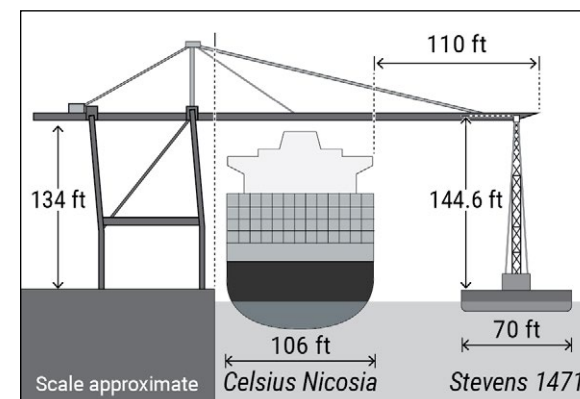
Approximate towing configuration of the *Royal Engineer* pushing the *Stevens 1471*. The crane components and their measurements are labeled.

Roughly 15 minutes passed between the time that the *Royal Engineer* mate and *Brunswick* dredge captain made passing arrangements and the time of the contact. The mate did not realize the STS crane extended over the side of the *Celsius Nicosia* and impeded the tow's route until about 1 minute before the contact. The mate's focus on maneuvering the tow between two vessels in a confined area likely contributed to his delayed awareness of how far the STS crane extended over the water.

By the time the mate noticed the STS crane's position, he was committed to proceeding through the narrow opening between two vessels, and the tow was traveling at 5 knots, with a following current.

The *Royal Engineer* and tow were making about 3.5 knots when the top of the *Stevens 1471* crane mast struck the boom tip of the STS crane, resulting in extensive damage to the STS crane.

THE PROBABLE CAUSE of the contact of the crane barge *Stevens 1471* with a North Charleston Terminal STS crane was the towing vessel mate not identifying that the STS crane was an overhead hazard when he decided to maneuver the tow through a confined area between a dredge and a vessel conducting cargo operations.



The horizontal extent of the North Charleston Terminal STS crane.



Left to right: The damaged STS crane. Circled areas show (1) metal distress and (2) damage to one of four gantry assemblies.

LESSONS LEARNED

IDENTIFYING THAT STS CRANES MAY BE AN OVERHEAD HAZARD

STS cranes, when conducting cargo operations on a vessel and in the lowered position, may extend considerably beyond the side of the vessel and become a hazard to vessels with high air drafts transiting nearby. Mariners should always consider their vessel and tow's air draft when identifying hazards to navigation.

CONTACT

Contact of Tank Vessel *Hafnia Amessi* with Pier

VESSEL GROUP

Cargo, Liquid Bulk

LOCATION

Cooper River, north of Charleston, South Carolina

CASUALTY DATE

January 14, 2024

ACCIDENT ID

DCA24FM018

INJURIES

None

ESTIMATED DAMAGES

\$8.1 million

REPORT NUMBER

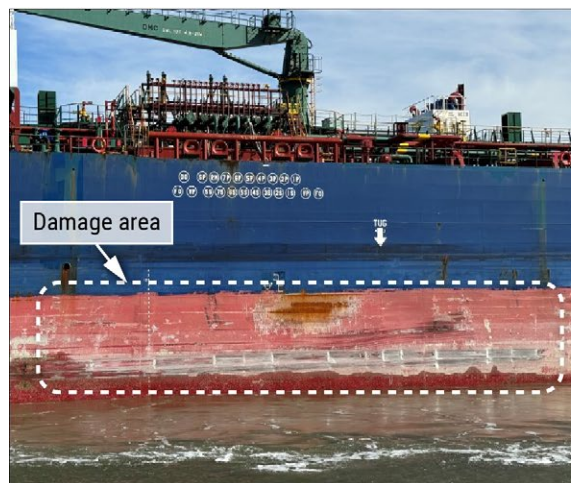
MIR-25-11

ISSUED

March 24, 2025

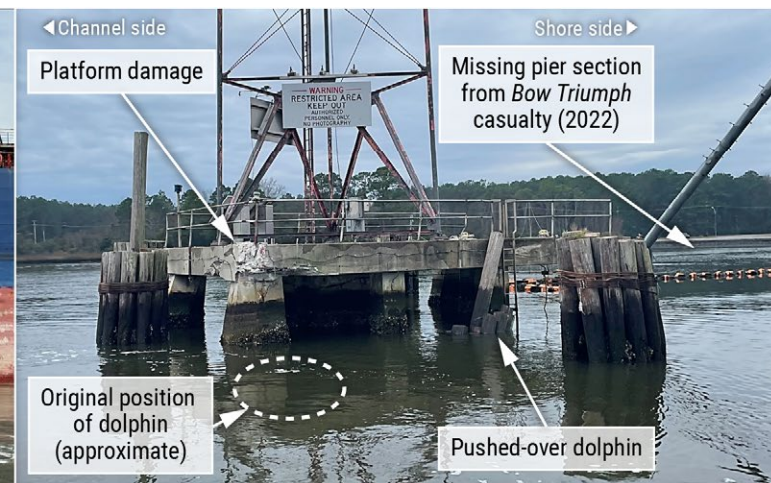


Hafnia Amessi underway following the contact with Pier B. SOURCE: COAST GUARD.



Left to right: *Hafnia Amessi* starboard side after the contact, showing inset plating and scraped paint within outlined area, and Naval Weapons Station Pier B, showing damage to the platform and protective dolphin.

BACKGROUND SOURCE, LEFT: COAST GUARD.

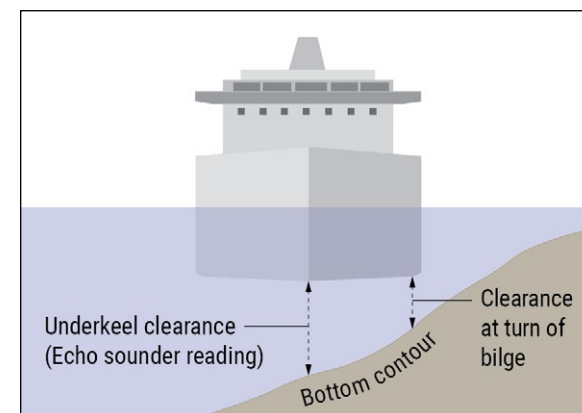


On January 14, 2024, at 1019 local time, the 604-foot-long tanker *Hafnia Amessi* was transiting outbound on the Cooper River near Naval Weapons Station, Joint Base Charleston, South Carolina, when the vessel struck the Naval Weapons Station Pier B. Hull plating on the vessel's starboard side, a cement platform on the end of the pier, and a protective dolphin were damaged. There were no injuries, and no pollution was reported. Damage to the vessel and pier was estimated at \$8.1 million.

At 0948, the *Hafnia Amessi* got underway with a Charleston Branch Pilots Association pilot conning. At 1000, the vessel entered the Joint Base Charleston Channel (JBC Channel), and, at 1014, was positioned in the center of the channel. The pilot then maneuvered the *Hafnia Amessi* toward the eastern side of the channel as the vessel approached a port turn onto the section of the channel that contained Pier B. He stated that he favored the eastern side because he expected the ship would be set toward the outside (western side) of the bend by the flood current. However, during the approach to the turn, the tanker moved toward the east bank more than he had anticipated.

When the *Hafnia Amessi* moved toward the east

bank, the vessel approached Shoal 4, where shoaling had reduced the depth significantly. At the same time the pilot was attempting to turn the *Hafnia Amessi* to port, the bank effect forces along Shoal 4 worked against the turn by pushing the bow away from the bank (to starboard) and pulling the stern toward the bank (to port).



Exemplar of relative difference in hull clearances along a sloped bank/shoal. (Illustration does not reflect actual contour or vessel in this casualty.)

The *Hafnia Amessi* would have also been affected by the flood current when the vessel rounded the port turn. As the tanker's bow emerged from the shadow of the east bank, the current would have acted on the submerged portion of the vessel's port bow—pushing it away from the bank and further working against the attempted port turn.

The *Hafnia Amessi* pilot's rudder and engine orders could not overcome the bank effect and current forces acting on the tanker, resulting in the vessel's contact with the pier.

The silting of the Cooper River on the eastern bank at Shoal 4 was a known hazard. AIS data from all tank vessels greater than 500 feet long that transited downbound through the JBC Channel in the 3 years before the *Hafnia Amessi* casualty showed that most vessels favored the center or western side of the channel (toward the outside of the bend) as they made the port turn near Pier B. Of the three vessels that transited on the eastern side of the channel, the *Hafnia Amessi*'s track came closest to the east bank of the river.

The *Hafnia Amessi* casualty demonstrates that transiting in the center of the channel is prudent to avoid the risks associated with bank effect and current. If the *Hafnia Amessi* had approached the turn in the relatively open water to starboard, the bank effect on the vessel's port side would have been minimized, and

the vessel would have been better positioned to handle the oncoming flood current.

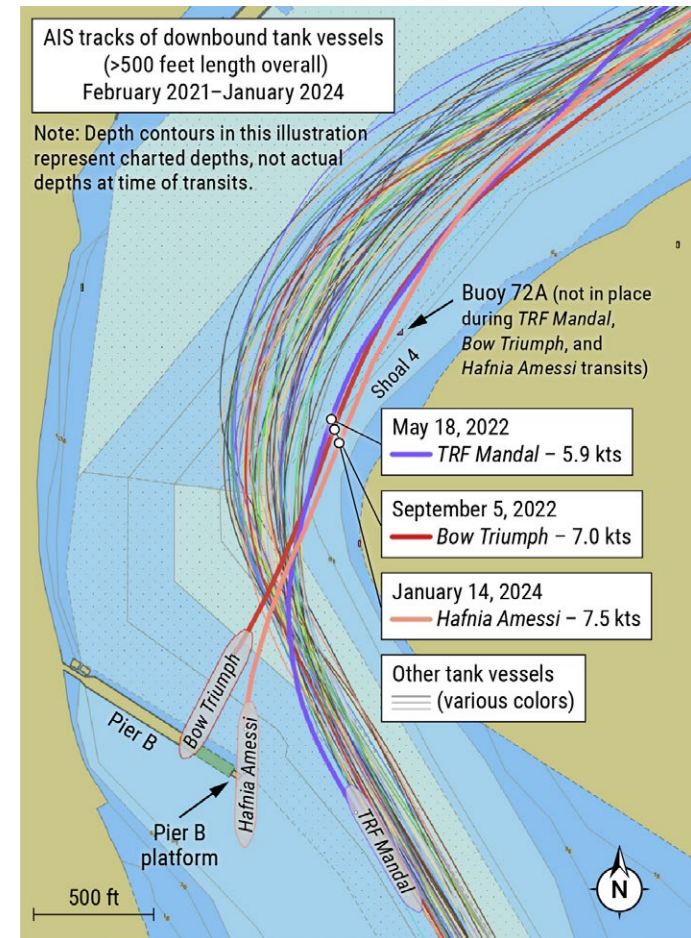
The *Hafnia Amessi* pilot had ordered the tugboat *Diane Moran* to escort the tanker down the Cooper River. When it became apparent that the *Hafnia Amessi* was not responding to rudder and engine orders as the pilot anticipated and was in danger of striking Pier B, the pilot directed the *Diane Moran* to push on the tanker's bow. According to the pilot, the ship's rate of turn did not increase until the tugboat began pushing. The *Diane Moran* pushed on the bow until it became too dangerous for the tugboat to remain in position without hitting the pier itself. The *Hafnia Amessi* contacted the end of the pier on its starboard side, but due to the turn induced by the tugboat, damage to both the pier and ship was considerably less than it could have been. The *Diane Moran* captain's quick response to the pilot's orders and his skilled maneuvering of the tugboat prevented a more serious casualty.

THE PROBABLE CAUSE of the contact of the tanker *Hafnia Amessi* with Naval Weapons Station Pier B was the pilot navigating the vessel too close to the east bank while approaching the turn immediately before the pier, exposing the tanker to bank effect, which the pilot's subsequent rudder and engine orders could not overcome.

LESSONS LEARNED

PLANNING FOR HYDRODYNAMIC FORCES IN AREAS SUBJECT TO SHOALING

Hydrodynamic forces reduce rudder effectiveness (squat and shallow water effect) and yaw the bow away from the closest bank and pull the stern in (bank effect). Shoaling can reduce the water depth in shallow waters, such as channels, below charted or expected, and therefore exacerbate the forces on a vessel. Bank effect can have an undesired effect on vessels, even for the most experienced shiphandlers. Pilots, masters, and other vessel operators should consider the risks in areas known for shoaling when planning transits. Where appropriate, employ additional measures to mitigate the risk, including use of tugboats, reducing or increasing speed, and/or delaying the transit until more favorable conditions exist.



AIS tracks of tank vessels greater than 500 feet in length from February 2021 to January 2024.

BACKGROUND SOURCE: NOAA ENC US5SC1LO AS VIEWED ON MADE SMART.

CONTACT

Contact of
Amber Brittany Tow
with Vane Dike

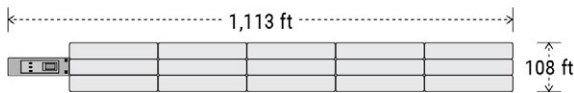
VESSEL GROUP
Towing/Barge

LOCATION
Ohio River, mile 604.3, Louisville, Kentucky

CASUALTY DATE	ACCIDENT ID
March 8, 2024	DCA24FM025
INJURIES	ESTIMATED DAMAGES
None	\$1.3 million
REPORT NUMBER	ISSUED
MIR-25-14	April 4, 2025



Amber Brittany in 2022. SOURCE: MATT BURKS.



Amber Brittany towing arrangement.



The *Amber Brittany* with three barges, and tug *Kelle B* assisting, after the tow broke apart. Eight barges that broke free from the tow are lodged alongside the Louisville and Indiana Railroad Bridge pilings.
BACKGROUND SOURCE: RICH AMMON.

On March 8, 2024, about 1550 local time, the towing vessel *Amber Brittany* was transiting upbound on the Ohio River, pushing a 15-barge tow, when the tow struck the vane dike at the upstream end of the McAlpine Locks and Dam in Louisville, Kentucky, and broke apart. There were no injuries, and no pollution was reported. Total damages to the barges, cargo, and dam gates were estimated at \$1.3 million.

About an hour earlier, at 1446, the tow entered the northern lock chamber (downriver side) of the McAlpine Locks and Dam, with the pilot on watch. At 1459, the *Amber Brittany* tow exited the lock and proceeded upriver in the Portland Channel.

As the *Amber Brittany* made its port turn while passing under the Louisville and Indiana Railroad Bridge, the head of the tow entered the area of the canal where the effect of an outdraft current, if present, would be expected. The dam gates were almost fully open, and river levels were rising, resulting in a strong outdraft, which pulled the head of the tow to port. The head of the tow continued to be drawn to port as the tow proceeded upriver. The pilot attempted to counteract the force of the outdraft but was ineffective. In addition to the outdraft, there could have been a water surge in the Portland Channel—resulting

from a lock filling that took place 8 minutes before the contact—that also impacted the *Amber Brittany* tow.

At 1550, the second barge in the port string of the *Amber Brittany* tow contacted the vane dike mooring cell, and the tow broke apart. Ten of the 15 barges broke free from the tow and floated downstream on the north side of the vane dike. Eight of the barges that broke free struck and lodged alongside railroad bridge pilings. The remaining two barges drifted downriver, eventually lodging in the McAlpine Lower Dam gates 2 and 3. Vessels in the area attempted to recover the barges. One barge sank near the bridge. Another barge began to take on water and was pushed to the bank of Shippingport Island.

The upstream section of the McAlpine Locks and Dam is uniquely difficult to navigate, even under ideal circumstances. The geography of this stretch of the river, combined with changing water currents near fixed hazards to navigation, creates a challenging environment. Prevalent outdraft currents near the vane dike and the location of the narrow span of the Louisville and Indiana Railroad Bridge are particular concerns when transiting the locks. Between January 2020 and April 2025, there were nine reported incidents in this area involving towing vessels, totaling over \$2.7 million in property damage.

While the pilot was qualified to operate towing vessels of this size along inland waters and Western Rivers, this was his first time transiting the McAlpine Locks at the helm of the *Amber Brittany*. Although company personnel were under the impression that the pilot had experience operating tows on the Ohio River, the pilot told Coast Guard and NTSB investigators that he had not previously operated on the Ohio River. The pilot had never been observed by the captain or anyone at the operating company transiting this portion of the Ohio River. Although the captain conducted a thorough turnover before the transit with instructions for the pilot to wake him with any concerns, he did not remain alongside the pilot while he transited this difficult area for the first time. The pilot's inexperience transiting the Portland Channel at the helm of the *Amber Brittany* and accompanying tow likely contributed to his ineffective attempt to counteract the force of the outdraft.

Cell phone records indicated that the pilot was using his personal cell phone just before the contact and that the first in a series of outgoing and incoming text messages began about 1547, which coincided with the *Amber Brittany*'s departure from the sailing line. Cell phone use, especially text messaging, can be visually, manually, and cognitively distracting. Therefore, any distraction from the primary navigation task due to cell phone use would have reduced the pilot's performance as he navigated the channel.

THE PROBABLE CAUSE of the contact of the *Amber Brittany* tow with the vane dike was the pilot not effectively compensating for the outdraft current while navigating out of the lock channel entrance, likely due to the pilot's inexperience in transiting the Portland Channel on the *Amber Brittany* and his distraction due to cell phone use.



Barges from the *Amber Brittany* tow lodged in the Lower McAlpine Dam Gate after the tow broke apart.

LESSONS LEARNED

PREPARING FOR DAM OUTDRAFTS

Lock canal entrances near dams present unique hazards for vessels transiting inland rivers. Fast-moving river water near low-flow canal waters can produce outdraft currents. Mariners should thoroughly assess the potential impact of outdraft currents when entering or exiting locking channels. Vessel horsepower and vessel handling should be carefully considered.

MAINTAINING AWARENESS IN AREAS OF RESTRICTED NAVIGATION

Lock canal entrances require heightened situational awareness from vessel operators. Using cell phones and other wireless electronic devices has been demonstrated to be visually, manually, and cognitively distracting. Talking on cell phones can have serious consequences in safety-critical situations, and sending or reading text messages is potentially even more distracting than talking because texting requires visual attention to the display screen of the device. Mariners should avoid using mobile devices, especially while maneuvering in unfamiliar areas of restricted navigation.



The *Amber Brittany* tow as it came through the Louisville and Indiana Railroad Bridge, its heading altered to port, it was set off the sailing line, and it contacted the vane dike mooring cell.

CONTACT

Contact of Towing Vessel **Cocodrie** with Valero St. Charles Refinery Walkway

VESSEL GROUP

Towing/Barge

LOCATION

Lower Mississippi River, mile 124.7, near Norco, Louisiana

CASUALTY DATE

March 15, 2024

ACCIDENT ID

DCA24FM028

INJURIES

None

ESTIMATED DAMAGES

\$663,000

REPORT NUMBER

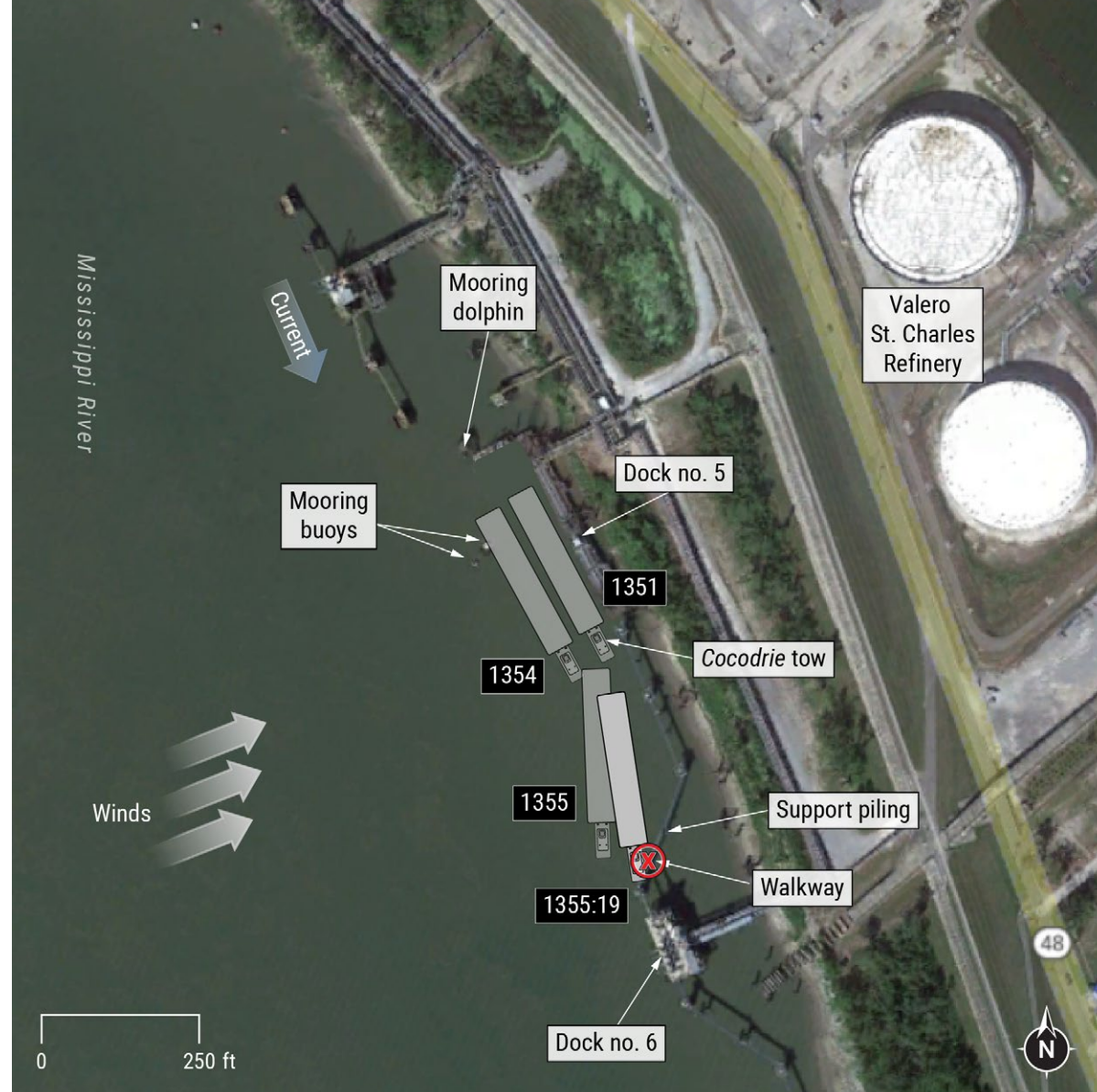
MIR-25-17

ISSUED

April 22, 2025



Cocodrie moored after the casualty on March 19, 2024.



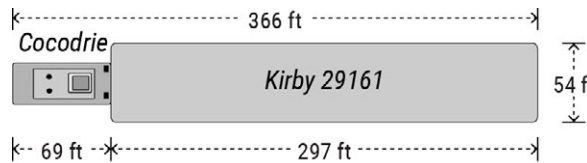
Path of *Cocodrie* tow up to and when the *Cocodrie* contacted the dock no. 6 walkway.

BACKGROUND SOURCE: GOOGLE EARTH; VESSEL DATA SOURCE: *COCODRIE* ROSE POINT.

On March 15, 2024, about 1355 local time, the towing vessel *Cocodrie* was pushing an empty tank barge, maneuvering away from a Valero St. Charles Refinery dock at mile 124.7 on the Lower Mississippi River, near Norco, Louisiana, when it struck a walkway for another nearby dock. There were no injuries, and no pollution was reported. Damage to

the vessel and the dock was estimated at \$663,000.

Earlier that day, about 0236, the 2,000-hp, twin screw, 69-foot-long *Cocodrie* and its tow, the 297-foot-long, 54-foot-wide tank barge *Kirby 29161*, moored starboard side to dock no. 5 at the Valero St. Charles Refinery to discharge petroleum product. Five crewmembers were aboard.



Cocodrie towing arrangement.

Offloading of the barge's cargo was completed at 1220, and, about 1338, the pilot attempted to get the tow underway to bring the empty barge to the Kirby fleet at mile 127 (per dispatch orders). The pilot stated that when he first got the tow underway, winds were 12–15 mph off the port side of the tow (pushing the tow toward the dock), but he was not concerned about the effect of the winds on the tow. These winds were within company guidelines, which prohibited tows from getting underway when winds were 20–25 mph.

As he maneuvered away from the dock, a mooring dolphin in front of the tow prevented the pilot from moving the tow forward from dock no. 5, and mooring buoys to port near the bow of the barge prevented him from moving the tow laterally off the dock into the river before proceeding ahead. Additionally, there was a risk of the barge's rake contacting dock no. 5 (the upper portion of the barge's bow sweeping above the dock) if the pilot attempted to angle the barge to starboard to pivot the tow away from the dock. Given these factors, the pilot explained that his best option was to walk the barge out toward the buoys and back away. However, about 350 feet aft of the *Cocodrie* was dock no. 6 and its walkway. With winds at 15 knots, the pilot could not maneuver to safely back the tow out, so he brought the tow back to the dock to regroup.

As the pilot attempted to maneuver the tow away from the dock a second time, winds increased to 25 mph, with gusts to 31 mph. Thunderstorms were in the area, and, with convective activity, wind speed and wind direction can be highly variable, even in the absence of precipitation. Because the *Kirby 29161* was empty, its draft was only about 2 feet, leaving about 10 feet of the barge—combined with the 5-foot-high trunk that spanned most of the barge's main deck—out of the water and exposed to the wind. Wind acting on the port side of the barge set the tow toward dock no. 6 and its walkway. Although the pilot attempted to correct the tow's position, the sudden onset of strong beam winds acting on the port side of the empty barge increased the difficulty of the maneuver, preventing him from appreciably moving the tow away from dock no. 5.

In an attempt to "twist" the head of the tow to port (away from the dock and its walkway), the pilot came full ahead on the starboard engine, moved the flanking rudder to starboard, and moved the main rudders to port. However, given the *Cocodrie*'s proximity to the dock no. 6 walkway, the pilot's action was too late to arrest the vessel's astern momentum, and the aft corner of the *Cocodrie* wheelhouse struck the walkway, causing it to come away from its mountings and fall onto the *Cocodrie*.



Cocodrie with the walkway resting across the deck of the aft main deck structure. SOURCE: COAST GUARD.

THE PROBABLE CAUSE of the contact of the towing vessel *Cocodrie* with the Valero St. Charles Refinery dock no. 6 walkway was the sudden onset of strong beam winds, which increased the difficulty of the undocking maneuver with an empty barge.

CONTACT

Contact of Bulk Carrier **American Mariner** with Munuscong Channel Junction Light

VESSEL GROUP

➤ Cargo, Dry Bulk

LOCATION

St. Marys River, about 25 miles south of Sault Ste. Marie, Michigan

CASUALTY DATE

March 28, 2024

ACCIDENT ID

DCA24FM032

INJURIES

None

ESTIMATED DAMAGES

\$2 million

REPORT NUMBER

MIR-25-18

ISSUED

April 29, 2025



American Mariner underway before the contact.

SOURCE: COAST GUARD.



Damage to the port side of the American Mariner after striking the Munuscong Channel Junction Light.

SOURCE: COAST GUARD.

On March 28, 2024, about 0018 local time, while transiting upbound in the St. Marys River, about 25 miles south of Sault Ste. Marie, Michigan, the bulk carrier **American Mariner** experienced a steering failure and struck the Munuscong Channel Junction Light, a 31-foot-diameter cylindrical concrete structure with a navigation aid on top. The vessel began taking on water; pumps stabilized the flooding. None of the 18 crewmembers on board were injured, and no pollution was reported. Damage to the vessel was estimated at \$800,750, and damage to the Munuscong Channel Junction Light was estimated at \$1.25 million for repairs.

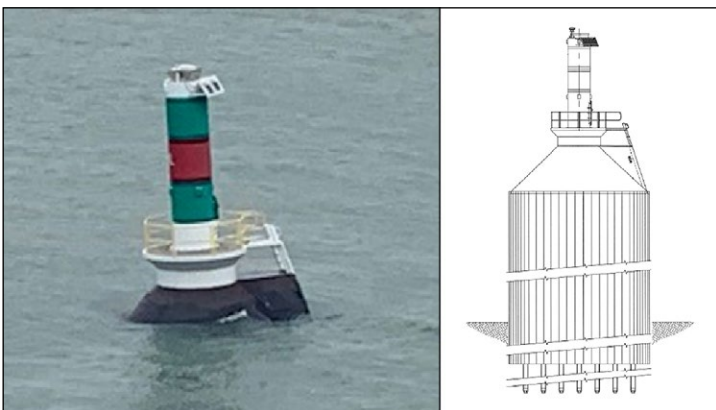
The 730-foot-long vessel was on its first voyage of the season following its winter layup period, during which hydraulic technicians performed annual preventative maintenance on the ship's steering gear hydraulic system and electronic technicians installed a new steering electronic control system stand on the bridge. Coast Guard inspections and class society surveys, which included testing and inspection of the new steering control system, were completed. Before

departing Sturgeon Bay, Wisconsin, on March 26, the crew completed functional steering tests.

According to the captain and deck officers, throughout most of the next 2 days, they used autopilot and one steering pump. While transiting rivers, though, crewmembers would steer the vessel using the FU steering wheel in hand steering mode and with two steering pumps online (per company policy) for redundancy and faster rudder response. Alarms for the vessel's steering system sounded intermittently on the bridge while the crew was operating in hand steering and running both steering pumps. Crewmembers investigated the alarms but could not determine the cause, and the rudder appeared to properly respond to input commands. Additionally, the steering hydraulic system was found to be hunting between left and right positions while the two pumps were running.

Just after midnight on March 28, the **American Mariner** was transiting upbound in the St. Marys River in Munuscong Lake and approaching the Munuscong Channel Junction Light. At 0018, the ship was beginning to maneuver around the light when

the wheelsman alerted the captain and second mate that the rudder was stuck about 20° left and he had lost steering control. The vessel swung to port and, despite crew efforts to respond to the casualty, the port bow of the *American Mariner*, moving about 12 mph, struck the Munuscong Channel Junction Light.



Upper portion of the Munuscong Channel Junction Light after being struck by the *American Mariner* and a rendering of the 31-foot-diameter concrete navigation aid. SOURCE: COAST GUARD.

Immediately after the casualty, crewmembers inspected the steering system and determined that the no. 1 control motor (which controlled the stroke of the main hydraulic pump) within the vessel's steering system had failed. The motor was disassembled, and a piece of black, pliable debris was found to be lodged in between the rotating gears of the control motor, preventing it from rotating properly. Once seized, the control motor's corresponding linkages to the main steering pump remained stationary, preventing the main steering pump from changing output pressure and locking the rudder in its last ordered position at 20° left. Once a replacement control motor was installed, the steering system responded properly to steering commands from the bridge.

During a postcasualty inspection of the hydraulic sump, technicians noted debris within the hydraulic oil. Because the debris was larger than the mesh size of the suction filter and would have been captured, the

debris likely did not originate from within the hydraulic sump of the steering system.

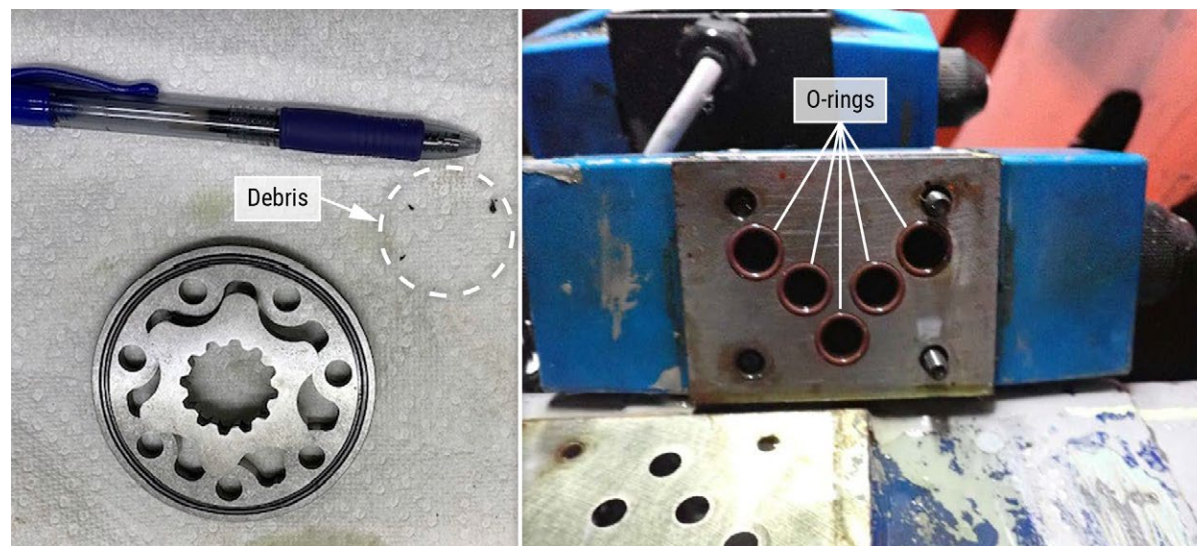
An Fourier transform infrared analysis found two black pieces of debris from the steering system's no. 1 control motor and an exemplar O-ring (replaced on the directional valve during the winter layup period the month before the casualty) were PVDF; however, results from another type of analysis, energy dispersive spectroscopy, differed. Additionally, the colors of the materials differed: the debris found in the no. 1 control motor was black and the exemplar O-ring was brown. Because the debris was not an exact match to the exemplar O-rings, it is possible that a similar type of PVDF O-ring used previously within the hydraulic system or a material from another component in the system downstream of the suction filters could have been dislodged during operation. The debris likely came from another hydraulic system component that was circulating through the unfiltered portion of the hydraulic control system.

Once electronic technicians recalibrated the steering control system after the casualty, the

steering alarms and hunting conditions no longer occurred, indicating likely issues with the calibration of parameters for the newly installed control system.

It cannot be determined whether conditions that triggered the alarms from the newly installed control system or the hunting condition contributed to debris that caused the failure of the no. 1 control motor. The additional heat generated by, and material wear on, the steering system as it constantly hunted for position while running on two pumps in an attempt to adjust to ordered steering commands could have been potential factors.

THE PROBABLE CAUSE of the contact of the bulk carrier *American Mariner* with the Munuscong Channel Junction Light was O-ring-type material debris in the steering gear system's hydraulic oil becoming lodged within a control motor, which caused it to seize, resulting in the rudder locking at its last ordered position.



Debris (circled) found in no. 1 steering gear control motor aboard the *American Mariner* and removed directional valve from *American Mariner* showing the O-rings replaced during winter layup.

BACKGROUND SOURCES: COAST GUARD (LEFT); GRAND RIVER NAVIGATION, INC. (RIGHT).

CONTACT

Contact of **Duke** Tow with Power Transmission Poles and Pelican Island Bridge

VESSEL GROUP

Towing/Barge

LOCATION

Galveston Ship Channel, Galveston, Texas

CASUALTY DATE

July 13, 2023

ACCIDENT ID

DCA23FM043

INJURIES

None

ESTIMATED DAMAGES

\$300,000

REPORT NUMBER

MIR-25-25

ISSUED

June 17, 2025



Duke underway in Houma, Louisiana, on October 30, 2024. SOURCE: TOMMY MATHERNE, MARINETRAFFIC.COM.



The damaged power transmission poles, in the foreground and circled with a dotted line. The smaller circle indicates the debris/damage to one of the bridge's piling clusters, seen right. SOURCE: COAST GUARD.

On July 13, 2023, about 0130 local time, the towing vessel **Duke** departed the Texas International Terminal in Galveston, Texas, pushing two barges, when one of the barges in the tow contacted three power transmission poles near the Pelican Island Bridge, and the tug subsequently contacted the bridge. There were no injuries, and no pollution was reported. Damage to the vessels, power poles, and bridge was estimated at over \$300,000.

About a half hour earlier, about 0100, the 84.5-foot-long **Duke**, with five crewmembers aboard, departed the Texas International Terminal, pushing two empty tank barges en route to Galena Park, Houston, eastbound in the Galveston Ship Channel. The two barges were made up abreast and bow to bow with the towboat. The captain told investigators that he had maneuvered barges out of the terminal “dozens” of times.

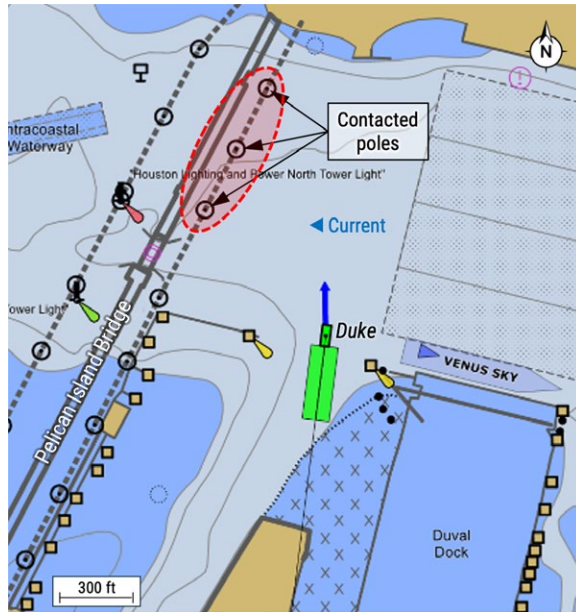
The **Duke** captain stated that he intended to back

out of the terminal with the barges and then shift position to make up to the aft end of the tow before proceeding outbound. He also stated that a bulk carrier, the **Venus Sky**, moored to the end of the pier immediately east of the Texas International Terminal required him to back out farther than normal into the channel, and that he was focused on staying clear of the moored vessel while he was underway.

As the captain was maneuvering the tow, the tow's starboard-side barge (**MM144**) contacted the first of three Center Point Energy electrical poles adjacent (on the east side) to the Pelican Island Bridge. The barge drifted to starboard (west) into a second pole, then the bridge. As the captain moved the tow forward to extricate it from the poles, the barge made contact with a third pole. These contacts resulted in a power outage that extinguished the bridge streetlights. After striking the poles, the tow's momentum carried the **Duke** into the bridge, where it contacted the bridge's pilings.

At the time, the flood current, as noted by the captain, was about 0.8 knots, which would have pushed the tow toward the bridge as he backed into the channel. Given the captain's focus on the moored vessel to the east, he likely did not recognize that the current was pushing the tow faster than he anticipated and toward the power poles and bridge until the tow struck them.

THE PROBABLE CAUSE of the contact of the *Duke* tow with power transmission poles and the Pelican Island Bridge was the captain's focus on staying clear of a nearby moored cargo vessel and not recognizing how close the tow was getting to the power poles and bridge.



Duke tow departing the basin at 0120. The poles and section of the bridge contacted by the tow are circled. BACKGROUND SOURCE: MAGNOLIA DATA AS VIEWED ON ROSE POINT.

CONTACT

Contact of **Joe B. Wyatt** Tow with Fort Madison Bridge Protection Cell and Fendering System

VESSEL GROUP

 Towing/Barge

LOCATION

Upper Mississippi River, mile 384,
Fort Madison, Iowa

CASUALTY DATE

May 9, 2024

ACCIDENT ID

DCA24FM037

INJURIES

None

ESTIMATED DAMAGES

\$3.28 million

REPORT NUMBER

MIR-25-28

ISSUED

July 10, 2025



The Joe B. Wyatt underway in May 2019.

SOURCE: WARREN UNDERWOOD, MARINETRAFFIC.COM.



Barges IN122011 and IN155499 immediately after impact blocking the primary channel. The IN155499 sinking next to the central wooden fendering. The Joe B. Wyatt is visible in the background. SOURCE: COAST GUARD.

On May 9, 2024, about 1312 local time, the towing vessel **Joe B. Wyatt** was transiting downbound on the Mississippi River near Fort Madison, Iowa, pushing 13 loaded hopper barges and 2 empty tank barges. While transiting through the Fort Madison Bridge, the tow struck a protection cell and fendering system for the bridge and broke apart. There were no injuries, and no pollution was reported. Damage to the protection cell, fendering system, barges, and the **Joe B. Wyatt** was estimated at \$3.28 million.

The 158-foot-long **Joe B. Wyatt** and its tow of 15 barges had departed a dock near mile 418 of the Upper Mississippi River earlier that day, about 0445, heading downbound toward St. Louis, Missouri. The tow had an overall length of 1,153 feet and a maximum width of 105 feet. There were eight crewmembers aboard, including a captain and a pilot.

At 1306, with the pilot at the helm, the **Joe B. Wyatt** tow passed the southwest end of Dutchman Island, about a mile upriver from the Fort Madison Bridge, at 8.2 mph. The tow was about 65 feet right (toward the right descending bank) of the charted primary sailing line (recommended track). (The bridge's central fendering system separated the

river into two navigational channels: the 200-foot-wide primary channel, located toward the right descending bank of the river, and a 194-foot-wide alternate channel toward the left descending bank.) While the pilot navigated the tow toward the bridge, two deckhands were positioned at the head of the tow on the port and starboard sides, relaying distances to the channel opening to the pilot.

After passing Dutchman Island, the **Joe B. Wyatt** pilot expected a crosscurrent coming from around the island to set the tow to port before reaching the primary channel of the Fort Madison Bridge. The **Joe B. Wyatt** tow, with a following current, was making about 8 mph over ground, typical of a downbound tow of that size. The pilot had decades of experience maneuvering tows, and he had steered tows through the Fort Madison Bridge many times. Based on this experience and his anticipation of a cross-current in the area, he maneuvered the **Joe B. Wyatt** over 200 feet off the sailing line toward the right descending bank as the tow approached the bridge. (At the time of the casualty, the river level was rising, but the pilot did not express concern about the river level.) However, the cross-current, if present at the time, did not have the effect the pilot had anticipated. By the

time the pilot noticed that the cross-current “wasn’t holding [him] up” and the tow was in danger of striking one of the bridge’s protection cells, the head of the tow was only about 1,900 feet away from the bridge. Because the pilot overcompensated for the anticipated cross-current, the tow was out of position as it approached the bridge.

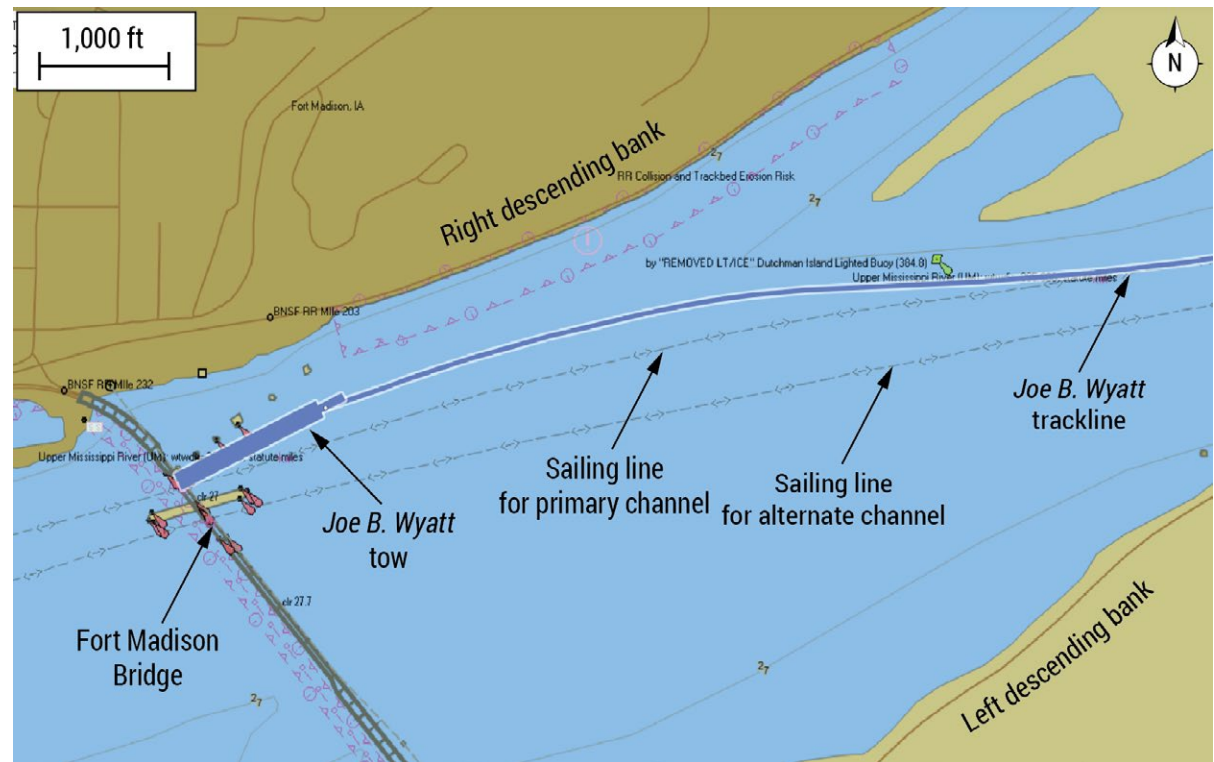
The pilot increased the engine rpm to attempt to maneuver the head of the tow back toward the center of the channel. However, the vessel’s speed and proximity to the protection cell, as well as the following current, prevented the pilot from maneuvering the tow sufficiently to avoid striking the protection cell. The third barge in the starboard string contacted the protection cell, and the tow subsequently broke apart, with 13 of the 15 barges drifting downriver. Assist boats recovered 14 of the 15 barges; the remaining barge sank along the shoreline and was later salvaged.

THE PROBABLE CAUSE of the contact of the *Joe B. Wyatt* tow with a protection cell and the fendering system of the Fort Madison Bridge was the pilot overcompensating for anticipated river crosscurrents during the tow’s approach to a bridge.



The sinking barge IN155499 being held in place by an assist boat.

SOURCE: WQAD NEWS 8, YOUTUBE.COM.



Track of the *Joe B. Wyatt* tow as it approached the Fort Madison Bridge at 1311 on May 9.

BACKGROUND SOURCE: CORPS OF ENGINEERS IENC U37UM359 AS VIEWED ON MADE SMART.

LESSONS LEARNED

SAILING LINE (RECOMMENDED TRACK)

Generally, a sailing line is assigned to a known safe route used by commercial vessels. A sailing line is developed with consideration of channel depth, current patterns, and any other known obstructions to navigation. A charted sailing line provides for a safe and successful transit when used as a guide, along with the mariner’s own experience and assessment of the existing circumstances.

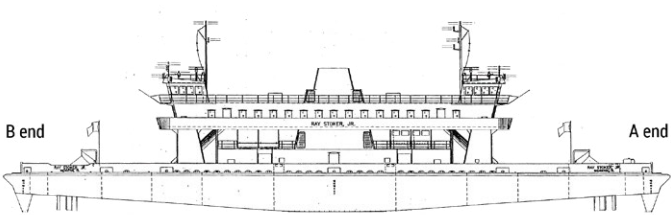
CONTACT

Contact of
Ferry *Ray Stoker, Jr.*
with Floating Dock

VESSEL GROUP
Passenger

LOCATION
Coast Guard Base Galveston, Galveston Channel,
Galveston, Texas

CASUALTY DATE	ACCIDENT ID
September 10, 2024	DCA24FM062
INJURIES	ESTIMATED DAMAGES
None	\$373,800
REPORT NUMBER	ISSUED
MIR-25-34	September 4, 2025



Profile view of *Ray Stoker, Jr.*, showing starboard side view of vessel with A end (Bolivar) and B end (Galveston) labeled. BACKGROUND SOURCE: TxDOT.



Ray Stoker, Jr. docked in Galveston, Texas, on September 25, 2024, after striking the floating dock at the Coast Guard Base Galveston.

On September 10, 2024, about 1823 local time, the vehicle and passenger ferry *Ray Stoker, Jr.* experienced a loss of propulsion control while underway in Galveston Channel, struck a floating dock at Coast Guard Base Galveston, in Galveston, Texas, and grounded in about 4 feet of water. Six crewmembers, seven passengers, and three vehicles were on board the ferry. There were no injuries, and no pollution was reported. Damage to the vessel and dock was estimated at \$373,800.

Earlier that day, at 1144, the 263-foot-long *Ray Stoker, Jr.* departed Galveston with a crew of six for the first 2.7-mile round trip of the day between Galveston and Bolivar, Texas. Throughout the rest of the day, the crew completed 13 trips across Galveston Bay.

At 1810, the *Ray Stoker, Jr.* departed Bolivar for the fourteenth and final trip of the day, bound for Galveston with seven passengers and three vehicles aboard. As the ferry approached its dock in Galveston, the crew experienced a loss of cycloidal propulsion system control (thrust and steering control), and the vessel began turning to port toward the Coast Guard base about 300 feet off its port side. The captain tried to correct the steering using both joysticks for the propulsion system, but neither produced any speed or directional changes to either propulsion unit. The ferry

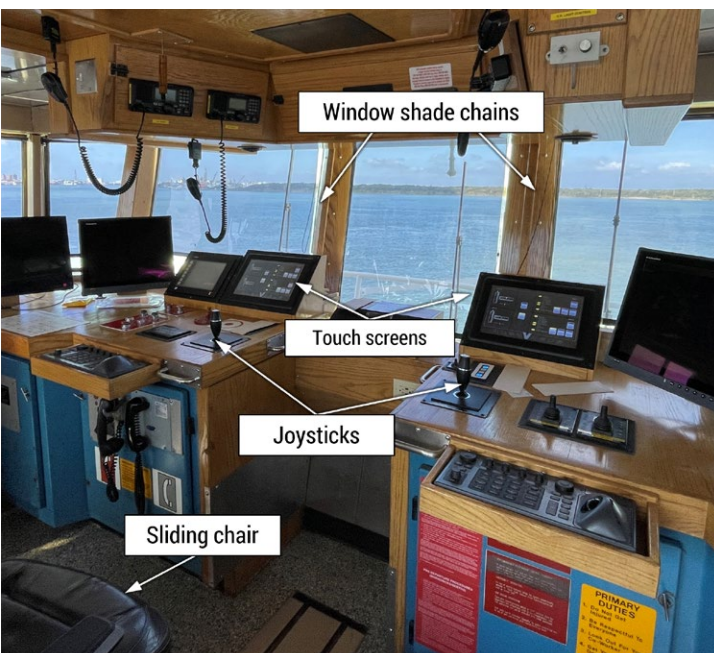
struck a floating pier at Coast Guard Base Galveston before grounding and coming to a stop.

Postcasualty inspection of the system by the manufacturer’s service technicians indicated that no alarms activated during the incident. Three days of sea trials were conducted in an attempt to replicate the loss of control, but the system operated as intended. Therefore, the vessel’s loss of cycloidal propulsion system control was not caused by an issue with the propulsion control system.

The control touch panel for the cycloidal propulsion system had a “station freeze” function that, when activated, would lock (or freeze) the joysticks in the last set position. Technicians considered the possibility that an object could have inadvertently activated this function. They tested the plastic clip on a window shade chain by touching the clip to the touch panel, and the clip activated functions in the same manner as an operator’s finger. Crewmembers in the wheelhouse did not recall clicking the station freeze icon, and they stated that they had not cleaned the touch panels during the transit. The captain stated that, at times during previous transits, he had seen the wheelhouse window shade chain lying across a control touch panel, and he usually removed it from the panel. Based on the time of the casualty (about an hour from sunset) and the number of crossings

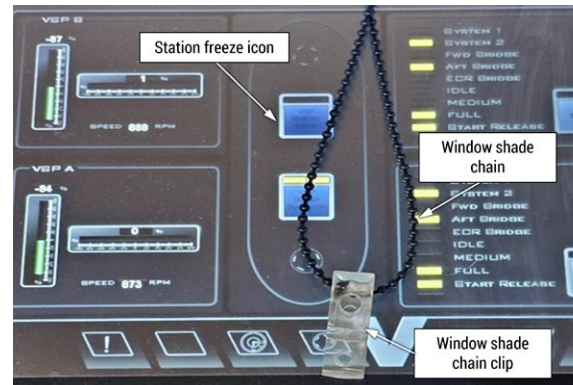
between Bolivar and Galveston, the shade chain could have been adjusted at some point due to the ferry's position relative to the sun. According to one deckhand, they typically adjusted the shade if the sun was "too bright" or going down. Adjusting the shade increased the potential that the chain and its plastic clip, once released after adjustment by the operator, would lay atop the touch panel. However, crewmembers in the wheelhouse did not recall adjusting the window shade during the transit. If the shade chain and its plastic clip had been left lying across the touch panel, the clip could have activated the station freeze function during the transit, unbeknownst to the operator, resulting in the loss of cycloidal propulsion system control.

Following the accident, the operating company installed transparent plexiglass covers over the control touch panels on the *Ray Stoker, Jr.* and instructed ferry crewmembers to install fittings to secure window shade chains so that they would not come into contact with the panels.

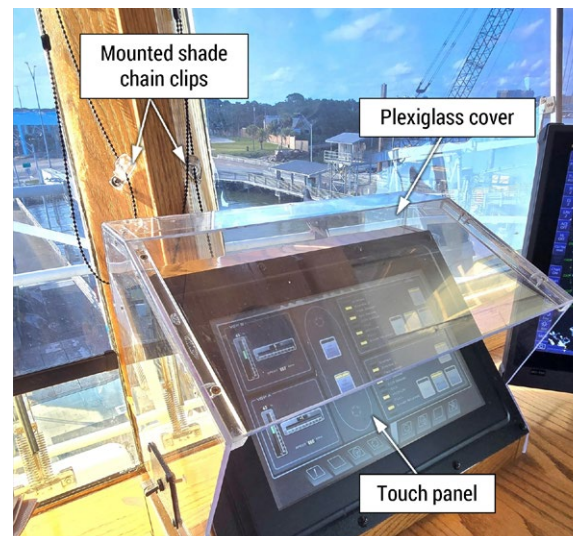


B end wheelhouse of *Ray Stoker, Jr.* (A end similar).

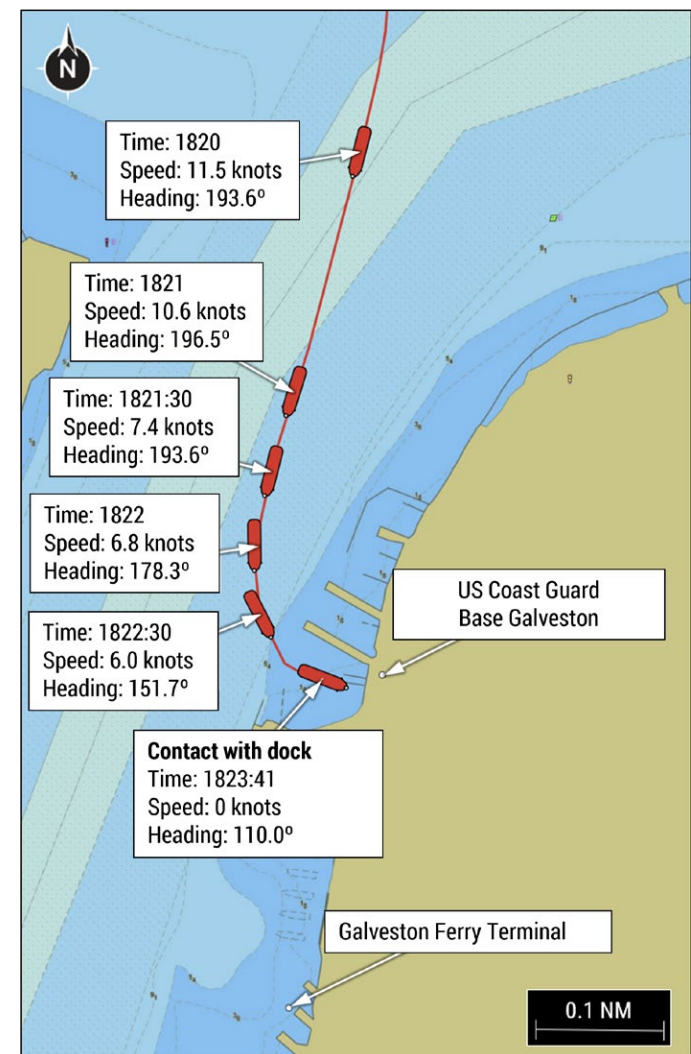
THE PROBABLE CAUSE of the contact of the ferry *Ray Stoker, Jr.* with a floating dock was likely a wheelhouse window shade chain clip activating the station freeze function on a propulsion control touch panel, resulting in a temporary loss of propulsion control.



Touch panel with plastic chain during postcasualty testing. SOURCE: VOITH SERVICE REPORT PROVIDED BY TXDOT.



Touch panel with plexiglass cover installed after the casualty. BACKGROUND SOURCE: TXDOT.



Trackline of *Ray Stoker, Jr.* from 1820 to 1823.

BACKGROUND SOURCE: NOAA ENC US5XTDB, AS VIEWED ON MADE SMART.

CONTACT

Contact of Tanker **Cosflourish Lake** with South Texas Gateway Terminal Dock

VESSEL GROUP

 Cargo, Liquid Bulk

LOCATION

Corpus Christi Bay, Ingleside, Texas

CASUALTY DATE

November 14, 2023

ACCIDENT ID

DCA24FM011

INJURIES

None

ESTIMATED DAMAGES

\$18 million

REPORT NUMBER

MIR-25-35

ISSUED

September 26, 2025



The **Cosflourish Lake** at anchor on November 15, after the contact. SOURCE: COAST GUARD.



Image recording system screenshot at 1415, the time of contact with the east dock breasting dolphins, from the port and starboard side of the **Cosflourish Lake**, looking forward.

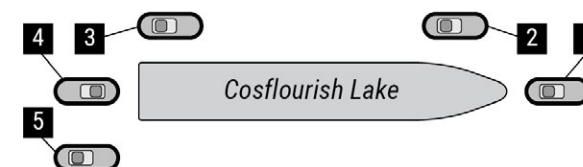
SOURCE: COSFLOURISH LAKE MARITIME LTD.

On November 14, 2023, about 1415 local time, the tanker **Cosflourish Lake** struck protective pilings and two breasting dolphins while docking at the east dock of South Texas Gateway Terminal (STGT) in Ingleside, Texas. There were no injuries, and no pollution was reported. Damage to the terminal was estimated at \$18 million.

Earlier that day, at 1018, the 1,092-foot-long VLCC **Cosflourish Lake** got underway from an offshore anchorage in a ballast condition, inbound to the STGT east dock (an 11-nautical mile transit). At 1254, three Aransas-Corpus Christi pilots boarded the vessel at the nearby pilot station, and shortly after, during the master/pilot exchange, Pilot 1 confirmed with the master that there were no deficiencies with the **Cosflourish Lake**. (Three pilots were required for a VLCC.)

About 1301, Pilot 1 took the conn. Pilot 1 briefed the master that the plan was to dock the tanker starboard-side-to using five tractor tugs: four 6,772-hp tractor tugs would have a line to the tanker, and one 5,150 hp-tractor tug would be standing by to

assist where needed. The pilots assigned numbers to the tugs from bow to stern, with the no. 1 tug (**Ted C Litton**) at the bow, the no. 2 tug (**Connolly M**) on the port shoulder, the no. 3 tug (**Cooper K**) on the port quarter, the no. 4 tug (**Mercury**) at the stern, and the no. 5 tug (**Zeus**) as the standby tug. About 1308, the no. 4 tug was secured with a line on the stern through the center chock.



Planned tug positions for the docking. Tug positions and orientations are approximate (not to scale).

At 1327, after a 5-nautical mile transit, Pilot 2 relieved Pilot 1 of the conn. Then, at 1353, after a 4.4-nautical mile transit, Pilot 3 relieved Pilot 2, when the vessel was about 1.6 nautical miles away from the dock to conduct the docking maneuver. Starting at

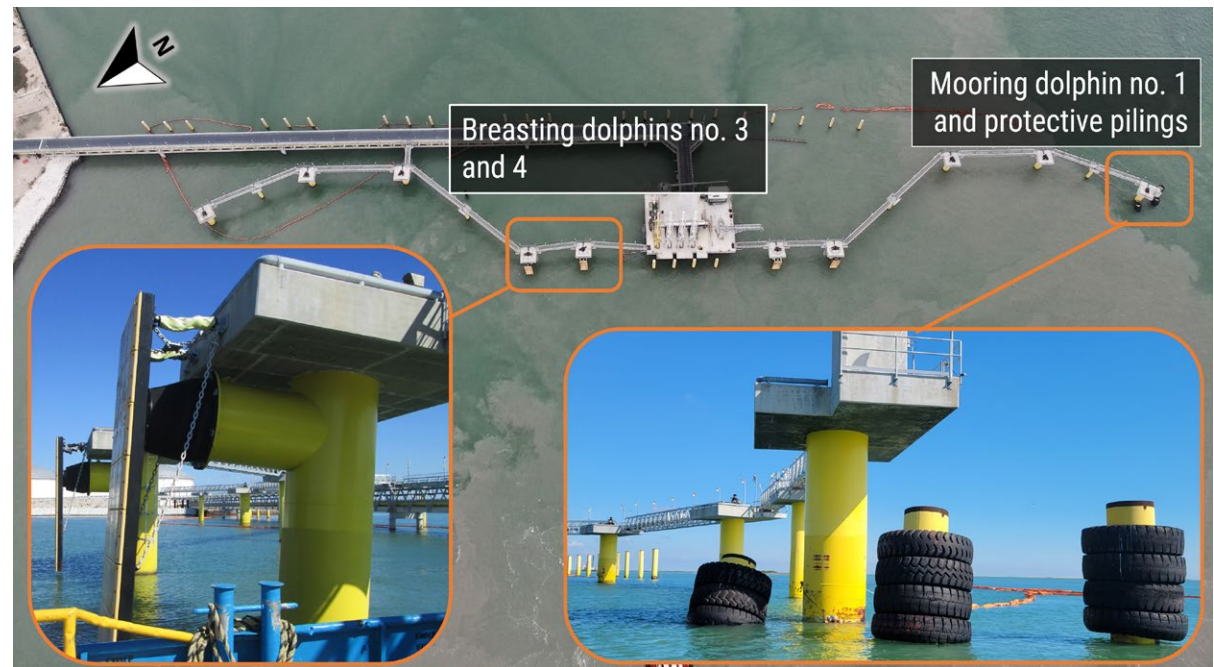
this handover and throughout the docking maneuver, Pilot 3 cursed at the master, used slang in his orders, and repeated orders that the vessel's crew had already confirmed had been carried out. Good bridge resource management principles call for clear, concise, and timely exchange of information in a professional manner, using standard maritime phraseology. Effective communication is vital in high-stress situations such as during a docking maneuver. Pilot 3's conduct was unprofessional and contrary to good bridge resource management principles.

As the vessel approached the dock, there were no reported deficiencies with the ship's navigation, communication, propulsion, and steering control systems. Visibility was good in the daylight, with a moderate breeze and low currents for the docking.

Pilot 3 used five tugs and engine and rudder orders to turn the *Cosflourish Lake* to starboard to align the vessel with the STGT east dock. None of the five assist tug operators reported any deficiencies with their communication, propulsion, or steering control systems; further, investigators reviewed all VDR recordings and found no evidence that the bridge team missed or was delayed in responding to any helm or propulsion orders.

Pilot 3 ordered the two tugs at the vessel's bow to push the bow to starboard, toward the dock (tug no. 1 was pushing from the port bow slow toward, and tug no. 2 was pushing at full power toward from the port shoulder) until about a minute before the contact with the breasting dolphins, when he ordered both tugs to pull the bow to port (away from the dock) at full power. However, Pilot 3's order came too late to arrest the bow's momentum to starboard, and the starboard forward side of the *Cosflourish Lake* struck breasting dolphin nos. 3 and 4 of the east dock.

THE PROBABLE CAUSE of the contact of the tanker *Cosflourish Lake* with the STGT dock was the pilot at the conn not effectively using the tugs at the vessel's bow while docking.



Drone photo of the STGT east dock postcasualty, with the left inset showing damaged breasting dolphin no. 3, and the right inset showing the displaced westernmost and middle protective pilings.

BACKGROUND SOURCE: GIBSON ENERGY. LEFT INSET: COAST GUARD. RIGHT INSET: GIBSON ENERGY.

CONTACT

Contact of Containership **Dali** with Francis Scott Key Bridge and Subsequent Bridge Collapse

VESSEL GROUP

▣ Cargo, General

LOCATION

Patapsco River, Baltimore Harbor,
Baltimore, Maryland

CASUALTY DATE

March 26, 2024

ACCIDENT ID

DCA24MM031

INJURIES

6 fatal, 1 serious, 1 minor

ESTIMATED DAMAGES

More than \$18 million

REPORT NUMBER

MIR-25-40

ISSUED

November 18, 2025



Containership **Dali** in 2019.

SOURCE: BUGGI PORSCIEN, VESSELFINDER.COM.



Damage to bridge Spans 16–18 and Pier 17, as seen looking toward the port side of the **Dali**.

On March 26, 2024, about 0129 local time, the 984-foot-long Singapore-flagged cargo vessel (containership) **Dali** was transiting out of Baltimore Harbor in Baltimore, Maryland, when it experienced losses of electrical power, propulsion, and steering and struck Pier 17, the southern pier that supported the central span of the Francis Scott Key Bridge. A substantial portion of the bridge subsequently collapsed into the river, and portions of the pier, deck, and truss spans collapsed onto the vessel's bow and forwardmost container bays.

Seven highway workers and one inspector were on the bridge when the vessel struck it. Six of the highway workers died as a result of the bridge collapse. One highway worker survived the collapse with serious injuries, and the inspector

escaped unharmed. One of the 23 persons aboard the **Dali** sustained a minor injury. Damage to the **Dali** exceeded \$18 million. Cargo damages were undetermined. Replacement costs for the bridge were estimated at \$4.3 billion to \$5.2 billion, and the bridge is anticipated to open to traffic in late 2030.

The evening before, on March 25, the **Dali** crew was preparing the loaded vessel to depart from Seagirt Marine Terminal. About the same time, the seven highway workers and one inspector were performing roadwork on the nearby Key Bridge. Due to the road work, one of four lanes was closed to traffic, and MDTA Police units were stationed at either end of the bridge for traffic calming.

About 0005, an Association of Maryland Pilots senior pilot and a pilot-in-training boarded the **Dali**.

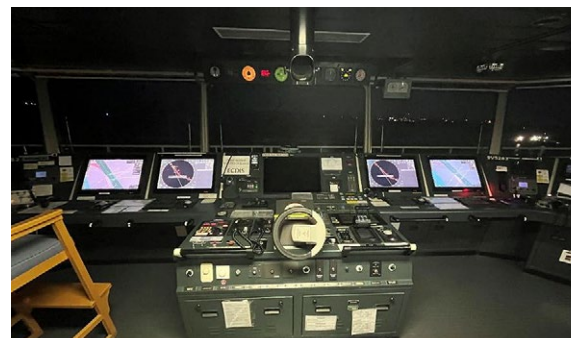


Damage to Spans 18 and 19, and Piers 18–22.



The Francis Scott Key Bridge in 2004 and the physical protection systems (dolphins and the pier fendering system) protecting piers from vessels transiting under the Key Bridge.

BACKGROUND SOURCE: MDTA.



The Dali's helm and conning area, including bow thruster and main engine controls, located on the centerline on the navigational bridge, looking forward. The overhead lighting would have been off while the vessel was underway in the darkness.

About 0036, the *Dali*, with the senior pilot at the conn, began maneuvering off the dock. The master, second mate, and helmsman were present on the vessel's bridge and on watch. At departure, two of the vessel's four diesel engine-driven generators, DG3 and DG4, were online and connected to a 6,600-volt HV main electrical bus. A third diesel generator, DG2, was in standby. Two tugs assisted the *Dali* outbound in the Fort McHenry Channel. By 0108, the senior pilot had let go the tugs.

Initial blackout (4:09 before bridge strike)

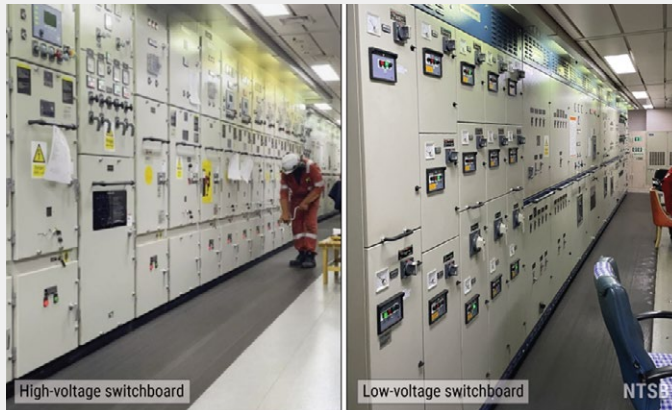
The *Dali's* transit through the channel continued normally until 0125:00, when the vessel experienced an LV switchboard blackout. The blackout resulted in a loss of steering (steering gear pump nos. 1, 2, and 3), the majority of vessel lighting, and equipment essential for the operation of the vessel, such as fuel pumps, cooling water pumps, and bow thruster auxiliary pumps. The main engine shut down, and the bow thruster, which was not in use, also shut down. At the time of the blackout, the *Dali* was underway at 8.9 knots (10.2 mph), and its bow was about 3.3 ship lengths away from the Key Bridge. Amid numerous alarms, the ECR crewmembers were able to determine that only the LV bus had lost power and the HV bus remained powered. At 0125:58, the electrician manually closed the HV and LV step-down transformer breakers (HR1 and LR1), restoring power to the LV bus and equipment powered from the LV switchboard, including steering gear pump nos. 1 and 2, vessel lighting, and auxiliary equipment for the main engine and electrical generators.

The fuel oil flushing pump, which had been utilized to supply fuel to DG3 and DG4, did not automatically restart when power was restored because the flushing pump was not configured to restart automatically following the loss of power. The main engine remained off throughout the remainder of the accident voyage.

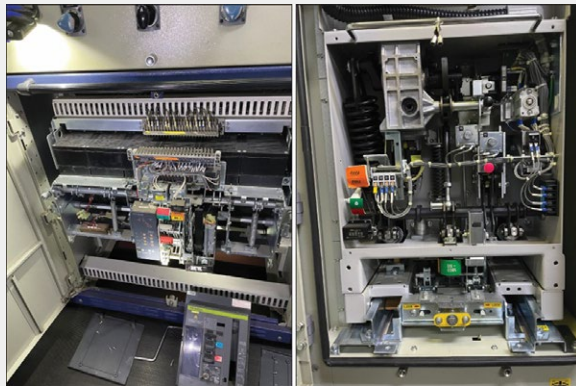
At 0125:59, with the vessel's bow about 2.5 ship lengths from the bridge and closing at a speed of 8.5 knots (9.8 mph), the senior pilot called his dispatcher to contact local authorities to shut down the bridge. The pilot also requested tugboat assistance by radio, and a tugboat started heading toward the *Dali*.

WHY DID THE *DALI* INITIALLY LOSE POWER?

The ship's electrical power was normally supplied by at least one of four AC diesel generators, which provided power for the HV and LV switchboards. The two switchboards were connected via two redundant step-down transformers (TR1 and TR2), each with a set of corresponding breakers: HR1 and LR1 were associated with TR1, while HR2 and LR2 were associated with TR2.

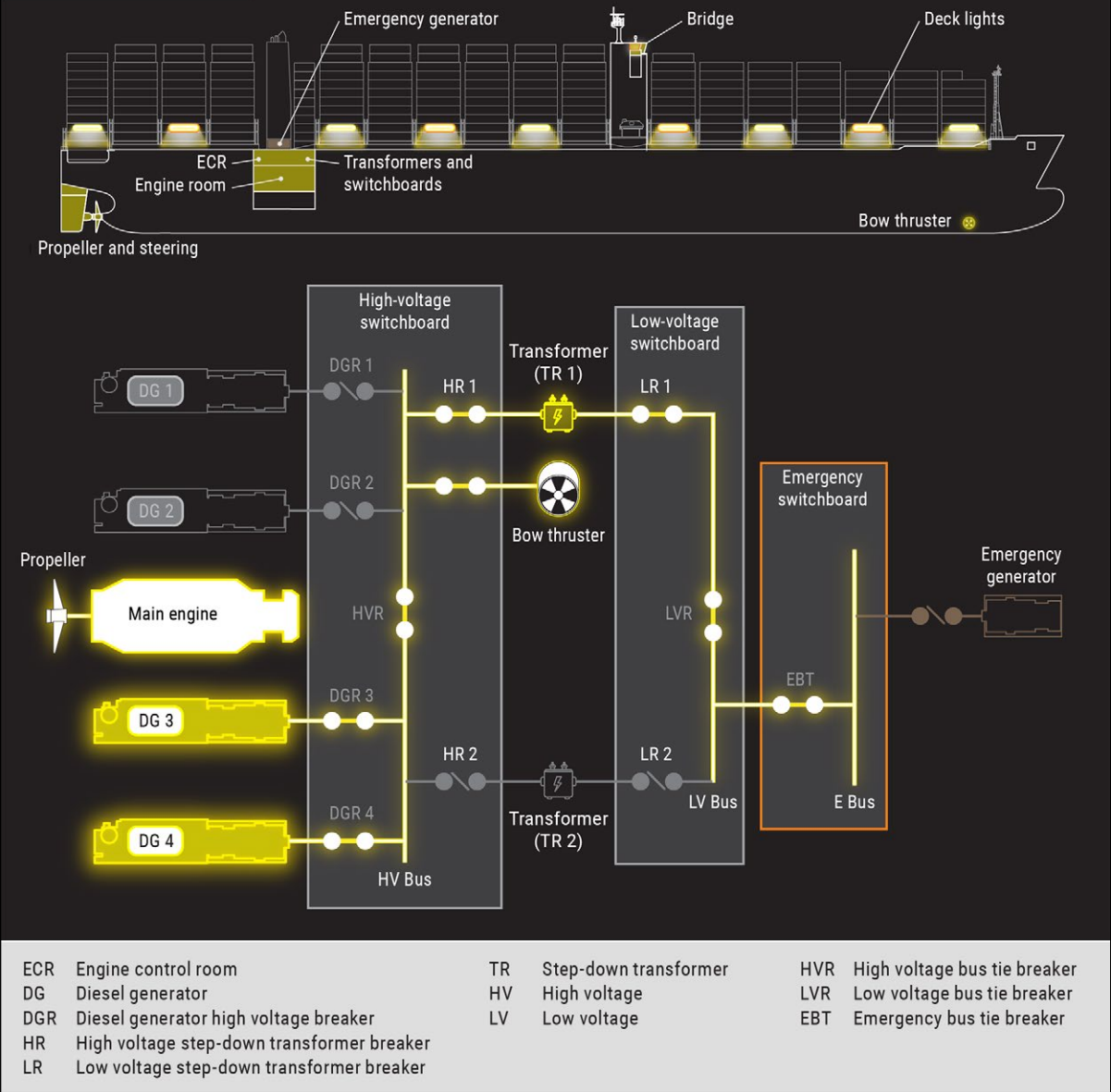


Left to right: The *Dali*'s HV switchboard (which housed the HV bus) and breakers, and the LV switchboard (which housed the LV bus) and breakers.



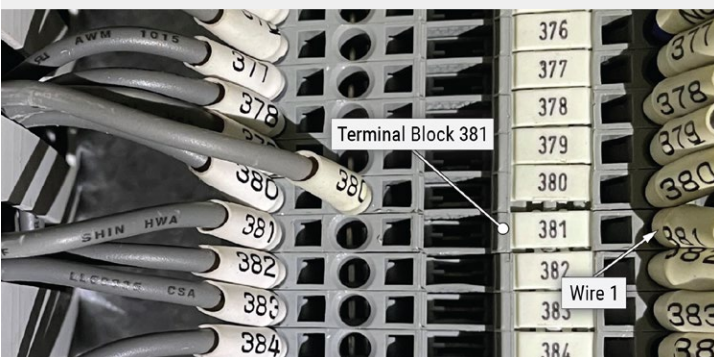
Left to right: The LR1 breaker (face cover removed) during examination, and the HR1 circuit breaker racked out in the test position during examination.

Time: Preaccident

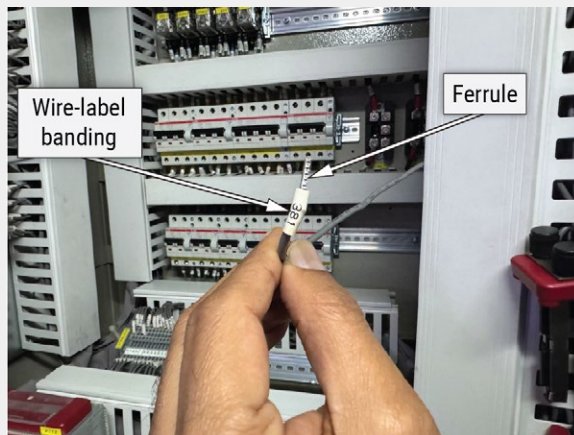


Configuration of *Dali* plant at time the *Dali* left the dock at Seagirt Marine Terminal on March 26, with DG3 and DG4 energized (highlighted in yellow). DG1 was offline, while DG2 was in standby.

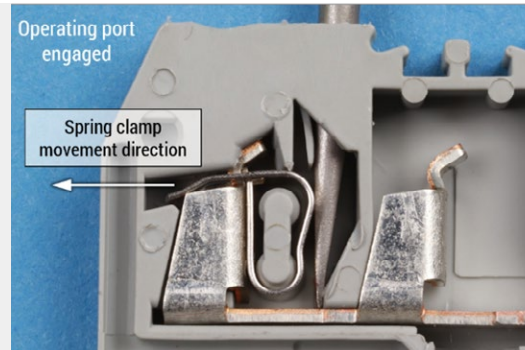
NTSB investigators discovered a loose signal wire (Wire 1) on a terminal block within the HV switchboard. The wire-label banding on the signal wire covered the wire's ferrule collar so that the ferrule could not be fully inserted into the terminal block's spring clamp gate, causing an inadequate connection. This left the wire vulnerable to becoming electrically disconnected. As the *Dali* approached the Francis Scott Key Bridge, Wire 1 disconnected from its terminal block and HR1 opened, interrupting power to TR1 and the LV switchboard and causing the blackout.



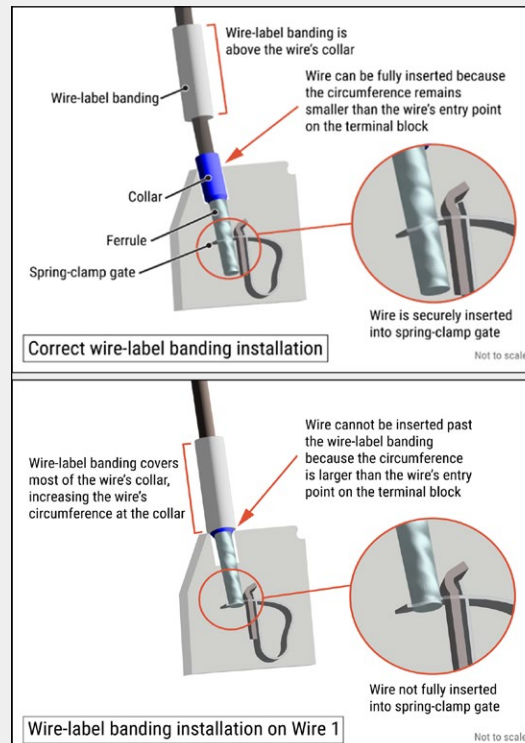
Signal wires Wire 1 and Wire 3 identified in Terminal Block 381.



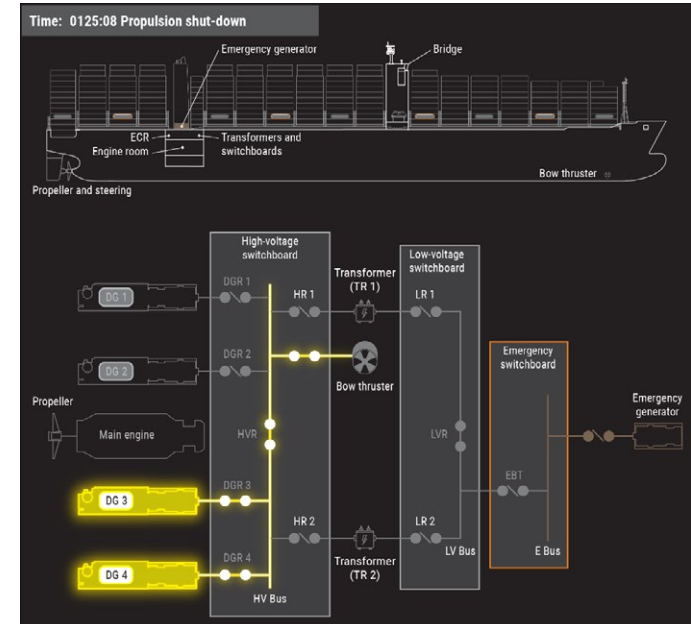
Wire 1 disconnected from Terminal Block 381.



The operating port of an exemplar terminal block when a tool is inserted, resulting in spring-clamp movement.



From top: Correctly installed wire-label banding compared to Wire 1's wire label banding installation, showing how placement of wire-label banding affects the way wires are seated in their terminal blocks.

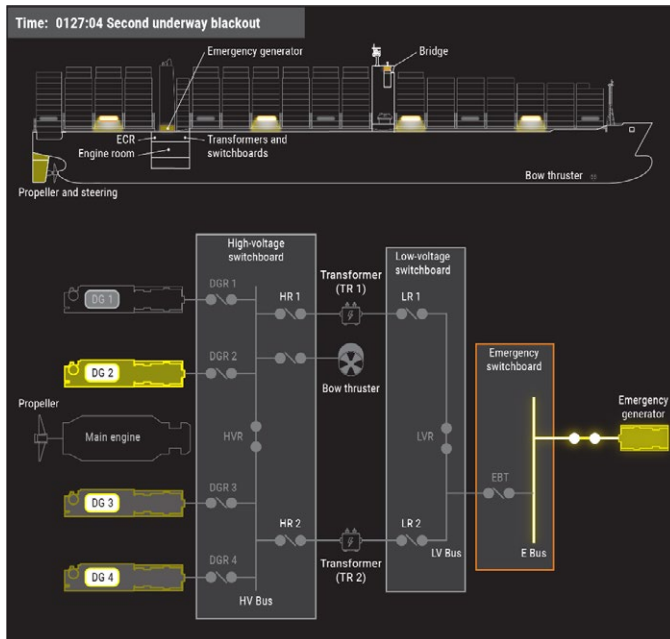


Configuration of *Dali* plant at 0125:08 after the main engine shut down.

A second blackout (2:05 before bridge strike)

At 0126:10, 70 seconds after the blackout, the EDG connected to the emergency bus, supplying power to the emergency switchboard, including steering gear pump no. 3. However, about 0127:02, the vessel experienced another blackout; both the HV and LV switchboards lost power. This occurred because the fuel pressure for DG3 and DG4 dropped, leaving the generators unable to maintain speed at their electric load and resulting in an underfrequency condition. The vessel's PMS, which monitored the generators, detected the low frequency and automatically started DG2 as designed. However, before DG2 could synchronize to the HV bus, the PMS automatically disconnected DG3 and DG4 from the HV bus due to their underperformance, leading to both HR1 and LR1 opening automatically.

All equipment powered by the two switchboards shut off, whereas the emergency bus remained powered during this second blackout. Within 3 seconds of the blackout, at 0127:07, the PMS synchronized DG2, powering the HV bus.

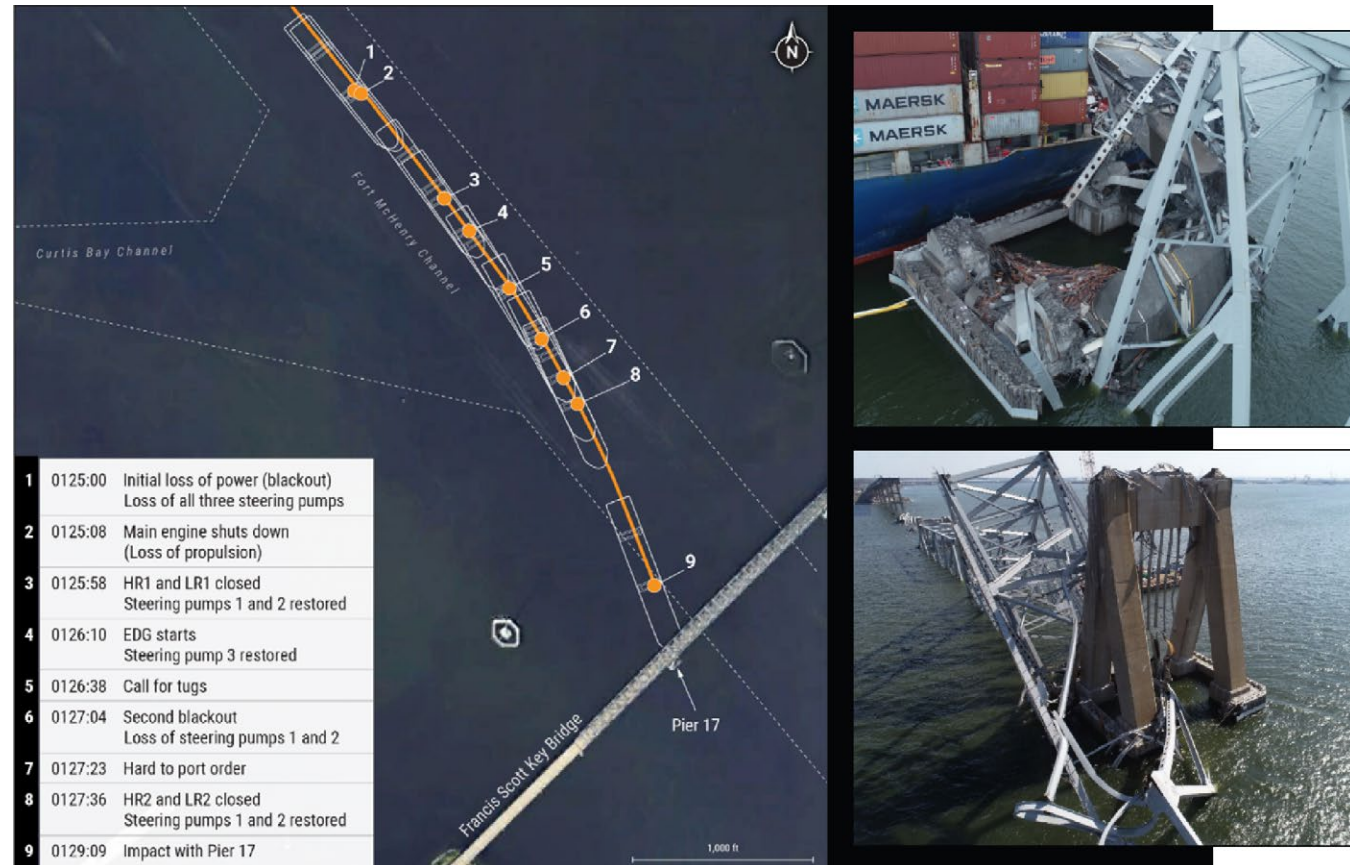


Configuration of *Dali* plant at 0127:04 when the vessel lost power (blackout) for a second time while underway.

The LV bus remained blacked out until 0127:36, when the engineering crew restored power by manually closing the HR2 and LR2 breakers. DG3 and DG4 remained disconnected from the HV bus and idled in a degraded state because the flushing pump that had been supplying fuel to them had not been restarted.

Over the next 30 seconds, the senior pilot and bridge team attempted to maneuver the vessel using the bow thruster and by letting go the anchor. However, at 0128:10, the bow of the *Dali* crossed out of the charted Fort McHenry Channel and began to ground in the mud near Pier 17 of the Key Bridge at 7.2 knots. MDTA Police officers blocked all bridge traffic soon thereafter.

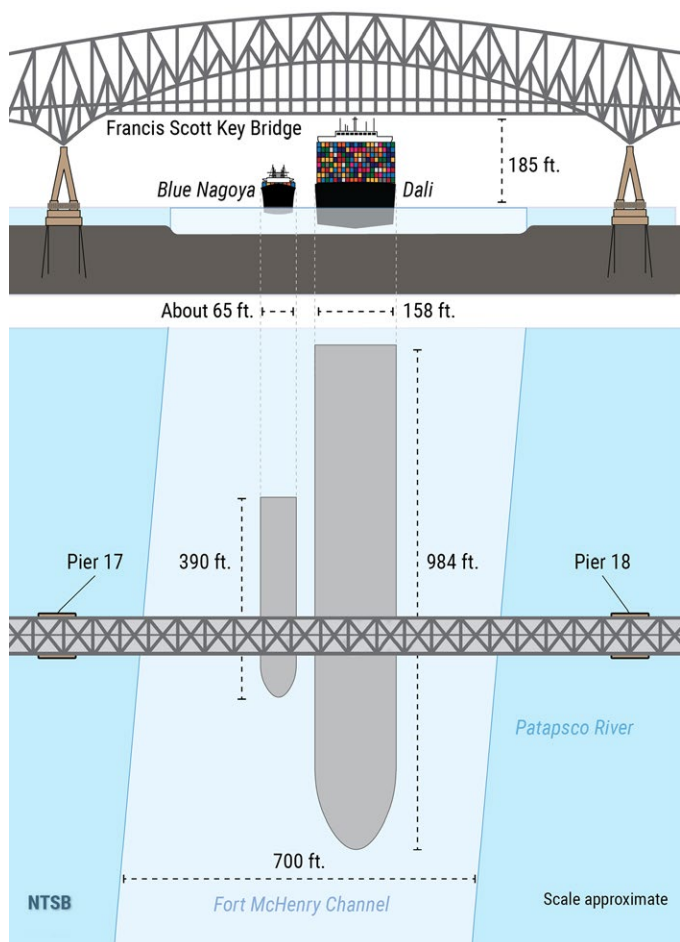
Despite the *Dali* crew and pilot's continued efforts to slow the vessel or change its course, the *Dali* continued toward Pier 17. Before the MDTA officers could alert the highway workers on the bridge, the *Dali*'s bow struck Pier 17 at a speed of 6.4 knots (7.4 mph). The pier collapsed, followed by the main spans (17, 18, and 19); Piers 19, 20, and 21; and Spans 20, 21, and 22.



Trackline of the *Dali* as it approached the Key Bridge. Each dot marks the location of the vessel's AIS antenna (above the vessel's bridge) at a given time. Insets show damage to fendering surrounding Pier 17 and Pier 18.

BACKGROUND SOURCE: GOOGLE EARTH.

THE PROBABLE CAUSE of the contact of the containership *Dali* with the Francis Scott Key Bridge was a loss of electrical power (blackout), due to a loose signal wire connection to a terminal block stemming from the improper installation of wire-label banding, resulting in the vessel's loss of propulsion and steering close to the bridge. **CONTRIBUTING** to the crew's inability to recover propulsion from the loss of electrical power was the limited time available due to the *Dali*'s proximity to the bridge. **CONTRIBUTING** to the collapse of the Francis Scott Key Bridge and the loss of life was the lack of countermeasures to reduce the bridge's vulnerability to collapse due to impact by ocean-going vessels, which could have been implemented if a vulnerability assessment had been conducted by the Maryland Transportation Authority as recommended by the American Association of State Highway and Transportation Officials. **ALSO CONTRIBUTING** to the loss of life was the lack of effective and immediate communications to notify the highway workers to evacuate the bridge.



Comparative sizes of the *Blue Nagoya* and the *Dali* relative to the Key Bridge. In 1980, the 390-foot-long Japan-flagged containership *Blue Nagoya* struck Pier 17 following a loss of steering about 600 yards from the bridge. The strike caused minor surface damage to the pier's columns, and the pier's fender was destroyed. The crushable concrete and timber fendering around the pier was rebuilt according to the original bridge design criteria, and the minor damage to the columns was repaired.

SAFETY ISSUES

◆ Vulnerability of bridges over navigable waterways to strikes by large oceangoing vessels.

In the *Dali* accident, the loss of power and propulsion during a critical maneuvering situation led to the vessel striking the Key Bridge. However, bridge strikes can occur as a result of any number of factors. To address the innumerable range of potential factors leading to a bridge strike, the vulnerability of bridges must be addressed. Further, measures to assess and address the vulnerability of bridges must account for mounting threats to bridge safety, such as the increasing vessel sizes and traffic density.

◆ Increasing vessel sizes and traffic density in US ports.

Increasingly larger containerships, such as the *Dali*, pose increased risks and challenges to maritime safety due to their reduced maneuverability in proximity to existing port and waterway infrastructure that was not designed to accommodate vessels of such size. As cargo vessel designs continue to evolve with the latest available standards and technology, increased redundancy to maintain critical systems, such as the main engine and steering, can mitigate risks in restricted waters.

◆ Improper placement of wire-label banding on terminal connection wires, preventing their secure connection into terminal blocks.

The initial underway blackout was caused by a series of electrical-related events that began when a signal wire (Wire 1), one of many in the main switchboard, electrically disconnected from its terminal block. Installed on each signal wire, including Wire 1, were labeling bands (wire-label banding), which were small silicone sheaths made of thermoplastic material that was heat-shrunk around the wire and had its associated terminal block identification number printed on it. The wire-label banding for Wire 1 covered all of the ferrule's blue insulated collar, increasing the ferrule's overall circumference, preventing the wire from being fully inserted into its terminal block—leaving Wire 1 vulnerable to becoming electrically disconnected.

◆ Lack of specific guidance for inspecting electrical terminal connections.

Synergy (the vessel's operator) required main switchboard inspections aboard the *Dali*, but the inspection guidance did not specify how to complete these checks, nor did it specify that all control (signal) wires in the HV switchboard had to be reviewed. Infrared thermal imaging is an inspection technique that allows inspectors to identify possible points of failure in electrical components not readily visible to the human eye. Had the technique been used to inspect the *Dali*'s HV switchboard connections as part of the vessel's preventative maintenance program, the loose Wire 1 may have been identified.

◆ Configuration of machinery and electrical systems needed to prevent loss of propulsion and recover steering and vessel electrical power following a blackout.

Preventing a loss of propulsion and recovering steering and vessel electrical power following a blackout are critical in restricted waters. On the *Dali*, the configuration of the main engine to shut down due to low cooling water pressure endangered the vessel because it prevented the main engine from being available following the initial underway blackout, thus reducing the vessel's maneuverability. The use of the flushing pump as a fuel service pump for the electrical diesel generators was inappropriate because the necessary fuel pressure for DG3 and DG4 would not be automatically reestablished after the restoration of power following a blackout per the fuel system's design. The vessel's LV step-down transformer HV breakers were set to manual mode rather than automatic. Keeping the HV breakers' control modes set to automatic rather than manual would have shortened the duration of the initial underway blackout from 58 seconds to 10 seconds, providing more time for the crew to attempt to recover critical systems, such as propulsion, as the vessel approached the Key Bridge. The EDG did not start within 45 seconds, as required by IMO regulations, likely because the radiator damper actuator's limit switch did not indicate open in the required time due to unknown circumstances.

Safety Issues *(continued)*

◆ **Lack of effective means of emergency communications to warn motorists and notify highway workers to evacuate a bridge during an emergency.** Because the *Dali* pilot contacted a shoreside dispatcher about a minute after the vessel lost power, MDTA police officers were able to stop all traffic from entering the bridge, and the bridge was cleared of all traffic before the vessel struck it. However, the highway workers and inspector on the bridge at the time were not notified of the emergency situation. Had they been notified about the same time the MDTA police officers were told to block vehicular traffic, the highway workers may have had sufficient time to drive to a portion of the bridge that did not collapse. The Key Bridge was not equipped with a warning system to prevent motorists from driving onto the bridge in the event of a hazard. In lieu of police officers or highway workers capable of quickly stopping traffic, motorist warning systems preventing motorists from entering onto a bridge are a critical countermeasure that can save lives and may be a component of an effective bridge protection strategy.



Collapsed section of Queen Isabella Causeway in Port Isabel, Texas. On September 15, 2001, four loaded barges crashed into one of the bridge's support columns. The collision caused two 80-foot spans to fall into the water. Eight people were killed as their cars fell 85 feet into the water. Five vehicles were recovered from the water along with three survivors.



Safety features installed on the rebuilt Queen Isabella Causeway (now known as the Queen Isabella Memorial Bridge). BACKGROUND SOURCE: TXDOT.

◆ **Inadequate standards for marine SMSs.** Proactive safety management, when done correctly, is predictive, designed to anticipate and address safety issues before they occur, and utilizes continuous data analysis to improve policies and procedures. The IMO's ISM Code establishes the standard for SMSs in the marine industry. While the requirements of the ISM Code include some elements of a comprehensive, proactive SMS, the ISM Code does not fully encompass the four critical components found in the commercial aviation industry's SMS model.

◆ **Inadequate standards for manufacturer-provided VDR software.** Recovery and analysis of the *Dali*'s VDR data was integral to investigating this accident. However, NTSB investigators encountered significant challenges that highlighted the need for robust standards for manufacturer-provided VDR software. Although the VDR model installed on board the *Dali* generally complied with IMO regulations and IEC standards, significant deficiencies in data accessibility, audio usability, and playback software functionality revealed a critical disconnect between published technical standards and practical investigative and organizational needs to identify safety issues and solutions, and for operators and regulators to ensure safety.

SAFETY RECOMMENDATIONS

As a result of its investigation of this accident, the NTSB issued **17 safety recommendations**.

We issued **recommendations** relating to detecting inadequate signal wire connections and preventing improperly placed wire-label banding on terminal blocks to Synergy, the vessel manager; WAGO, the manufacturer of the terminal block with the loose signal wire connection; and HD Hyundai Heavy Industries, the vessel's builder.

We issued **several recommendations** to Synergy and HD Hyundai Heavy Industries related to the configuration of systems and machinery to aid in recovery following a blackout. Additionally, we **recommended** that the Coast Guard conduct and publish the results of a study that examines redundant means to ensure that large single-propulsion-engine cargo vessels maintain propulsion and steering when maneuvering in restricted waters. We also **recommended** that the vessel's classification society, Nippon Kaiji Kyokai, share the circumstances of the accident with its members, highlighting lessons learned from our investigation.

We **recommended** that the Coast Guard propose to IMO that it revise the ISM Code and associated guidelines to fully incorporate safety policy, safety risk management, safety assurance, and safety promotion into its SMS requirements.

We issued **two recommendations** to increase the safety of workers on bridges over navigable waterways. Additionally, we issued **three recommendations** to address motorist warning systems on bridges.

Finally, as a result of this investigation, we issued **two recommendations** related to improving VDR systems' functionality and ease of use during investigations.

! SAFETY RECOMMENDATION REPORT

MIR-25-10

Safeguarding Bridges from Vessel Strikes: Need for Vulnerability Assessment and Risk Reduction Strategies

As part of our investigation of the *Dali*'s collision with the Francis Scott Key Bridge, and the bridge's subsequent collapse, the NTSB identified the need to safeguard bridges from vessel strikes. On March 18, 2025, we issued safety recommendation report MIR-25-10 to address this urgent need. In this report, we found that if the MDTA had completed a vulnerability assessment in accordance with the 1991 AASHTO *Guide Specification*, the MDTA would have been aware that the Key Bridge was above the AASHTO threshold of risk for catastrophic collapse from a vessel collision when the accident occurred. Additionally, had the MDTA conducted a vulnerability assessment of the Key Bridge using the AASHTO Method II vulnerability assessment calculation, the MDTA would have had information to proactively identify strategies to reduce the risk of a collapse and loss of lives associated with a vessel collision with the bridge. We found that, at the time of our report's publication, the owners of 68 bridges over navigable waterways frequented by ocean-going vessels were likely unaware of their bridges' risk of catastrophic collapse from a vessel collision and the potential need to implement countermeasures to reduce the bridges' vulnerability.

The NTSB issued **four urgent safety recommendations** to safeguard bridges from contact by large ocean-going vessels. We **recommended** that the FHWA, in coordination with the Coast Guard and US Army Corps of Engineers, establish an interdisciplinary team and provide guidance and assistance to bridge owners on evaluating and reducing the risk of a bridge collapse from a vessel collision. We also **recommended** that the bridge owners identified in the report determine their bridges' AASHTO Method II annual frequency of collapse and inform the NTSB whether the probability of collapse is above the AASHTO threshold. Finally, we **recommended** that these bridge owners develop and implement a comprehensive risk reduction plan if this annual frequency exceeded the AASHTO threshold.

As of the publication of the NTSB's November 2025 final report on the *Dali* accident, all recipients have responded and are taking, or have taken, action to address the urgent recommendations.



View of the collapsed western span of the Sunshine Skyway Bridge in Tampa Bay, Florida, after the Liberian-flagged bulk carrier *Summit Venture* rammed a support pier on May 9, 1980. The NTSB investigated the accident and issued recommendations to FHWA and the Coast Guard that ultimately resulted in AASHTO's adoption of its 1991 *Guide Specification and Commentary for Vessel Collision Design of Highway Bridges*, which introduced a vulnerability assessment calculation for bridges.



Rendering of the planned cable-stayed replacement for the Francis Scott Key Bridge.

SOURCE: KEY BRIDGE REBUILD, MDTA.



The rebuilt Sunshine Skyway Bridge showing the dolphin and island protection system.

SOURCE: MARK LUTHER, UNIVERSITY OF SOUTH FLORIDA CENTER FOR MARITIME AND PORT STUDIES.

CONTACT

Contact of Bulk Carrier **Algoma Discovery** with BNSF Allouez Taconite Facility

VESSEL GROUP

➤ Cargo, Dry Bulk

LOCATION

BNSF Allouez Taconite Facility,
Superior, Wisconsin

CASUALTY DATE	ACCIDENT ID
July 20, 2024	DCA24FM052
INJURIES	ESTIMATED DAMAGES
None	\$1.08 million
REPORT NUMBER	ISSUED
MIR-25-45	December 10, 2025



Algoma Discovery at unknown date before the contact.

SOURCE: CARSON LAST, MARINETRAFFIC.COM.



Exterior and interior damage to the Algoma Discovery following the casualty. SOURCE: COAST GUARD.

On July 20, 2024, about 2215 local time, the Canada-flagged cargo vessel **Algoma Discovery** struck five of the loading shuttles at the BNSF Allouez Taconite Facility, in Superior, Wisconsin, after losing electrical power and main propulsion while docking. There were no injuries, and no pollution was reported. Damage to the facility was estimated at \$950,000, and damage to the **Algoma Discovery** was estimated at \$130,000.

Three days before the casualty, while the 729-foot-long **Algoma Discovery** was en route to the facility, engineers discovered that one of the vessel's three generators (the no. 2 generator) was not producing voltage. The vessel's chief engineer restored the voltage by "flashing" its field and tested it by placing it in parallel with the no. 3 generator. He informed the master and the operating company of the situation and worked with the electrical superintendent to identify the cause of the generator's inability to produce a magnetic field. Although he was able to restart the generator by "flashing" it, the chief engineer did not identify the cause of the loss of the generator's magnetic field. In addition, the no. 2 generator was not tested with a significant demand, such as operating the bow thruster.

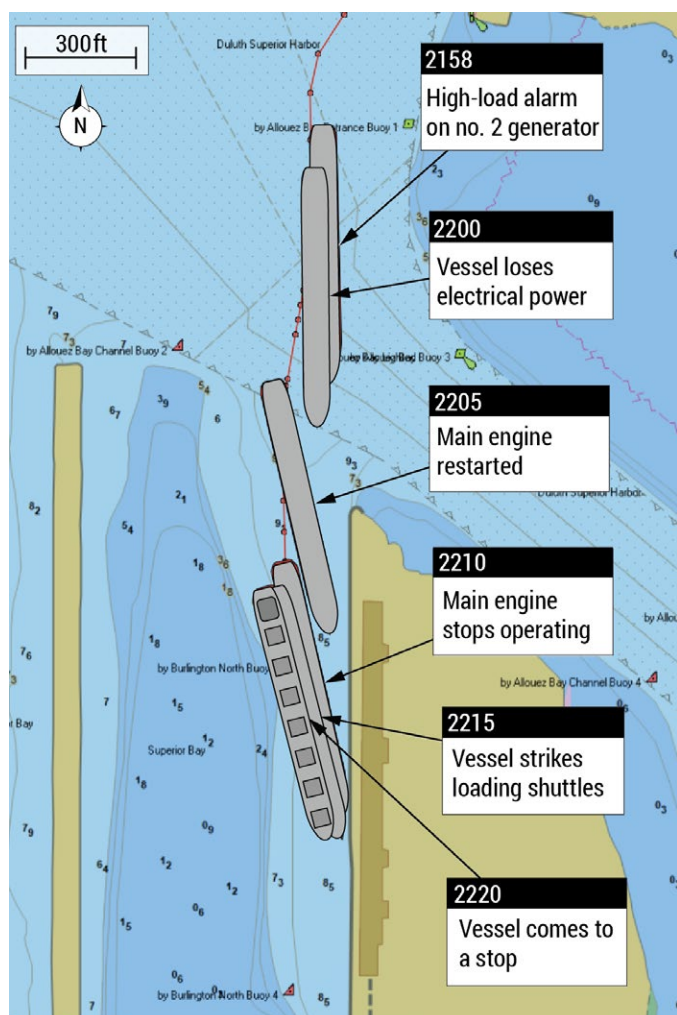
On the day of the casualty, at 2200, as the vessel approached the facility to dock, the no. 2 generator again stopped producing voltage, resulting in a loss of vessel electrical power and the first of two shutdowns of the main engine. The chief engineer was able to initially restore vessel electrical power (the no. 1 and

no. 3 generators were placed online), but there was not enough power to operate the bow thruster. Rudder control (steering) was regained when the emergency generator powered the emergency switchboard less than a minute after the loss of power.

The chief engineer restored the main engine at 2205, indicating that there was sufficient pressure within the control air system for a start. About 5 minutes later, at 2210, as the master maneuvered the vessel, the low air control pressure alarm sounded. Because the main engine relied on a minimum control air pressure to operate, the loss of control air caused the interlocks on the engine, normally kept open with air pressure, to close. As a result, the engine shut down a second time at 2215. After trying to restart the main engine several times, the chief engineer noted that both the start air and control air pressures were low.

The low start air pressure was likely due to the vessel's compressed air bottle system pressure being depleted from the multiple attempts to restart the engine the second time. When the vessel lost power, the refrigeration air dryer for the control air system shut down, most likely due to the loss of electrical power to the fan motor. This prevented the supply of compressed air to the control air system. The refrigeration air dryer system was not configured to restart automatically; instead, the crew would have to manually restart it after main electrical power was restored. Therefore, the air used for multiple maneuvering commands (from the bridge engine controls to the control air system for

the main engine) following the first engine shutdown, combined with keeping the interlocks for main engine operation open, likely drained the remaining control air pressure—this resulted in the low control air alarm, shut down of the main engine, and the inability to restart the main engine again, leaving the vessel without propulsion as it approached the dock.



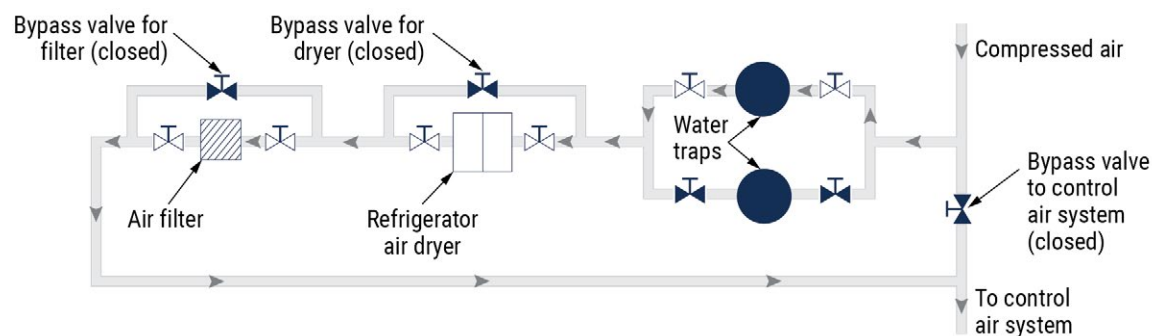
Trackline of *Algoma Discovery* as it approached the dock to the time it came to a stop after striking the loading shuttles. BACKGROUND SOURCE: NOAA ENC US5DLHCG AS VIEWED ON MADE SMART.

Without main propulsion and a bow thruster, the master could not effectively maneuver the vessel to avoid striking the facility's loading shuttles. Had the chief engineer or operating company required further testing of the no. 2 generator at a significant load before the vessel's docking, they may have identified that the malfunction with the no. 2 generator had not been corrected. With the knowledge that the vessel did not have three operational generators, which were required to operate the bow thruster, the crew and operating company then could have implemented measures to ensure a safe docking without the use of the bow thruster.

After the casualty, an electrical technician examined the no. 2 generator and found three of the four capacitors in the generator's automatic voltage regulator internal rectifier circuit were not connected

and the fourth had malfunctioned, which prevented the generator from maintaining its voltage. Once the malfunctioning capacitors were replaced and connected, the generator operated properly.

THE PROBABLE CAUSE of the contact of the bulk carrier *Algoma Discovery* with the BNSF Allouez Taconite Facility was the chief engineer and operating company not sufficiently evaluating and repairing the cause of an online generator's previous automatic voltage regulator malfunction, resulting in the vessel's loss of electrical power and propulsion while maneuvering toward the dock, and subsequent low control air pressure, which led to a second loss of propulsion.



Typical flow of compressed air through the water traps, refrigerator air dryer, and air filter before reaching the control air system. BACKGROUND SOURCE: ALGOMA CENTRAL CORPORATION.

LESSONS LEARNED

MITIGATING RISKS OF ELECTRICAL GENERATING SYSTEM FAILURES WHILE MANEUVERING

Electrical generating system failures during maneuvering can result in a loss of propulsion and steering. Therefore, mitigating the loss of electrical power is paramount in restricted waters or during maneuvering, where immediate hazards (grounding, traffic, objects) are in proximity, and therefore, response time is critical to avoiding a casualty. Electrical generating system components, such as generators, should be tested to full capacity (or as close to full capacity as possible) following any maintenance or repair to ensure that they can meet electrical demand while the vessel is being maneuvered. Additionally, when electrical system failures cannot be completely resolved, the implementation of alternate measures to ensure a safe transit should be considered, such as the use of tugs to assist in maneuvering or docking.

CONTACT

Contact of Towing Vessel **Schweiger** with US Coast Guard Station Cape Disappointment Docks

VESSEL GROUP

Towing/Barge

LOCATION

Baker Bay West Channel, Ilwaco, Washington

CASUALTY DATE

September 11, 2024

ACCIDENT ID

DCA24FM061

INJURIES

None

ESTIMATED DAMAGES

\$750,000

REPORT NUMBER

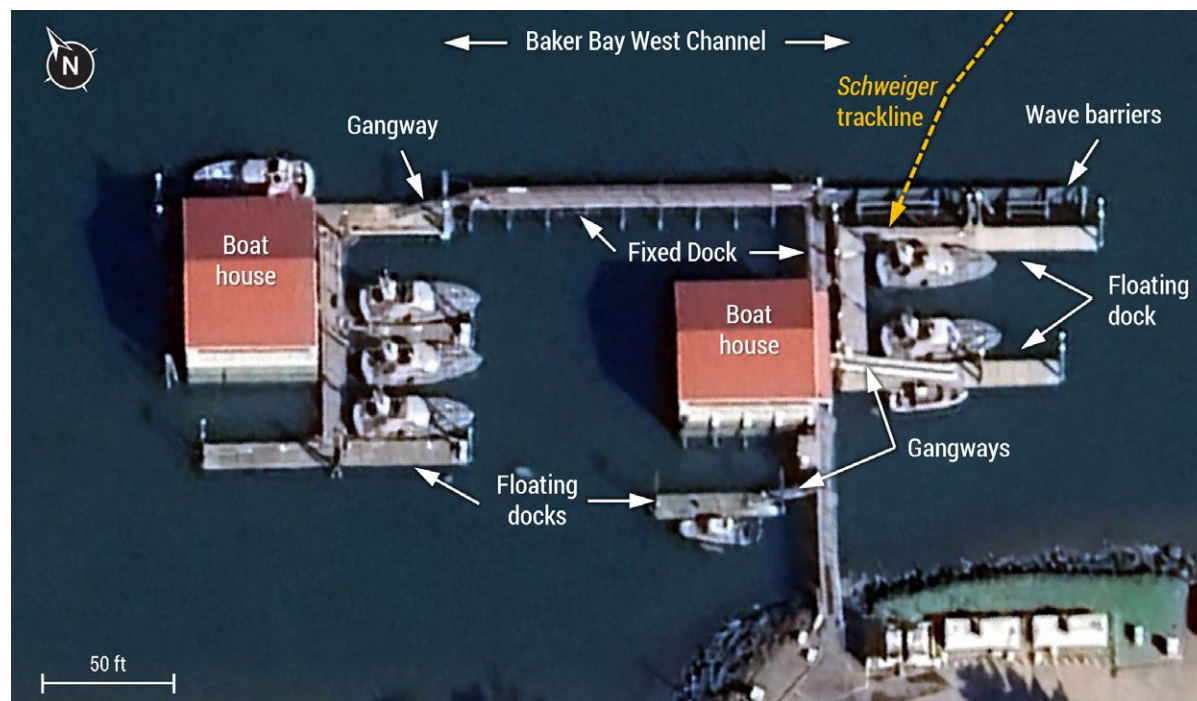
MIR-25-47

ISSUED

December 12, 2025



Schweiger moored at Port of Ilwaco, September 2024.



Overview of Coast Guard Station Cape Disappointment. BACKGROUND SOURCE: GOOGLE EARTH.

On September 11, 2024, the 60-foot-long towing vessel **Schweiger** was transiting the Baker Bay West Channel near Ilwaco, Washington, when it struck the Coast Guard Station Cape Disappointment docks about 1236 local time, after it veered out of the channel. There were no injuries. About 20 gallons of diesel fuel spilled into the waterway as a result of the contact. The **Schweiger** was undamaged. Damage to the station infrastructure was estimated to exceed \$750,000.

Earlier that day, about 0634, the **Schweiger**, with the captain at the helm and a deckhand aboard, departed the Ilwaco Marina en route to the southeastern end of Sand Island, Oregon, to pick up a barge and additional personnel and then transit to Tansy Point, Oregon, to assist with a marine construction project. The captain and deckhand had commuted locally to the towing vessel to work a day shift beginning at 0600.

After connecting a barge at Sand Island and dropping the barge at Tansy Point, about 1140, the captain and deckhand got the **Schweiger** underway lightboat to return to the Port of Ilwaco. The vessel entered Baker Bay West Channel about 1227 while traveling about 7.5 knots.

The vessel's AIS track showed a deliberate course change from the 306° leg to the 284° leg on the red (right) side of the Baker Bay West Channel about 1233:47, indicating the captain was still alert at the time. At 1235:12, the **Schweiger** began moving to port and crossed the channel. At 1236, the rate of turn to port increased, and the vessel contacted the Coast Guard Station Cape Disappointment docks about 30 seconds later. The tug broke through the wave barrier, damaging a floating dock and associated pilings. A fuel system and electrical systems located behind the wave barrier were also damaged. Two 47-foot-long Coast Guard motor lifeboats and a smaller

25-foot-long patrol boat moored to the floating dock moved when the *Schweiger* struck the docks but were not damaged.

The captain reported that he fell asleep before the contact. Based on the time the vessel began turning to port, the captain likely fell asleep about 1 to 3 minutes before the contact, sometime between 12:35:12 and 12:36:25.



CCTV captured the *Schweiger* underway moments before contacting the wave barrier and floating dock.

BACKGROUND SOURCE: COAST GUARD.

Later in the day after the contact, the captain learned that he had COVID-19 and a collapsed lung. Acute COVID-19 coronavirus infections can cause tiredness, lack of energy, headaches, and an inability to focus. Suddenly falling asleep without warning has not been described as a typical feature of COVID-19, but tiredness is a common effect of COVID-19. People with acute COVID-19 also may sometimes experience syncope (which is fainting, not sleeping). Therefore, as the captain was acutely symptomatic with confirmed COVID-19 at the time of the vessel's transit, it is likely he was experiencing the effects of an acute COVID-19 coronavirus infection while operating the vessel.

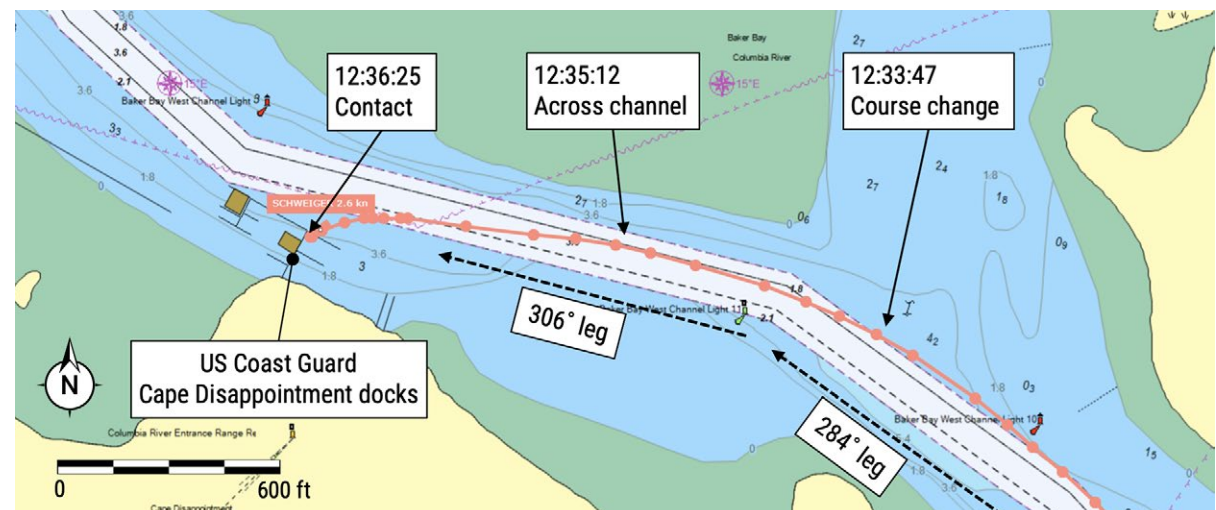
While the captain reported getting sufficient sleep in the 2 days before the contact, his sleep quality was likely poor, given the effects of acute COVID-19. This poor sleep quality would have resulted in increased levels of fatigue on the day of the contact and

increased the likelihood of the captain falling asleep while navigating the vessel.

The captain reported taking several tablets of ivermectin, which is a prescription medication commonly used to treat parasitic infections in humans and animals. Ivermectin was proposed early in the COVID-19 pandemic as an alternative therapy for prevention and treatment of COVID-19 infections but was subsequently found to be ineffective for this purpose, with significant potential for adverse side effects. Ivermectin generally carries a warning that neurotoxicity can occur with use, including alterations of consciousness (ranging from drowsiness and stupor to coma) as well as confusion and disorientation. Department of Transportation postaccident testing does not test for ivermectin, and the medication the

captain took was not prescribed by a physician, so investigators could not confirm whether the medication he took was, in fact, ivermectin. Given his illness and the prescribed and unprescribed medication he took, it cannot be ruled out that he may have suffered a sudden medical incapacitation, which resulted in him becoming incapacitated before the contact.

THE PROBABLE CAUSE of the contact of the towing vessel *Schweiger* with the US Coast Guard Cape Disappointment docks was the captain falling asleep while navigating the vessel, likely due to increased fatigue caused by an acute COVID-19 coronavirus infection.



Trackline of the *Schweiger* as it transited the Baker Bay West Channel on September 11.

BACKGROUND SOURCE: NOAA ENC US5WA02, AS VIEWED ON MADE SMART.

LESSONS LEARNED

USE OF MEDICATION WHILE OPERATING VESSELS

For the safety of the crew, equipment, and vessel, use of medication in conjunction with the operation of a vessel must be done with caution. Mariners should be aware of any adverse side effects of medications that impact their ability to perform their duties. Mariners should never use medications with which they are unfamiliar or for which they are not the prescribed user.

FIRE/EXPLOSION

Engine Room Fire aboard Fishing Vessel *Three Girls*

VESSEL GROUP
Fishing

LOCATION
Gulf of Maine, 118 nm east-southeast of
Portland, Maine

CASUALTY DATE	ACCIDENT ID
August 11, 2024	DCA24FM056
INJURIES	ESTIMATED DAMAGES
None	\$1.3 million
REPORT NUMBER	ISSUED
MIR-25-04	January 22, 2025



Three Girls docked in Portland, Maine, on August 14, 2024, after the fire.



Fire damage to the foredeck of the *Three Girls* and the interior of wheelhouse.

On August 11, 2024, about 2056 local time, while the fishing vessel *Three Girls* was engaged in fishing operations in the Gulf of Maine about 118 nautical miles east-southeast of Portland, Maine, a fire broke out in the vessel’s engine room. The five crewmembers and an NMFS observer abandoned the burning vessel into a liferaft and were rescued by a Coast Guard cutter crew that same evening. There were no injuries, and no pollution was reported. Damage to the vessel was estimated at \$1.3 million.

Nine days earlier, on August 2, the 81.6-foot-long *Three Girls* had arrived in Boston, Massachusetts, so the crew could prepare for a fishing trip. On August 9, the *Three Girls* departed Boston, bound for fishing grounds about 100 miles off the coast of New England. The crew began fishing the following morning, August 10, catching about 20,000 pounds of various groundfish over the next 2 days.

On August 11, about 2045, the captain called the crew to report to the stern deck to begin hauling the fishing net back onto the vessel. About 2050, when the fishing net was recovered from the seafloor and almost on the deck, the captain noticed a burning smell. He saw thick, black smoke billowing out from the engine room exhaust fan in the port stack. He also saw

black smoke coming out of the engine room entrance but was unable to determine whether the fire was on the port or starboard side.

After discovering the fire, the captain shut off the winch engine remotely from the wheelhouse control station, ordered the crew to prepare to abandon ship, and broadcast a distress call over VHF channel 16. The crew launched and entered the liferaft in an expeditious and orderly fashion less than 8 minutes from the time the captain first smelled smoke, ensuring that the vessel’s EPIRB was activated to provide their accurate position to responders. The crew was rescued by Coast Guard responders.

A postcasualty examination of the engine room found the most extensive fire damage was in the forward, port side and a few areas of “clean burn” present between the hydraulic return oil filter housing and the winch engine that was operating at the time, indicating the fire had burned hottest there. Therefore, the fire area of origin was likely in the port, forward corner of the engine room between the hydraulic return oil filter housing and the winch engine.

After the fire, all hydraulic hoses from the hydraulic return oil filter box were found detached from their aluminum filter housing covers, which had

been melted away by the fire, indicating the hoses, their fittings, or another component of the steel filter box had failed. Due to the extent of the fire damage throughout the engine room, investigators were unable to determine which hydraulic hose, fitting, or component may have initially failed. If the filter box or a component of the filter box failed, pressurized hydraulic oil would have sprayed into the engine room onto nearby operating machinery.

Before the captain discovered the fire, the hydraulic system was running about 90%, with all the hydraulic components operational at full load, and the winch engine was running at nearly full speed. The surface temperature of the winch engine exhaust manifold and piping (about 800–1,000°F) could have provided an ignition source for the spraying pressurized hydraulic oil—which had a flashpoint of 329°F—from a failed component of the hydraulic return oil filter box/housing. Investigators could not find any alternative ignition or fuel sources near the fire area of origin. Therefore, the cause of the fire was likely the ignition of pressurized hydraulic oil spraying on components of the running winch engine exhaust system.

Shutting off the winch engine would have stopped the spray of pressurized hydraulic oil that was fueling the fire. However, the starboard electrical generator—which powered the supply and exhaust ventilation fans in the engine room—could not be stopped remotely. Additionally, there were no dampers or remote shutoffs for the supply and exhaust fans in the engine room to secure this ventilation. Therefore, oxygen, feeding the fire, continued to circulate throughout the engine

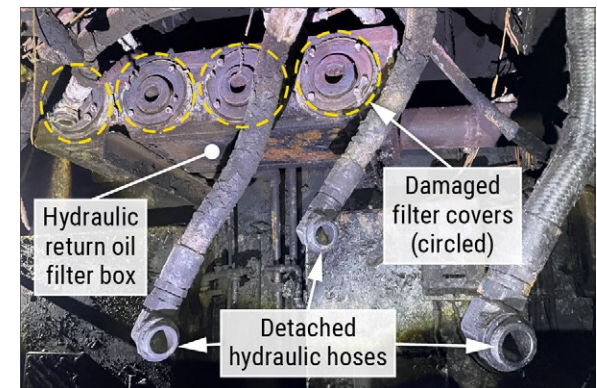
room, and the fire continued to burn. Within minutes, the fire overwhelmed the wheelhouse, and smoke began blowing over the stern deck, where the crew had mustered. The inability to secure ventilation to the engine room allowed for a continued supply of oxygen to the fire, hastening its growth and spread.

THE PROBABLE CAUSE of the fire aboard the fishing vessel *Three Girls* was likely the failure of a component on the hydraulic system (located in the engine room) for on-deck fishing equipment, resulting in pressurized hydraulic oil spraying onto a running engine's exhaust system and igniting.

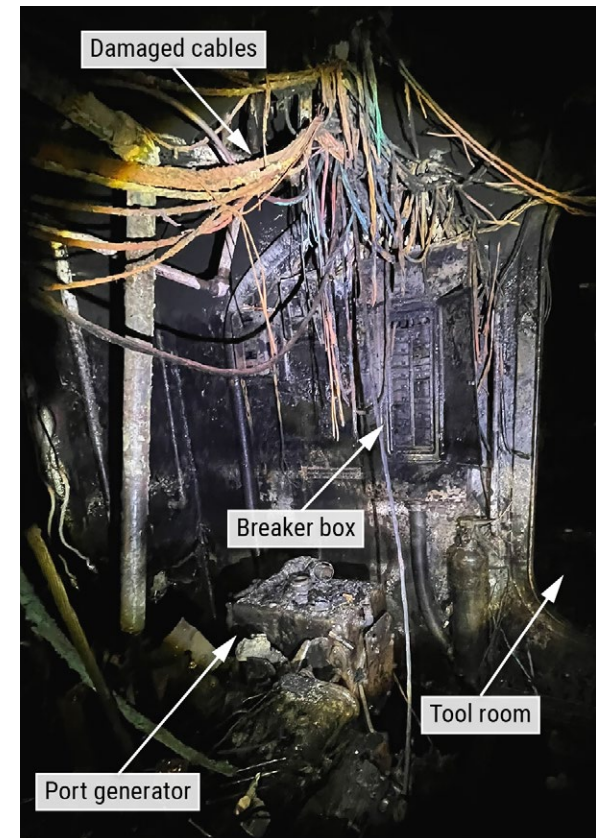


View of the burning *Three Girls* from the rescue helicopter, with fire in the wheelhouse.

SOURCE: COAST GUARD.



Hydraulic system return oil filter box in the *Three Girls* engine room after the fire.



Fire damage in the port forward corner of the *Three Girls* engine room.

LESSONS LEARNED

SECURING ENGINES AND VENTILATION DURING ENGINE ROOM FIRES

After an engine room fire ignites, it is imperative to remove the sources of available fuel and ventilation to the fire to prevent it from spreading. Vessel designers, builders, owners, and operators are encouraged to install, regularly test, and have emergency drills that incorporate remote shut offs for all machinery within these spaces to ensure the machinery can be remotely stopped from outside the space where it is situated. Additionally, to prevent the reintroduction of oxygen to the space, vessel designers and owners should ensure that the ventilation, both natural and forced draft, can be completely and remotely secured to all engine rooms.

FIRE/EXPLOSION

Engine Room Fire aboard Cargo Vessel *Stride*

VESSEL GROUP

▣ Cargo, General

LOCATION

Barbours Cut Marine Terminal,
Galveston Bay, LaPorte, Texas

CASUALTY DATE

January 8, 2024

ACCIDENT ID

DCA24FM015

INJURIES

2 fatal, 1 serious

ESTIMATED DAMAGES

\$12 million

REPORT NUMBER

MIR-25-05

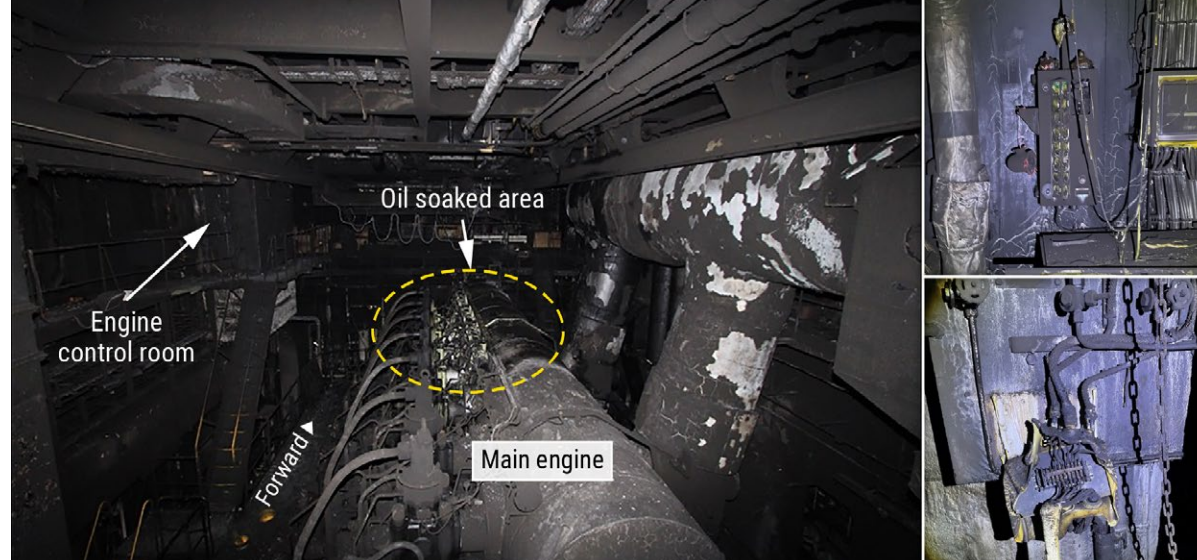
ISSUED

January 29, 2025



The *Stride* underway before the fire.

SOURCE: YE CHIA-WEI, MARINETRAFFIC.COM.



View of the *Stride* engine room 3rd deck looking forward, after the fire, showing the main engine and surrounding areas covered in soot and an oil-soaked section of the main engine. Insets, from top: damaged light signal column in funnel casing and melted electrical component on boiler on D deck.

On January 8, 2024, about 0331 local time, a fire broke out in the engine room aboard the 598-foot-long cargo vessel *Stride* during bunkering operations while it was docked at the Barbours Cut Marine Terminal in LaPorte, Texas. Crewmembers shut down all ventilation to the engine room, and the fire self-extinguished. Shoreside firefighters and the ship's emergency teams removed three crewmembers from the engine control room who were unable to escape the fire; two died on scene, and one was seriously injured. No pollution was reported. The vessel was declared a constructive total loss, valued at \$12 million.

Before the fire broke out, the crew were conducting bunkering operations, and the chief engineer ordered 80 mt of diesel oil to be loaded into the port and starboard DBDO tanks, which had room for about 97 mt of diesel oil. During bunkering, engineering crewmembers opened the fill valves for the DBDO tanks. This action should have allowed diesel oil to fill both the port and starboard tanks. However, 6 weeks before the fire, a replacement valve was ordered and installed for the port DBDO tank. The replacement valve was not the same type of valve specified by the vessel's fuel oil system drawing. An angle stop check valve, which allowed flow in only one direction, even when open, was ordered instead of an angle stop valve, which would

have allowed fuel to flow in both directions. The vessel had not bunkered diesel oil into the port DBDO tank since the valve replacement, so the crew had no prior indication that the wrong valve type was ordered and installed. Because the angle stop check valve was installed, on the day of the accident, the diesel oil went solely into the starboard DBDO tank, which had capacity for about 37 mt until it was completely full.

Prudent marine practice while starting a bunkering operation would be to fill slowly at first and then establish a fill rate by locally sounding each tank at frequent intervals. However, during bunkering, no crewmembers used sounding tapes or observed the local tank gauges to check the levels of the two tanks being filled, as was required by the company's SMS. As a result, they did not notice the incoming diesel oil was not flowing into the port DBDO tank. Additionally, within 2 minutes of the start of bunkering, the chief engineer quickly requested two increases in pumping rates, without establishing a filling rate into both tanks, resulting in the starboard DBDO tank quickly filling to its maximum capacity within about 25 minutes.

After the starboard DBDO tank became full, the incoming fuel was forced up the tank's vent piping as the barge continued to pump diesel oil to the *Stride*. The vent piping had several engine room fuel tanks'

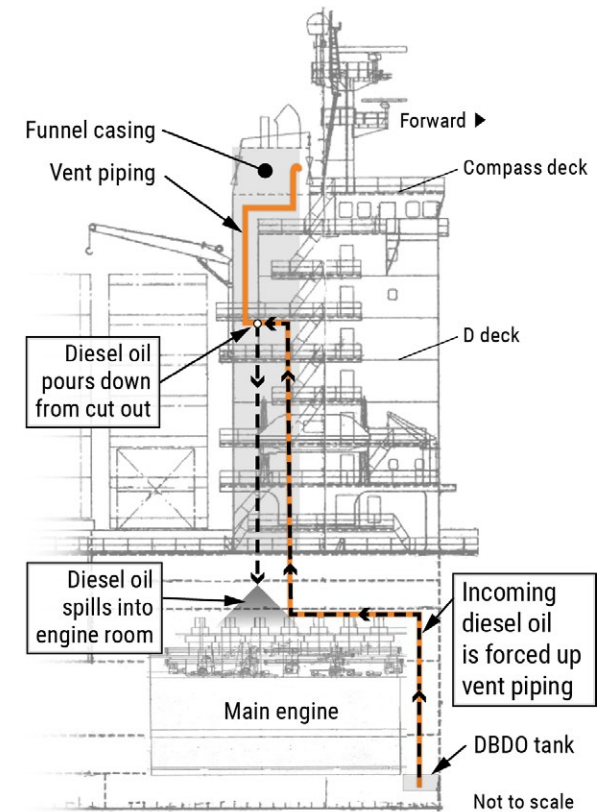
vents connected into a common 12-inch pipe that ran upward within the funnel casing directly above the lower engine room and was designed to vent to open atmosphere through a gooseneck on the compass deck above the bridge.

At some unknown time, a 7-inch-by-11-inch section of pipe had been cut into the top of a horizontal section of the 12-inch vent pipe on the D deck. There were no records of this unauthorized alteration. The cut out section of pipe had been replaced with a flexible sealant and then wrapped in tape. Once the diesel oil reached this area of the vent piping, the

diesel oil pressure in the pipe exceeded the flexible sealant's capacity and ejected the cut-out section of vent pipe onto the deck below.

Diesel oil then poured out of the opening in the vent pipe and cascaded down through the engine room, igniting and resulting in a fire. Had the cut out not been present, the diesel oil would have likely exited the vent pipe on the compass deck and spilled onto the vessel exterior and into the water, rather than directly into the engine room, which contained operating machinery and other ignition sources.

THE PROBABLE CAUSE of the fire on board the cargo vessel *Stride* was diesel oil cascading onto operating machinery in the engine room during bunkering due to an incorrect valve type installed into a diesel oil tank fill line, which prevented diesel oil from filling the tank and directed it up the common vent line, where it flowed from a cut out section of the vent pipe down into the engine room. **CONTRIBUTING** to the overfilling of the bunkering line was engine crewmembers not monitoring the levels of the tanks being filled aboard the vessel, as required by the bunkering procedure in the operating company's SMS.



Side profile view of engine room and funnel casing area with the combined fuel tanks vent pipe, annotated in orange, up to compass deck.

BACKGROUND SOURCE: DANAOS SHIPPING COMPANY LTD.



Left to right: Circled area identifying the open section of fuel vent piping on D deck; diesel oil observed in vent piping, seen from above, through cut out section; and cut out placed back in position.

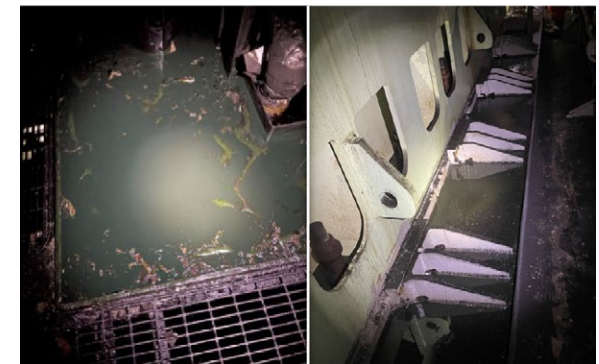
LESSONS LEARNED

CONSULTING VESSEL DRAWINGS WHEN ORDERING REPLACEMENT COMPONENTS

Vessel drawings contain piping symbols for equipment such as valve types, sizes, and functions. Owners, operators, and crews should carefully note all components of a vessel's drawings and diagrams to ensure that proper spare or replacement parts are ordered to maintain functionality.

ENSURING ADEQUATE PERSONNEL FOR BUNKERING OPERATIONS

During bunkering operations, vessel owners, operators, and crews should ensure adequate personnel are available to take frequent soundings, establish fuel tank filling rates, and communicate to the person in charge so tanks are monitored and do not overflow.



Diesel oil puddled in deck containment D deck and alongside base of main engine on tanktop.

FIRE/EXPLOSION

Engine Room Fire aboard Towing Vessel *Johnny M*

VESSEL GROUPS

Towing/Barge

LOCATION

Tennessee River, mile 22.4, Grand Rivers, Kentucky

CASUALTY DATE	ACCIDENT ID
January 30, 2024	DCA24FM020
INJURIES	ESTIMATED DAMAGES
None	\$3 million
REPORT NUMBER	ISSUED
MIR-25-15	April 10, 2025



Johnny M underway before the fire.
SOURCE: ROGER GREEN, MARINETRAFFIC.COM.



Local firefighters fighting the fire aboard Johnny M. SOURCE: EAST MARSHALL FIRE DEPARTMENT.

On January 30, 2024, about 0330 local time, an engine room fire broke out aboard the 88-foot-long towing vessel *Johnny M*, which was pushing four barges on the Tennessee River near Grand Rivers, Kentucky. The six crewmembers aboard were unable to extinguish the fire and abandoned ship to a good Samaritan vessel. Local fire departments extinguished the fire. There were no injuries, and no pollution was reported. Damage to the vessel totaled \$3 million.

After the fire ignited, the crew responded to contain the fire by pulling the remote fuel shutoff cables for each engine, isolating the main fuel source from each engine; placing all available (four) covers on the intake fans and exhaust fans to the engine room on the upper deck; and activating the CO₂ fixed fire extinguishing system (a postcasualty examination of the CO₂ system indicated it had functioned as designed). Afterward, the fire appeared to be extinguished, but about an hour later, crewmembers again saw smoke coming from the vessel.

The main engine combustion air intake openings—which supplied air through fabric-covered flexible

ducting that extended from the aft side of each stack to each engine’s intake turbochargers—remained uncovered because the vessel was not outfitted with covers for these intake openings. The fire consumed the flexible ducting for the air intake openings. The flexible ducting was designed to be part of a closed system to provide combustion air to each engine’s turbochargers. However, the flexible ducting was made of combustible material; it was not structurally protected from fire (nor was it required to be). Therefore, as the ducting was consumed by the fire, it allowed oxygen from outside the vessel to enter the engine room through the uncovered air intake openings and feed the fire. Given that the CO₂ was ultimately ineffective in completely extinguishing the fire, the ducting likely burned before or during the activation of the fixed fire extinguishing system. Nearby combustible materials would have melted, allowing oil to leak out and further fuel the fire.

Fixed fire extinguishing systems in machinery and other hazardous spaces require a minimum concentration of extinguishing agent to be effective. To ensure the effectiveness of the system and prevent

the reintroduction of oxygen to the space, ventilation (both natural and forced draft) must be completely secured to all fire-protected spaces. Had the vessel been outfitted with covers for the main engine combustion air intake openings or the flexible ducting been made of a fire-resistant or noncombustible material or structurally protected from fire, oxygen likely would not have been able to enter the engine room, and the CO₂ fixed fire extinguishing system likely would have been effective.

A postcasualty examination of the vessel found that the port main engine nos. 1 and 2 connecting rods were forcibly separated from the crankshaft and their bearing caps broken off. There were no indications that the port main engine was overloaded leading up to the casualty. Additionally, the port main engine had been overhauled about 7 months before the fire, so excessive wear of engine components was likely not a reason for the connecting rod failure. The day before the fire, the wheelhouse log noted the crew had "stopped to check [the] port main [engine]," but the operating company and crew did not provide additional information about this entry. A forensic examination or disassembly of components of the port main engine was not completed after the casualty. Therefore, investigators could not definitively determine why the connecting rod failed.

Pieces of the bearing caps for the disconnected connecting rods were found forcibly wedged between sections of the engine crankcase, and the surfaces of the crankshaft journals were deformed, indicating the engine continued to run and the crankshaft continued to turn after the connecting rods had become disconnected. Parts from the disconnected connecting rods (including the bearing caps) would have collided randomly and chaotically as the crankshaft continued to turn, damaging other internal engine components—such as the crankshaft journals—blowing open the crankcase covers, and rupturing the crankcase (as the marine surveyor noted in his report). Hot, atomized lube oil would have vented through the openings of the damaged port main engine, igniting the fire.



Johnny M exhaust stacks showing covered engine room exhaust fans and engine air intake openings (two openings under each hood). Insets, from top: Engine room intake fan (there were two intake fans—one port and one starboard) and metal cover, all located on upper deck.

THE PROBABLE CAUSE of the engine room fire on the towing vessel *Johnny M* was a catastrophic main engine failure that caused the venting and ignition of hot atomized lube oil. **CONTRIBUTING** to the ineffectiveness of the CO₂ fixed fire extinguishing system was the lack of structural fire protection for the main engines' combustion air intake ducting, which allowed oxygen to enter the engine room once the fire consumed the ducting.

LESSONS LEARNED

STRUCTURAL FIRE PROTECTION

The flexible ducting providing combustion air to the main engines on board the *Johnny M* extended from the engine stacks on the main deck down to the engine room and did not have any insulation or other barriers to prevent the passage of smoke, heat, and fire—known as structural fire protection. This type of unprotected ducting has the potential to provide a pathway for fixed fire extinguishing agents, such as CO₂, to escape and air to enter the engine room if the ducting is compromised by a fire within the space. Identifying potentially unprotected openings and ducting into a fire-protected space and incorporating structural fire protection can ensure the effectiveness of a fixed fire extinguishing system and prevent the spread of fire.

FIRE/EXPLOSION

Fire aboard Roll-on/Roll-off Container Vessel *Grande Costa D'Avario*

VESSEL GROUP

🚢 Cargo, General

LOCATION

Port Newark, berth 18, Newark, New Jersey

CASUALTY DATE

July 5, 2023

ACCIDENT ID

DCA23FM039

INJURIES

2 fatal, 6 minor

ESTIMATED DAMAGES

More than \$23 million

REPORT NUMBER

MIR-25-16

ISSUED

April 15, 2025



The *Grande Costa D'Avario* docked in 2021 with the stern loading ramp open/extended.

SOURCE: EGIDIO FERRIGHI, MARINETRAFFIC.COM.



A fire boat directing water onto the *Grande Costa D'Avario*. SOURCE: ATF.

On July 5, 2023, about 2100 local time, the 692-foot-long Ro/Con *Grande Costa D'Avario* was docked at Port Newark, New Jersey, when a pusher vehicle (a passenger vehicle owned by the cargo loading company and retrofitted with a steel front bumper), operated by shoreside workers who were loading used vehicles onto the vessel's garage decks, caught fire in an interior garage deck.

Vessel crewmembers attempted to put out the fire using portable fire extinguishers but were unsuccessful. The captain ordered the vessel's fixed gas (CO₂) fire extinguishing system to be released into the fire protection zone encompassing the decks

with the fire (Zone C). The crew attempted to seal the zone's garage decks to allow the CO₂ to smother the fire, but they were unable to close a large hydraulic garage door that was controlled from a single panel inside the garage.

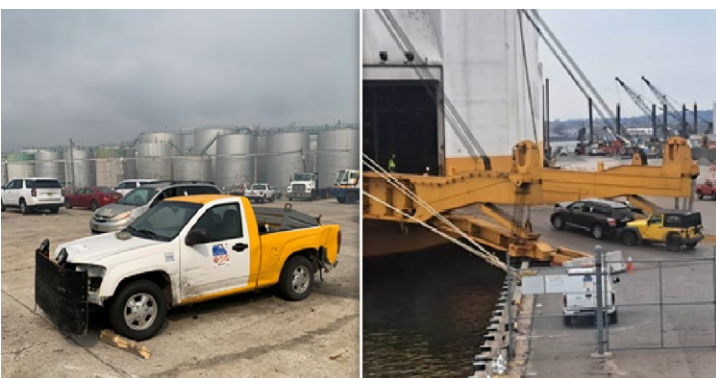
Land-based firefighters arrived on scene. While attempting to put out the fire, two of the land-based firefighters likely became disoriented, and, because they were unable to find their way out of one of the smoke-filled garage decks, they died. Six additional emergency responders were injured during the firefighting and rescue operations. The damage to the vessel was estimated to be over \$23 million.

THE PROBABLE CAUSE of the fire aboard the Ro/Con vessel *Grande Costa D'Avario* was Ports America's use of a passenger vehicle as a pusher vehicle in an industrial application for which it was not intended, which led to the vehicle's transmission fluid overheating, boiling over, and igniting on a hot engine surface. **CONTRIBUTING** to the fire's duration and severity was the absence of operating controls on the outside of one of the vessel's fire boundary garage doors, which prevented the crew from safely closing the door and directly led to the ineffectiveness of the fixed gas fire extinguishing system. **ALSO CONTRIBUTING** to the severity of the fire was the Newark Fire Division's lack of marine vessel firefighting training, which resulted in an ineffective response and led to the firefighter casualties.

SAFETY ISSUES

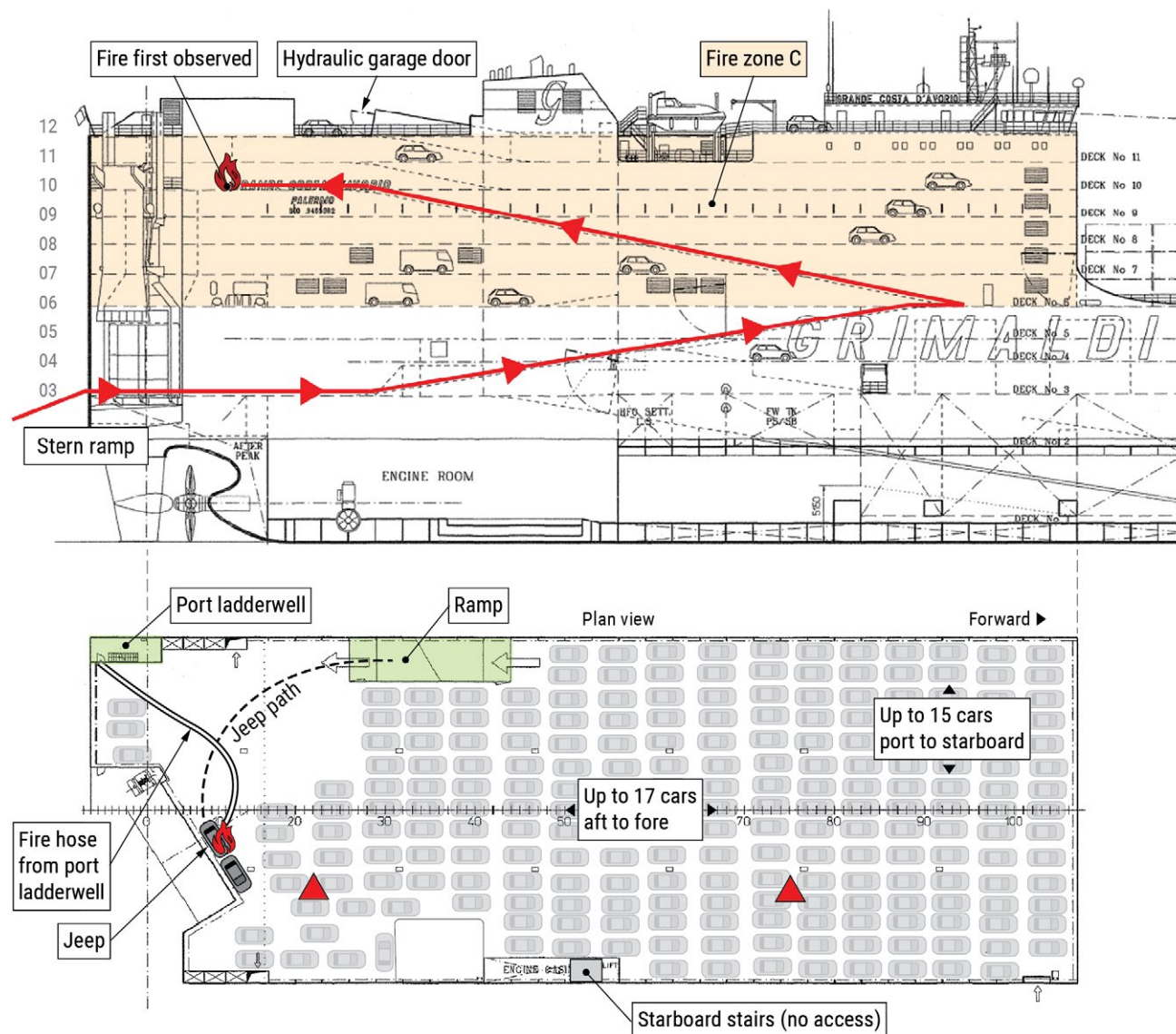
◆ The hazards associated with using passenger vehicles as pusher vehicles in cargo operations.

We found the vessel fire resulted from the overheated transmission fluid of a Jeep pusher vehicle, which boiled over and ignited on a hot engine surface. The Jeep was a passenger vehicle that Ports America (the operator of Port Newark Terminal and employer of longshoremen) had retrofitted with a large steel front bumper for use in an industrial, cargo-loading setting (pushing nonrunning vehicles onto vessels and up multiple ramps). As a passenger vehicle, the Jeep's transmission was not designed to handle this type of heavy vehicle use; as a pusher vehicle, it was used in an industrial manner and routinely subjected to rigorous conditions. According to OSHA, a mobile, power-driven vehicle used to push nonrunning vehicles aboard a vessel was subject to OSHA PIT standards, including capacity ratings, maintenance, and modifications being approved by the manufacturer or an accredited testing laboratory. The Jeep was not suitable for use as a PIT because it did not meet OSHA's PIT standards, including the requirement for modifications to be approved by the manufacturer or an accredited testing laboratory.



Ports America-owned pusher vehicles.

SOURCE (RIGHT): GCAPTAIN.COM.

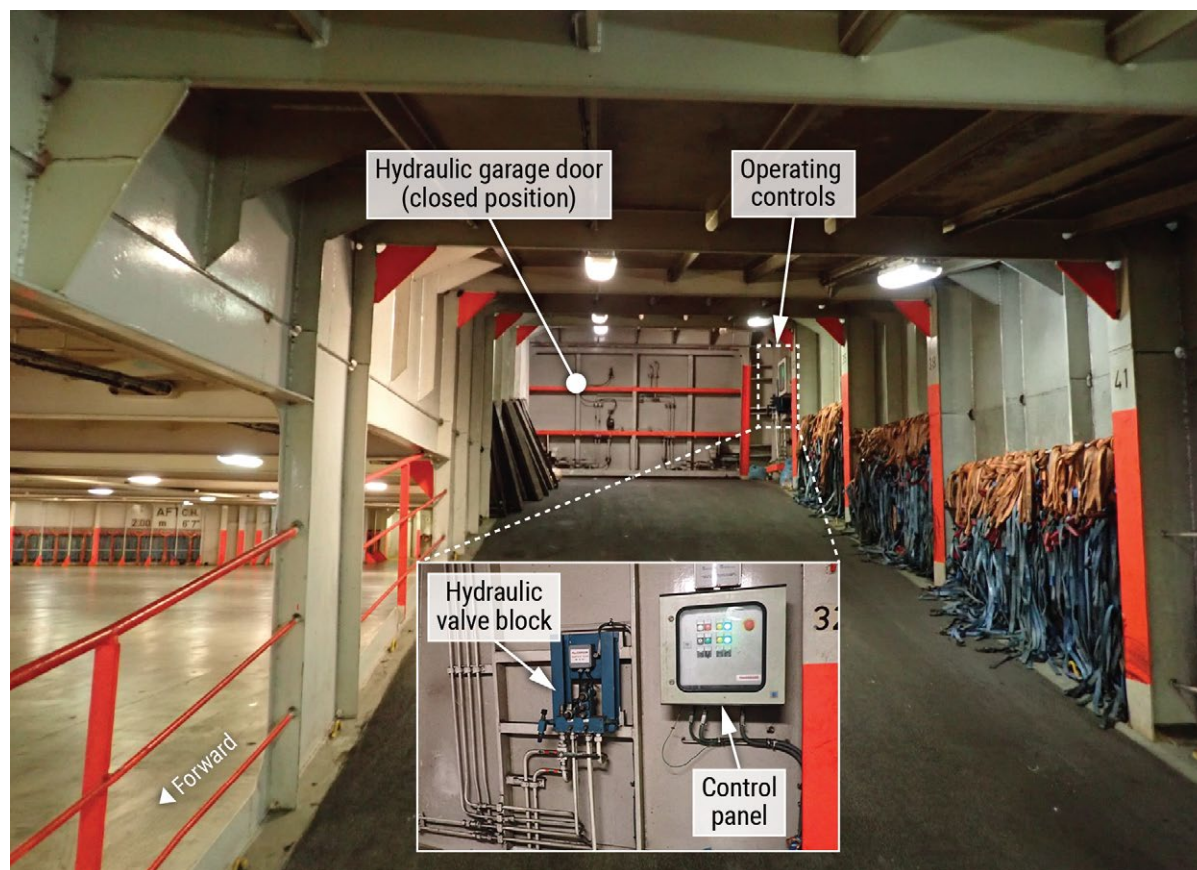


Above: Partial profile of the *Grande Costa D'Avorio*, showing the garage decks, the Jeep's approximate route to deck 10 and location of the fire, and plan view of deck 10 layout, showing an approximation of the deck's loaded condition (based on the estimated 200 cars loaded on that deck at the time). The locations where the two missing firefighters were found are indicated by triangles. BACKGROUND SOURCE: GRIMALDI DEEP SEA SPA.

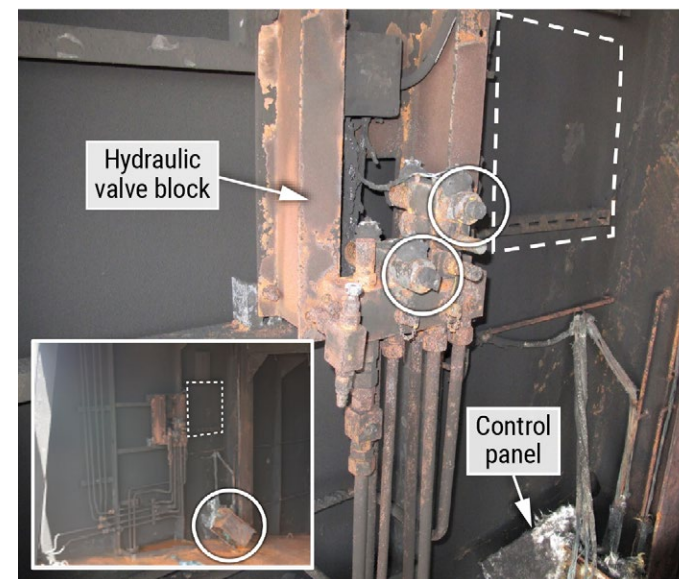
Left: Damage to Jeep after the fire.

Safety Issues *(continued)*

◆ **Absence of operating controls on the outside of a garage deck door that was part of a fire boundary zone for a space protected by a fixed gas fire extinguishing system.** Before ordering the release of the vessel's fixed CO₂ fire extinguishing system, the captain ordered the crew to seal the space. However, the crew could not close the deck 12 hydraulic garage door because the door controls were located *inside* the door. For a crewmember to close the door, they would have had to hold a button down (or operate the manual valves or hand pump) inside the fire protection zone until the door was completely closed, and then travel down the ramp and about 120 feet through a smoky garage deck partially loaded with cargo vehicles to exit into the port ladderwell—a dangerous egress even for a crewmember equipped with an SCBA. We found that, although the vessel captain's decision to release CO₂ into the fire protection zone that included the deck with the fire was appropriate, the deck 12 hydraulic garage door lacked operating controls outside the fire protection zone, which prevented the crew from safely closing the door and thus led to the ineffectiveness of the CO₂ in extinguishing the fire.



Deck 12 hydraulic garage door looking aft up the vehicle ramp, from the interior of the garage space on deck 11. Inset shows the door's control panel to the right of the valves used for manual operation. Photos taken on the Grimaldi vessel *Grande Senegal*, a sister vessel to the *Grande Costa D'Avorio*. BACKGROUND SOURCE: COAST GUARD.



Deck 12 garage door hydraulic valve block after the fire, with manual operating control valves circled. The location of the door's control panel, which burned and fell off the bulkhead, is outlined in the dotted line. Inset shows a wide view of the area and the control panel (circled) on the floor. INSET SOURCE: ATF.



Overall damage to deck 12 (looking forward).

BACKGROUND SOURCE: ATF.



Damage to the vessel's stern.

◆ **Ineffective land-based firefighting response.**

With the CO₂ fire extinguishing system activated, all of deck 10 and the rest of fire protection Zone C was considered an “immediately dangerous to life and health area.” Following the activation of the system, shipboard firefighting convention would have been to keep the space sealed to allow the CO₂ gas to thoroughly smother the fire, while boundary cooling the bulkheads and decks that bordered the space with firefighting water, as well as continually monitoring temperatures to help determine the status of the fire inside. However, the Incident Command and chiefs of the Newark Fire Department responding units—who were responsible for the land-based fire response, the firefighters, and their safety—continued to direct firefighting efforts into the fire protection zone in which CO₂ had been released. Two firefighters lost their lives attempting to fight the fire, and it took recovery teams several hours to locate and recover the firefighters once they discovered they were missing. By directing firefighters to enter the area where the CO₂ extinguishing system had been activated, contrary to general marine firefighting convention, firefighters were exposed to additional and unnecessary risk.

The Newark Fire Division was not adequately prepared to respond to a vessel fire, and they lacked marine vessel firefighting training. Therefore, their actions were ineffective, contributed to the fire's spread and the vessel damage, and led to the firefighter casualties. When ports work with local municipalities in advance to coordinate vessel firefighting response preparedness and training, safety is improved, and better outcomes are achieved.

◆ **Lack of emergency procedures for shoreside personnel.** Accounting for all personnel during fire and emergency events is critical to ensure an effective, safe evacuation and provide fire responders needed information related to who is on board. This is especially crucial aboard vessels such as the *Grande Costa D'Avorio*, where often there are upwards of 50 shoreside personnel on board the vessel engaged in cargo operations. While the personnel were likely familiar with the decks on which they were loading cargo, they were likely not familiar with the overall vessel layout, emergency escape routes, and the firefighting and extinguishing systems, such as CO₂. Under OSHA safety regulations, longshoring employers are required to develop and implement a written emergency action plan that covers the designated actions employers and employees must take to ensure employee safety from fire and other emergencies.

Both of the companies that employed the longshoremen and lashers (Ports America and American Maritime Services) used informal methods—supervisors' text messages and verbal communications—to account for their employees and determine that all personnel were off the vessel and safe. Additionally, neither company had a designated muster area on the pier, a training program, or a procedure or policy in place that outlined the actions employees must take during emergencies on board vessels to ensure employees' safety. The lack of an emergency procedure that provided a way to account for all employees after an emergency evacuation, such as a muster area, or training in the event of an emergency on board a vessel increased the risk to life or injury to the shoreside workers.

SAFETY RECOMMENDATIONS

As a result of this investigation, we made **11 new safety recommendations**. We **recommended** that OSHA inform its field personnel of the circumstances of the *Grande Costa D'Avorio* fire and provide guidance in proper enforcement of the PIT requirements at marine terminals and during longshoring operations to assure safe and healthy working conditions. We also made **recommendations** to the Newark Fire Division and the Port Authority of New York and New Jersey, the American Association of Port Authorities, the International Association of Firefighters, the International Association of Fire Chiefs, and the National Volunteer Fire Council to improve land-based firefighting departments' marine vessel firefighting training and familiarity. To ensure that shoreside personnel are aware of what to do in the event of a fire aboard a vessel, we **recommended** that Ports America and American Maritime Services develop policies, per 29 *CFR* 1917.30 and 29 *CFR* 1918.100, for such emergencies, including accounting for all employees.

In addition, we made a **recommendation** to Grimaldi Deep Sea, the ship owner, to inventory all its vessels to identify all openings that are part of a fire boundary and modify its vessels so that the openings are capable of being closed from outside the protected space. We also **recommended** that RINA Services, the vessel's classification society, revise its procedures for review and approval of vessel plans to ensure compliance with all applicable international regulations. Lastly, we **recommended** that the Coast Guard submit a proposal to IMO to clarify the *SOLAS* regulation requiring that all openings capable of admitting air into or allowing gas to escape from a protected space can be closed from outside the protected space applies, regardless of their expected operational condition when in port or at sea.

FIRE/EXPLOSION

Fire aboard Fishing Vessel *Jordyn Rose*

VESSEL GROUP

Fishing

LOCATION

Naknek River, Naknek, Alaska

CASUALTY DATE

June 24, 2024

ACCIDENT ID

DCA24FM050

INJURIES

None

ESTIMATED DAMAGES

\$910,000

REPORT NUMBER

MIR-25-20

ISSUED

May 13, 2025



***Jordyn Rose* on the day of fire.** SOURCE: *JORDYN ROSE* CAPTAIN.

On June 24, 2024, about 1030 local time, the fishing vessel *Jordyn Rose* caught fire while it was beached near the mouth of the Naknek River near Naknek, Alaska. The captain, the only person on board at the time, abandoned the vessel onto the beach. There were no injuries, and no pollution was reported. The vessel was a total loss, valued at \$910,000.

A few hours earlier, about 0700, while the 32-foot-long vessel was underway with a crew of two near the mouth of the Naknek River, there was an issue with the vessel's propulsion engine throttle controls, which limited the vessel's maneuverability. To avoid being carried into Kvichak Bay by the outgoing tide, the captain decided to intentionally ground (beach) the vessel—a common practice in the area.

About 0800, the captain beached the vessel, without damaging it. The captain planned to resolve

the throttle issue while the vessel was beached and get back underway when the tide came back in about 12 hours later.

Once beached, the captain shut down the main engine and generator, leaving seven onboard batteries as the only electrical power source. The batteries powered the cabin lights, other electronics, and a diesel-fueled accommodation heater. The captain noted that, while the vessel was beached, the batteries remained on to power the heater, but he turned other electronics off to conserve the batteries.

Shortly after beaching the vessel, the captain took a nap in the main cabin. As the tide receded, the *Jordyn Rose* developed a port list. The captain was awakened from a nap by smoke and then saw smoke coming from the below-deck bunk area into the main cabin. The cabin began to fill with smoke, so he did not

enter the bunk area and, instead abandoned the vessel, joining the deckhand, who had exited the vessel onto the beach before the fire began.

After abandoning the vessel, the captain observed flames spreading into the main cabin from the bunk area. The captain's observations were consistent with the post-fire survey report, which indicated that the greatest amount of fire damage, and likely area of origin, was near the port bow. Additionally, photos taken by the captain immediately after abandoning the vessel showed the fire near the port bow before it spread to the rest of the vessel.

While walking away from the burning vessel, the captain heard an explosion, which he attributed to a propane tank used for the galley stove. The tank had been secured to an aluminum handrail on the flybridge. Based on the captain's statements, the propane tank for the galley stove exploded well after the fire was discovered and was not located in the below-deck area where the captain first observed the smoke. This limited the possible ignition sources to the onboard batteries, associated electrical wiring, diesel-fueled accommodation heater, or other energized electrical components. However, due to the significant fire damage to the *Jordyn Rose* and onboard components, the ignition source and sequence could not be determined.

The extensive damage also prevented investigators from determining whether the vessel was equipped with smoke or fire detectors. (The captain could not confirm if any smoke or fire detectors were installed.) Because the captain did not hear any alarms, it is likely that none were installed. Although the captain completed voluntary dockside exams in 2024, 2022, and 2021, these exams did not address the presence or functionality of smoke and fire detectors. (The vessel was not required to have smoke or fire detectors.) Therefore, there was no way to alert the sleeping captain to the fire. The captain observed smoke coming from the bunk area only after he woke up, and by the time he retrieved a fire extinguisher, the smoke had become too dense, and he was forced to abandon the vessel. Had smoke or fire detectors been installed, the captain would have been alerted to the fire sooner and had more time to respond.

THE PROBABLE CAUSE of the fire aboard the fishing vessel *Jordyn Rose* was an undetermined interior source near the port bow of the vessel.



Fire damage to the *Jordyn Rose* bow (facing forward).

BACKGROUND SOURCE: ALASKA SURVEY ASSOCIATES.

LESSONS LEARNED

INSTALLATION OF SMOKE AND FIRE DETECTORS ON FISHING VESSELS

Although not required on most commercial fishing vessels, smoke and fire detectors allow for the earliest detection and notification of a fire, maximizing the time operators have to respond to the fire or abandon the vessel. Vessel operators can improve fire safety by installing detectors in all areas susceptible to fire (such as the engine room and galley), and the detectors should be capable of notifying crewmembers throughout the vessel of fire or smoke.

FIRE/EXPLOSION

Fire aboard
Fishing Vessel
Tarka II

VESSEL GROUP

Fishing

LOCATION

Pacific Ocean, about 4 nm southwest of
Tatoosh Island, Washington

CASUALTY DATE

September 10, 2024

ACCIDENT ID

DCA24FM060

INJURIES

None

ESTIMATED DAMAGES

\$460,000

REPORT NUMBER

MIR-25-24

ISSUED

June 12, 2025



Tarka II on unknown date before the fire.

SOURCE: *TARKA II* CAPTAIN.



The *Tarka II* as seen on the Coast Guard overflight and the *Tarka II* as seen by the captain upon returning to the vessel, both on the night of the fire. SOURCES: COAST GUARD (LEFT), *TARKA II* CAPTAIN (RIGHT).

On September 10, 2024, about 1600 local time, the commercial fishing vessel *Tarka II* was transiting in the Pacific Ocean about 4 nautical miles southwest of Tatoosh Island, Washington, when the captain discovered a fire in the engine room. The two crewmembers on board did not attempt to fight the fire. They abandoned the *Tarka II* into a liferaft and were rescued by the Coast Guard. The fishing vessel later sank with an estimated 1,000 gallons of diesel fuel on board. There were no injuries. The vessel was not recovered and considered a total loss, valued at \$460,000.

At midnight earlier that day, the 66-foot-long *Tarka II* got underway from Westport, Washington. The captain and crewmember were transiting to a shipyard in Port Angeles, Washington, for annual vessel maintenance.

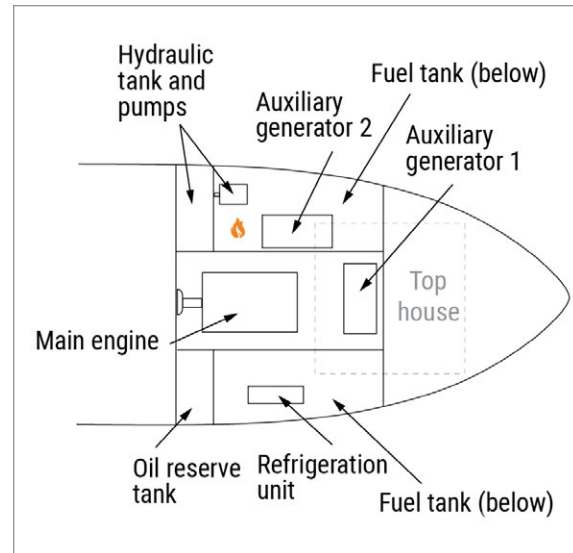
About 1600, the captain was at the helm with the main engine and the no. 1 auxiliary generator running. The captain observed smoke emanating from the sides of the exhaust stacks located just aft of the wheelhouse (likely from engine room vents on or near the main exhaust stacks). When he entered the

engine room, he noticed white smoke that smelled like engine exhaust, and he believed there was an exhaust leak. After shutting down the generator and main engine, the captain then noticed a small, smoldering fire on the port side of the engine room near the hydraulic tank and hydraulic pump. Shortly afterward, the captain opened the door, the smoke turned black, and the flames intensified. The rapid growth of the fire and black smoke indicated a fuel source ignited. Opening of the engine room door introduced additional oxygen to the fire, further intensifying the fire. Concerned about an explosion, the captain radioed the Coast Guard over VHF, and then he and the other crewmember abandoned the vessel into a liferaft.

The *Tarka II* was equipped with a crab pot davit (located on the starboard side of its working deck) and a hydraulically operated steering system. The systems each had a dedicated 20-hp hydraulic pump powering them and shared a hydraulic reservoir tank in the engine room. The hydraulic lines for the davit were not pressurized at the time of the fire. However, the steering system's hydraulic lines (pipes and hoses) were pressurized. The captain noted that hydraulic

lines ran “inches” from the engine exhaust pipes, which were protected by fiberglass lagging. Investigators were unable to verify the condition or arrangement of the exhaust lagging in the engine room because the vessel sank and there were no photos available of the engine room before the fire. The captain reported that the smoke initially looked and smelled like engine exhaust. It is possible that exhaust pipe heat, or an exhaust leak, either from the main engine or the running no. 1 auxiliary generator, ruptured one of the pressurized hydraulic lines, causing the hydraulic fluid to spray and ignite on a nearby, unprotected hot surface, and spread to nearby combustibles. However, because the *Tarka II* sank and was not recovered, the exact source of the fire could not be determined.

The captain had no indication of the fire before he saw smoke coming from the sides of the vessel's exhaust stacks. The *Tarka II* engine room was equipped with a CCTV camera that displayed on a monitor in the wheelhouse, but it was not in use at the time of the fire. Additionally, there were no smoke or fire detectors installed in the engine room, nor were any required. The two smoke detectors on board were located just outside of the engine room door and in the galley, and they only activated after the captain opened the engine room door to investigate the smoke. It is unknown how long the fire had been burning before the captain noticed smoke; however, had the engine room CCTV system been on or had smoke or fire detectors been installed in the engine room, the captain would have likely been alerted to the fire sooner.



General layout of the *Tarka II* engine room (not to scale) with the location of the fire indicated by the flame symbol. BACKGROUND SOURCE: *TARKA II* CAPTAIN.

THE PROBABLE CAUSE of the fire aboard the fishing vessel *Tarka II* was an unknown source within the engine room.

LESSONS LEARNED

EFFECTIVE PLACEMENT OF SMOKE AND FIRE DETECTORS

Installation of smoke and fire detectors in spaces that are typically uncrewed when underway, such as the engine room, allows for the earliest detection and notification of a fire, maximizing the time for operators to respond to the fire or take actions to abandon the vessel. Vessel operators can improve fire safety by installing detectors in all areas susceptible to fire (such as the engine room and galley, and spaces that contain machinery, hot exhaust tubing, and fuel sources). Additionally, the detectors should be capable of notifying crewmembers throughout the vessel of fire or smoke and be routinely checked to ensure they are in good working order.

FIRE/EXPLOSION

Fire aboard Towing Vessel *Lucinda Smith*

VESSEL GROUP

Towing/Barge

LOCATION

Acushnet River, New Bedford, Massachusetts

CASUALTY DATE

December 7, 2024

ACCIDENT ID

DCA25FM010

INJURIES

None

ESTIMATED DAMAGES

\$1.5 million

REPORT NUMBER

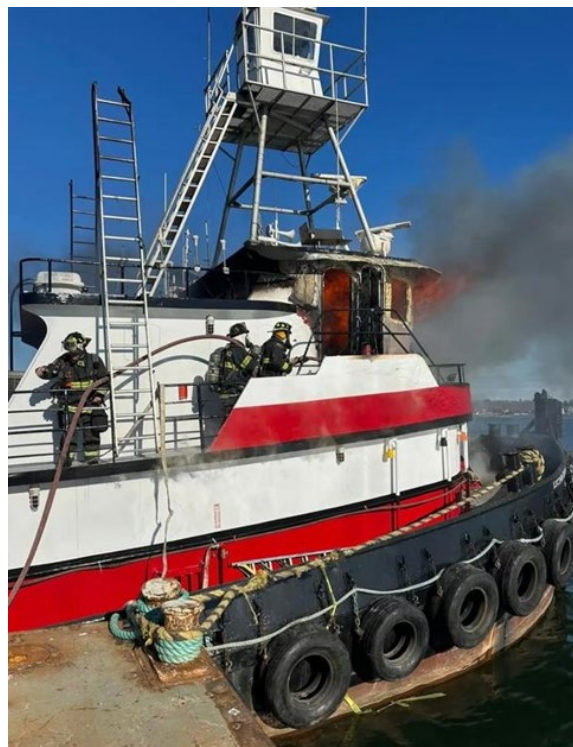
MIR-25-27

ISSUED

July 1, 2025

**Lucinda Smith underway in 2022.**

SOURCE: BILL BLACK, MARINETRAFFIC.COM.

**Land-based firefighters on Lucinda Smith.**

SOURCE: NEW BEDFORD FIRE DEPARTMENT.

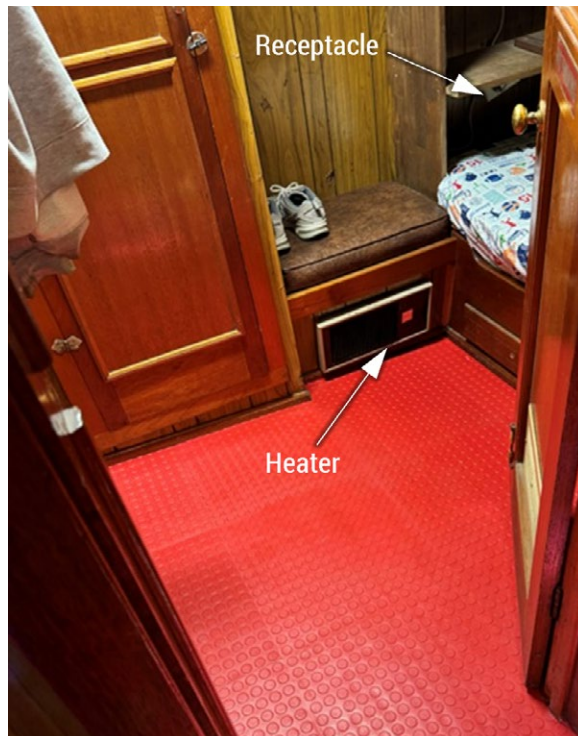
On December 7, 2024, about 1115 local time, the towing vessel *Lucinda Smith* was moored alongside a dock on the Acushnet River in New Bedford, Massachusetts, when a fire started in one of the vessel's unoccupied staterooms. The crew attempted to extinguish the fire but was unsuccessful and was forced to abandon the vessel onto the dock. Shortly afterward, the local fire department arrived and extinguished the fire. There were no injuries, and no pollution was reported. Damage to the vessel was estimated at \$1.5 million.

The 81-foot-long *Lucinda Smith* had been at the dock in New Bedford since late August of that year while it underwent replacement of the main engines. While at the dock, several crewmembers, including the first mate, lived and worked aboard the vessel.

On the day of the fire, the vessel's engineer was in the engine room changing potable water filters when he heard a smoke alarm going off. Independent smoke alarms were located in the galley, passageways, crew staterooms, and the bridge; the engineer was unsure which smoke alarm he heard first.

The engineer observed smoke coming from under the door and through the vents of the first mate's stateroom (the mate was on the dock at the time). He stated that when he opened the door to the stateroom to investigate, the fire "flashed over" and intensified. The engineer and other crewmembers on the dock attempted to fight the fire but were quickly overwhelmed by "a lot of smoke and a lot of heat" and were forced to evacuate the vessel to the dock. As nearby combustible materials—wood paneling and framing, insulating material, clothing, and bed linen—caught fire, they provided a path for the fire to expand into the overhead and eventually the entire stateroom, other accommodation areas, and the wheelhouse.

**Damaged wheelhouse.** SOURCE: COAST GUARD.



First mate's stateroom, with partial view of the bunk, on unknown date before the fire.

SOURCE: R B OUR EQUIPMENT LEASING.

After the fire, ATF investigators determined that the fire originated in the first mate's stateroom, aft of the wheelhouse, near the end of the bunk (by the electric heater). Electrical sources near the bunk included an electric heater, an oscillating fan, and an electrical wall receptacle. Crew interviews revealed that the heater and fan were not in use before the fire and thus likely were not an ignition source. The receptacle and associated vessel wiring were original to the vessel's construction and nearly 50 years old. If there was an electrical fault—such as a loose, broken, or frayed wire, or broken receptacle hardware—within the receptacle or nearby circuitry, it could have created excessive resistance heating. Resistance heating from electrical conductors within receptacles can produce sufficient heat to ignite nearby combustibles. However, due to the extent of the fire damage, the exact ignition source and cause of the fire could not be determined.

THE PROBABLE CAUSE of the fire aboard the towing vessel *Lucinda Smith* was an undetermined ignition source in one of the vessel's staterooms.



Electric heater in first mate's stateroom after the fire.

SOURCE: ATF.

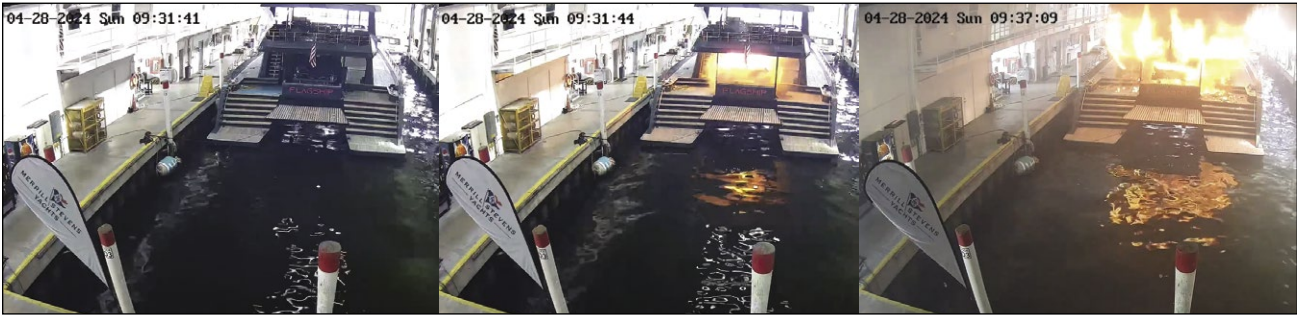
FIRE/EXPLOSION

Fire aboard
Yacht *Flagship*

VESSEL GROUP	
Yacht/Boat	
LOCATION	
RMK Merrill Stevens Shipyard, Miami River, Miami, Florida	
CASUALTY DATE	ACCIDENT ID
April 28, 2024	DCA24FM035
INJURIES	
None	
ESTIMATED DAMAGES	
\$5 million	
REPORT NUMBER	
MIR-25-31	
ISSUED	
July 28, 2025	



The *Flagship* before the fire, on unknown date.
SOURCE: FLAGSHIP MARINE LLC.



Left to right: Video still images from the shipyard’s internal security camera showing (1) the *Flagship* moored within the facility before the fire; (2) an explosion from the aft area of the vessel at 1031; and (3) progression of the fire within the vessel. (Timestamps are 1 hour behind the actual time because the shipyard clocks were not set for daylight savings time.) SOURCE: RMK MERRILL STEVENS.

On April 28, 2024, at 1031 local time, a fire started aboard the uncrewed yacht *Flagship* while it was docked at an enclosed bay of a shipyard on the Miami River in Miami, Florida. Shoreside firefighters moved the vessel to a nearby sea wall, where they extinguished the fire. The vessel eventually sank at the sea wall. There were no injuries, and no pollution was reported. The *Flagship* was declared a total loss, valued at \$5 million.

At the time of the casualty, the shipyard security cameras recorded an explosion aboard the 82-foot-long *Flagship*, originating from a hatch that led to a 24-volt lithium-ion battery bank. After the explosion, smoke was visible, followed by fire. Shortly thereafter, the fire grew rapidly, engulfing the vessel. Investigators later identified extensive damage to the aluminum deck and hull structure in the area around and above the location of the 24-volt lithium-ion battery bank. Based on the security video and the location of the most extensive fire damage, a lithium-ion battery cell within the 24-volt battery bank was most likely the initiating source of the explosion and fire.

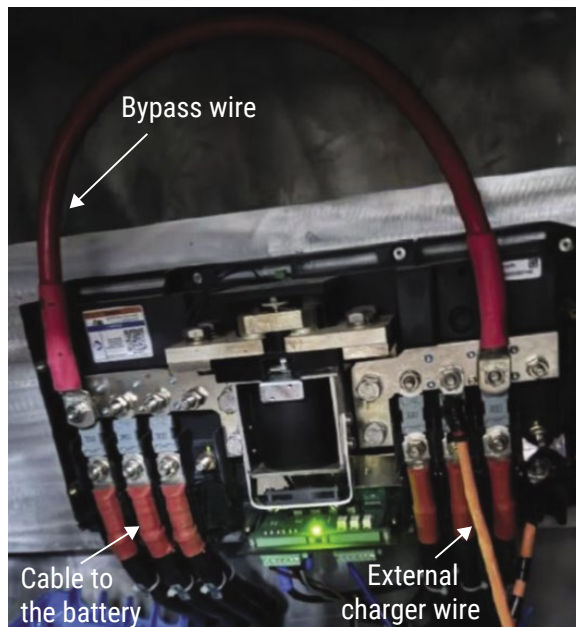
In addition to the 24-volt battery bank, the *Flagship* was outfitted with three 48-volt lithium-ion battery banks that could power a portion of the yacht’s electrical load for up to 20 hours without the vessel’s generator. Each battery bank was monitored by a separate battery management system (BMS), a

computer system designed to ensure efficient and safe operation of the electrical battery system. A BMS is critical to the safety and overall performance of lithium-ion batteries. The four BMSs aboard the *Flagship* managed the voltage, current, and temperature of each battery cell, as well as the charging and discharging. The BMSs were designed to start charging each of the battery banks when the charge level fell below 94% and would continue to charge until the charge level reached 100%. The battery banks could be charged from the vessel’s generator, shore power connection, or the solar panels located on the flying bridge.

In September 2023, the newly constructed vessel was shipped from Turkey to the US, arriving in Miami in October. A December survey report noted that the BMSs for the three 48-volt battery banks were not fully functional and that the associated batteries were 100% discharged (0% charge). In January 2024, the vessel was towed to the RMK Merrill Stevens Shipyard to address outstanding issues.

Since the vessel’s arrival in the US, the BMSs for the battery banks of the 24-volt system and the three 48-volt battery systems had been inoperable; they did not safely monitor and maintain the charge level of the batteries. This problem with the BMSs was not immediately resolved. In the interim, the vessel manufacturer, shipyard personnel, an electrician, and

the vessel owner's representative developed a new procedure to increase the charging speed of the lithium-ion batteries by bypassing the BMS of each battery bank. A wire was attached to bypass each BMS so the batteries could be manually charged at a faster pace by an external charger. As a result, the charge level within the vessel battery banks was not automatically maintained by the BMSs, and, due to an unidentified electrical drain within the vessel, the batteries became fully discharged on several occasions for extended periods. In addition, routinely charging the batteries using a portable battery charger could have resulted in overcharging, since the external battery charger was not connected to and monitored by a BMS, and the battery charge level was instead monitored by personnel at the shipyard. Therefore, the practice of externally charging the lithium-ion batteries without resolving the BMS issues resulted in fluctuations in the level of charge on the battery bank.



The installed bypass wire and the wire from the external charger on one of the 48-volt BMSs on board the *Flagship*.

BACKGROUND SOURCE: RMK MERRILL STEVENS.

Extensive fluctuation in the level of charge within the batteries may have caused one of the cells to become unstable, eventually resulting in thermal runaway. A thermal runaway occurs when a battery cell overheats and combusts; it is a chemical reaction that can occur to any type of battery cell if it is damaged, shorted, overheated, defective, deep discharged, or overcharged. The heat produced from a thermal runaway of a lithium-ion battery cell can exceed 1,100°F, which can easily cause the adjoining cells of the same battery bank to ignite, as well as cause significant damage to aluminum structures. Lithium-ion battery cell explosions are typically caused by a thermal runaway.

THE PROBABLE CAUSE of the fire on the yacht *Flagship* was the thermal runaway and explosion of the 24-volt lithium-ion battery bank due to the inoperable BMSs, resulting in the practice of manually charging the lithium-ion batteries with a portable battery charger, which compromised the safe monitoring of the vessel's lithium-ion battery systems.



The 24-volt lithium-ion battery bank (circled), after the fire.

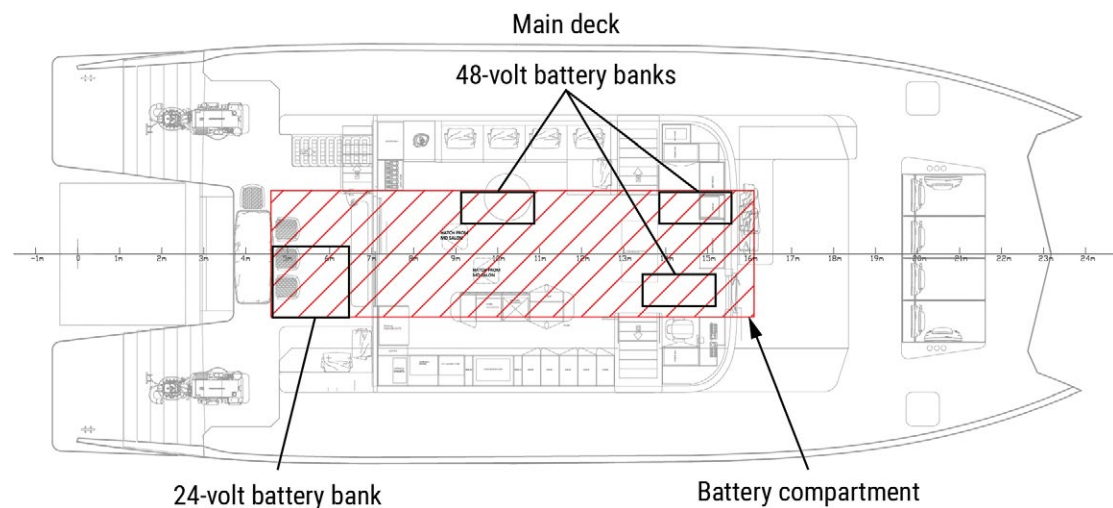


Diagram of the main deck of the *Flagship* showing the approximate locations of the 24-volt and 48-volt lithium-ion battery banks. BACKGROUND SOURCE: RMK MERRILL STEVENS.

FIRE/EXPLOSION

Fire aboard Bulk Carrier *Cuyahoga*

VESSEL GROUP

► Cargo, Dry Bulk

LOCATION

Ashtabula Harbor, Lake Erie, Ashtabula, Ohio

CASUALTY DATE

March 15, 2024

ACCIDENT ID

DCA24FM027

INJURIES

None

ESTIMATED DAMAGES

\$11 million

REPORT NUMBER

MIR-25-38

ISSUED

October 15, 2025



Cuyahoga after the fire, on March 20, 2024.



Cuyahoga during the fire. BACKGROUND SOURCE: ASHTABULA FIRE DEPARTMENT.

On March 15, 2024, about 1315 local time, the bulk carrier *Cuyahoga* was undergoing maintenance while docked in Ashtabula, Ohio, when a fire broke out in a cargo hold where hot work was being conducted. The crew and maintenance personnel on the vessel were unable to extinguish the fire and evacuated to shore. The Ashtabula Fire Department, with assistance from the ship's crew, extinguished the fire. There were no injuries, and no pollution was reported. The vessel was declared a constructive total loss estimated at \$11 million.

Earlier that day, about 0800, 15 crewmembers boarded the 605-foot-long *Cuyahoga*, which had been in winter layup since January. The crewmembers began preparing the vessel for its scheduled departure on March 17. About the same time, hot work was being conducted on gate channels on the port side of the cargo tunnel below cargo hold no. 2. The work included removing the existing I-beam from the channel with a cutting torch, staging a new beam, and welding the new beam in place. Additionally, a replacement ladder was being installed on the forward

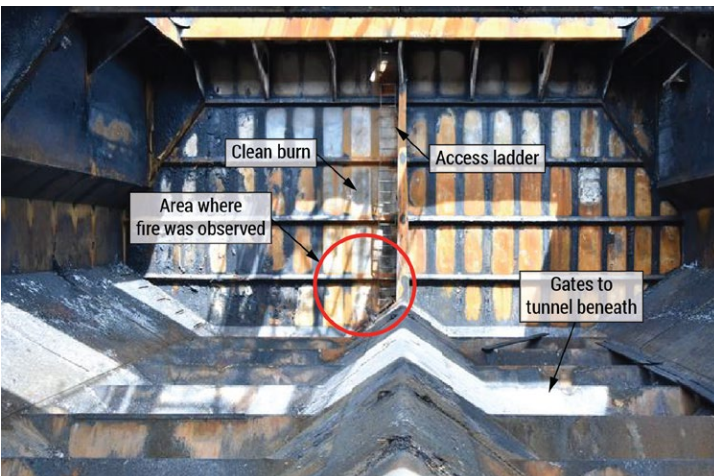
bulkhead, and safety chains were being removed in the middle and aft sections of the hold.

Personnel conducting hot work in cargo hold no. 2 did not see any signs of a fire on the forward bulkhead while carrying out their work. After hot work was completed at 1130, three personnel (a fitter, fire watch, and welder) remained in the cargo hold for about 30 minutes and did not observe any signs of fire before departing the hold. The first indication that there was a fire was at 1315—about 105 minutes after hot work had been completed—when personnel first saw fire on the forward bulkhead of cargo hold no. 2.

None of workers in the hold or in the cargo tunnel on the *Cuyahoga* were conducting hot work at the time the fire started. There were no signs of fire or smoke in the unloading tunnels below the cargo hold, and after the fire, investigators found no indication that a fire was initiated in the tunnels and moved into the cargo hold. A postcasualty examination of cargo hold no. 2 found clean burning in the same area where the fire was first seen by the fire watch. Clean burning is consistent with high temperature fires that have a

longer period of time to burn and consume the source of fuel. Given the location of the clean burn, it is likely that the fire's origin was on the forward bulkhead of cargo hold no. 2.

Based on interviews of maintenance personnel and crewmembers and data collected after the fire, the bulkhead's coating in cargo hold no. 2 caught fire. All of the cargo holds had been painted with an epoxy coating that had an ignition temperature between 600°F to 1,100°F and could ignite when exposed to direct flame or to the heat generated during welding. Therefore, the fuel source for the fire was the epoxy coating on the vessel's cargo holds.



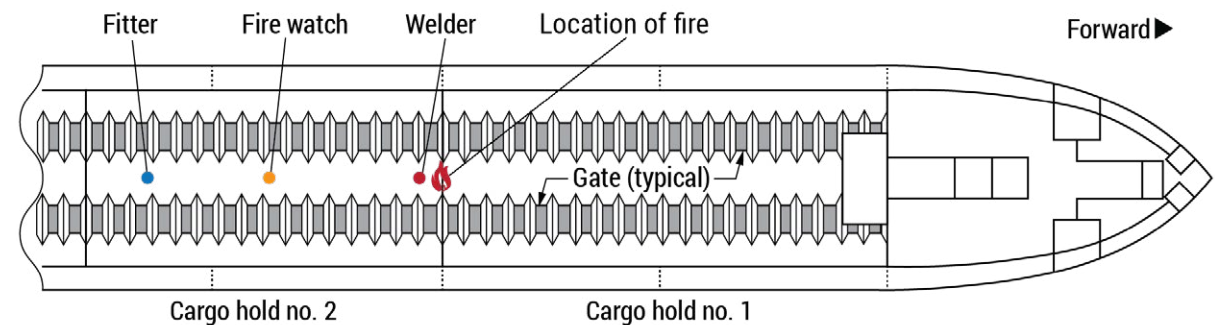
Fire damage to the forward bulkhead of cargo hold no. 2, showing the location (circled) where the welder, fitter, and fire watch saw the initial fire.

BACKGROUND SOURCE: ASHTABULA FIRE DEPARTMENT.

Given the time since hot work had been completed—over an hour and a half—and the fact that no one saw smoke or flame before the start of the fire, it is possible that a smoldering fire occurred, which ultimately then led to the ignition of the epoxy coating in cargo hold no. 2. A smoldering fire is formed when combustible materials ignite, but the combustion proceeds slowly and steadily on the material's surface with little heat and no smoke or flame. A smoldering

fire is not easily detected and, depending on its surroundings, can last for hours after the initial ignition. Given that hot work had been ongoing in the area without any indication of a fire, and that there were no other apparent ignition sources nearby, it is possible a spark from the earlier hot work (welding) started a smoldering fire. Possible fuel sources near the fire's area of origin included residue (of an undetermined origin) or the wooden planking where the ladder was being installed. However, the exact source could not be determined.

THE PROBABLE CAUSE of the fire on the bulk carrier *Cuyahoga* was the ignition of the epoxy coating on the forward bulkhead within cargo hold no. 2, possibly from a smoldering fire from an undetermined source associated with earlier hot work in the hold.



Layout of the cargo hold no. 2 with location of fire and approximate locations of fitter, fire watch, and welder (not to scale).

LESSONS LEARNED

COMBUSTIBLE MATERIALS AND SMOLDERING FIRES

The NTSB has investigated multiple fires caused by a smoldering fire that occurred following the completion of hot work. A smoldering fire is formed when combustible material ignites, but the combustion proceeds slowly and steadily on the material's surface with little heat and no smoke or flame. A smoldering fire is not easily detected, and depending upon its surroundings, it can last for hours after the initial ignition. A smoldering fire can long outlast the time a fire watch observes an area following hot work. Additionally, it can quickly grow into a flaming fire, with no warning. Therefore, it is critical to evaluate work areas for fire hazards and ensure that combustibles are relocated or protected from hot work.

FIRE/EXPLOSION

Engine Room Fire aboard Dredging Vessel *Stuyvesant*

VESSEL GROUP

Specialty/Other

LOCATION

St. Johns River, Jacksonville, Florida

CASUALTY DATE

November 2, 2024

ACCIDENT ID

DCA25FM004

INJURIES

1 fatal

ESTIMATED DAMAGES

\$18 million

REPORT NUMBER

MIR-25-39

ISSUED

October 20, 2025



***Stuyvesant* underway in 2022.**

SOURCE: THE DUTRA GROUP.



The *Stuyvesant* after the fire. SOURCE: COAST GUARD

On November 2, 2024, about 1435 local time, the dredging vessel *Stuyvesant*, with a crew of 22, was holding station in the St. Johns River, near Jacksonville, Florida, when a fire broke out in the engine room. Two crewmembers were in the MCR when the fire started: one escaped, and the other was removed by the shipboard emergency squad and later pronounced dead at a local hospital. After reporting no active fire and removing the crewmember, the crew verified that the engine room was sealed and released the fixed gas fire extinguishing system. No pollution was reported. Damage to the vessel was estimated at \$18 million.

Earlier that day, dredging work was ongoing on the 392.7-foot-long *Stuyvesant*. About 1130, the vessel completed dredging operations and headed outbound to dump the dredge spoils. Due to a tide shift, the vessel returned to the channel.

While the vessel was holding station, the dredging equipment was shut down, reducing the vessel's electrical load, and the port auxiliary engine was not required to be operational. The engineering crew took this opportunity to conduct routine maintenance on the engine, which had been rescheduled from the

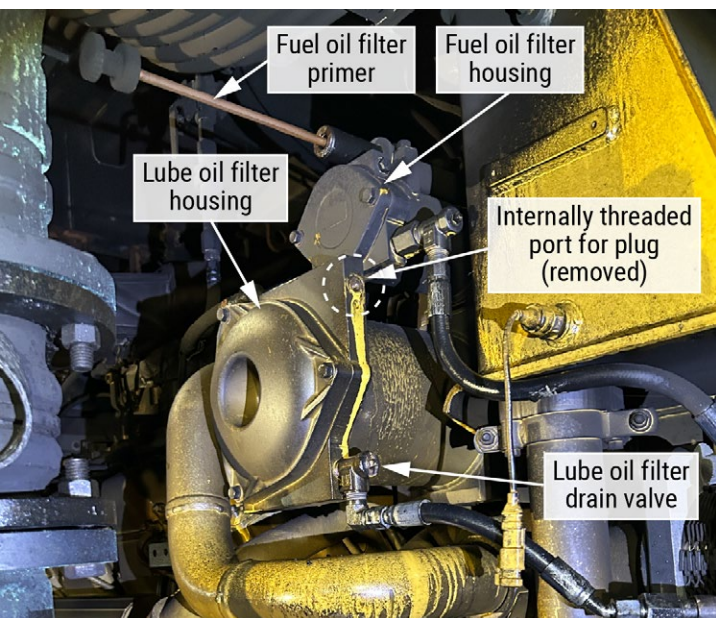
previous day. The engine crew took the port auxiliary generator offline and shut the engine down. The vessel's two main engines continued to operate to hold the *Stuyvesant* in position, with the shaft generators providing electrical power.

The first engineer, oiler, and wiper started the maintenance on the port auxiliary engine, which included replacing the fuel and lube oil filters and the lube oil in the sump. Once the work was complete, the first engineer started the engine remotely from the MCR instead of the local start panel alongside the engine on the outboard bulkhead. Investigators found that the crew had not reinstalled the plug on the engine's lube oil filter housing after completing maintenance. Without the plug reinstalled on the lube oil filter housing, pressurized lube oil would have sprayed out from the port auxiliary engine through the internally threaded port at the top of the lube oil filter housing when the engine was started.

Because the engineering crewmembers started the engine remotely from the MCR, rather than locally, they had no indication that lube oil was discharging and subsequently spraying from the port auxiliary engine when it was started. The operating company has since

updated its maintenance procedures to mandate that, following maintenance on an engine, crewmembers locally start the engine.

Less than a minute after starting the engine, about 1435, engineering crewmembers saw flames in the engine room. Given the orientation of the port auxiliary engine in relation to the operating port main engine, the fire started when pressurized lube oil from the port auxiliary engine sprayed onto a hot surface of the port main engine.



Port auxiliary engine lube oil filter housing aboard *Stuyvesant* after the fire. The internally threaded port with the missing plug is circled at the top of the lube oil filter housing.

About 2.5 minutes after the fire was discovered, the port auxiliary engine received an “unintended stop” command, which stopped the engine and discontinued the release of spraying lube oil as the primary source of fuel for the fire. The chief engineer activated the emergency stops for the main engines, which stopped the engines and reduced the heat produced by them. All ventilation fans shut down, reducing the oxygen entering the engine room. When the shipboard

emergency squad reached the engine room, they did not see flames. The crew then verified all the dampers for the engine room ventilation fans were closed to seal the space before releasing the CO₂ fixed fire extinguishing system, which ensured the CO₂ worked effectively and the fire did not reflash.

The engine manufacturer’s instructions were available on the vessel and provided detailed information on how to conduct the tasks. However, investigators found instances where these tasks had not been completed in accordance with the manufacturer’s instructions for the port auxiliary engine. Additionally, based on crewmembers’ statements and items investigators found out of place after the casualty, it is unlikely crewmembers inspected the port auxiliary engine before starting the engine as recommended by the manufacturer. Had the engine crewmembers followed the engine manufacturer’s instructions when completing their maintenance work,

it is likely they would have discovered the missing plug during an inspection and taken steps to reinstall components before starting the engine and prevented the fire. The operating company has since updated its maintenance procedures to mandate that, following maintenance on an engine, two crewmembers inspect the equipment before starting the engine.

THE PROBABLE CAUSE of the engine room fire on the dredging vessel *Stuyvesant* was lube oil spraying from an auxiliary diesel engine (generator) and igniting off a nearby running diesel engine, due to engine crewmembers not reinstalling a plug after routine maintenance in accordance with the engine manufacturer’s instructions and not thoroughly inspecting the port auxiliary engine before initially starting it.



Removed plug on top of a storage cabinet and the removed fill cap from the port auxiliary engine.

BACKGROUND SOURCE (RIGHT): COAST GUARD.

LESSONS LEARNED

STARTING MACHINERY LOCALLY AFTER MAINTENANCE

After maintenance has been conducted on engine room machinery, diligent inspection of the machinery is critical to ensure it functions as expected and all components have been reinstalled properly. Starting up engines locally, rather than remotely, gives crewmembers the opportunity to immediately verify that the engine is operating satisfactorily (to manufacturer’s specifications) with no visible fuel, lube oil, or water leaks, and has no atypical noises or vibrations that require it to be stopped.

FIRE/EXPLOSION

Lithium-ion Battery Fires aboard Cargo Vessel *Genius Star XI*

VESSEL GROUP

 Cargo, Dry Bulk

LOCATION

North Pacific Ocean, about 371 nm southwest of Agattu Island, Alaska (December 25) and about 57 nm southeast of Seguam Island, Alaska (December 28)

CASUALTY DATES	ACCIDENT ID
December 25 & 28, 2023	DCA24FM013
INJURIES	ESTIMATED DAMAGES
None	\$3.8 million
REPORT NUMBER	ISSUED
MIR-25-41	December 2, 2025



Cargo vessel *Genius Star XI* on February 24, 2024, after the fires.



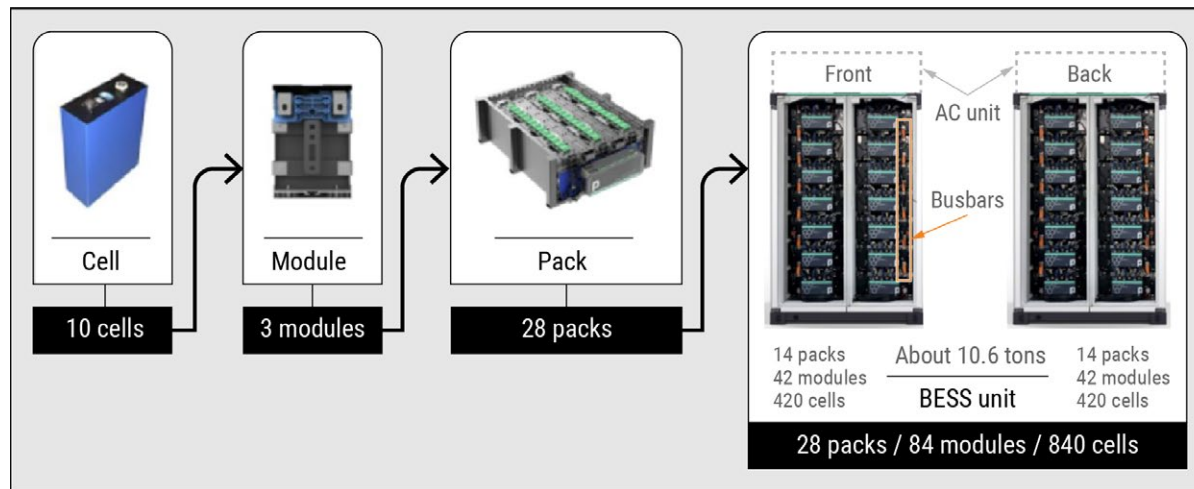
Infrared photo of the *Genius Star XI* en route to Dutch Harbor, showing an indication of heat (in white) within cargo hold no. 2 on December 28. BACKGROUND SOURCE: COAST GUARD.

On December 25, 2023, at 0830, while the cargo vessel *Genius Star XI* was transiting the North Pacific Ocean in heavy weather with a cargo of lithium-ion BESS units on board, a fire was discovered in a cargo hold. The crew discharged the vessel's CO₂ fixed fire extinguishing system into the hold, and the vessel proceeded to the nearest port, Dutch Harbor, Alaska, for assistance. On December 28, about 0215, while the vessel was en route to Dutch Harbor, a fire started in a second cargo hold. The crew externally cooled the cargo hold using fire hoses, and, after the vessel anchored in Dutch Harbor on December 29, the fire was determined to be extinguished. There were no injuries, and no pollution was reported. Damage from both fires was estimated at \$3.8 million.

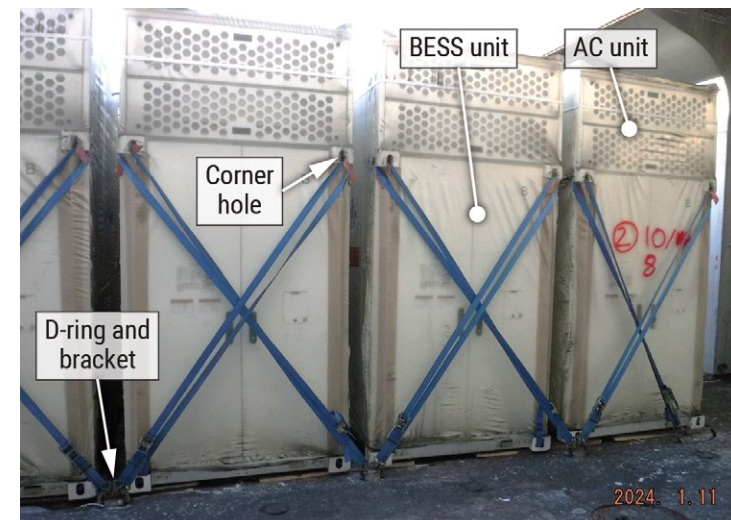
After the vessel arrived in Dutch Harbor, the Coast Guard determined that 43 of the 160 BESS units on the tween deck in cargo holds no. 1 and no. 2 had been damaged (none of the 32 BESS units stored on the lower deck in the holds were damaged). In addition, 41 of the units had become loose. They found that the fires originated from three of the BESS units that had broken loose (two on the tween deck of hold no. 1 and a single unit on the tween deck of hold no. 2).

The BESS units had been arranged and secured in accordance with the approved storage and lashing plan,

but, during the voyage, numerous lashing belt hooks fractured. Investigators discovered that the diameter of the D-ring and the inner diameter of the hook (throat opening) were not compatible. Essentially, the hook was not able to fully seat on the D-ring, so only the tip of the hook was securing the lashing belt to with the D-ring. This concentrated the securing load at the turn, or bend, of the hook, instead of having that load properly transmitted across the full throat of the hook, resulting in the hook's fracture and separation. Since each BESS unit was secured by four lashing belts, the fracturing of one lashing belt hook placed additional stress on the unit's remaining hooks. Because the hooks were not properly seated on the D-ring, it is more likely that they would subsequently fracture and separate. These lashing belt hook failures would have resulted in loose and shifting BESS units. Additionally, numerous welded brackets securing D-rings separated or partially separated from the tween decks. It is likely that, in addition to shifting cargo from lashing hook failures, the separation of the D-ring securing brackets from the tween deck also contributed to the BESS units becoming loose and shifting within the cargo holds. The crew implementing the storage and lashing plan did not identify the incompatibility of the hooks with the D-rings, which compromised the effectiveness of the plan.

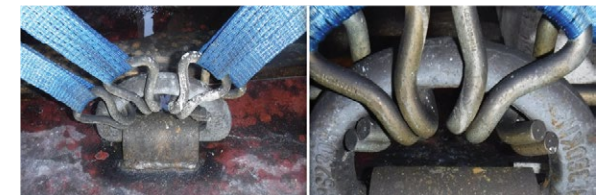


Internal arrangement of a BESS unit (Powin Stack 800 Centipede Energy Segment). BACKGROUND SOURCE: POWIN.



Postcasualty photo showing the method used to secure the BESS units within the cargo hold.

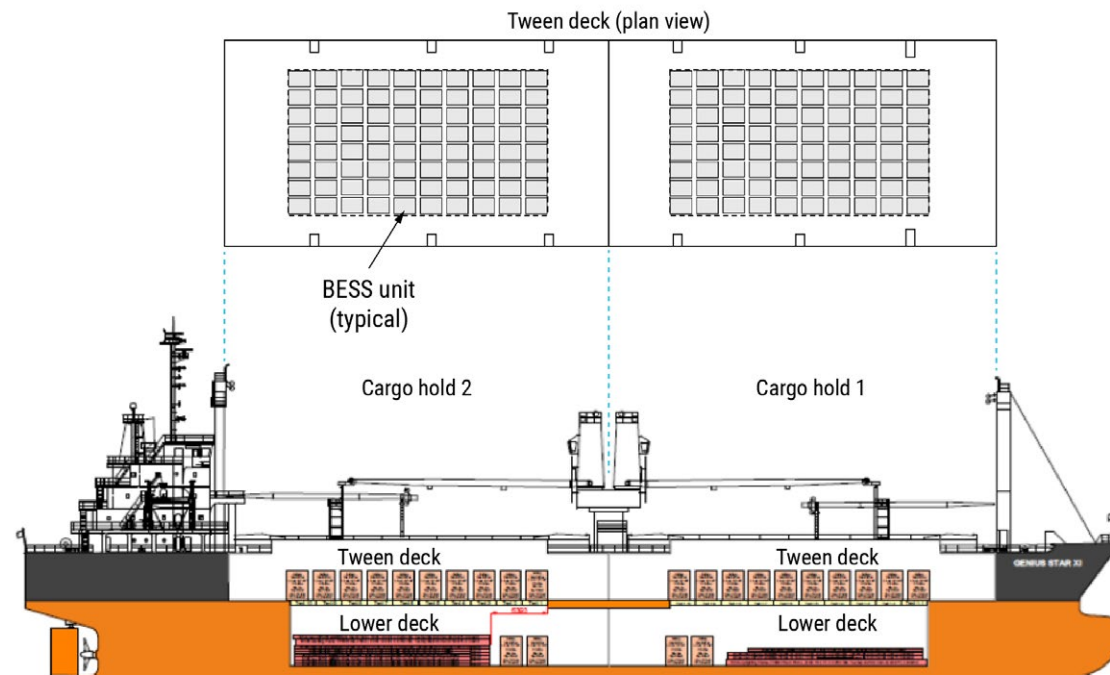
BACKGROUND SOURCE: COAST GUARD.



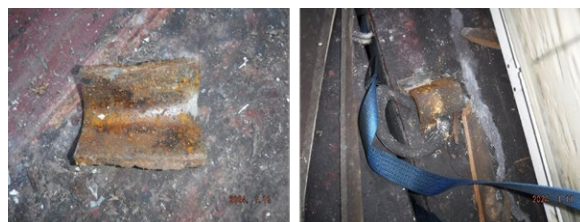
Postcasualty photos showing a D-ring held by a bracket that is attached to the tween deck, with hooks and lashing belts holding BESS units, and a close-up view showing only the tip of the hook in contact with the D-ring. SOURCE: COAST GUARD.



Two separate hooks that fractured and separated from a D-ring. SOURCE: COAST GUARD.



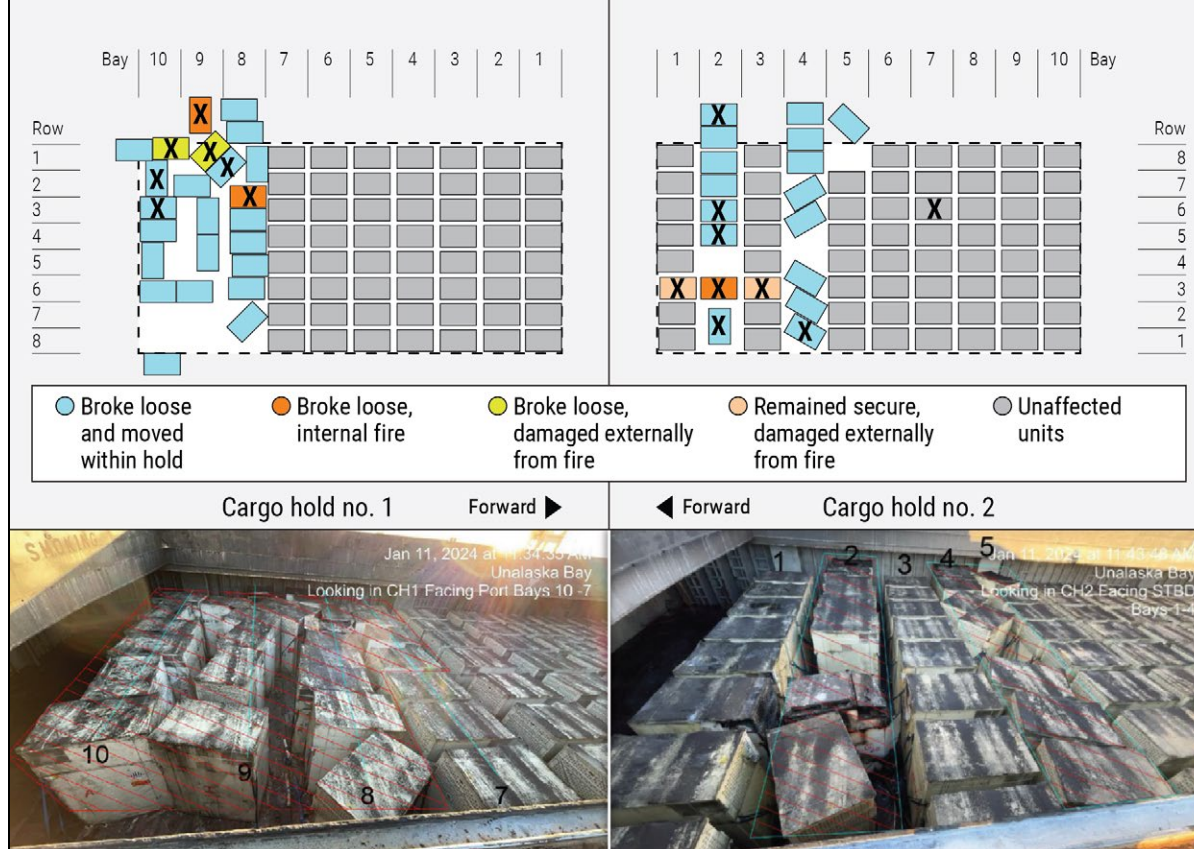
Location of the 192 BESS units (gray boxes) within cargo holds no.1 and no. 2. BACKGROUND SOURCE: NORDEN.



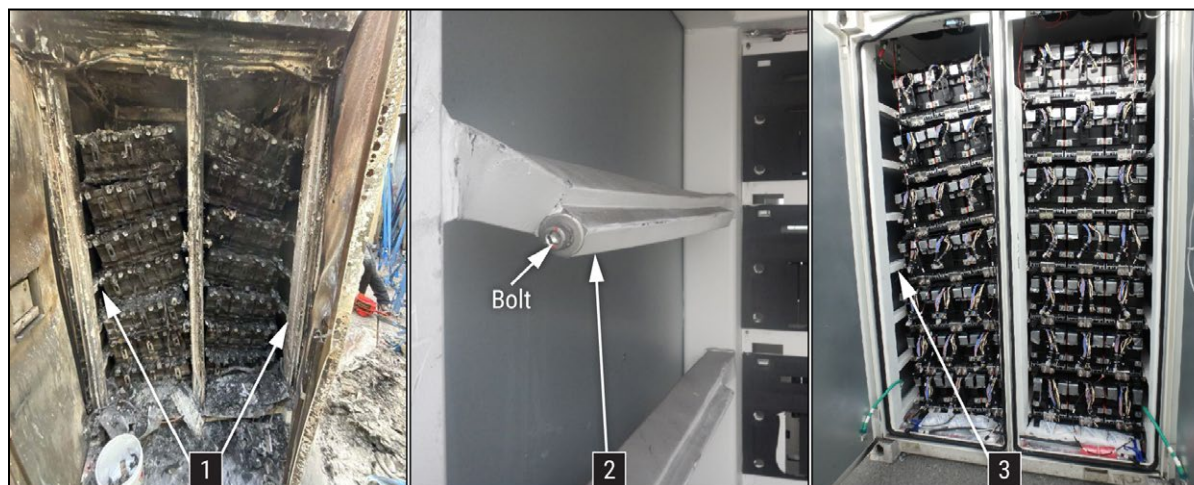
Bracket found separated from the deck, and a D-ring partially pulled from a deformed bracket that was still connected to the deck. SOURCE: COAST GUARD.

The 41 BESS units that had broken from their lashing belts and shifted had some level of internal shelf deformation. Additionally, 13 units that had broken from their lashing belts had one or more shelves that had detached from the deformed shelf rail, resulting in shelf collapses within the unit. When a shelf detached from its rail and collapsed, its two 136-kilogram (300-pound) lithium-ion battery packs could move freely and impact the interior structure of the BESS unit. Arcing and scorch marks were found within those same 13 units, which likely occurred when the exposed battery pack busbar impacted the inside of the unit and caused the batteries to short circuit and create an electrical discharge. The electrical discharge likely caused the lithium-ion batteries to short circuit, which damaged the cells and caused them to overheat, initiating a thermal runaway in three of the BESS units. The heat produced from a thermal runaway of a lithium-ion battery cell can exceed 572°F (300°C), which could have easily caused the adjoining cells of the same battery bank, as well as nearby combustible materials, to ignite, further spreading the fire.

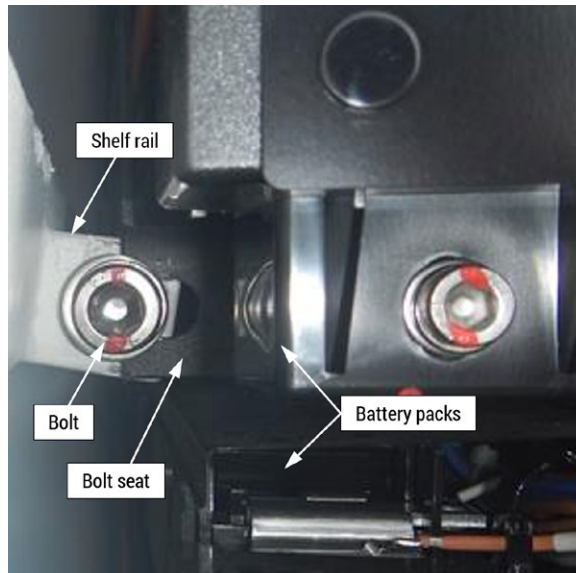
THE PROBABLE CAUSE of the two (December 25 and December 28, 2023) fires aboard the *Genius Star XI* was the breakaway of 41 BESS units in the cargo holds during heavy weather conditions due to improperly secured lashing belts, which resulted in internal structural deformation of these units and thermal runaway of lithium-ion battery packs in 3 of the BESS units.



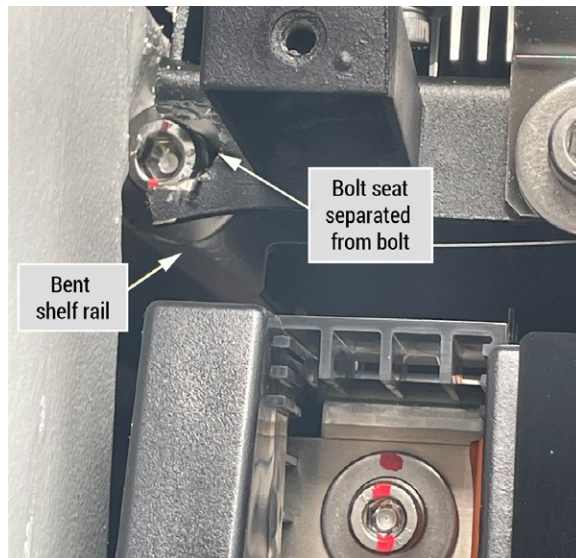
Shifted BESS units in tween deck cargo holds no. 1 and no. 2. BESS units marked with an X in the plan view were examined by investigators on February 25, 2024. BACKGROUND SOURCE: ENERGY SECURITY AGENCY (ESA).



Postcasualty examples of shelf rail deformation in BESS units, showing units that experienced (1) shelf rail deformation with collapse and thermal damage, (2) shelf rail deformation, and (3) shelf-rail deformation followed by a several shelf collapses with no fire. Note: the busbars were removed. BACKGROUND SOURCE: ESA.



Postcasualty photo of a BESS unit that had not broken loose from its lashing belts but had deformed shelf rails and battery pack shelf separation. BACKGROUND SOURCE: ESA.



An example of a shelf rail deformation showing a bent shelf rail with a bolt seat for the shelf separated from the bolt.



Examples of internal damage due to indentation and scorching, and arcing (circled) found inside of the BESS units on the tween deck in cargo holds no. 1 and no. 2. BACKGROUND SOURCE: ESA.

LESSONS LEARNED

ENSURING PROPER CARGO SECURING

In addition to following a vessel's cargo securing manual and implementing the approved vessel storage and lashing plan, a vessel's crew must also conduct a thorough inspection of all the cargo-securing arrangements both during and after cargo loading. Such inspections are critical to identifying improper attachments or other concerns with cargo securement that could compromise the assumptions planners make in implementation of the plan. Not ensuring cargo is properly secured can result in cargo breakaway. Special attention should be placed on examining fitment of components, such as lashing belt hooks, wires, or chain falls used to secure the cargo to ensure they are properly seated (fully engaged) on the D-rings or other points of securement.

FLOODING/HULL FAILURE

Flooding and Partial Sinking of Towing Vessel *Uncle Blue*

VESSEL GROUP

Towing/Barge

LOCATION

Lower Mississippi River, mile 184, Ascension Parish, Louisiana

CASUALTY DATE

March 26, 2023

ACCIDENT ID

DCA23FM023

INJURIES

None

ESTIMATED DAMAGES

\$500,000

REPORT NUMBER

MIR-24-23

ISSUED

August 12, 2024



Uncle Blue underway before the casualty.

SOURCE: MICHAEL ALEXIS.



Uncle Blue partially sunken. SOURCE: COAST GUARD.

On March 26, 2023, about 0500 local time, the towing vessel *Uncle Blue* was towing one empty barge on the Lower Mississippi River in Ascension Parish, Louisiana, when the vessel began flooding. The six crewmembers aboard attempted to pump out the vessel but were unsuccessful, and they evacuated to the barge. A Good Samaritan vessel pushed the towboat and barge to the right descending bank, where the *Uncle Blue* partially sank. There were no injuries, and no pollution was reported. Damage to the vessel was estimated at \$500,000.

Earlier that day about 0200, the 71-foot-long *Uncle Blue* was pushing one empty deck barge en route to McKinney Salvage (mile 228) near Baton Rouge to pick up a cargo of crane parts. As the vessel neared the Sunshine Bridge (mile 167), the steersman made a round of the vessel (he typically conducted rounds hourly). He checked the engine room, generators, bilges, and doors (the lazarette and aft voids were only accessible via sealed flush access hatches on deck); the bilges were dry. About 0300, the vessel was rounding Bringier Point near mile 173, and the steersman made another round of the vessel. He only checked the engine room on every other round, so he did not include it in his 0300 round.

About 0330, the steersman returned to the wheelhouse and took the helm from the captain in time to make the bend at Eightyone Mile Point (mile 178). After rounding the bend at Eightyone Mile Point, the *Uncle Blue* listed to starboard. The engine room bilge alarm sounded, and the captain noticed water “roll up on the [aft] deck.”

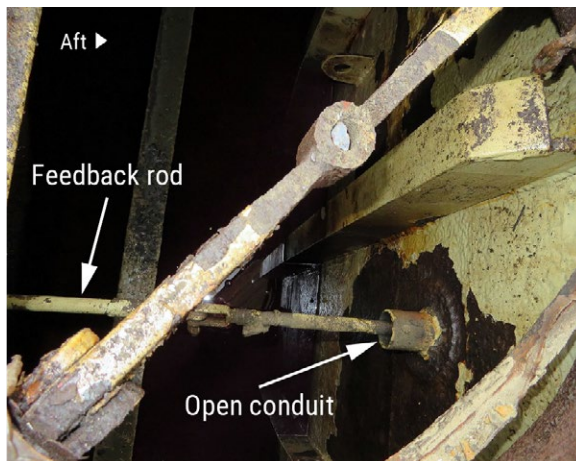
The steersman discovered flooding in the engine room; the captain then sounded the general alarm, awakening the remaining crew. The captain called for help on VHF channel 67 and maneuvered the vessel and barge toward the right descending bank. A nearby towing vessel answered the VHF call and pushed the *Uncle Blue* around toward the bank. The aft main deck bulwark was awash by the time they reached the bank.

Efforts to dewater the engine room were unsuccessful, and the crew abandoned the vessel to the barge. The *Uncle Blue* continued to sink until it was partially submerged; the barge remained afloat.

The *Uncle Blue* had been in service for almost 60 years. During salvage, investigators discovered numerous wastage holes in the hull on the port side of the lazarette. Given the vessel’s age and the holes found in the hull, the vessel’s hull had not been adequately maintained. Investigators did not identify

other potential sources for the flooding; therefore, the wasted steel hull in the lazarette was the initial source of the flooding.

Pipe runs (conduits) inside the hull, which had previously been used to allow rods to run the length of the hull, were either corroded or missing where they passed through the voids. These openings allowed water from the lazarette to flood through two voids and, eventually, into the engine room. Thus, the conduits allowed for progressive flooding, which resulted in the partial sinking.



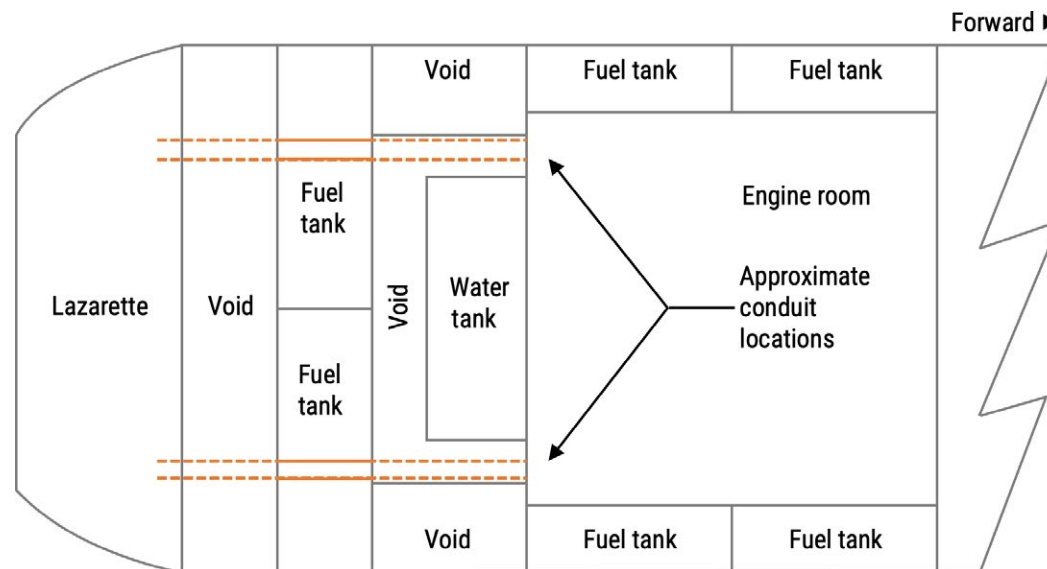
Feedback rod and conduit in the flooded void, between the lazarette and aftmost fuel tanks during salvage operations.



Temporary epoxy repair, applied during the postcasualty salvage, on the port quarter, near the lazarette.

The *Uncle Blue* had only one bilge high-water level sensor, located at the forward end of the engine room. Because the vessel sank by the stern, the float on the sensor would not have lifted until the lazarette and two voids were filled and the aft end of the engine room was inundated with water. Therefore, as it was configured, the bilge high-water level alarm system was ineffective as a means to alert the crew. Had an additional sensor been installed in the lazarette, the crew would have had an earlier indication of the flooding and may have been able to act to address it.

THE PROBABLE CAUSE of the flooding and partial sinking of the towing vessel *Uncle Blue* was a lack of watertight integrity due to the poor condition of the hull, which allowed water to ingress through wastage holes into the lazarette. **CONTRIBUTING** to the sinking were unsealed penetrations in transverse bulkheads, which allowed for progressive flooding forward into the engine room, and the lack of a high-water bilge sensor in the lazarette, which prevented early detection of flooding into the space.



Aft section of the *Uncle Blue* below deck general arrangement.

LESSONS LEARNED

INSPECTING AND REPAIRING STEEL HULLS

Steel hulls are susceptible to corrosion, erosion, and damage over time. To avoid flooding or weakening of the hull, it is good marine practice for owners to conduct regular oversight and maintenance of hulls, including between drydock periods. An effective maintenance and hull inspection program should proactively address potential steel wastage, identify hull and watertight integrity deficiencies, and ensure corrosion issues are repaired in a timely manner by permanent means.

FLOODING/HULL FAILURE

Sinking of the Industrial Vessel *Cape Douglas*

VESSEL GROUP

Fishing

LOCATION

Chiniak Bay, 4 nm southeast of Kodiak, Alaska

CASUALTY DATE

November 6, 2024

ACCIDENT ID

DCA25FM003

INJURIES

None

ESTIMATED DAMAGES

\$250,000

REPORT NUMBER

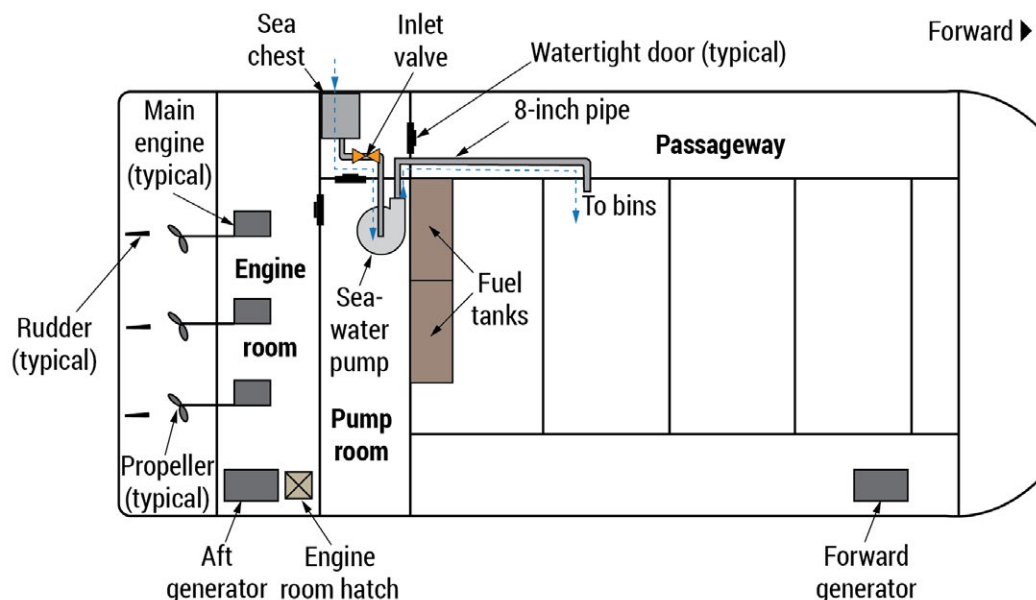
MIR-25-22

ISSUED

May 29, 2025

**Cape Douglas docked in 2022.**

SOURCE: ALASKA MARINE SURVEYORS, INC.



Simplified representation of the below-deck spaces of the *Cape Douglas* (not to scale) showing the inlet valve and seawater pump that supplied the 8-inch bin flooding line. Also shown are the vessel's portside watertight doors. BACKGROUND SOURCE: *CAPE DOUGLAS* CAPTAIN.

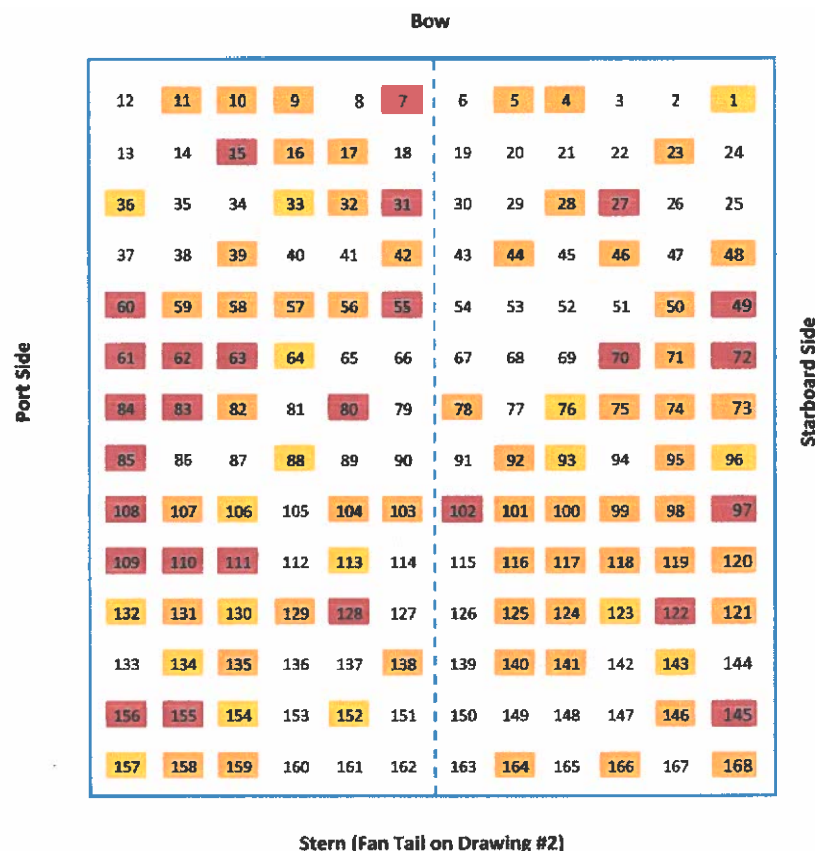
On November 6, 2024, about 1255 local time, the industrial vessel *Cape Douglas* was transiting Chiniak Bay, about 4 nautical miles southeast of Kodiak, Alaska, when the captain observed flooding in the engine room. Unable to control the flooding, the captain and crewmember abandoned the vessel into a towed skiff and were rescued by a good Samaritan vessel. There were no injuries. The vessel later sank with an estimated 400–600 gallons of diesel fuel on board. The vessel was not recovered and was a total loss, valued at \$250,000.

Earlier that morning, the captain and a deckhand boarded the 110-foot-long *Cape Douglas* to prepare for a contracted job to haul and dispose of fish byproduct offshore. (The vessel was a converted landing craft primarily used to haul heavy equipment, operating as an industrial vessel, but was occasionally used to haul and dispose of fish byproduct, thereby operating as a fish tender.) After checking the vessel's propulsion and steering systems, the captain and deckhand began

loading the fish byproduct at a nearby fish meal plant.

Loading was complete at 1100, and the captain got the vessel underway, en route to the byproduct disposal site. At 1240, the *Cape Douglas* approached the area of the disposal site. The deckhand took the helm while the captain went below deck to open the inlet valve to the seawater pump, so they could use the vessel's deck washdown system to loosen the byproduct and wash it overboard to dispose of it. Next, the captain attempted to start the seawater pump locally, but the pump would not start. He decided to leave the pump off temporarily and went back to the wheelhouse to see how close they were to the disposal site.

About 15 minutes later, the captain discovered flooding in the engine room. The captain and deckhand were unable to control the flooding and abandoned the vessel into a towed skiff before being rescued by a nearby good Samaritan vessel; the *Cape Douglas* ultimately sank.



Results of the 2022 audio gauge hull testing on the bottom plating of the *Cape Douglas* (numbers shown are survey audio gauge locations). Hull wastage between 15–18% is shown in yellow, 18–25% wastage is shown in orange, and wastage exceeding 25% is shown in red. SOURCE: ALASKA MARINE SURVEYORS, INC.

Photos from a 2022 survey of the *Cape Douglas* showed evidence of rust and deterioration below deck in the engine room and passageway. (The passageway housed the sea chest and associated pump, valves, and piping for the deck washdown system used to flush overboard the fish byproduct in the vessel's fish bins.) The accompanying audio gauge hull testing revealed wastage greater than 25% in multiple areas of the vessel's 0.312-inch-thick bottom plating, including along the port side of the vessel near the deck washdown system components. Coast Guard guidance generally allows for 25% corrosion in steel plating but specifies that for converted landing crafts, like the *Cape Douglas*, the plating "should generally be replaced when wasted

more than 15%." Additionally, about 7 months before the sinking, the City of Kodiak harbormaster had raised concerns about the vessel's condition.

The vessel's age (80 years old), visual signs of rust and deterioration, and documented hull wastage suggest a general degradation of the vessel and onboard systems, such as the deck washdown system. However, the vessel was not salvaged, so investigators could not determine the condition of the components of the deck washdown system, including the inlet valve between the sea chest and the seawater pump, the pump, or the associated piping. Based on the captain's statements, these components were over 25 years old and had not been used or tested for at least 2 years

before the sinking. On the day of the sinking, the system was not tested before getting underway, so the captain would not have identified any issues with it. As the *Cape Douglas* neared the disposal site, the captain did not observe any flooding below deck while opening the inlet valve for the seawater pump and attempting to start the seawater pump. The flooding was only observed by the captain when he returned to the engine room about 15 minutes after opening the valve. Because the flooding occurred shortly after the valve was opened, the flooding was likely caused by a failure of the deck washdown system piping or the system's components downstream of the open valve.

Although the *Cape Douglas* was equipped with watertight doors in the engine room and companionway spaces, these doors remained open during the transit. Maintaining watertight integrity of a vessel is a fundamental principle of safe operations on water. Within the hull, watertight bulkheads and watertight doors are designed to prevent progressive flooding by containing any incoming water to the compromised space. Had the watertight doors for the engine room, passageway, pump room, and sea chest room been secured, they may have contained the flooding.

THE PROBABLE CAUSE of the sinking of the industrial vessel *Cape Douglas* was flooding of a below-deck passageway or the pump room from an undetermined failure in the vessel's deck washdown system. **CONTRIBUTING** to the sinking were open watertight doors, which allowed progressive flooding into the engine room and other below-deck spaces.

FLOODING/HULL FAILURE

Hull Failure and Implosion of Submersible *Titan*

VESSEL GROUP

Specialty/Other

LOCATION

North Atlantic Ocean, 370 nm southeast of St. John's, Newfoundland and Labrador, Canada

CASUALTY DATE

June 18, 2023

ACCIDENT ID

DCA23FM036

INJURIES

5 fatal

ESTIMATED DAMAGES

\$4.2 million

REPORT NUMBER

MIR-25-36

ISSUED

October 2, 2025



Submersible *Titan* descending on unknown date.

SOURCE: OCEANGATE.



The *Titan* and LARS being launched via stern ramp from the *Arctic Horizon* in 2022. SOURCE: GARRY COMBER.

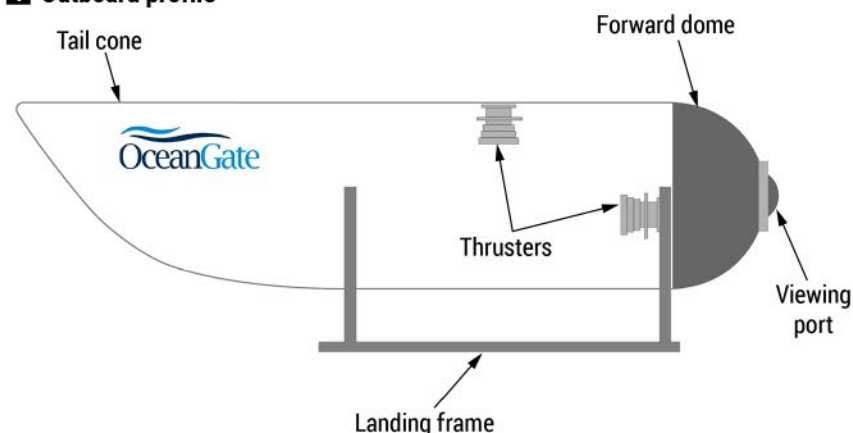
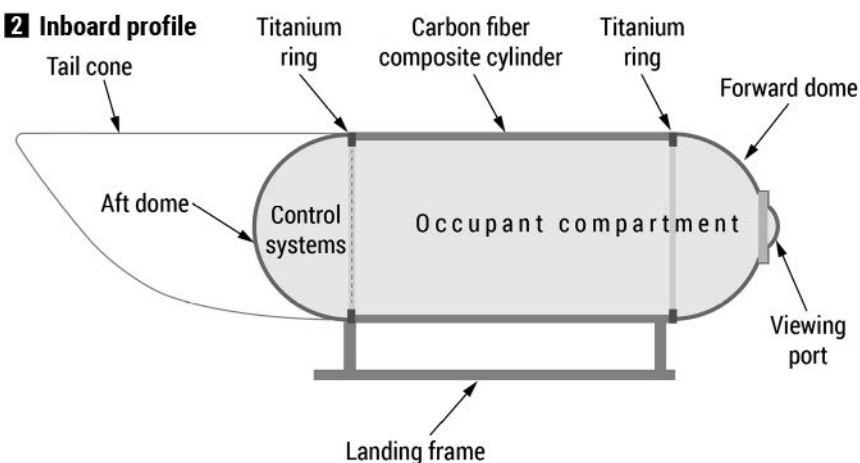
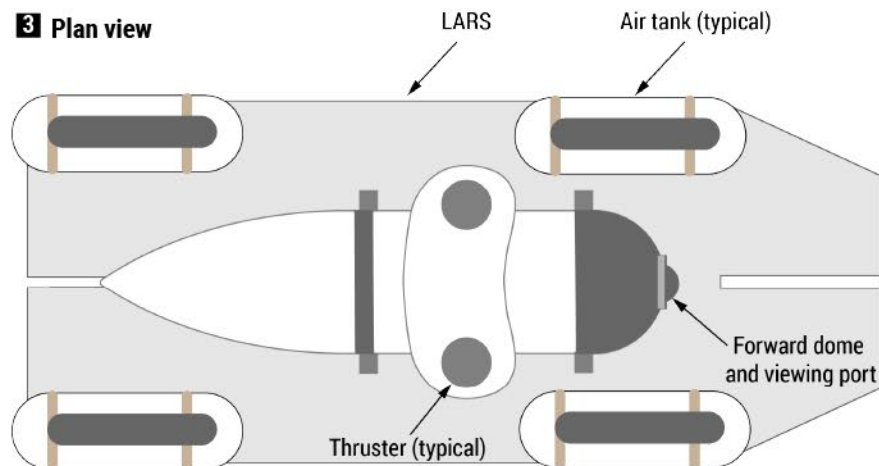
On June 18, 2023, about 1047 local time, while diving to the wreck of the ocean liner *Titanic* in the North Atlantic Ocean, about 372 nautical miles southeast of St. John's, Newfoundland and Labrador, Canada, the submersible *Titan*'s pressure hull failed, and the vessel imploded. All five persons on board the vessel died. The *Titan* was a total loss; according to a 2023 customs declaration, the submersible's value, combined with its launch and recovery system, was estimated at CAD\$5.6 million (about USD\$4.2 million).

The 22-foot-long *Titan* had an 8.1-foot-long pressure hull (pressure vessel) that maintained atmospheric pressure for the occupants during dives. The hull consisted of a 5-inch-thick, carbon fiber-based composite cylinder fitted at each end with a titanium ring (segment) that was capped with a titanium dome. The submersible was designed, built, and operated by OceanGate Inc., through its affiliate companies, to provide expeditions to the wreckage site of the ocean liner RMS *Titanic*, which was located

in the North Atlantic Ocean, about 370 nautical miles southeast of St. John's, at a depth of 3,880 meters (12,730 feet).

For the 2023 expedition, OceanGate chartered the 220-foot-long, Canadian-flagged vessel *Polar Prince* for use as a surface tender for the *Titan*. For each expedition mission, OceanGate loaded the *Titan* onto its LARS—a purpose-built, floodable barge that served as a launching platform for the vessel. On May 12, OceanGate's first of six planned missions for the 2023 expedition began. Over the next month, the *Titan* completed four missions, but none of the missions included dives beyond 10 meters (33 feet).

On June 16, the fifth mission of the 2023 expedition began when the *Polar Prince* departed St. John's with the *Titan* and LARS in tow en route to the *Titanic* dive site. On June 18, about 0400, the *Polar Prince* arrived at its destination, and about 0800, the OceanGate CEO (serving as the pilot), a *Titanic* expedition guide, and three "mission specialists" boarded the *Titan*.

1 Outboard profile**2 Inboard profile****3 Plan view**

Simplified representations of the *Titan* (scale approximate). 1: Outboard profile. 2: Inboard profile (pressure hull area highlighted in gray). 3: Plan view of *Titan* on LARS. 4: *Titan* secured on LARS in 2022. SOURCE (4): GARRY COMBER.

About 0900, the *Titan* was released from the LARS and began its descent to the *Titanic* wreckage at a rate of 30 meters per minute (98 feet per minute). The dive was expected to take about 8 hours (2.5 hours to descend, 3 hours to explore the wreck, and 2.5 hours to ascend).

While diving, the pilot on the *Titan* maintained communications with the *Polar Prince* via an acoustics system. Communications checks occurred every 10 to 15 minutes beginning about 0919.

At 1047, while the *Titan* was at a depth of 3,363 meters (11,032 feet), OceanGate received a message that the submersible was dropping two weights (which was a standard procedure at this depth to slow its descent). At 1048, the *Polar Prince* sent a message back to acknowledge the *Titan*'s message but received no response.

At 1049, the *Polar Prince* sent the *Titan* a "lost tracking" message but received no response. OceanGate crew aboard the *Polar Prince* first assumed

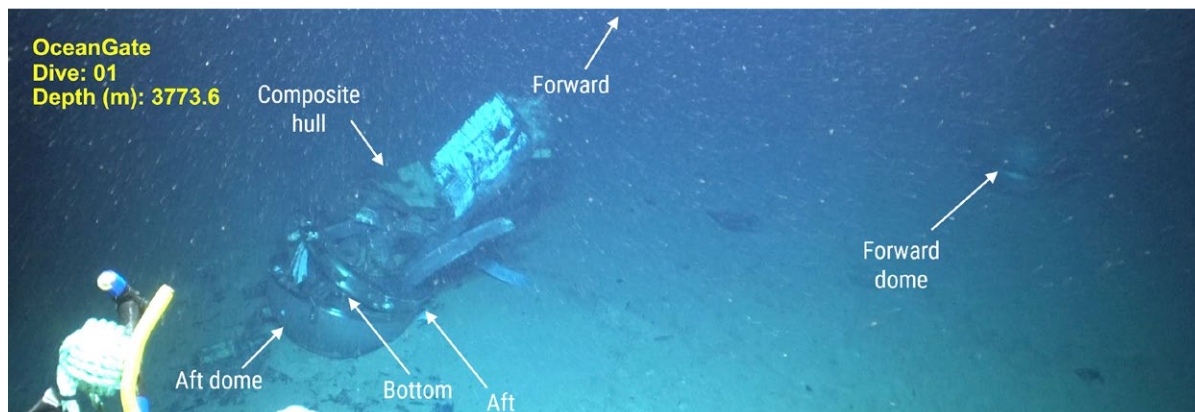
there was an issue with the acoustic communications equipment and sent two to three messages every minute in an attempt to restore communication with the submersible. The mission director calculated that, given the *Titan*'s anticipated ascent rate and last known depth (3,363 meters), the *Titan* should have surfaced about 1500 had the pilot followed OceanGate's procedures to begin ascending 60 minutes after loss of communications. However, there was no indication that the vessel had surfaced.

After 3 hours of searching, the submersible still had not been located, so, about 1855, the *Polar Prince* crew contacted Joint Rescue Coordination Center Halifax (Royal Canadian Air Force and Canadian Coast Guard) and, at 1910, US Coast Guard RCC Boston. Additionally, OceanGate personnel aboard the *Polar Prince* contacted Pelagic Research Services, a deep water ROV operating company, to coordinate use of their ROV, *Odysseus*, in searching for the *Titan*. (The *Odysseus* was in Buffalo, New York, at the time.)

Because the implosion occurred in US Coast Guard RCC Boston's internationally agreed-upon search and rescue region, the US Coast Guard coordinated search and rescue efforts. However, according to the US Coast Guard, no one agency or country had all the assets needed to perform the search, so additional coordination with other US agencies and organizations

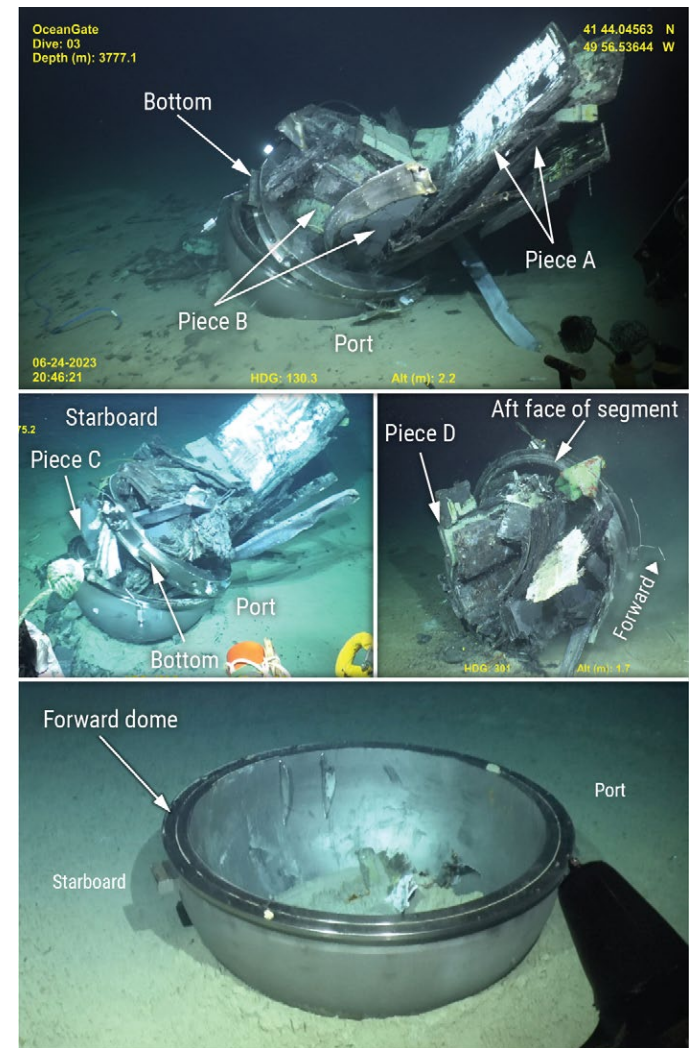
and other countries was needed. Over the next 4 days, Canadian and US aircraft and ships arrived on scene and searched the surface for the *Titan* and the persons on board. Additionally, responders transported the *Odysseus*, along with another ROV capable of reaching 6,000 meters (19,685 feet), to the scene—just a few hours over the theoretical window of available oxygen (96 hours) in the *Titan* crew compartment. (According to US Coast Guard SAR personnel, it would normally take 2 weeks to transport an ROV to the location.)

On June 22, both ROVs were deployed. At 0940, the *Odysseus* discovered a debris field consistent with the *Titan*, including the tail cone and both titanium domes, near the submersible's last known position, about 500 meters (1,148 feet) northeast of the bow of the *Titanic*. There were no survivors.



Titan wreckage on ocean floor. BACKGROUND SOURCE: PELAGIC RESEARCH SERVICES.

THE PROBABLE CAUSE of the hull failure and implosion of the submersible *Titan* was OceanGate's inadequate engineering process, which failed to establish the actual strength and durability of the *Titan* pressure vessel and resulted in the company operating a carbon fiber composite vessel that sustained delamination damage that was subsequently exacerbated by additional damage of unknown origin, resulting in a damaged internal structure that subsequently led to a local buckling failure of the pressure vessel. **CONTRIBUTING** were US and international voluntary guidance and US small passenger vessel regulations that were insufficient to ensure OceanGate adhered to established industry standards. **ALSO CONTRIBUTING** was OceanGate's flawed analysis of their pressure vessel monitoring system data, which led to their continued operation of a damaged pressure vessel.

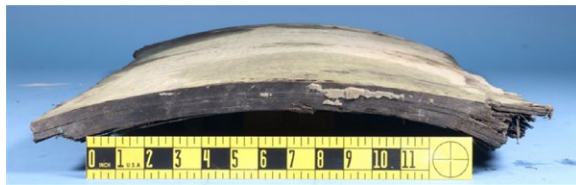


Titan wreckage showing pressure vessel pieces A, B, C, and D, and forward dome.

BACKGROUND SOURCE: PELAGIC RESEARCH SERVICES.



From top: Recovered carbon fiber composite pressure hull outer surface and inner surface.



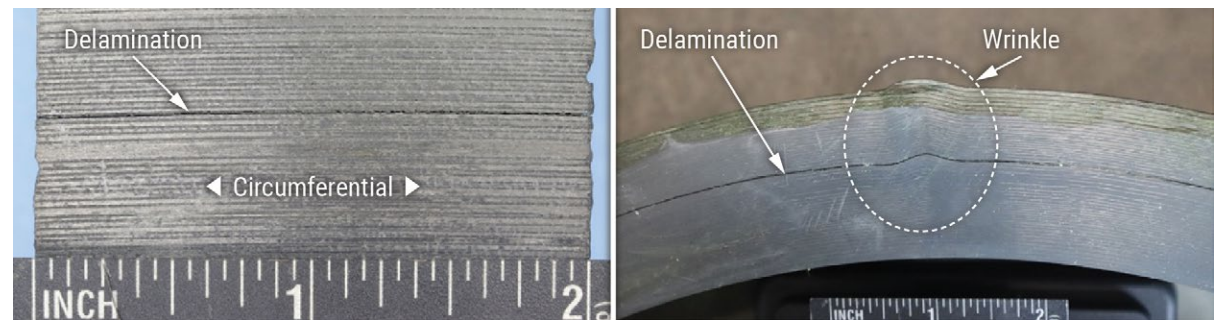
From top: Recovered carbon fiber composite cylinder machined end face, and mid-span fractured face.



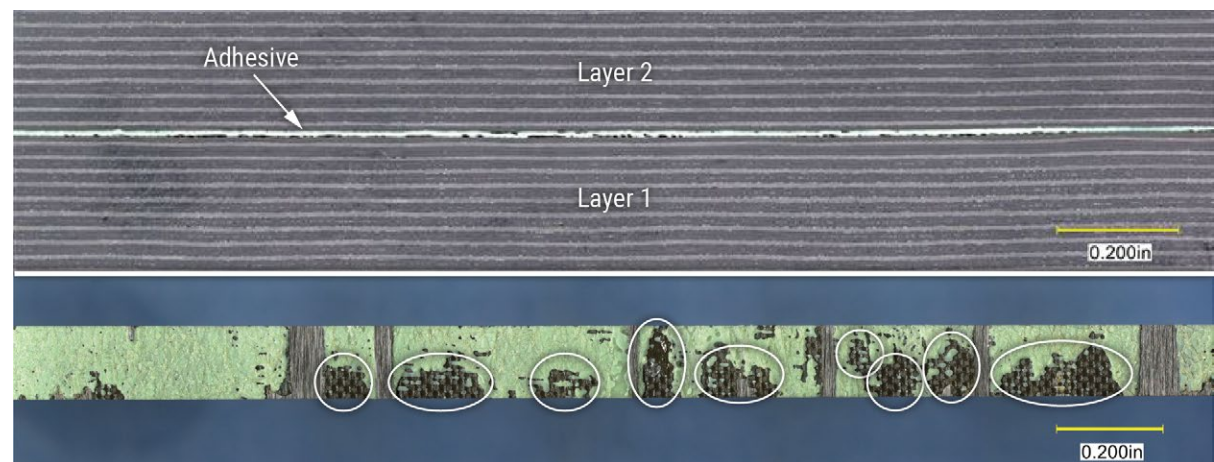
Side view of a trimmed end piece of the *Titan* cylinder.

SAFETY ISSUES

❖ **OceanGate's inadequate engineering process for the *Titan*.** A design and development program typically includes phases for design, testing, verification, and validation. However, OceanGate did not conduct adequate verification testing before deploying and operating the *Titan*. After the failure of the first full-scale pressure vessel, the company used a new manufacturing method to build a second version of the pressure vessel and did not build or test new sub-scale models using this process. OceanGate's engineering process for the *Titan* resulted in the construction of a carbon fiber composite pressure vessel that contained multiple anomalies and failed to meet necessary strength and durability requirements. The second version of the pressure vessel was used for dives during the 2021, 2022, and 2023 expeditions, including the casualty dive. Because OceanGate did not adequately test the *Titan*, the company was unaware of the pressure vessel's actual strength and durability, which was likely much lower than their target, as well as the implications of how certain operational changes, including storage condition and towing, could impact the integrity of the pressure vessel and overall safety of the vessel.



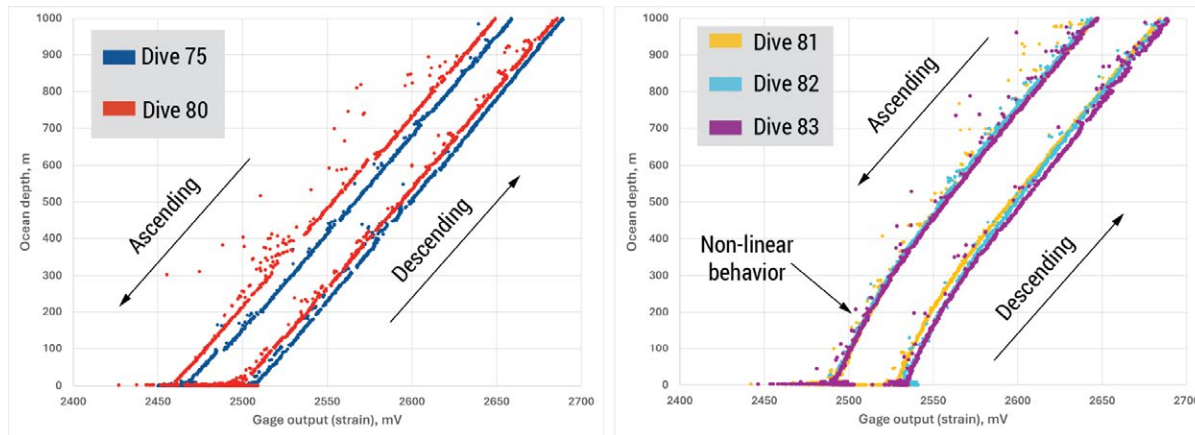
From left: Centerline delamination in trimmed end piece of first full-scale *Titan* pressure vessel, and wrinkle and delamination in trimmed end piece of one-third scale model.



From top: Cross section of layers 1 and 2, showing adhesive between layers, and voids (circled) in the adhesive between layers 1 and 2.

Safety Issues (continued)

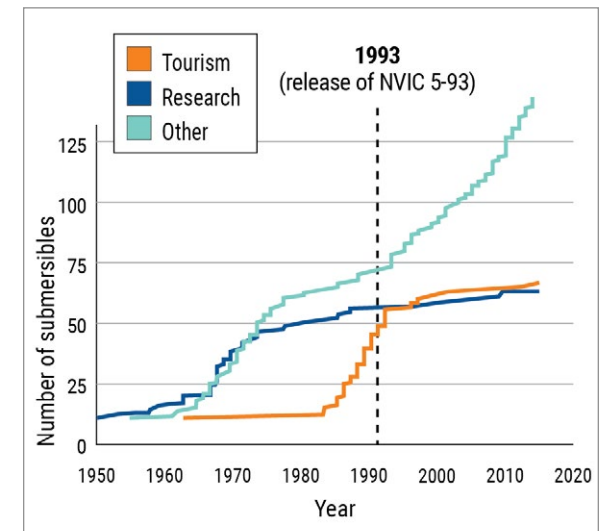
❖ **OceanGate's flawed analysis of *Titan* strain gage and acoustic emission (real-time monitoring system) data as a measure of pressure hull integrity.** OceanGate monitored the *Titan* pressure vessel's integrity using its real-time monitoring system. OceanGate analyzed data from the strain gages against time. However, analyzing strain data in this way was flawed because it was difficult for OceanGate to compare data between dives. A more appropriate means of evaluating strain data would have been to evaluate it against depth, since the external pressure acting on the pressure vessel was a direct result of the vessel's depth. Because OceanGate's analysis of the data was flawed, the company was unaware that the *Titan* was damaged and needed to be immediately removed from service after dive 80.



Strain gage output for the first and last 1,000 meters (3,281 feet) of dive depth for dives 75 and 80–83 (gage group 4 – hoop strain gage). The curves have been aligned using the linear portion of the descent phase of the trip. The strain for dives 81, 82, and 83 show non-linear behavior below 500 meters (1,640 feet) depth.

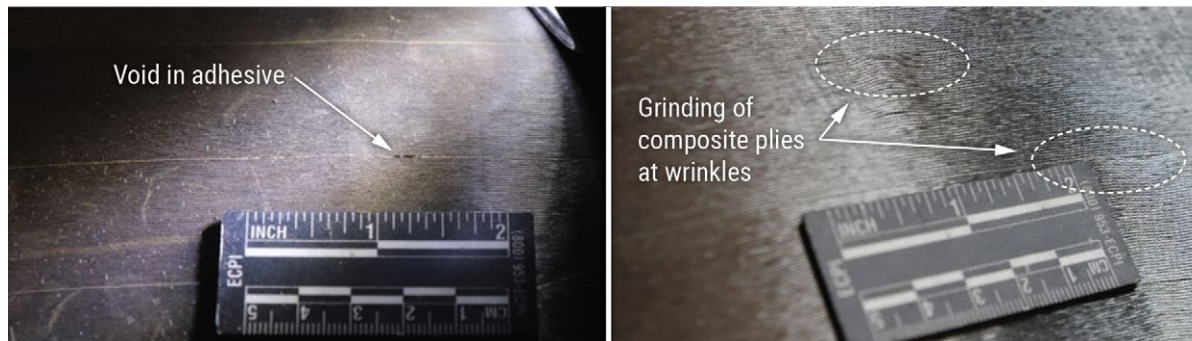
❖ **OceanGate's failure to notify search and rescue assets about its planned expedition.** US Coast Guard NVIC 05-93 recommended that "appropriate rescue facilities" must be ready in case a submersible is not able to surface on its own. According to OceanGate's former director of marine operations, it was industry practice to have either an ROV or a second crewed submersible on site or readily available elsewhere and to train for emergency recoveries. However, OceanGate's procedures did not require OceanGate personnel to notify search and rescue assets or have assets on-site before conducting diving operations. Thus, on the day of the casualty, OceanGate did not have assets standing by when the *Polar Prince* lost communications with the *Titan*. Had OceanGate followed the NVIC 05-93 guidance for emergency response plans, they likely would have had emergency response assets standing by, and the *Titan* likely would have been found sooner, saving time and resources even though a rescue was not possible in this case.

❖ **Insufficient voluntary guidance and US regulations for pressure vessels for human occupancy.** NVIC 05-93 provides voluntary guidance for the design, construction, and operation of "passenger carrying submersibles" subject to US regulations. Additionally, class societies and other organizations have established rules and standards for the design and construction of manned submersibles. However, existing US small passenger vessel regulations and voluntary guidance, as currently written, enabled OceanGate's operation of the *Titan* in an unsafe manner and are not sufficiently tailored to current PVHO operations to ensure the safety of PVHOs in accordance with established technical and classification society standards. International standards for PVHOs would ensure consistency in design, construction, and operation requirements for PVHOs that operate around the world.

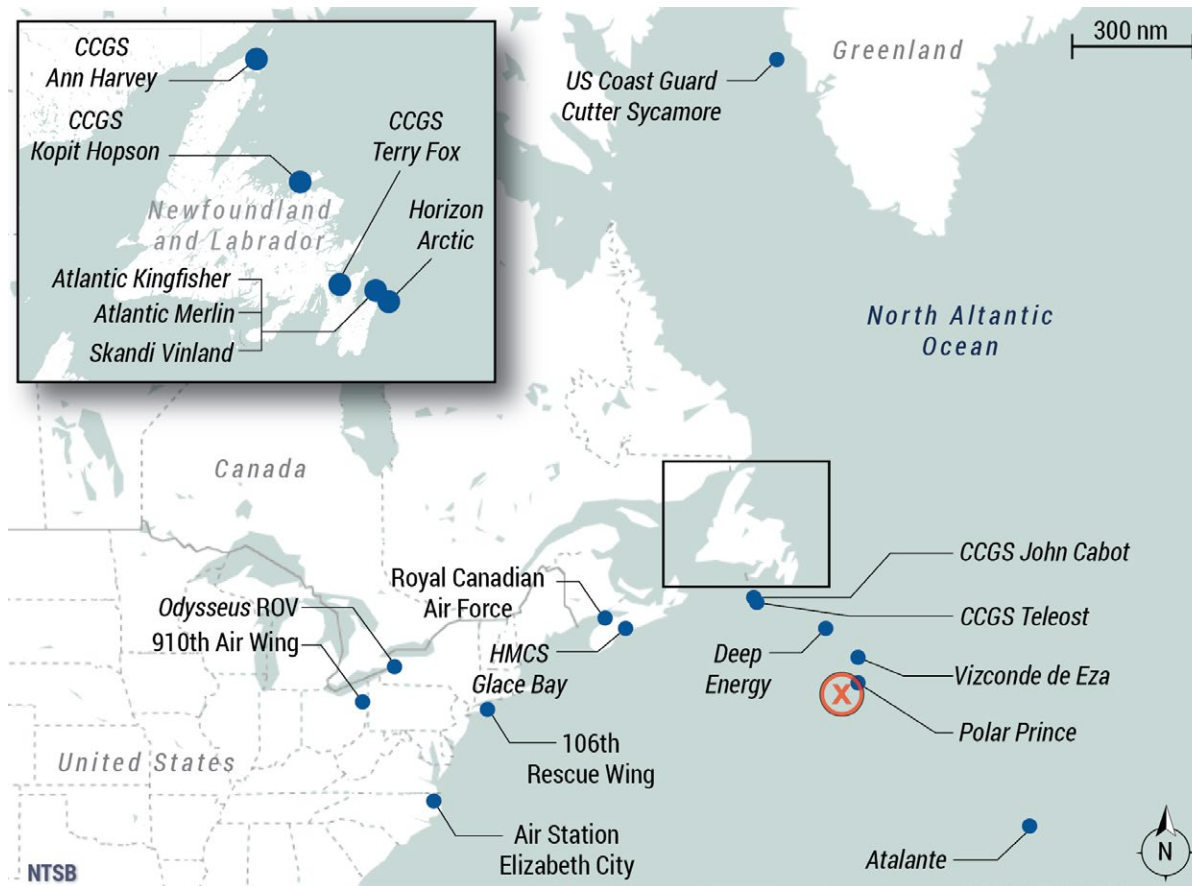


Crewed submersible population from 1950 to 2017. A dashed line marks the 1993 publication of Coast Guard NVIC 05-93.

BACKGROUND SOURCE: MARINE TECHNOLOGY SOCIETY.

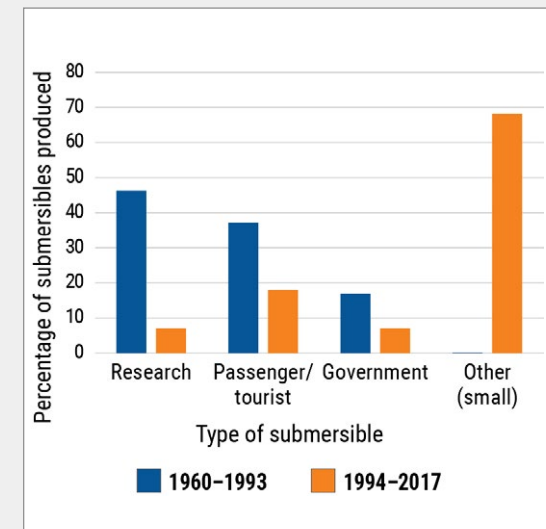


Void in the adhesive layer tenting around a wrinkle and grinding of outer carbon fiber plies at a wrinkle.



SAFETY RECOMMENDATIONS

As a result of this investigation, we issued **four recommendations**. We **recommended** that the US Coast Guard commission a panel of experts to study current PVHO operations and disseminate findings of the study to industry. Additionally, we **recommended** that the US Coast Guard implement US regulations for PVHOs informed by the findings of the recommended study and consistent with international PVHO requirements and guidance. We also **recommended** that the US Coast Guard update NVIC 05-93 to include the revised definition of small passenger vessel as reflected in the Passenger Vessel Safety Act of 1993 and to reflect the findings of the recommended study. Finally, we **recommended** that the US Coast Guard propose that the IMO make MSC.1/Circ. 981 mandatory to promote consistent application of PVHO rules amongst member states.



Production of submersibles (PVHOs) by type manufactured before and after 1993 (between 1960-1993 and 1994-2017).

DATA SOURCE: MARINE TECHNOLOGY SOCIETY.

FLOODING/HULL FAILURE

Flooding and Sinking
of Towing Vessel
Cajole

VESSEL GROUP

Towing/Barge

LOCATION

Lower Mississippi River, mile 112, Waggaman,
Louisiana

CASUALTY DATE

June 12, 2024

ACCIDENT ID

DCA24FM046

INJURIES

None

ESTIMATED DAMAGES

\$2 million

REPORT NUMBER

MIR-25-44

ISSUED

December 10, 2025



Cajole underway on an unknown date before the sinking. SOURCE: MARK HAURY, MARINETRAFFIC.COM.

On June 12, 2024, about 1530 local time, the towing vessel *Cajole* was upbound the Lower Mississippi River near Waggaman, Louisiana, when the vessel began flooding. The two crewmembers aboard attempted to pump out the vessel but were unsuccessful. They tied off to a nearby barge and evacuated to a good Samaritan vessel. The *Cajole* later sank. There were no injuries, and a sheen was reported. Damage was estimated at \$2 million.

Earlier that day, a crew of two, consisting of a captain and a deckhand, arrived at the JMI Elmwood shipyard on the Harvey Canal, in Belle Chasse, Louisiana, where the 61-foot-long *Cajole* had been drydocked for maintenance, repairs, and Coast Guard inspection. The captain and deckhand completed prevoyage preparation checks of the vessel, and the captain conducted a walkaround of the vessel. They did not notice anything abnormal, and about 0630, the vessel departed the shipyard with the captain at the helm, transiting north in the Harvey Canal, bound for Weber Marine in Convent, Louisiana.

Between departure and 0745, the captain received an alarm on the bridge. The captain could not recall the nature of the alarm. He silenced the alarm and continued navigating the vessel.

Partway through the transit, the captain reported that the vessel was losing speed; he later entered the engine room and saw water entering the engine room space from the forward starboard corner near a bulkhead penetration (conduits). There were two spaces forward of the engine room's forward bulkhead: the auxiliary void and bow void. After the towboat was salvaged, investigators found no hull damage that would have allowed water ingress into these spaces.

According to the captain, the cover on an access hatch to the starboard side of the auxiliary void was in place when he discovered the flooding in the engine room. The cover was lost during the casualty, so investigators were not able to evaluate its condition. The hatch was flush to the main deck, and with the vessel's low freeboard, would have made it easy for water to enter if the cover was compromised or not sealed. It is not uncommon for water to wash over

a towing vessel's bow as it transits through a river, especially in lightboat condition, like the *Cajole* when it departed the shipyard.

AIS data showed that, about 1102, the captain turned the vessel to port so that the vessel was perpendicular to the river, and the vessel started to slow down soon afterward. This turn exposed the starboard side of the vessel to the river current and could have resulted in water rushing over the starboard side and into any insufficiently sealed seams (degraded gasket or poor hatch fit) or an unsecured hatch cover that partly, or fully, slid off the starboard-side auxiliary void hatch opening. Additionally, although the crew activated the engine room bilge pumps and used four portable pumps from good Samaritan vessels, the pumps could not keep up with the rate of flooding, which indicates a large opening, such as an access hatch opening, was needed to produce this rate of flooding. Given the lack of other potential sources of ingress, it is likely water entered through a compromised (partly secured, or unsecured and displaced underway) auxiliary void access hatch.



Cajole partially submerged and secured to a barge after all involved personnel safely disembarked the vessel. SOURCE: COAST GUARD.



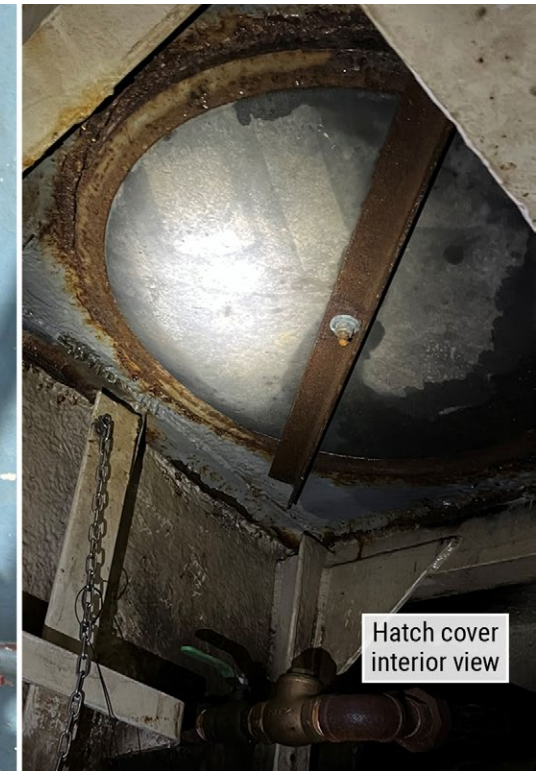
View of unsealed piping conduit penetration between the engine room and auxiliary space from the auxiliary space on May 28, 2024. SOURCE: COAST GUARD.

About 2 weeks before the casualty, a Coast Guard inspector found that piping and electrical wire conduits between the forward auxiliary void and engine room were not properly sealed to be watertight. Operating company personnel sealed the piping and electrical wire conduits, and the inspector signed off that the repairs were completed satisfactorily. However, based on the flooding that the captain saw coming through at least one of the conduits, the repairs the crew had made during the Coast Guard inspection were likely not completely effective. With the starboard-side conduit between the engine room and auxiliary void lacking watertight integrity, water was able to progressively flood between the spaces. Therefore, the water in the engine room was likely the result of progressive flooding, through the conduits, from the auxiliary void located directly forward of the engine room. The flooding added weight to the vessel, causing it to sink lower in the water and decreasing its freeboard, which may have allowed for flooding through other deck or house openings. The vessel's reserve buoyancy was then overcome, resulting in it sinking.

THE PROBABLE CAUSE of the flooding and sinking of the towing vessel *Cajole* was likely a compromised flush-mounted access hatch, which allowed water to flood into a forward void space, and unsealed penetrations in a transverse bulkhead, which allowed for progressive flooding aft into the engine room.



***Cajole* after the sinking, with starboard-side auxiliary void access hatch cover replaced and permanently sealed to the main deck for transit to shipyard.**



LESSONS LEARNED

SEALING WATERTIGHT BULKHEAD PENETRATIONS

For the safety of a vessel and all on board, the integrity of the hull and watertight bulkheads must be maintained, and any deficiencies must be appropriately addressed. Issues with watertight integrity, including unsealed watertight bulkhead and deck penetrations and deck and hull plate wastage, need to be addressed by permanent means. The Coast Guard advises, "Ensure electrical cables and conduits, piping runs, remote valve actuators, and other components that penetrate watertight bulkheads, decks, and compartments are inspected frequently and properly maintained. Each may have a unique sealing method involving glands with packing assemblies, penetration seals, or other methods. Frequent inspection and proper maintenance of these various fittings and assemblies will assist in minimizing the possibility of progressive flooding."

SOURCE: COAST GUARD, "MAINTAINING VESSEL WATERTIGHT INTEGRITY," MARINE SAFETY ALERT 1-08, MAY 9, 2008.

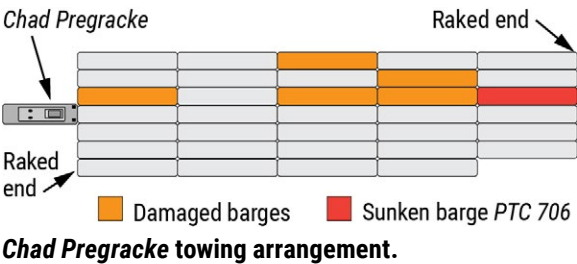
FLOODING/HULL FAILURE

Sinking of Barge **PTC 706** and Subsequent Breakup of **Chad Pregracke** Tow

VESSEL GROUP	
Towing/Barge	
LOCATION	
Lower Mississippi River, mile 260.6, near New Roads, Louisiana	
CASUALTY DATE	ACCIDENT ID
March 16, 2024	DCA24FM029
INJURIES	ESTIMATED DAMAGES
None	\$2 million
REPORT NUMBER	ISSUED
MIR-25-46	December 11, 2025



Chad Pregracke after the casualty.



Barge **PTC 706** after arriving at the recycling yard in Houma, Louisiana, on April 22, 2024, with damaged rake.
SOURCE: MODERN AMERICAN RECYCLING SERVICES, INC.

On March 16, 2024, about 0008 local time, the towing vessel **Chad Pregracke** was transiting downbound on the Lower Mississippi River pushing 34 loaded barges, near mile 260.6, about 5 miles east of New Roads, Louisiana, when a barge, the **PTC 706**, at the head of the tow rapidly sank, causing the tow to break apart. Five barges in the tow were damaged. Damages were estimated at \$2 million. There were no injuries, and no pollution was reported.

About a day and a half earlier, on the evening of March 14, the 173-foot-long **Chad Pregracke** got underway from a fleeting area near mile 586 in Rosedale, Mississippi, pushing 34 loaded barges (all measuring 200 feet long by 35 feet wide) downbound on the Lower Mississippi River to New Orleans, Louisiana. The tow was arranged with six strings of five barges and one string (the outer starboard string) of four barges. The total length of the tow was 1,173 feet by 245 feet wide. The barges had cargoes of soybeans, corn, and coal. The barges with soybeans and corn had covers over their cargo hoppers; the coal barges did not. At the head of the tow, there were three uncovered coal barges and three covered barges, each

with its raked end facing forward. Just after midnight on March 16, and after the tow passed through the Audubon Bridge, near mile 260.6, the pilot, who was operating the vessel, noticed the stern of the 200-foot-long coal barge **PTC 706** (at the head of the tow) sticking up, with the bow of the barge submerged. Barges at the head of a tow can be shoved under water. This can occur on barges with low freeboard due to the effect of river current on the tow or a tow pushing too fast. In this case, however, the **PTC 706** (center barge) and other coal barges had more freeboard (30–31 inches) than the adjacent covered barges (18–30 inches), but the adjacent barges were not submerged. Therefore, it is more likely that the **PTC 706**'s freeboard was reduced by weight forward in the barge. This weight forward could have been caused by water in the rake void, forward wing tanks, or forward in the open hopper/hold (possibly from rainwater accumulation or spray over the bow of its uncovered cargo hopper). When the bow of the barge submerged, the force of the tow's forward momentum would have driven the barge further under water.

With the *PTC 706* under water, the face wires, which connected the *Chad Pregracke* with the tow, parted, causing the tow to break up. The *PTC 706* later sank, and a survey located the barge at mile 260.6 in about 62 feet of water in an inverted position about 750 feet downriver of where the tow began to break up. Five other barges sustained damage due to the breakup, ranging from flooding in compartments to cargo loss and damage, to hull structure damage.



From top: Covered barge LTD 4611 partially sunken by its bow to port, and damage to the stern area of MTC 500B, the barge that was immediately aft of the PTC 706.

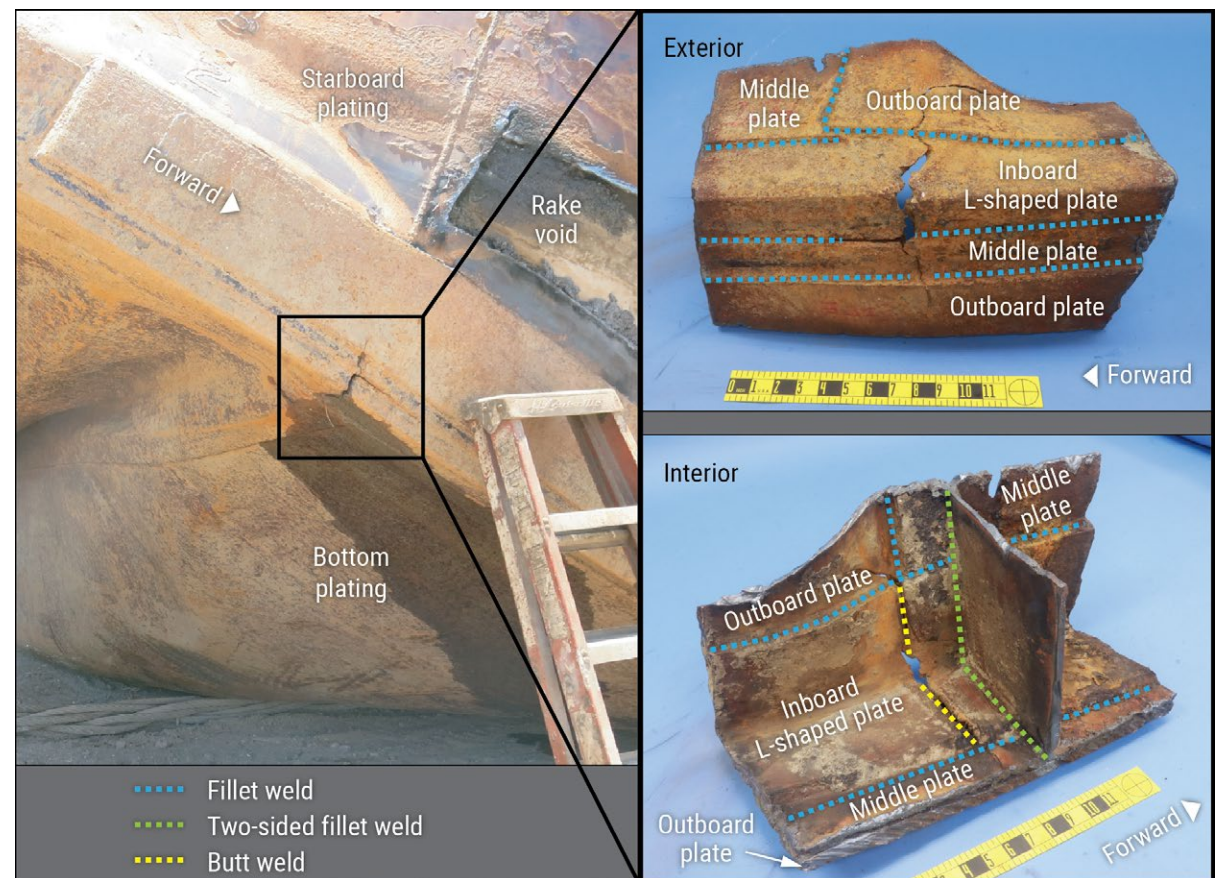
After the casualty, investigators found a hull fracture along a butt weld forward on the starboard-side bilge knuckle of the barge, between the rake void and wing tank no. 1, an area susceptible to extreme wear. The weld exhibited a lack of weld penetration, with large pores, weld splatter, and flash deposits in the unwelded areas between the plates. These characteristics would have left the weld unable to accommodate as much load as the plates it was joining. Once the porous area of this butt weld fractured,

the resulting crack would have grown into the adjoining plates until it arrested. If the fracture existed before the barge sank, it would have provided an opening for water ingress. Thus, flooding, even at a slow rate, into the rake void or wing tank no. 1, would cause an increase in forward draft of the barge.

Continuing to push a barge with an increased forward draft could lead to the bow being submerged. However, the rake area of the barge was severely damaged as a result of the sinking, and investigators could not determine whether the fracture existed before the casualty or was the result of the barge's

contact with the river bottom. Therefore, the cause of the *PTC 706* being down by the bow could not be definitively determined.

THE PROBABLE CAUSE of the sinking of barge *PTC 706* and subsequent breakup of the *Chad Pregracke* tow was the barge *PTC 706*, which was located at the head of the tow, being down by the bow due to an undetermined reason and subsequently being driven under water by the forward momentum of the tow.



PTC 706 starboard-side bilge knuckle before section was cut away on April 22, 2024. Inset: Bilge knuckle section cutaway examined by the NTSB, with plate segments and types of welding joints labeled.

GROUNDING/STRANDING

Grounding of Bulk Carrier *John J Boland*

VESSEL GROUP

Cargo, Dry Bulk

LOCATION

Port Dolomite, Lake Huron, about 4 nm east of Cedarville, Michigan

CASUALTY DATE	ACCIDENT ID
April 21, 2023	DCA23FM029
INJURIES	ESTIMATED DAMAGES
None	\$776,125
REPORT NUMBER	ISSUED
MIR-24-19	July 12, 2024



The Cedarville dock in Port Dolomite, Michigan.
SOURCE: GOOGLE EARTH.



John J Boland discharging cargo using its self-unloading boom in Lorain, Ohio, after the grounding.

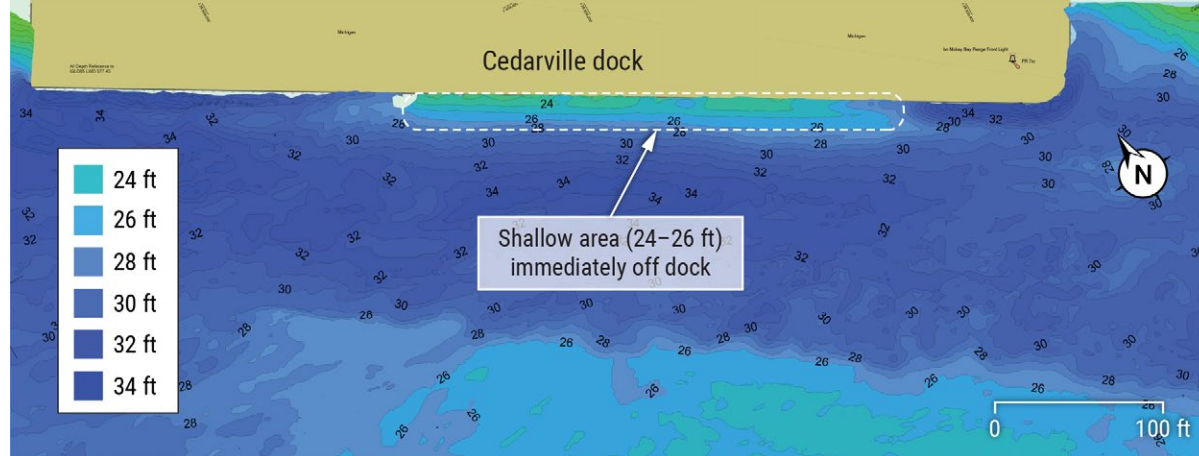
On April 21, 2023, the bulk carrier *John J Boland* grounded twice in Port Dolomite, Michigan, while loading cargo. About 1445, after getting underway, the crew discovered flooding and damage to the hull of the vessel. No pollution or injuries were reported. Damage to the vessel was \$776,125.

The 667-foot-long *John J Boland* arrived the day before and tied up port side to the Cedarville dock, where the crew planned to load 30,000 tons of aggregate stone. The vessel's first mate had created the load plan and was responsible for loading and ballast operations on board. The first mate created the load plan based on past load plans, using the ship's loading and stability software and the operating company's draft guidance spreadsheet, which established the depth at the Cedarville dock as 25 feet at low water datum (the master approved the load plan). Based on the established depth in the draft guidance and the application of the Mackinaw City gage (20 inches above low water datum), the first mate calculated the vessel could be loaded to no greater than 26 feet 8 inches draft at the Cedarville dock.

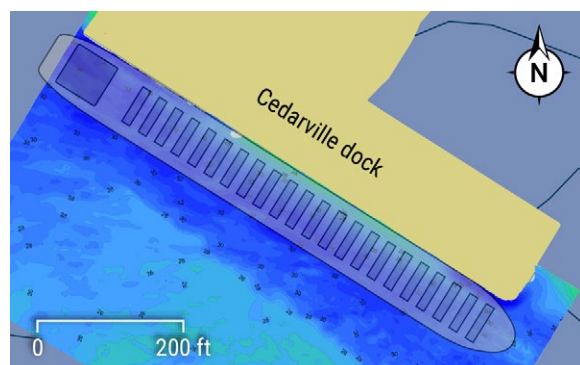
The first mate believed that the company's draft guidance included an 18-inch "safety factor" that would provide additional underkeel clearance between the vessel and the seabed. He therefore determined the calculated draft should have been sufficient to

load without grounding. However, the operating company's draft guidance did not reference a safety factor. Additionally, the company's SMS did not provide guidance related to minimum underkeel clearances to be maintained during loading operations, and there was no explanation as to how the draft guidance (last updated for Cedarville in 2015) was calculated. Therefore, the operating company did not provide adequate guidance to create a load plan with sufficient underkeel clearance.

The mates on watch referenced the load plan to load cargo, and the oncoming first mate (who relieved the offgoing first mate during loading) used the load plan to conduct trimming operations (final loading to the target draft). While the vessel was being trimmed and product was still being added to the hold, the forward draft stopped increasing at 26 feet 7 or 8 inches, indicating the vessel had touched bottom. In the area where the vessel touched bottom was a shoal; at the time of the grounding, the depth of the shoal would have been about 26 feet 5 inches. Although the forward draft was still within the limits of the load plan, it exceeded the depth of the shoal by 2 to 3 inches. The load plan was inadequate because it did not mention the shoal or include company guidance to hold the bow at least 12 feet off the dock during trim loading.



May 8, 2023 (16 days after grounding) bathymetric survey of Cedarville dock (at International Great Lakes Datum). BACKGROUND SOURCE: RYBA MARINE CONSTRUCTION CO.



Overlay of *John J Boland*'s position at 0946 after the vessel initially grounded over the 2019 bathymetric survey of the Cedarville dock, which was based on International Great Lakes Datum at low water datum.

BACKGROUND SOURCES: NOAA ENC US5MI53M, RYBA MARINE CONSTRUCTION CO.

After the grounding, the crew freed the vessel by using mooring lines to move it ahead. The oncoming first mate then continued trim loading through the aft hatches. However, when the vessel's aft draft reached 26 feet 3 inches, the aft draft stopped increasing, indicating the vessel had grounded a second time.

At the time, the vessel's draft forward was 26 feet 10 or 11 inches, exceeding the load plan's limiting draft, exceeding the depth of the shoal by 5 to 6 inches, and again leaving the vessel with no underkeel clearance near the bow. About the same time, the aft draft stopped increasing and the ship listed to starboard.

In response, the crew loaded product through the port side of the hatches, intending to correct the list to starboard; however, their continued loading likely placed the vessel harder onto the shoal.

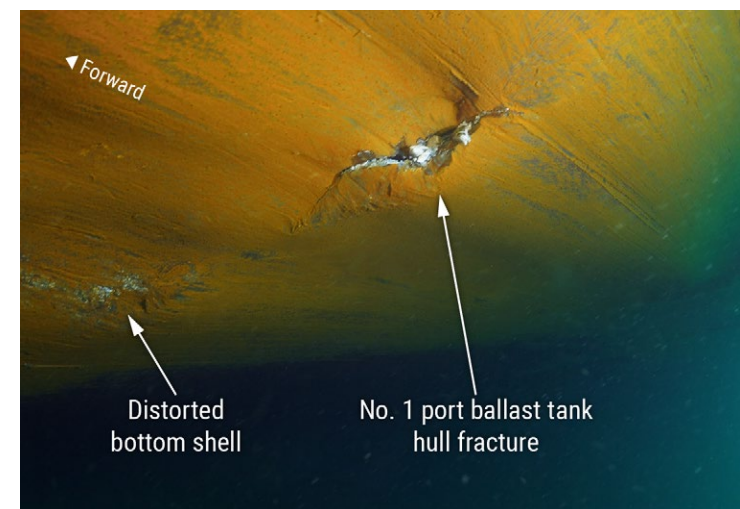
The master decided to use the vessel's main engine (propulsion) to free it and back off the dock after the second grounding because the vessel was ready to depart. The vessel's hull would have scraped along the bottom as the master backed the vessel off the dock, likely causing damage to the hull.

Both the master and oncoming first mate stated they had touched bottom or become "stuck" while loading vessels in various ports in the Great Lakes. Based on their previous experience on vessels that had contacted bottom during loading operations without incurring damage, the master and first mate likely became desensitized to the risk of vessel damage associated with grounding.

LESSONS LEARNED

DEVELOPING LOAD PLANS

To safely carry out cargo-loading operations, it is important for vessel crews to understand the characteristics of the facilities where they will be operating, including the depth of water at the dock and potential hazards, such as nearby shoaling, that could impact the loading process. Effective company policies and guidance for cargo loading include pertinent information, such as clear expectations for required underkeel clearance, to assist personnel developing load plans with identifying and mitigating hazards. Additionally, crewmembers can consult nautical charts and surveys, tidal and/or water gage information, ship-specific stability and loading information, and information from the dock/facility when developing a load plan.



No. 1 port ballast tank hull fracture and distorted bottom shell. BACKGROUND SOURCE: BENEATH THE SURFACE.

THE PROBABLE CAUSE of, and resulting hull damage to, the self-unloading bulk carrier *John J Boland* was inadequate operating company guidance to create a load plan with sufficient underkeel clearance and the master's decision to use the main engine to free the vessel after it was aground. **CONTRIBUTING** was the master and first mate becoming desensitized to the risk of vessel damage associated with grounding during loading operations.

GROUNDING/STRANDING

Grounding of
Cargo Vessel
Bonnie G

VESSEL GROUP

Cargo, General

LOCATION

Caribbean Sea, near Cyril E. King Airport,
St. Thomas, US Virgin Islands

CASUALTY DATE

October 4, 2023

ACCIDENT ID

DCA24FM001

INJURIES

None

ESTIMATED DAMAGES

\$1.5 million

REPORT NUMBER

MIR-25-03

ISSUED

January 17, 2025



Bonnie G underway in 2021.

SOURCE: RASHEID CHAMBERS, MARINETRAFFIC.COM.



Bonnie G stranded on the rocks following the grounding. SOURCE: COAST GUARD.

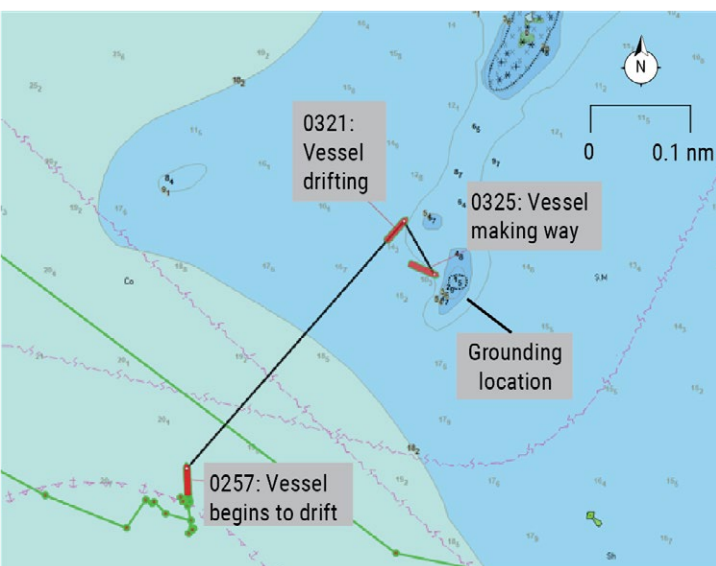
On October 4, 2023, about 0328 local time, the cargo vessel *Bonnie G* ran aground in the Caribbean Sea, less than 1 nautical mile south of Cyril E. King Airport on St. Thomas, US Virgin Islands, while maneuvering following an anchor chain failure in heavy weather. The twelve persons on board abandoned the vessel and were rescued by a US Coast Guard small boat. The *Bonnie G* remained hard aground for several weeks until salvors could successfully refloat it and tow it to a dock. There were no injuries, and no pollution was reported. Damage to the vessel was estimated at \$1.5 million.

The 172-foot-long *Bonnie G* arrived in St. Croix, US Virgin Islands, on October 3, for cargo operations. Before departing St. Croix, the captain reviewed the weather forecast for the vessel’s intended route back to St. Thomas. There was a small craft advisory in effect, with winds forecasted to be between 10–15 knots and gusting to 25 knots after midnight. The captain decided the weather was acceptable, and the vessel got underway that afternoon.

As the vessel approached St. Thomas, arriving in Crown Bay, the winds were sustained at 27 knots. In addition, a loaded barge had broken free of its moorings and was partially blocking *Bonnie G*’s mooring location. The captain decided to anchor the vessel until the weather improved.

Once the vessel was in position within Anchorage F, the port anchor was deployed with 1.5 shots (135 feet) of chain. The captain likely based his decision to pay out 135 feet of chain on his erroneous assessment that the water depth in the area was only “around 7 to 8 meters” (23–26 feet). In actuality, the navigation chart for the location indicated the water depth was 68 feet. When anchoring a vessel, a length of anchor chain that is five to seven times the water depth (scope) should be used; even more anchor chain should be used in adverse weather. About 340–475 feet (3.7–5.3 shots) of chain and potentially more could have been let go, considering the windy conditions. The *Bonnie G* captain did not deploy enough anchor chain for a secure anchorage (inadequate scope).

If inadequate scope is used, there is less holding power, and the anchor may be subject to shock tension. In these conditions, the anchor is more likely to drag, and in extreme cases, the chain may be damaged or break. About 3 hours after anchoring, the *Bonnie G* began to drift north-northeast, in the direction of land. When the crewmember on watch attempted to heave the anchor, he discovered that the anchor chain had parted at the first shackle, and that the anchor was no longer attached to the vessel. The inadequate scope of anchor chain was likely a factor in the anchor chain parting.



The *Bonnie G*'s trackline after the captain began navigating the vessel toward the green buoy and the West Gregerie Channel, just before the vessel grounded. BACKGROUND SOURCE: NOAA ENC 25649 AS VIEWED ON MADE SMART.

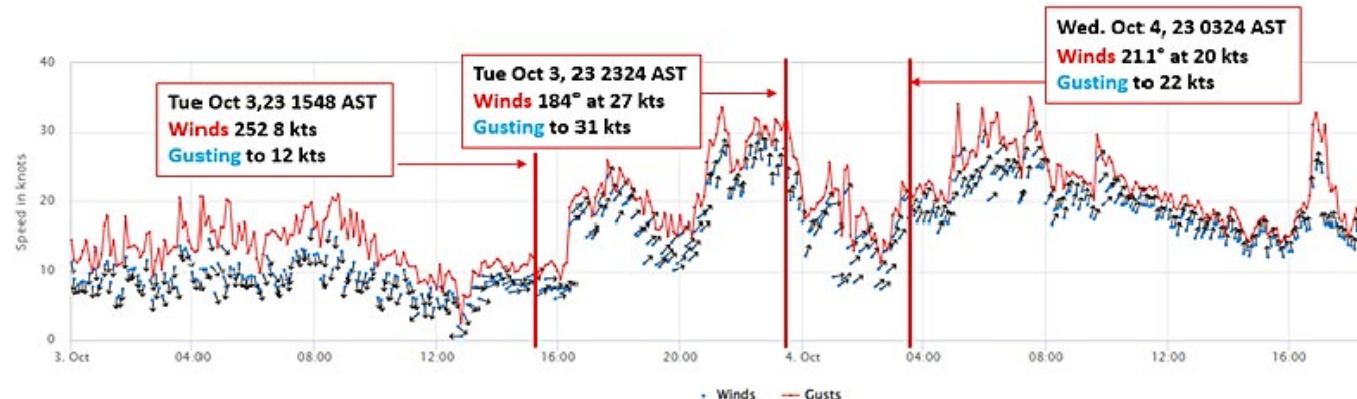
After learning the anchor chain had parted, the captain decided to maneuver the vessel into nearby familiar waters, toward open water. The captain was attempting to keep his vessel and crew safe after encountering heavy weather at night, experiencing a broken anchor chain, and then observing his vessel drifting toward shore. However, because the captain

did not use the available onboard navigational chart to identify a charted rock nearby when maneuvering, he inadvertently steered directly onto the rock and grounded the vessel.

As a result of the vessel grounding, the hull was breached just forward of the engine room. Floodwater filled the midships passageway and then poured into the engine room through the open watertight door. Watertight doors are required to remain closed while not being traversed and while a vessel is underway so as to maintain watertight bulkhead subdivision and prevent progressive flooding (from a flooded space to another space). The forward watertight door in the engine room of the *Bonnie G* was open during the

casualty events, and it was not secured before the crew abandoned the vessel. Had the watertight door been shut as required, it is likely that progressive flooding of the engine room and aft spaces would not have occurred, limiting vessel damage.

THE PROBABLE CAUSE of the grounding of the cargo vessel *Bonnie G* was the inadequate scope of chain deployed when anchoring, which likely led to the anchor chain parting, and the captain not identifying a charted rock and steering the vessel onto it when attempting to maneuver to safe water.



Graphed wind observations recorded at the Charlotte Amalie Harbor weather station on October 3 and 4, 2023. Red bars indicate the approximate times of the *Bonnie G*'s departure from St. Croix, arrival into Crown Bay, and the grounding. BACKGROUND SOURCE: NOAA.

LESSONS LEARNED

BEING AWARE OF NEARBY HAZARDS WHEN ANCHORED

When anchoring, mariners should review navigational charts and other sources of local information, such as the *US Coast Pilot*, to become familiar with nearby hazards. It is important to have this information available in heavy weather conditions, when there is heightened risk of drifting and crews may need to get a vessel underway on short notice.

GROUNDING/STRANDING

Grounding of
Towing Vessel
City of Louisville

VESSEL GROUP

Towing/Barge

LOCATION

Upper Mississippi River, mile 42.6,
near Thebes, Illinois

CASUALTY DATE

July 29, 2023

ACCIDENT ID

DCA23FM050

INJURIES

None

ESTIMATED DAMAGES

\$2 million

REPORT NUMBER

MIR-25-19

ISSUED

May 6, 2025



City of Louisville on unknown date before the grounding. SOURCE: RELIANT MARINE SOLUTIONS.



The City of Louisville aground. SOURCE: COAST GUARD.

On July 29, 2023, about 1449 local time, the towing vessel *City of Louisville* was upbound on the Upper Mississippi River pushing 11 barges when it grounded near mile 42.6, about 1.4 miles south of Thebes, Illinois. The grounding damaged the hull, flooding the engine room and the machinery and aft accommodation spaces. An estimated 30 gallons of gear oil were released into the river. There were no injuries. Damage to the vessel was estimated at \$2 million.

Two days earlier, about 1233, the 138-foot-long *City of Louisville* got underway from a terminal on the Lower Mississippi River (near mile 823.7) with a tow of 11 empty hopper barges (each having about 18 to 22 inches of draft). The tow was destined for a fleet on the Upper Mississippi River at mile 126 near St. Genevieve, Missouri. The overall length of the tow was about 738 feet, and the overall width was about 140 feet.

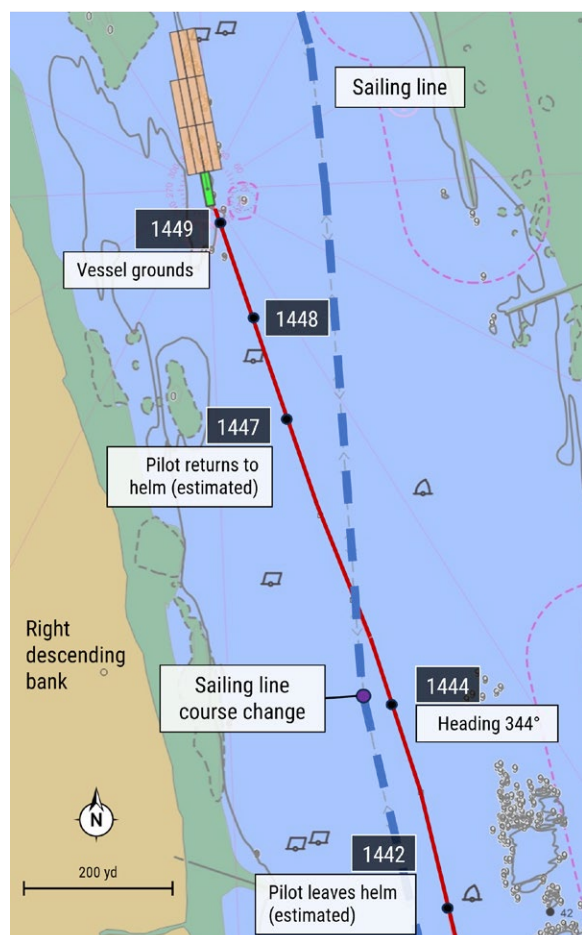
On July 29, about 1100, the pilot took over the navigational watch in the wheelhouse from the relief captain for their normally scheduled watch change. The *City of Louisville* proceeded upriver without event, with the pilot at the helm and making a speed of about 4 to 5 mph.

About 1442, the pilot left the helm and went to the port side of the wheelhouse. He estimated he was away from the helm about 5 minutes. Leaving the helm unattended is contrary to prudent navigation practices when operating on rivers. The Mississippi River, in particular, has frequent turns, and the potential for

strong currents and heavy traffic. Due to these factors, inattention to a vessel's path, even for a brief time, can result in encountering other vessels and hazards such as shallow areas or structures on the banks nearby.

During the time the pilot said he was away from the helm, he missed a 9° course change to starboard on the sailing line (the recommended track). The pilot said that, before he left the helm, he checked the electronic charting system (ECS). However, the ECS would have displayed the upcoming change in course. Further, the pilot did not identify that the tow had begun to progress closer to the right descending bank while he was away from the helm, which should have been apparent from his reported position on the port side of the wheelhouse.

When the pilot returned to the helm, the vessel was about 95 yards west of the sailing line, making a "sharp" turn to port. The pilot attempted to correct the turn by putting the steering rudders to 30° to starboard (no change was made to the propulsion control levers). The head of the tow began to swing to starboard, and the stern swung to port in the direction of the right descending bank. At 1449, the vessel grounded in a rocky area about 150 yards west of the sailing line, breaching the vessel's hull and flooding the engine room. The vessel was reported to have about 8 feet of draft at the time of the casualty; river conditions at that time were low with the river gage nearest to the casualty site at 7.4 feet (Upper Mississippi River mile 43.7).



ECS showing the positions of the *City of Louisville* for 7 minutes before the time of grounding.

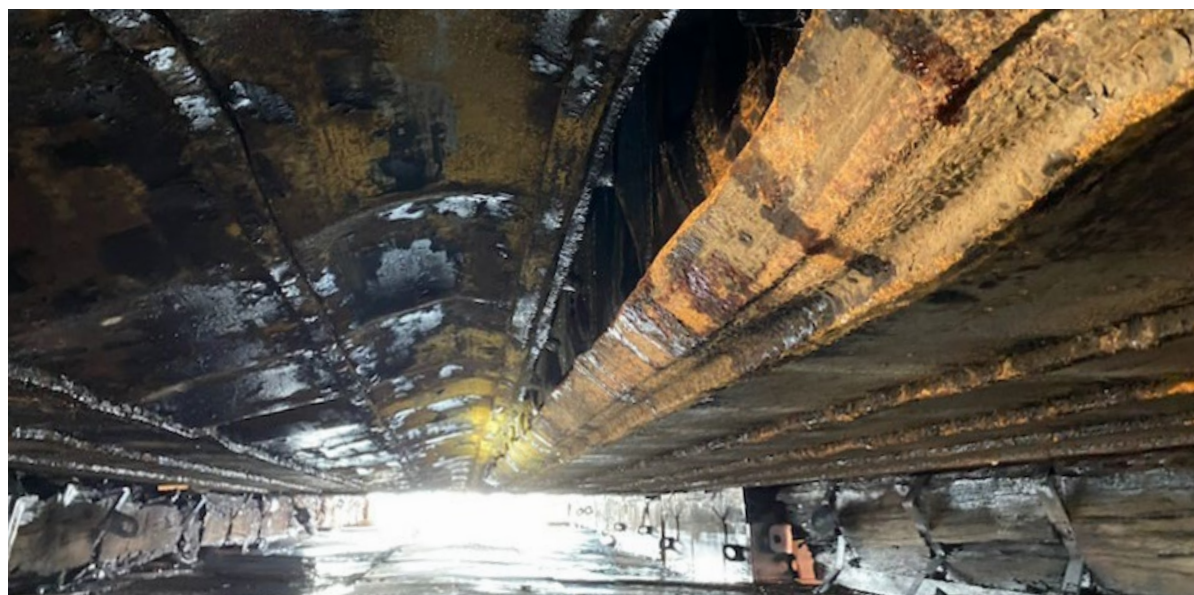
BACKGROUND SOURCE: CORPS OF ENGINEERS CHART U37UM000 AS VIEWED ON ROSE POINT.

The *City of Louisville* was required to be fitted with a pilothouse alerter system, which was designed to detect when an operator became incapacitated while underway. When underway, if the rudder levers were not moved within a specified interval of time, an audible alarm would sound in the wheelhouse. If the operator did not reset the alarm by moving the rudder levers, an alarm would sound in other vessel spaces to alert other crewmembers that the operator was not responding.

Investigators found, several weeks after the grounding, that the system's power supply was missing, but they could not determine when it had been disconnected. Investigators were also not able to determine the interval that the alarm was set for (how long the operator could not move the rudder levers before the first alarm would sound in the wheelhouse). The secondary alarm did not sound in the relief captain's stateroom or the crew lounge before the grounding. Therefore, given the pilot's estimate that

he was away from the helm for 5 minutes, the system either had a time interval to alarm set to greater than 5 minutes or was nonoperational.

THE PROBABLE CAUSE of the grounding of the *City of Louisville* was the pilot leaving the helm unattended while operating his tow on the Mississippi River.



The aft portside (looking forward) bottom shell plating damage of the *City of Louisville*, shown in dry dock.

SOURCE: COAST GUARD.

LESSONS LEARNED

USING PILOTHOUSE ALERTER SYSTEMS

A pilothouse alerter, when used as intended, is an effective tool that can help ensure a towing vessel operator remains awake and vigilant while on duty (and notify another crewmember if the pilothouse alarm is not acknowledged). Established procedures for the operation and use of the system should be outlined in the company SMS and should include the time interval for reset of the alerter system, which should be set based on the vessel's navigational risk and proximity to navigational hazards (including traffic), as well as measures to ensure the system cannot be unintentionally reset.

GROUNDING/STRANDING

Grounding of
Towing Vessel
Tom Frazier

VESSEL GROUP

Towing/Barge

LOCATION

Ohio River, mile 355.1, Portsmouth, Ohio

CASUALTY DATE

February 10, 2024

ACCIDENT ID

DCA24FM024

INJURIES

None

ESTIMATED DAMAGES

\$258,737

REPORT NUMBER

MIR-25-23

ISSUED

June 11, 2025



The *Tom Frazier* underway in 2008.

SOURCE: BILLY SMITH, MARINETRAFFIC.COM.



The *Tom Frazier* aground. SOURCE: COAST GUARD.

On February 10, 2024, about 1855 local time, the towing vessel *Tom Frazier* was pushing 15 empty hopper barges upbound on the Ohio River, near Portsmouth, Ohio, when the vessel grounded on a submerged jetty while maneuvering to meet a downbound tow. The nine crewmembers aboard the towboat were safely evacuated to shore. There were no injuries. An estimated 5 gallons of oil were released from the *Tom Frazier*. Damage to the vessel was \$258,737.

The 136-foot-long towing vessel *Tom Frazier* and its tow of 15 barges—arranged in three strings of five barges each—had departed Cairo, Illinois, 8 days earlier, en route to South Point, Ohio, upbound on the Ohio River, with a crew of nine.

On February 10, at 1830, the tow approached Portsmouth, in darkness. Upbound vessels had to transit through two bridges connecting Portsmouth and Greenup County, Kentucky, coming out of the 90° bend in the Ohio River near Portsmouth: the Carl D. Perkins Bridge at mile 356.8 and the U.S. Grant Highway Bridge at mile 355.5.

At 1838, with the captain at the helm, the *Tom Frazier* successfully transited through the

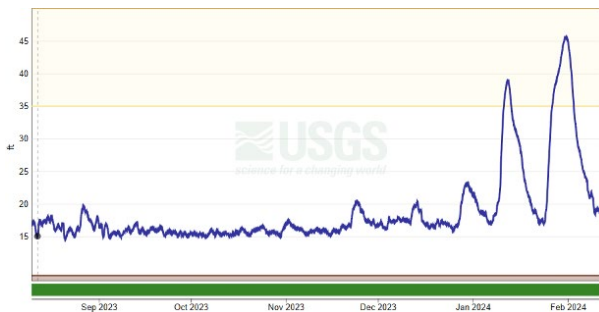
Carl D. Perkins Bridge. As the 15-barge *Tom Frazier* tow approached the U.S. Grant Bridge, the captain made passing arrangements with the larger, downbound *Debi Sharp* tow; they agreed to a starboard-to-starboard passing. As the upbound tow transited through the bridge, the captain maneuvered the tow to port toward the right descending bank to facilitate the passing, as was common for upbound vessels meeting downbound vessels in this area. However, the captain maneuvered the tow so that it passed very close to the right descending bank, outside the charted 9-foot-depth contour line.

Two stone jetties that extended about 55 feet out from the bank were on the right descending bank about 0.5 miles upriver from the bridge. At the time of the casualty, the river level was 19.2 feet (at the Portsmouth gage, about 0.4 miles downstream from the jetties), and the jetties were submerged. Given the nighttime conditions and water level, the jetties would not have been visible. Although the jetties were charted on ENCs and thus were visible on the *Tom Frazier*'s ECS, the captain did not identify the hazard ahead as he maneuvered the vessel toward the bank to make room for the downbound tow. The empty barges

passed over the jetties, but the *Tom Frazier* grounded on them, puncturing the bottom plating and flooding a forward compartment.

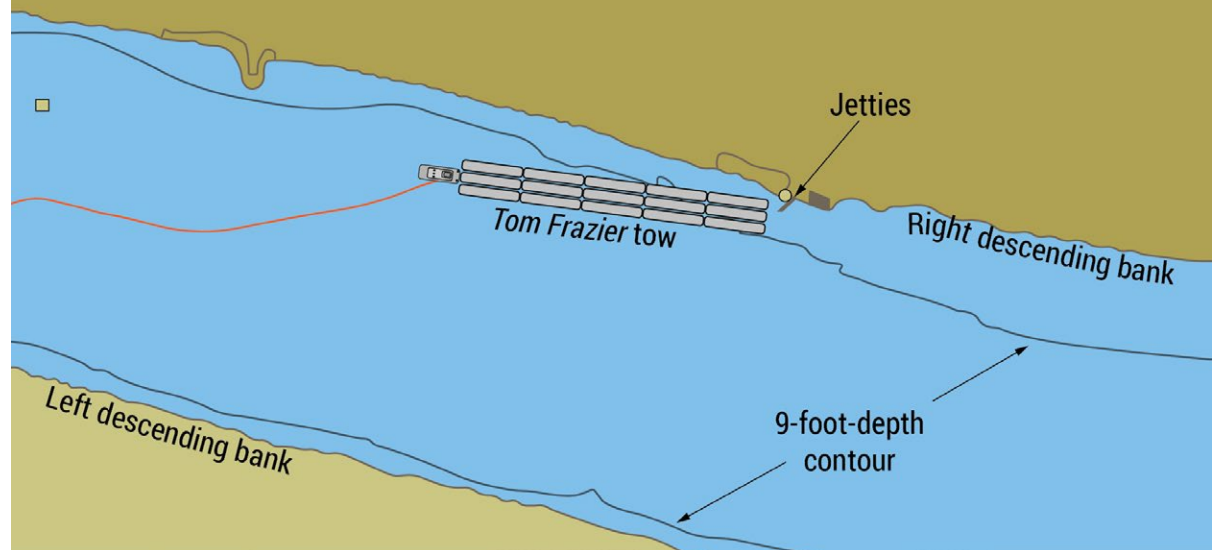
The *Tom Frazier* began listing to starboard, and the engine room flooded. The captain of the *Tom Frazier* notified Coast Guard Sector Ohio Valley via VHF radio. Local first responders, individuals ashore, and crews from nearby vessels evacuated the crew to shore. The *Tom Frazier* tow was transferred to another towing vessel, and the *Tom Frazier* remained aground until salvors, aided by rising water levels, freed the vessel on February 13 (3 days later).

THE PROBABLE CAUSE of the grounding of the towing vessel *Tom Frazier* on submerged jetties was the captain maneuvering his tow too close to the bank in order to avoid a downbound tow, and not identifying the hazard posed by the charted jetties.



Ohio River water levels at Portsmouth between August 10, 2023, and February 11, 2024.

SOURCE: USGS.



Re-creation of ENC showing stone jetties, with *Tom Frazier* tow arrangement and trackline overlaid.

BACKGROUND SOURCE: NOAA ENC U370H332; TRACKLINE SOURCE: *TOM FRAZIER* AIS.



Trackline of *Tom Frazier* tow as the vessel transited through the U.S. Grant Bridge and toward the right descending bank. Inset satellite photos show the jetties visible on January 26, 2022 (17.4 to 18.5 feet at the Portsmouth gage) and submerged on February 14, 2024 (28.7 to 31.6 feet at the Portsmouth gage).

BACKGROUND SOURCE: GOOGLE EARTH. TRACKLINE SOURCE: *TOM FRAZIER* AIS. GAGE DATA: USGS.

GROUNDING/STRANDING

Grounding of
Recreational Vessel
6 Saturdays

VESSEL GROUP	
Yacht/Boat	
LOCATION	
St. Augustine Inlet, St. Augustine, Florida	
CASUALTY DATE	ACCIDENT ID
June 19, 2024	DCA24FM048
INJURIES	ESTIMATED DAMAGES
None	\$1 million
REPORT NUMBER	ISSUED
MIR-25-30	July 22, 2025



6 Saturdays in the boatyard after the grounding, on November 22, 2024.
SOURCE: BILLY SMITH, MARINETRAFFIC.COM.



The 6 Saturdays as viewed from the St. Johns County Sheriff’s Office helicopter at 1546.
SOURCE: ST. JOHNS COUNTY SHERIFF’S OFFICE.

On June 19, 2024, about 1517 local time, the recreational vessel **6 Saturdays** grounded near the St. Augustine Inlet entrance, near St. Augustine, Florida. After the grounding, the captain maneuvered the vessel into deeper water, where it partially sank and was later salvaged. The captain and one passenger on board subsequently abandoned the vessel and were rescued by local first responder marine units. There were no injuries, and no pollution was reported. Damage to the vessel was estimated at \$1 million.

Earlier that day, about 0840, the 55-foot-long, Florida-registered **6 Saturdays** departed a marina at Hilton Head, South Carolina, and headed into the North Atlantic Ocean, southbound toward the St. Augustine Inlet. The boat had a draft of about 4 feet. According to the vessel’s AIS data, at 1459, when it was about 2.5 nautical miles northeast of the St. Augustine Inlet, the **6 Saturdays** began to turn to the southwest from a southerly course toward the inlet

at a speed of 26 knots. Over the next 16 minutes, the vessel changed speed and heading multiple times as it approached the inlet.

About 1515, the **6 Saturdays** transited into an area with charted water depths that ranged from 0 to 5.9 feet. Just after 1517, at a speed of 15 knots, the **6 Saturdays** grounded and came to an abrupt stop about 0.2 nautical miles east of the beach on the shoals at the north side of the inlet.

A St. Johns County marine operations unit first responder who was near the St. Augustine Inlet witnessed the **6 Saturdays** run aground. He called St. Johns County dispatch and requested a full response to the location of the grounding for a possible rescue of the vessel occupants.

The captain said that, after the vessel grounded, there were 4- to 5-foot swells and an easterly wind that pushed the vessel toward the shore. He also noted that the stern was submerged in the water, the bow was up,

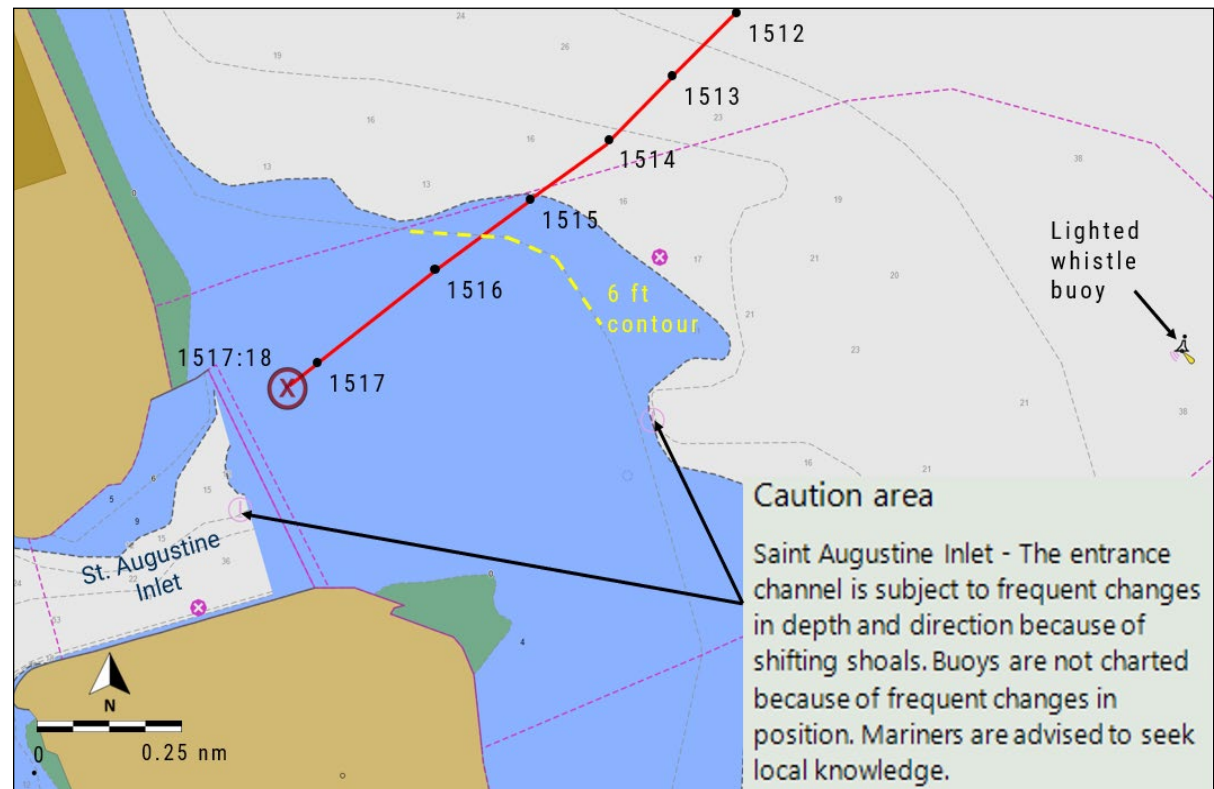
and the boat was taking on water.

The **6 Saturdays** had lost propulsion to both of its forward-facing, twin-counter-rotating propellers, which were mounted on pods under the hull. The captain was able to get one propulsion pod running and activated the bow thruster to turn the bow of the **6 Saturdays** into the waves in an attempt to stop the water from washing over the stern. With one propulsion pod, which he described as making a "really loud noise," available for use, at 1526, the captain got the vessel underway in a northeasterly direction away from the inlet at a speed of about 7 knots.

The captain said that about 2 minutes later, at 1528, the boat's bilge level alarms started going off. Although all bilge pumps had been started, they could not keep up with the flooding, and the vessel began to sink by the stern. The captain and passenger abandoned the vessel and were rescued by first responders.

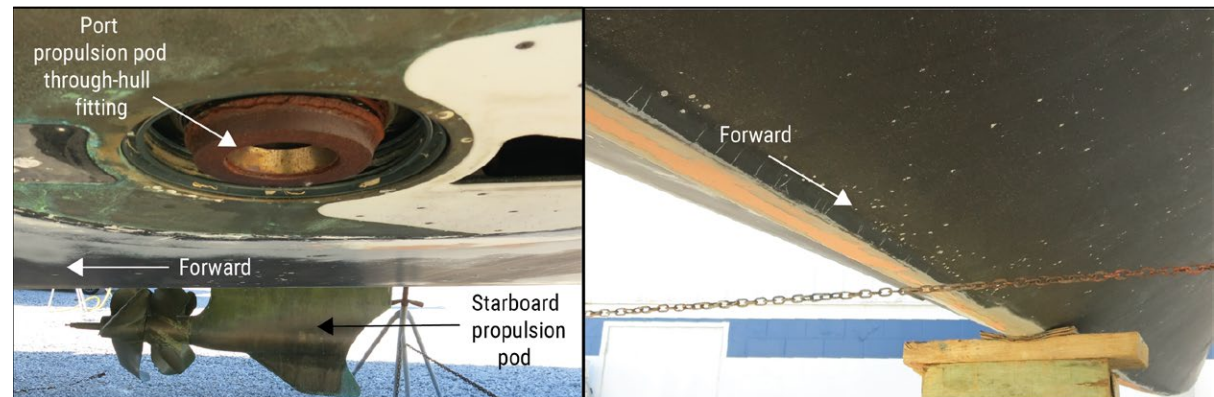
The navigation chart for the area where the grounding occurred contained a cautionary note warning of frequent changes in depth due to shifting shoals. Additionally, the *US Coast Pilot* warned of dangerous and shifting shoals extending 1 nautical mile seaward. Although the captain of the **6 Saturdays** said he had operated vessels many times through the St. Augustine Inlet, he was unaware of the shoaling and published cautions and warnings. The captain did not navigate the vessel to the lighted whistle buoy off the entrance of the inlet to follow the buoyed channel inward, which would have kept the vessel in safe water. Instead, he proceeded directly through the shoal water at a speed of about 15 knots. The captain's decision to navigate the vessel through shoal water with charted depths that were likely less than the vessel's draft led to the vessel's grounding.

THE PROBABLE CAUSE of the grounding of the recreational vessel **6 Saturdays** was the captain's decision to navigate through an area known to have shoals instead of the buoyed entrance channel marking the safe navigation passage into the St. Augustine Inlet.



ENC with the positions and track of the 6 Saturdays up to the grounding location, and caution area inset.

BACKGROUND SOURCE: NOAA ENC US5FL7RG.



From left: Aft bottom of the 6 Saturdays, including the through-hull fitting for the missing port propulsion pod and damage to the propeller blades of the starboard propulsion pod. Scratch mark damage to the keel.

GROUNDING/STRANDING

Grounding of Barge
Cordova Provider

VESSEL GROUP

Towing/Barge

LOCATION

Axel Lind Island, Alaska

CASUALTY DATE

January 11, 2025

ACCIDENT ID

DCA25FM017

INJURIES

None

ESTIMATED DAMAGES

\$2.9 million

REPORT NUMBER

MIR-25-32

ISSUED

August 6, 2025



The integrated tug and barge *Krystal Sea* and *Cordova Provider* in 2013, before the grounding.



The *Cordova Provider* aground on the rocks at Axel Lind Island on January 14, 2025. SOURCE: CORDOVA PROVIDER LLC.

On January 11, 2025, at 0250 local time, the ITB *Krystal Sea/Cordova Provider* was transiting Prince William Sound when the four lines connecting the tug to the barge parted, causing the barge to uncouple from the tug. The barge drifted, eventually grounding on the coast of Axel Lind Island, Alaska, about 0635. There were no injuries, and no pollution was reported. The barge *Cordova Provider*, valued at \$2.9 million, was declared a constructive total loss by the vessel's owner. The *Krystal Sea* was not damaged.

The previous day, at 0717, the 260-foot-long ITB *Krystal Sea/Cordova Provider* departed Valdez with a crew of four, including the captain, mate, and two deckhands. Before getting underway, no discrepancies were noted with the lines, and the lines were properly rigged. The ITB docked in Cordova at 2013, and workers offloaded cargo. After the cargo operations were completed, the ITB departed at 2110, with the captain at the helm, to cross Prince William Sound for Whittier, Alaska.

The forecast for the transit at the time of departure predicted wind from the southeast at 45 knots with seas at 6 feet, increasing to 10 feet after midnight. At 2350, when the captain turned

over the watch to the mate, the weather conditions near Red Head Point included wind from the east at 35 knots and seas at 3 feet. The ITB passed Red Head Point at 0001.

At 0200, the seas were 4–6 feet as the vessel proceeded across Prince William Sound with the wind and waves on the vessel's port quarter. While the ITB was transiting, one of the four push lines securing the tug to the barge parted. Shortly after the parting of the first line, the remaining three push lines also parted. The barge *Cordova Provider* separated from the tug *Krystal Sea* and eventually grounded on Axel Lind Island.

When the lines parted, weather conditions were similar to those that the vessel regularly encountered on its normal transit route. Since it was nighttime when the incident occurred, the mate and crewmember in the wheelhouse did not see what caused the lines to part or which line parted first. Five days before the casualty, the captain visually inspected the four push lines and noted no deficiencies. A postcasualty visual inspection of the recovered lines by a technician from a local industrial and maritime supply company found that the lines were in fair condition with no visible deficiencies and determined that all the push lines and

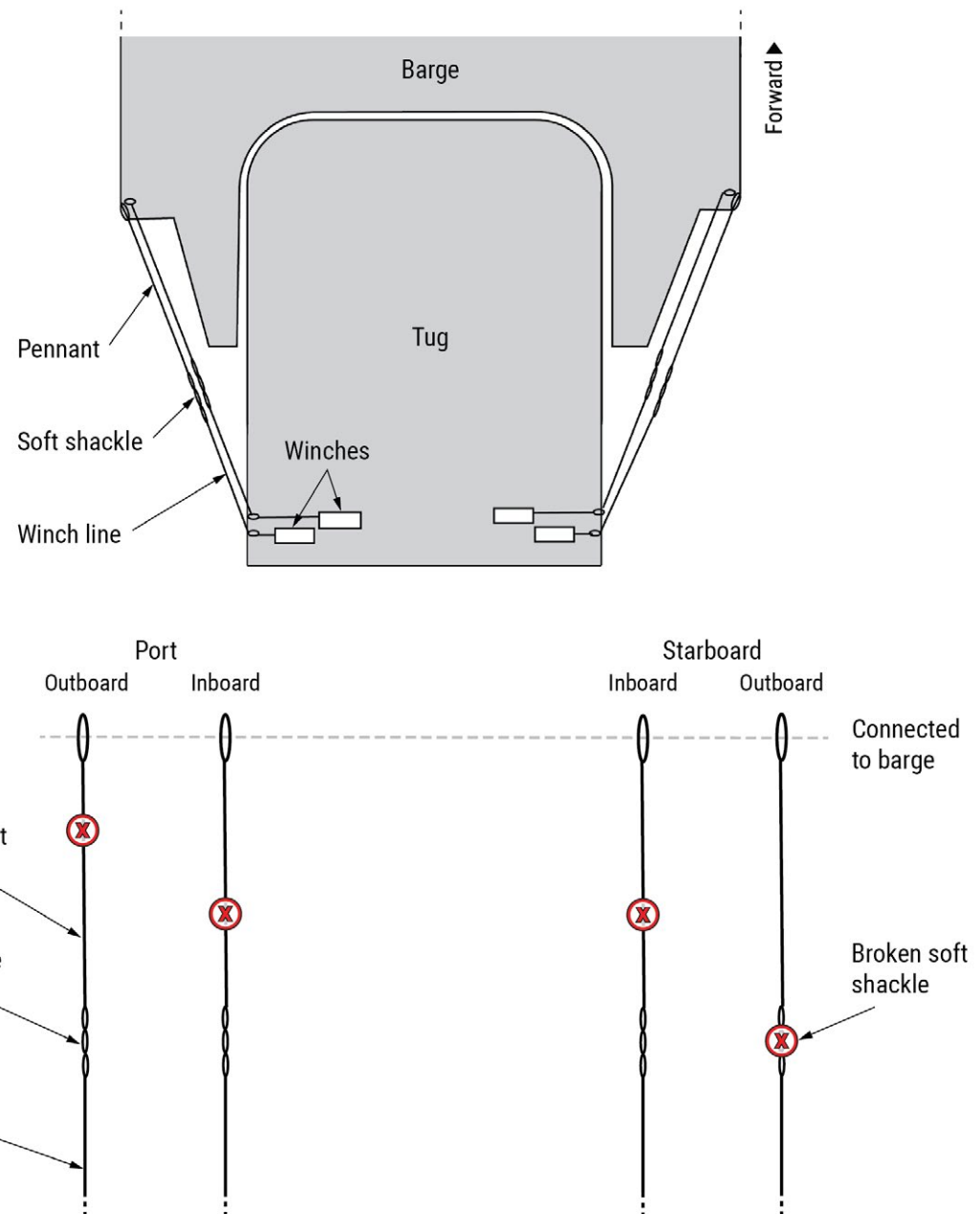
the soft shackle parted due to the lines exceeding their breaking strength, likely due to shock loading. Given that the ITB was in regularly encountered conditions and the lines were reported as properly rigged, it is undetermined how the first push line that parted was shock loaded. Once the first push line parted, this likely began a cascading failure as the remaining three push lines took up the additional strain.

THE PROBABLE CAUSE of the grounding of the barge *Cordova Provider* was due to shock loading that led to the parting of the push lines connecting the *Cordova Provider* to the tug *Krystal Sea*.



The recovered pennant section of the port outboard and starboard inboard push lines, postcasualty.

SOURCE: CORDOVA PROVIDER LLC.



From top: Simplified plan view of the ITB, showing the makeup, arrangement, and location of the push lines connecting the tug to the barge (scale approximate); and diagram showing, with a red X, where each of the push lines parted. BACKGROUND SOURCE: BERING MARINE CORP (TOP), CORDOVA PROVIDER LLC (BOTTOM).

GROUNDING/STRANDING

Grounding of the Towing Vessel *John M Donnelly*

VESSEL GROUP

Towing/Barge

LOCATION

Lower Mississippi River, mile 246.5, near Baton Rouge, Louisiana

CASUALTY DATE	ACCIDENT ID
October 30, 2023	DCA24FM007
INJURIES	ESTIMATED DAMAGES
1 minor	\$505,834
REPORT NUMBER	ISSUED
MIR-25-37	October 10, 2025



John M Donnelly in 2022. SOURCE: GREG MILLIKEN.



Bottom plating near the bow of the *John M Donnelly* that was inset when the vessel grounded.

SOURCE: BUDWINE AND ASSOCIATES, LLC.

On October 30, 2023, at 1610 local time, the towing vessel *John M Donnelly* was pushing 25 empty dry cargo barges upbound at mile 246.5 on the Lower Mississippi River, near Baton Rouge, Louisiana, when it grounded on a submerged obstruction. One crewmember sustained a minor injury. No pollution was reported. The cost of damage to the vessel was \$505,834.

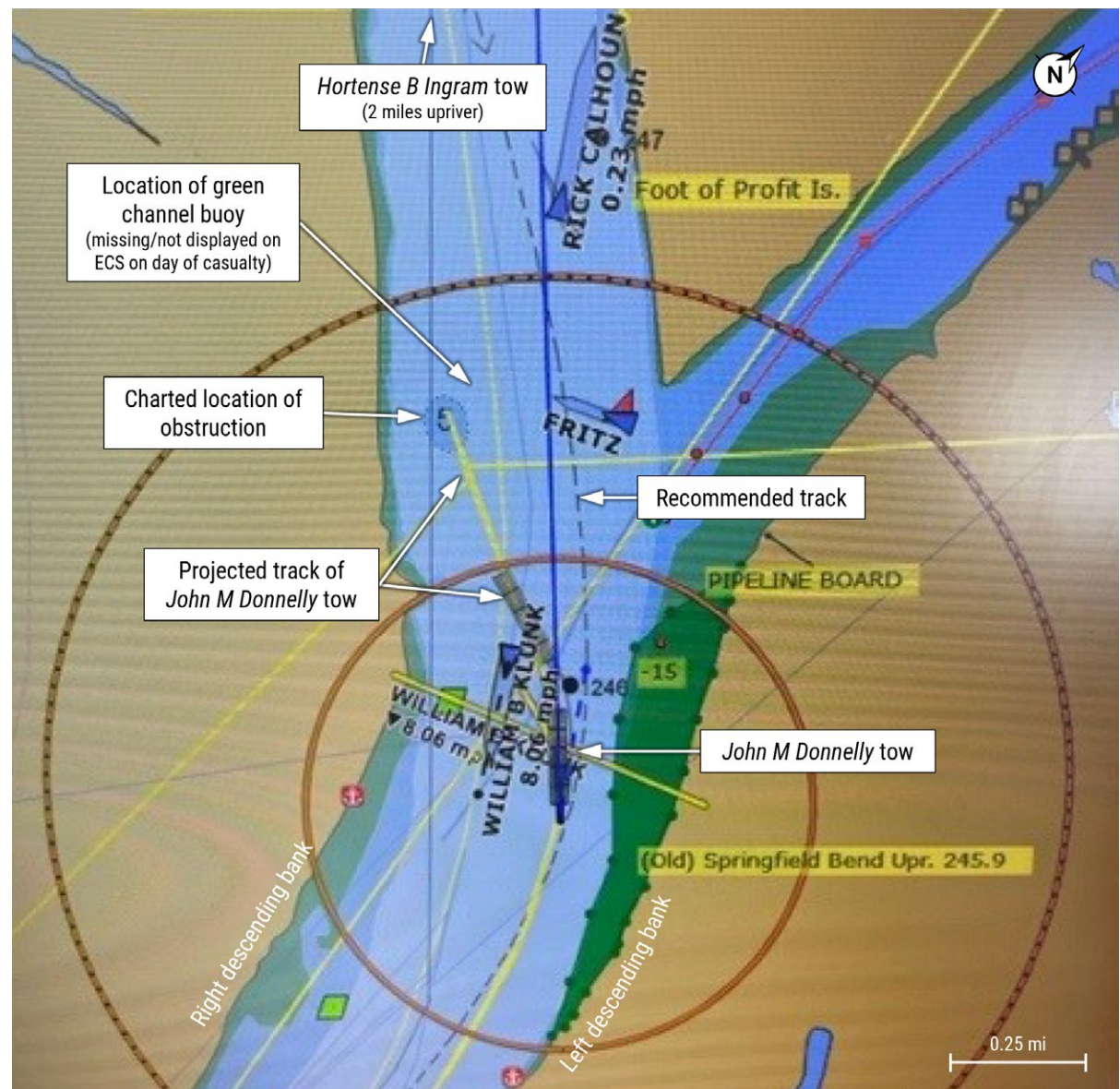
Earlier that afternoon, the 186-foot-long, steel-hulled towing vessel *John M Donnelly* was pushing the tow (five strings of five barges) upbound on the Lower Mississippi River. At 1545, the *John M Donnelly* pilot began maneuvering the tow around Springfield Bend, a turn in the river about 5 miles north of Baton Rouge, Louisiana. Through the turn, the tow transited closer to the left descending bank at a speed of 9 miles per hour, generally following the “recommended track” (sailing line) shown on the

IENC and displayed on the vessel’s ECS. Near the end of the bend, the *John M Donnelly* tow met the downbound *William B Klunk* tow, and the two tows passed port to port at mile 245 on the river. As the tow approached Profit Island, the *Rick Calhoun* and *Fritz* tows were stopped on the left descending bank awaiting the passage of the downbound *Hortense B Ingram* tow. To pass the stopped tows and meet the *Hortense B Ingram* tow starboard to starboard, the *John M Donnelly* pilot maneuvered the tow across the channel near the right descending bank. As the tow crossed the channel, it moved away from the recommended track shown on the IENC. Given the historically low water levels in the Mississippi River, the pilot should have exercised caution as the tow approached the bank. A submerged obstruction was located 600 feet from the bank at mile 246.5. The IENC showed the

obstruction as an area of shallow water 5 feet deep. On October 30, the USGS river gage at Baton Rouge measured a height of 5.3 feet. Based on the charted depth of the obstruction and the water level recorded at the USGS river gage, the depth at the site at the time of the grounding was likely about 7.8 feet. As the *John M Donnelly* approached the right descending bank, the tow crossed over the obstruction. None of the empty barges contacted the obstruction, but the *John M Donnelly*, with its 9.5-foot draft, struck it, bringing the tow to a stop.

The green buoy marking the edge of the channel near the obstruction was missing at the time of the grounding. Additionally, the buoy was not shown on the *John M Donnelly*'s ECS display when investigators replayed the casualty event on the system. However, the location of the obstruction was visible as an area of shallow water on the *John M Donnelly*'s ECS. The pilot did not identify the hazard ahead as he maneuvered the tow toward the bank to make room for the stopped and downbound tows, resulting in the grounding.

THE PROBABLE CAUSE of the grounding of the towing vessel *John M Donnelly* on a submerged obstruction in the Mississippi River was the pilot not identifying the hazard posed by the charted obstruction during low water conditions while maneuvering his tow to avoid other tows.



Screen capture from replay of *John M Donnelly* Rose Point ECS at 1604:25 on October 30, 2023, 3.5 minutes before the towing vessel grounded. BACKGROUND SOURCE: COAST GUARD.

MACHINERY DAMAGE

Diesel Generator Engine Failure aboard Passenger Vessel *Ocean Navigator*

VESSEL GROUP

Passenger

LOCATION

Ocean Gateway Terminal, Pier 2B, Portland, Maine

CASUALTY DATE

October 18, 2023

ACCIDENT ID

DCA24FM004

INJURIES

1 serious

ESTIMATED DAMAGES

\$2.4 million

REPORT NUMBER

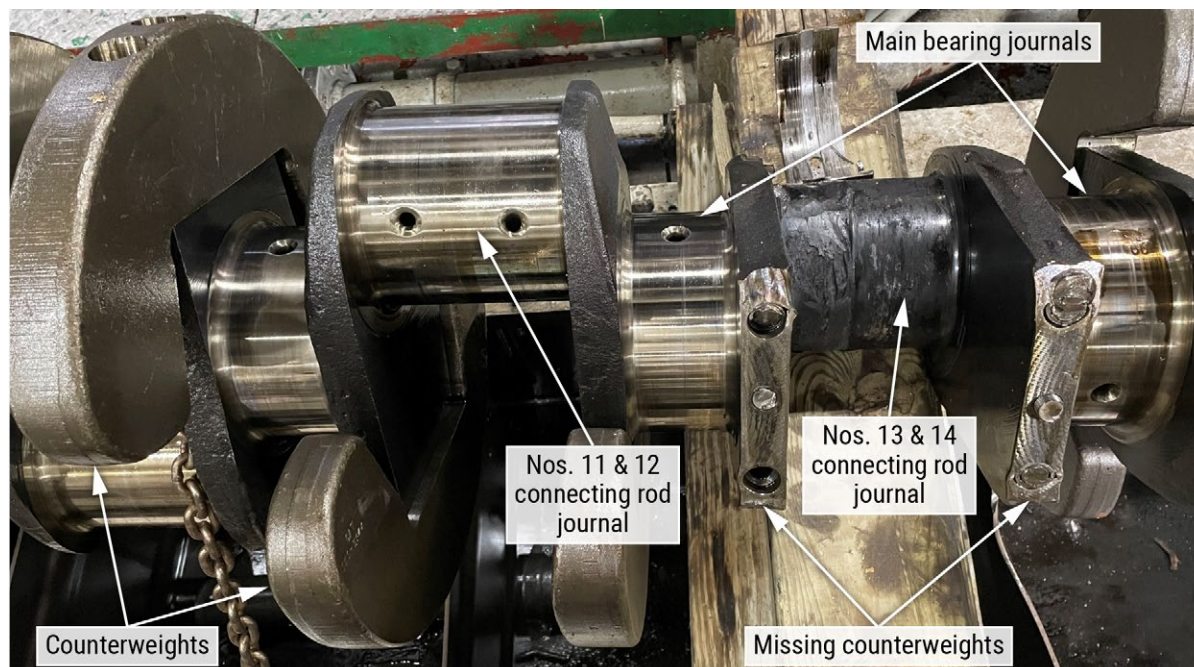
MIR-25-13

ISSUED

April 2, 2025



Ocean Navigator docked in Portland, Maine, on October 19, 2023, after the fire.



Removed crankshaft from damaged no. 2 auxiliary generator on board *Ocean Navigator* after the engine failure.

On October 18, 2023, about 0710, the 300-foot-long coastal cruise ship *Ocean Navigator* was moored at the Ocean Gateway Terminal in Portland, Maine, with 210 persons aboard when the no. 2 auxiliary diesel generator engine suffered a mechanical failure. The failure led to the ejection of components from the engine and resulted in a fire in the engine room. Crewmembers secured ventilation to the engine room, and the fire self-extinguished. One crewmember near the engine at the time of the failure was seriously injured. No passengers were injured, and no pollution was reported. Damage to the vessel was estimated at \$2.4 million.

After the fire, third-party technicians disassembled all components from the no. 2 auxiliary engine and found the crankshaft, several main bearings, connecting rod bearings, and the no. 14 fuel injector to be damaged. Factory-trained representatives from the engine's manufacturer inspected the components and noted abnormal wear on the connecting rod

bearings and main bearings, which showed signs of cavitation erosion (some considered excessive) and bearing damage from debris, indicating debris had been introduced at some point into the lube oil system. Because pre- and postcasualty lube oil analysis indicated the lube oil was suitable for further service, it is unclear how debris initially entered the lube oil system of the engine. However, it is likely that the debris entrained in the lube oil system of the no. 2 auxiliary engine led to the catastrophic damage to the engine. The no. 13 connecting rod disconnected, and parts from the disconnected connecting rod collided chaotically as the crankshaft continued to turn, damaging other engine components until a portion of the no. 13 connecting rod or other internal components ruptured the engine block near the nos. 12 and 14 cylinders. As a result of the block rupturing, hot, atomized lube oil vented through the damaged inspection covers and ignited off hot components internal to the engine.



Damaged no. 2 auxiliary generator aboard *Ocean Navigator* after the engine failure. The circled area identifies the location of the engine block damage.

The engineering logbooks for the vessel showed that, in the 2 months before the engine failure, crewmembers added lube oil to the no. 2 auxiliary engine (37 gallons in September and 42 gallons in October). In comparison, the crew added only about 5 gallons of lube oil to the no. 1 auxiliary engine, which operated at the same rpm and with similar load conditions. They also did not add oil to either of the main engines. The need to add significantly more lube oil to replenish the consumed oil in the no. 2 auxiliary engine indicated that there was likely an issue within the no. 2 auxiliary engine—either the engine was burning lube oil or the lube oil purifier was removing a larger quantity of contaminated oil during the purification process.

The crew had last changed the entire quantity of lube oil for the no. 2 auxiliary engine in September 2022—about 13 months before the engine failure—but the engine had operated more than 5,000 hours with this lube oil in the engine, exceeding the manufacturer's recommendation by 5 times. Contaminants, such as debris and chemical corrosives, entrained in the lube oil

would have been likely to accumulate—diminishing the lubrication quality—and the effectiveness of additives in the lube oil would have been reduced—diminishing the performance of the lube oil.

Additionally, the crew had last changed the lube oil filter elements in May 2023, when the engine had about 11,000 hours on it. The engine manufacturer provided guidance for the lube oil filter elements to be replaced at every oil change or after the filter elements had been used for 1,000 hours. At the time of the engine failure, the engine had about 14,329 hours on it, indicating the filters had been used for 3,329 hours, exceeding the manufacturer's recommendation by over 3 times.

The use of a filter beyond the manufacturer's recommended replacement guidance can result in a clogged filter, making the filter less effective than intended. If a filter is clogged, the filter's bypass valve will remain open, preventing the lube oil from passing through the element, and any debris particles entrained in the oil will flow directly into the engine and remain circulating in the lube oil system.

THE PROBABLE CAUSE of the failure of the no. 2 auxiliary diesel generator engine and resulting engine room fire on board the passenger vessel *Ocean Navigator* was debris entrained in the engine's lube oil system—possibly due to the crew exceeding manufacturer-recommended intervals for changing the lube oil and oil filter elements—which caused catastrophic mechanical damage to the engine.

LESSONS LEARNED

CONTAINING ENGINE ROOM FIRES

Engine rooms contain multiple fuel sources as well as mechanical ventilation, making the spaces especially vulnerable to rapidly spreading fires. After an engine room fire ignites, it is imperative to remove the sources of available fuel and ventilation to the fire to prevent it from spreading. In the engine room fire aboard the *Ocean Navigator*, the crew's quick action to secure engine room ventilation and engine fuel sources prevented the spread of fire and ultimately resulted in the fire self-extinguishing. Vessel crews should familiarize themselves and train frequently on machinery, fuel oil, lube oil, and ventilation shutoff systems to quickly act to contain and suppress engine room fires before they can spread to other spaces.

ADHERING TO MANUFACTURER'S RECOMMENDED MAINTENANCE PROCEDURES AND INTERVALS

Manufacturers provide maintenance recommendations and intervals (schedules) to ensure equipment operates safely, optimally, and reliably throughout its service life. By regularly reviewing equipment manufacturer manuals and guidance, operators can ensure conformance with recommended maintenance plans and mitigate the risk of equipment malfunction or failure.

SHIP/EQUIPMENT/CARGO DAMAGE

Container Loss
aboard Containership
President Eisenhower

VESSEL GROUP

Cargo, General

LOCATION

Pacific Ocean, 94 nm south of Oakland, California

CASUALTY DATE

February 6, 2024

ACCIDENT ID

DCA24FM023

INJURIES

None

ESTIMATED DAMAGES

\$735,000

REPORT NUMBER

MIR-25-06

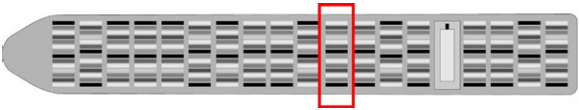
ISSUED

January 30, 2025



President Eisenhower underway at unknown date before the container loss.

SOURCE: BAR PILOT, MARINETRAFFIC.COM.



Simplified plan view of the *President Eisenhower*; a rectangle shows the approximate location of bay 42.



Area of the container collapse in bay 42 on the port side of the *President Eisenhower* and closer view of the collapsed containers. SOURCE: COAST GUARD.

On February 6, 2024, about 2135 local time, the US-flagged containership *President Eisenhower* was drifting about 94 nautical miles south of Oakland, California, while awaiting a berthing assignment, when the crew discovered that 23 shipping containers had been lost overboard. None of the lost containers carried hazardous materials. There were no injuries, and no pollution was reported. Damage to the containership and the value of the lost cargo was estimated to exceed \$735,000.

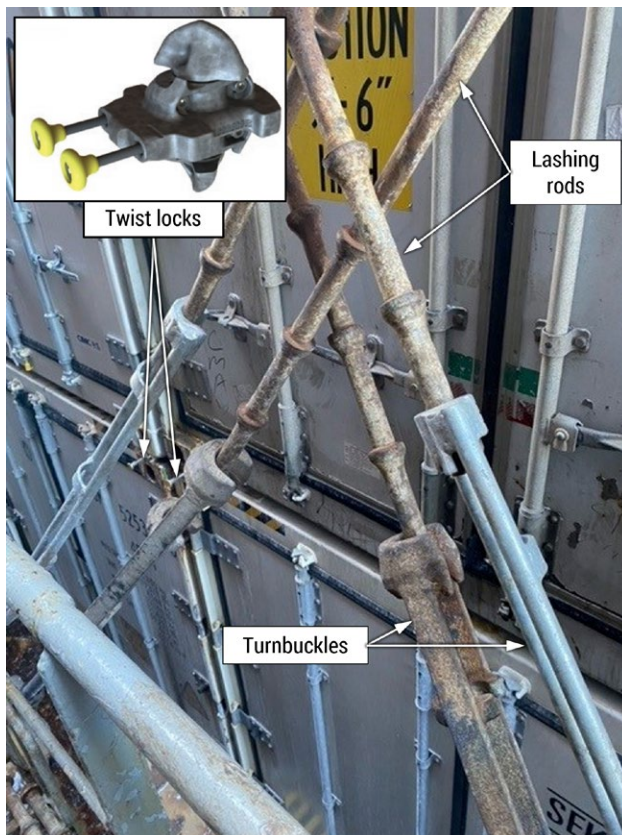
About a week earlier, on January 31, the 984-foot-long *President Eisenhower* arrived in Los Angeles, California. Over the next 2 days, longshoremen loaded containers in 16 of the containership’s 18 bays, using lashing rods, turnbuckles, and twist locks to secure the containers.

Longshoremen loaded containers in accordance with a cargo loading plan developed by ship planners using the VGM of each container provided by the booking agent. However, after the casualty, the booking agent found that an administrative error—

wherein the cargo weights for 39 containers were inputted incorrectly—resulted in the VGMs for those 39 containers being significantly underreported on the cargo loading plan (after the casualty, the booking agent modified their procedures and booking system to prevent this type of input error from occurring in the future). The actual VGM for the 39 containers was 18.3 to 22.2 metric tons greater than the VGM used to develop the cargo loading plan. Of these 39 containers, 20 were loaded in stacks on the hatch covers in bay 42.

The stack weights in bay 42 exceeded the company cargo securing manual’s allowance, and the forces acting on both the containers and the cargo-securing equipment were greater than what was expected. Additionally, because the container VGMs were incorrect on the cargo loading plan, the container stacks on the port side of bay 42 were inadvertently arranged with heavier containers in the upper tiers and progressively lighter containers toward the bottom tiers—an arrangement called reverse stratification. This arrangement resulted in the stacks having a

higher center of gravity. The cargo-securing equipment (twist locks and lashings) on a reverse-stratified container stack would be subjected to increased forces from vessel motion while underway at sea. Therefore, the loading of containers in overweight and reverse-stratified stacks in bay 42 increased the likelihood of a cargo-securing equipment failure.



Intact lashings (lashing rods and turnbuckles) and twist locks on *President Eisenhower* after the casualty. Inset shows an exemplar twist lock.

BACKGROUND SOURCES: COAST GUARD, MACGREGOR.

The VGM of the containers was not verified at the terminal, and there were no issues during the loading operations. Once cargo operations were completed on February 3, the recorded drafts were within 0.2 meters (0.7 feet) of acceptable variance, or "correction factor,"

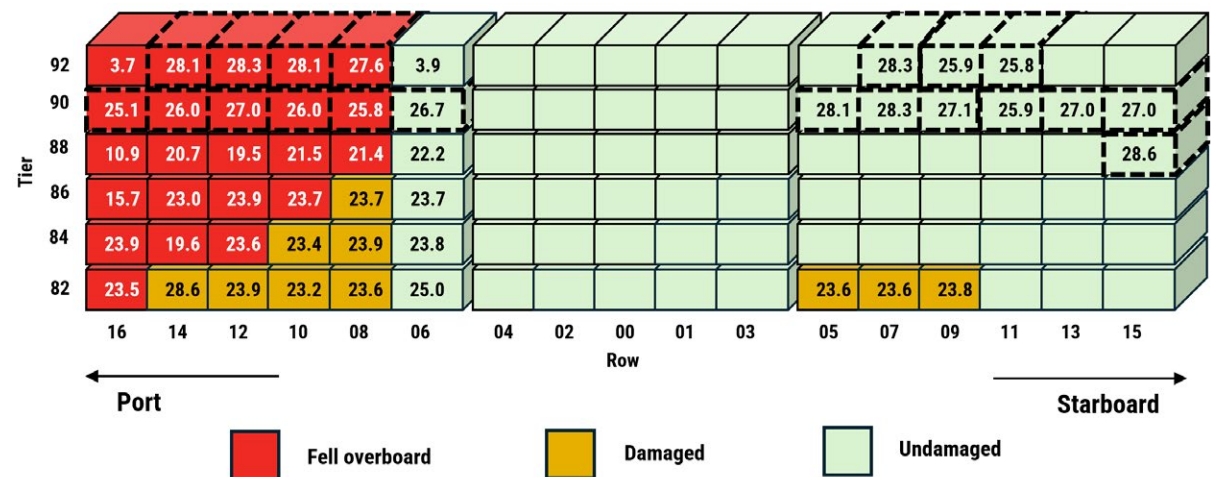
when compared to the calculated draft in the cargo loading and stability software. As such, there were no indications that the container stacks in bay 42 were overweight during loading operations or while the crew prepared to depart from Los Angeles.

At 0525, the *President Eisenhower* got underway en route to Oakland. The vessel successfully transited over the next few days without issue. On February 6, about 1000, when the vessel was about 75 nautical miles away from the Port of Oakland, a crewmember inspected the containers' lashings and found nothing amiss. However, later that day, at 2135, a crewmember discovered that some containers were missing from the port side of bay 42.

After the casualty, the vessel operator found that the overweight and reverse-stratified container stacks exceeded the calculated "lashing forces," which caused the cargo-securing equipment to fail. Throughout the day leading up to the crew's discovery of the lost containers, the vessel had drifted while awaiting entrance to the Port of Oakland, and increased wind and seas caused the vessel to roll

at 18°. The 18° rolls were significantly higher than what the vessel had previously encountered on the transit (reported at a maximum 5°). A postcasualty examination by the classification society found lashing plate and socket damage, indicating that the lashings became overloaded and pulled free. The increased rolling magnitude from seas would have increased the compression forces acting on the containers within the stacks and the racking forces acting on the cargo-securing equipment until the equipment failed, resulting in the container damage and loss.

THE PROBABLE CAUSE of the container loss aboard the container ship *President Eisenhower* was the input of incorrect cargo weight for 39 containers when the cargo loading plan was developed by shoreside planners, resulting in the containers being loaded in overweight and reverse-stratified stacks, causing cargo-securing equipment to fail while the vessel was drifting.



Bay 42 container stacks showing the location of the lost and damaged containers as well as the actual, shipper-provided VGM for each container in metric tons. The containers with the incorrect VGMs on the cargo loading plan are outlined with a dashed line.

OTHER

Collapse of Chalmette Refinery Dock Section During Docking of *Ovide J* Tow

VESSEL GROUP	
Towing/Barge	
LOCATION	
Chalmette Refinery crude oil dock, Lower Mississippi River near mile 89, Chalmette, Louisiana	
CASUALTY DATE	ACCIDENT ID
April 25, 2023	DCA23FM031
INJURIES	ESTIMATED DAMAGES
None	\$7 million
REPORT NUMBER	ISSUED
MIR-25-08	February 6, 2025



Towing vessel *Ovide J* underway on unknown date before the dock collapse.
SOURCE: MICHAEL FARRELL, MARINETRAFFIC.COM.



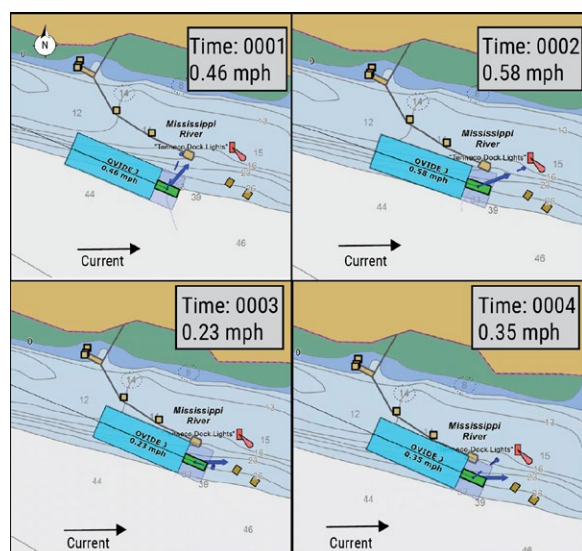
The collapsed crude oil dock, looking upriver. Inset shows the area of the dock that collapsed (circled).
SOURCES: COAST GUARD, NEARMAP.

On April 25, 2023, about 0004 local time, the towing vessel *Ovide J* was maneuvering two loaded crude oil barges to the Chalmette Refinery crude oil dock near mile 89 on the Lower Mississippi River in Chalmette, Louisiana, when the starboard barge contacted the dock, after which about 150 feet of the dock collapsed into the water. There were no injuries, and no pollution was reported. There was extensive damage to the dock’s pipelines, bridges, and pilings. The estimated cost of repairs to the dock was about \$7 million.

The experienced relief captain operating the vessel at the time had successfully docked at this location nearly 20 times that year, including earlier that week. He stated, “If I had to do it again, I would do it the same way over again. I would not change a thing.” The 76-foot-long *Ovide J*’s approach was at

a controlled speed (under 0.5 mph) and at a shallow angle. The 373-foot-long tow did not break up as a result of the contact with the transfer platform, and the onboard recording did not show any jolting movement on the towing vessel, indicating that it did not strike the dock with a large amount of force. In addition, no fendering timbers were damaged from the contact, and none of the pilings were damaged from direct contact with the starboard barge *EMS 348*.

A postcasualty survey revealed shearing of dolphin no. 3 support pilings 5 to 20 feet below the waterline. The dock settled to the riverbed, 10 feet below the river height at the time of the casualty. The transfer platform moved about 30 feet toward the shoreline and had a 10° inshore list. The elevated bridge remained connected to dolphin no. 3 but was about 17° closer to the shoreline than its original position.



The *Ovide J* tow in the minutes before it contacted the Chalmette Refinery crude oil dock. Blue vector arrows indicate the tow's direction of motion.

DATA SOURCE: *OVIDE J* AIS DATA IN ROSE POINT.

A 2017 inspection report classified several horizontal braces between dolphin no. 3 pilings as having major deterioration. The report noted that two pilings were severely deteriorated, and all no. 3 dolphin pilings were shifted toward the shoreline. A 2021 visual structural inspection of the crude oil dock identified damage and deterioration, such as disconnected joints and corrosion at the dolphin no. 3 transfer platform. The company that completed the visual inspection recommended a complete inspection. However, according to the dock owner, the recommendations had "not been progressed" as of the date the dock collapsed.

The observed deterioration to the dolphin no. 3 transfer platform before the collapse indicated that the dock's structural integrity was severely degraded. Because a portion of the dock collapsed from what appeared to be a low-impact contact during docking, it is likely that the dock's dolphin no. 3 transfer platform structure was compromised to the extent that it could not sustain the forces from a typical docking. The dock owner was aware that the dock had structural integrity

issues before the collapse but had not yet taken steps to address them. Following the dock collapse, the dock owner has begun taking measures to more closely monitor dock integrity.

THE PROBABLE CAUSE of the collapse of a section of the Chalmette Refinery crude oil dock during the docking of the *Ovide J* tow was the degraded condition of the no. 3 dolphin transfer platform structure.



Visual inspection photos from 2021 showing a lower header joint not connected to the other column and a joint starting to disconnect on the dolphin no. 3 transfer platform at the Chalmette Refinery crude oil dock.

BACKGROUND SOURCE: HOPPER ENGINEERING ASSOCIATES.

LESSONS LEARNED

MAINTAINING WATERFRONT INFRASTRUCTURE

It is important for dock owners to inspect, evaluate, maintain, and rehabilitate facilities, piers, docks, and other infrastructure to minimize the risk to the environment and the vessels that traverse the waterways. Scheduling inspections, as well as maintaining and replacing waterfront infrastructure and components, is critical to continued safe operations.

Lessons Learned

This year's investigations resulted in lessons learned—including some we have seen before—about a variety of hazards to marine transportation. **Most of the accidents we investigated were preventable.**

It is critical for owners, operators, mariners, and vessel designers to keep in mind the circumstances of accidents aboard similar vessels while reviewing their own operations. **What lessons can be learned from our investigations?**

As you review the following lessons learned, think about how each issue manifested into a safety problem and how it might apply to your operation.

By considering our lessons learned or finding your own lessons learned from the accidents we investigated, it is our hope that mariners can make changes to avoid similar accidents.

Left: Dali accident response (page 46).



Performing Maintenance Effectively

Without effective maintenance, equipment cannot be relied on to perform as designed. Manufacturers provide maintenance requirements and intervals (schedules) to ensure equipment operates safely, efficiently, and reliably throughout its service life. By regularly reviewing equipment manufacturer manuals and following their guidance, operators can mitigate the risk of equipment malfunction or failure. Additionally, correct spare or replacement parts should be ordered and installed to maintain functionality. After maintenance has been conducted on machinery, diligent inspection of the machinery, both before and immediately on restart, is critical to ensure it functions as expected and all components have been reinstalled properly.

Not following manufacturer-recommended maintenance guidance or intervals was a factor in the fires aboard the ***Ocean Navigator*** and ***Stuyvesant***, as well as the collision between the ***Jack Edwards*** and ***Julie C***. The installation of an incorrect valve in a diesel oil tank fill line led to the fire aboard the ***Stride***.

Jack Edwards
(page 16)



Effective Voyage Planning and Management

Before starting a maneuvering evolution, operators should consult appropriate resources, such as the *US Coast Pilot*, navigational charts, and notices to mariners, to assess and plan for navigation risks and hazards along the voyage route or at a mooring or anchoring location. Potential hazards include shoaling, submerged objects, or overhead obstructions for vessels with high air drafts. Throughout a voyage, maintaining an attentive lookout can ensure a mariner identifies less obvious hazards in time to avoid them. When conditions or events require deviation from the voyage, mooring, or anchoring plan, operators should utilize all available resources to determine new hazards that may impact the revised plan.

Ineffective voyage planning that did not identify the risk of overhead contact led to the contact of the ***Nickelena*** tow with a bridge. The vessel operator not identifying and avoiding a hazard—either overhead or in the waterway—while navigating a vessel was a factor in the ***6 Saturdays***, ***Atlantis***, ***Bonnie G***, ***City of Louisville***, ***Royal Engineer***, ***Tom Frazier***, ***John M Donnelly***, and ***William E Strait*** accidents.

Atlantis
(page 20)



Detecting and Containing Vessel Fires

A fire aboard a vessel is one of the most dangerous threats a mariner can face. Therefore, it is critical that mariners take steps to limit the potential consequences of a fire aboard a vessel. Installing smoke and fire detectors in all areas that are susceptible to fire and/or typically uncrewed when underway allows for the earliest detection and notification of a fire, maximizing the time for operators to respond to the fire. Once a fire is discovered, securing all sources of available fuel and ventilation to the fire can prevent it from spreading and increase the effectiveness of fixed fire extinguishing systems. Additionally, limiting the use or storage of combustible materials near heat sources, or by structurally protecting bulkheads and decks with insulation, can help control the spread of a fire.

Not installing smoke or fire detectors delayed the crew's awareness of the fires aboard the ***Tarka II*** and ***Jordyn Rose***. In the engine room fire aboard the ***Ocean Navigator***, the crew's quick action to secure engine room ventilation and engine fuel sources prevented the spread of fire and ultimately resulted in the fire self-extinguishing. Conversely, crews being unable to secure ventilation aboard the ***Grande Costa D'Avorio*** and ***Johnny M*** rendered the vessels' fixed fire extinguishing systems ineffective. Similarly, being unable to remove fuel sources and secure ventilation in the ***Three Girls*** hastened the fire's growth and spread. Combustible materials provided a path for the fires aboard the ***Lucinda Smith*** and ***Cuyahoga*** to expand.

Three Girls
(page 58)



Assessing the Condition of Waterfront Infrastructure

The operation of vessels near port and waterway infrastructure can pose increased risks and challenges to maritime safety, particularly for larger vessels with reduced maneuverability. To mitigate the risk of an accident occurring, architects and engineers of waterfront infrastructure, such as docks, piers, and bridges, must account for infrastructure's vulnerability to a marine accident and regularly reassess port vessel traffic characteristics (including size, frequency, and speed). Additionally, owners of waterfront infrastructure should regularly inspect and evaluate infrastructure to identify maintenance issues and ensure timely repairs.

The vulnerability of the Key Bridge to strike by large ocean-going vessels contributed to its collapse when the **Dali** struck it. The degraded condition of a waterfront dock led to its collapse when the **Ovide J** struck it.



Ovide J
(page 116)

Ensuring Watertight Integrity

Maintaining the watertight integrity of a vessel's hull and watertight bulkheads is a fundamental principle of safe operations on water. By conducting regular oversight and maintenance of hulls to proactively address potential hull wastage, identify watertight integrity deficiencies, and repair corrosion, vessel operators can avoid flooding or weakening of the hull. Additionally, watertight bulkheads are designed to prevent progressive flooding when portions of the hull are compromised. Therefore, any penetrations in these bulkheads must be sealed by permanent means. While a vessel is underway, closing all watertight doors helps to maintain watertight integrity and prevent progressive flooding.

Hull wastage and vessel degradation were factors in the flooding and sinking of both the **Uncle Blue** and **Cape Douglas**. A lack of watertight integrity due to unsealed bulkhead penetrations contributed to flooding in the **Uncle Blue** and **Cajole** accidents. Open watertight doors led to progressive flooding in the **Bonnie G**, **Lovebug**, and **Cape Douglas** accidents.

Uncle Blue (page 84)



Accounting for Bank Effect

Ships maneuvering in confined waters (e.g., within a channel or near a shoal) can experience hydrodynamic forces known as bank effect, which tend to push the bow away from the closest bank while pulling the stern to the bank. Shallow water exacerbates these forces on a vessel. To combat bank effect, pilots, masters, and other vessel operators should employ measures to mitigate the risk, including use of tugboats, reducing speed, or delaying the transit until more favorable conditions exist.

The pilot navigating too close to a bank and exposing the vessel to bank effect led to the **Hafnia Amessi** striking a pier. Bank effect contributed to the **Dali**'s heading tending to starboard after the vessel lost propulsion; the vessel ultimately exited the boundary of the navigable channel and struck the Francis Scott Key Bridge

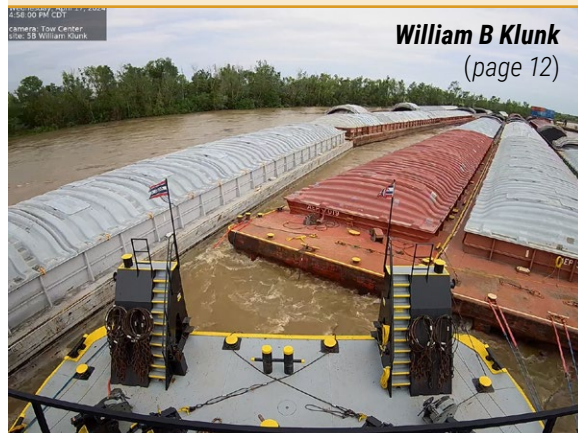


Hafnia Amessi
(page 30)

Combating Fatigue and Distraction

Maintaining alertness and vigilance while operating a vessel improves a mariner's ability to make decisions and react to emergency situations. Fatigue can impede a mariner's ability to remain alert and vigilant and increase the likelihood of errors that lead to accidents. Additionally, distraction, such as using a cell phone, can interfere with a mariner's ability to safely navigate a vessel and maintain a proper lookout. A watch alarm, or pilothouse alerter system, if used as intended, is an effective tool that can help ensure mariners remain awake and vigilant while on duty.

Fatigue contributed to the vessel operator falling asleep while navigating in the **Papa Rod/ Appaloosa** and **Schweiger** accidents. The pilot becoming distracted due to cell phone use, combined with fatigue, led to the **William B Klunk** tow colliding with moored barges. An installed pilothouse alerter system did not alarm when the pilot left the helm unattended on the **City of Louisville**.



Properly Securing and Monitoring Lithium-Ion Batteries

Lithium-ion batteries are susceptible to thermal runaway, which occurs when a damaged, overheated, defective, deep-discharged, or overcharged battery overheats and combusts. Therefore, lithium-ion battery cargoes must be properly secured to avoid cargo breakaway and damage. Additionally, batteries should be charged appropriately and monitored via a BMS to safely maintain the charge level.

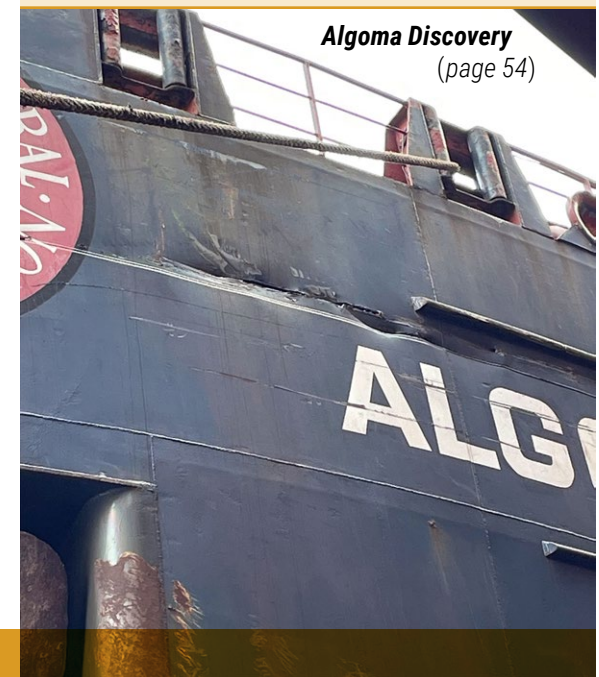
Thermal runaway of batteries due to improper charging led to the fire aboard the **Flagship**. Improper securement of battery energy storage systems resulted in their damage and thermal runaway, leading to two fires aboard the **Genius Star XI**.



Mitigating the Risks of a Loss of Electrical Power

Electrical generating system failures can result in a loss of propulsion and steering during maneuvering. Preventing this loss of propulsion and recovering vessel steering and electrical power following a blackout is critical. Testing electrical generating system components to full capacity following maintenance or repair can ensure they meet electrical demand during vessel maneuvering. Additionally, increased redundancy to maintain critical systems, such as the main engine and steering, can mitigate risks in restricted waters. The implementation of alternate measures, such as the use of assist tugs, to ensure a safe transit should be considered when electrical system failures cannot be completely resolved.

Not sufficiently evaluating and repairing the cause of a generator failure led to a loss of propulsion in the **Algoma Discovery** accident. The configuration of several of the **Dali's** systems delayed the crew's ability to recover from a blackout and maneuver the vessel as it approached a bridge.



Planning and Training for Emergencies

Mariners may face any number of emergencies while navigating a vessel, including fires; loss of electrical power, propulsion, or steering; and loss of communications. When these emergencies arise, mariners must understand how to effectively respond. Establishing emergency response procedures provides a way to account for the responsibilities of each crewmember, as well as any other personnel, aboard a vessel. Frequent training in these procedures ensures crewmembers or other personnel are adequately prepared to respond to an emergency. Additionally, clearly and quickly communicating the nature of an emergency with the crew, passengers, and nearby responders can improve the response and reduce the risk of injuries.

A lack of emergency procedures and training led to the ineffective response by land-based firefighters in the fire aboard the **Grande Costa D'Avorio**. The pilot informing a shoreside dispatcher about the **Dali's** loss of power led to the bridge being cleared of traffic before the vessel struck it, preventing a greater loss of life. The **Titan** operating company not following emergency response plan guidance meant that the submersible was not found as quickly as possible after a loss of communication. The **BBC Africa** crew's delayed response to implement emergency procedures contributed to the vessel's collision with another vessel.

Titan (page 88)



Operating in Strong Currents or Heavy-Weather Conditions

Strong currents pose unique hazards for vessels working on and transiting inland waterways. Assessing the impact of strong current on all aspects of operations, including towing operations, mooring and unmooring evolutions, and making passing arrangements, can mitigate the risk of an accident occurring. Severe or heavy weather, whether operating inland or offshore, can also create challenging conditions that affect a mariner's ability to navigate and operate a vessel. Developing a plan to account for weather can prepare a crew for the accompanying challenges when heavy or severe weather cannot be avoided. Plans may include taking additional precautions, such as using tugs, increasing the number of lines used when mooring, dropping anchor, or improving cargo securement.

Strong currents contributed to the **Amber Brittany**, **Duke**, and **Joe B Wyatt** accidents. High winds or heavy-weather conditions were factors in the **Cocodrie**, **Columbia Gorge**, **Baylor J. Tregre**, **William E Strait**, **Genius Star XI**, and **President Eisenhower** accidents.



"Stakeholders at all levels can voluntarily implement the lessons learned from our investigations to ensure safety."

Jennifer L. Homendy, NTSB Chairwoman

Operating Equipment and Machinery Systems as Designed

Equipment and machinery systems typically have standards that require specific maintenance, operator training, ratings, and/or testing. Operating equipment or a machinery system in a way that is contrary to its designed configuration or outside of prescribed parameters increases the risk of failure and unforeseen impacts to safety. For critical systems in particular, such as steering and engine fuel and lube oil systems, the consequences of system failure due to improper operation can be catastrophic. Redundant systems should never be bypassed, except in an emergency and only until the emergency situation has passed. Equipment that is not performing as expected or is functioning outside of the manufacturer's parameters should be reported and repaired before use, whenever possible.

The use of a non-industrial passenger vehicle as a PIT, in contravention of OSHA standards, caused the fire aboard the **Grande Costa D'Avorio**. Operating the diesel generator fuel system utilizing a flushing pump instead of the redundant fuel supply pumps led to a second electrical blackout on the **Dali**. Steering system irregularities on the **Jack Edwards** were not addressed before its collision with the **Julie C**, and the degraded system was a factor in the accident.



NTSB Marine Safety Alert SA-101

Following our investigation into the 2023 **Fire aboard Roll-on/Roll-off Container Vessel *Grande Costa D'Avorio*** (MIR-25-16) where two firefighters died and six were injured, and other casualties such as the 2021 **Fire aboard Roll-on/Roll-off Vehicle Carrier *Höegh Xiamen*** (MAR-21-04) where nine firefighters were injured, five of them seriously, the NTSB issued **Safety Alert SA-101** in 2025, urging land-based firefighters to know the risks and challenges posed by in-port vessel fires.



Scan this QR code to access SA-101 on our website.

Land-Based Firefighters: Know the Risks and Challenges Posed by In-Port Vessel Fires



Firefighters conduct exterior boundary cooling on the *Höegh Xiamen* on June 5, 2021, the day after the fire was discovered. Boundary cooling involves using water deluge to keep bulkheads and decks cool to prevent the spread of fire through conduction and to prevent structural collapse, all while taking care to not flood the ship with firefighting water, which would risk sinking or capsizing the vessel.

SOURCE: JACKSONVILLE FIRE AND RESCUE DEPARTMENT.

NTSB Safety Alert SA-101 is a result of our investigations of casualties in which land-based firefighters sustained injuries due to the firefighters' lack of training in vessel firefighting. We found that many land-based firefighters lack the necessary training and familiarity with vessel layouts and fire protection systems to effectively fight in-port vessel fires. Combating vessel fires requires different resources, skills, and tactics, and land-based firefighters may be unaware of how to leverage the structural fire protection that is built into most commercial vessels. Additionally, many ships have built-in fixed firefighting systems that use gas, such as carbon dioxide, in conjunction with a vessel's fire protection zones, to displace oxygen and extinguish shipboard fires. To effectively use a fixed firefighting system, the spaces in which the system is activated must be sealed off to avoid a reflash of the fire and eliminate the hazard the gas presents for firefighters.

Fire departments that serve ports can improve the safety of their firefighters and achieve better outcomes when responding to vessel fires by:

- sending personnel to advanced shipboard firefighting training;
- developing shipboard firefighting standard operational procedures and training personnel on them; and
- working with local ports to coordinate vessel firefighting response preparedness and training in conjunction with drills.

Table of Vessel Particulars by Vessel Group

REPORT NUMBER	VESSEL NAME	VESSEL SUBTYPE	FLAG	LENGTH	BREADTH	DRAFT	PERSONS ON BOARD	PAGE
 CARGO, DRY BULK								
MIR-24-19	John J Boland	Bulk carrier	United States	680.0 ft (207.3 m)	78.0 ft (23.8 m)	27.8 ft (8.5 m)	18	98
MIR-25-18	American Mariner	Bulk carrier	United States	730.0 ft (222.5 m)	78.0 ft (23.8 m)	12.5 ft (3.8 m) fwd 22.5 ft (6.9 m) aft	18	36
MIR-25-12	Appaloosa	Bulk carrier	Marshall Islands	590.6 ft (180.0 m)	99.7 ft (30.4 m)	20.7 ft (6.3 m)	21	10
MIR-25-33	Common Faith	Bulk carrier	Greece	623.3 ft (189.9 m)	105.9 ft (32.3 m)	39.0 ft (11.9 m)	23	14
MIR-25-38	Cuyahoga	Bulk carrier	Canada	604.9 ft (184.4 m)	60.0 ft (18.3 m)	24.8 ft (7.6 m)	40	76
MIR-25-45	Algoma Discovery	Bulk carrier	Canada	729.8 ft (222.4 m)	75.5 ft (23.0 m)	48.1 ft (14.7 m)	22	54
 CARGO, GENERAL								
MIR-25-03	Bonnie G	General cargo vessel	Vanuatu	171.8 ft (52.4 m)	40.0 ft (12.2 m)	9.8 ft (3.0 m)	12	100
MIR-25-05	Stride	Containership	Panama	597.5 ft (182.0 m)	99.1 ft (30.2 m)	19.8 ft (6.0 m)	22	60
MIR-25-06	President Eisenhower	Containership	United States	983.9 ft (299.9 m)	140.2 ft (42.8 m)	32.8 ft (10.0 m)	23	114
MIR-25-40	Dali	Containership	Singapore	983.9 ft (299.9 m)	158.1 ft (48.2 m)	39.9 ft (12.2 m)	23	46
MIR-25-16	Grande Costa D'Avario	Ro/Con	Italy	692.0 ft (210.9 m)	105.0 ft (32.0 m)	30.8 ft (9.4 m)	28	64
MIR-25-33	BBC Africa	Multi-purpose carrier	Antigua and Barbuda	390.0 ft (118.9 m)	66.3 ft (20.2 m)	20.2 ft (6.2 m) fwd 21.8 ft (6.7 m) aft	15	14
MIR-25-41	Genius Star XI	General cargo vessel	Panama	410.0 ft (125.0 m)	68.9 ft (21.0 m)	29.5 ft (9.0 m)	19	80
MIR-25-42	Julie C	General cargo vessel	United Kingdom	453.1 ft (138.1 m)	69.9 ft (21.3 m)	16.1 ft (4.9 m)	17	16
 CARGO, LIQUID BULK								
MIR-25-11	Hafnia Amessi	Tanker	Singapore	603.9 ft (184.1 m)	89.9 ft (27.4 m)	23.8 ft (7.3 m)	25	30
MIR-25-35	Cosflourish Lake	Tanker	Hong Kong	1,092.5 ft (333.0 m)	196.9 ft (60.0 m)	23.0 ft (7.0 m) fwd 36.1 ft (11.0 m) aft	34	44
 FISHING								
MIR-25-04	Three Girls	Fishing vessel	United States	81.6 ft (24.9 m)	24.0 ft (7.3 m)	11.0 ft (3.4 m)	6	58
MIR-25-12	Papa Rod	Fishing vessel	United States	80.8 ft (24.6 m)	24.0 ft (7.3 m)	9.0 ft (2.7 m)	3	10
MIR-25-20	Jordyn Rose	Fishing vessel	United States	32.0 ft (9.8 m)	14.0 ft (4.3 m)	3.5 ft (1.1 m)	1	68
MIR-25-22	Cape Douglas	Fish tender (Industrial vessel)	United States	110.0 ft (33.5 m)	32.0 ft (9.8 m)	5.5 ft (1.7 m)	2	86
MIR-25-24	Tarka II	Fishing vessel	United States	66.0 ft (20.1 m)	17.0 ft (5.1 m)	9.0 ft (2.7 m)	2	70
 OFFSHORE								
MIR-25-42	Jack Edwards	Offshore supply vessel	United States	277.9 ft (84.7 m)	60.0 ft (18.3 m)	12.8 ft (3.9 m)	10	16
 PASSENGER								
MIR-25-07	Columbia Gorge	Small passenger vessel	United States	145.0 ft (44.2 m)	36.2 ft (11.0 m)	6.0 ft (1.8 m)	0	26
MIR-25-13	Ocean Navigator	Coastal cruise ship	Bahamas	300.0 ft (91.4 m)	50.0 ft (15.2 m)	13.9 ft (4.2 m)	210	112
MIR-25-34	Ray Stoker, Jr.	Ferry	United States	263.3 ft (80.3 m)	65.3 ft (19.9 m)	11.0 ft (3.4 m)	13	42

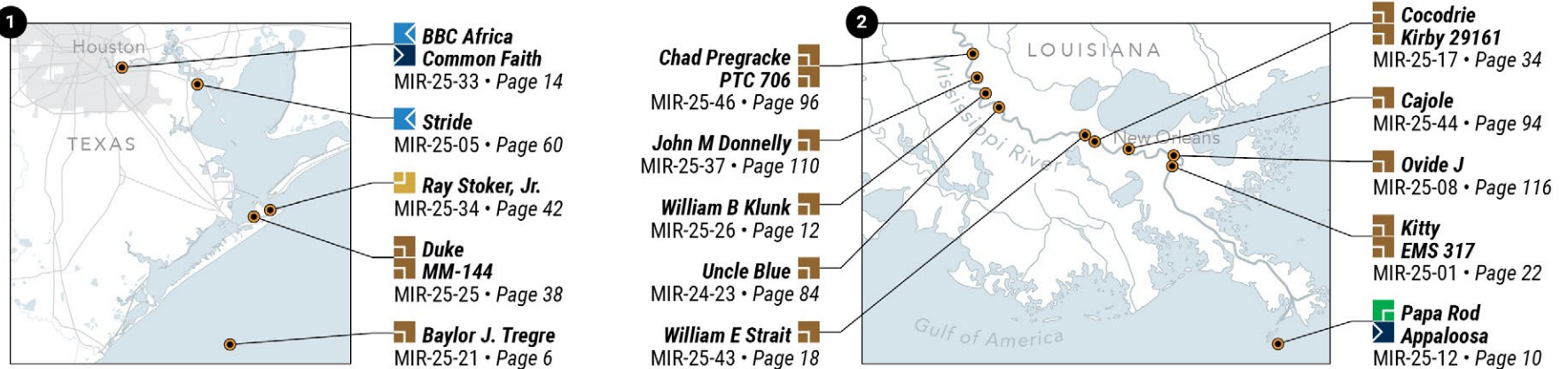
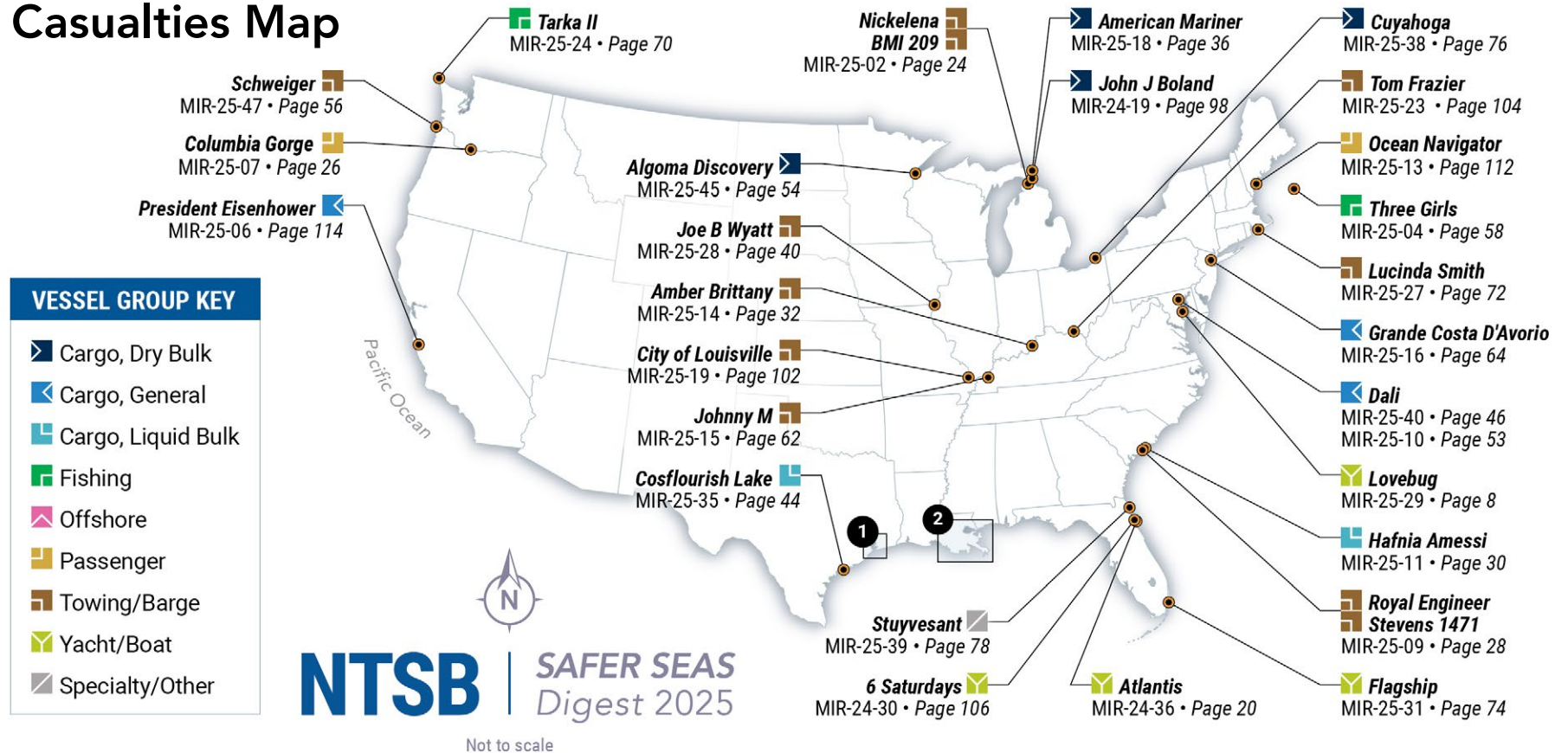
REPORT NUMBER	VESSEL NAME	VESSEL SUBTYPE	FLAG	LENGTH	BREADTH	DRAFT	PERSONS ON BOARD	PAGE
 TOWING/BARGE								
MIR-24-23	Uncle Blue	Towing vessel	United States	71.2 ft (21.7 m)	26.1 ft (8.0 m)	7.5 ft (2.3 m)	6	84
MIR-25-01	Kitty	Towing vessel	United States	67.7 ft (20.6 m)	28.0 ft (8.5 m)	9.5 ft (2.9 m)	6	22
MIR-25-01	EMS 317 (barge of Kitty)	Barge	United States	297.5 ft (90.7 m)	54.0 ft (16.5 m)	10.5 ft (3.2 m)	0	22
MIR-25-02	Nickelena	Tugboat	United States	102.7 ft (31.3 m)	44.0 ft (13.4 m)	16.2 ft (4.9 m)	5	24
MIR-25-02	BMI 209 (barge of Nickelena)	Barge	United States	210.0 ft (64.0 m)	58.6 ft (17.9 m)	11.0 ft (3.4 m)	0	24
MIR-25-08	Ovide J	Towing vessel	United States	76.0 ft (23.2 m)	27.5 ft (8.4 m)	10.7 ft (3.3 m)	5	116
MIR-25-09	Royal Engineer	Towing vessel	United States	60.6 ft (18.5 m)	22.2 ft (6.8 m)	9.2 ft (2.8 m)	4	28
MIR-25-09	Stevens 1471 (barge of Royal Engineer)	Crane barge	United States	140.0 ft (42.7 m)	70.0 ft (21.3 m)	6.0 ft (1.8 m)	0	28
MIR-25-14	Amber Brittany	Towing vessel	United States	138.4 ft (42.2 m)	39.3 ft (12.0 m)	10.4 ft (3.2 m)	6	32
MIR-25-15	Johnny M	Towing vessel	United States	88.3 ft (26.9 m)	30.0 ft (9.1 m)	9.9 ft (3.0 m)	6	62
MIR-25-17	Cocodrie	Towing vessel	United States	69.1 ft (21.1 m)	30.0 ft (9.1 m)	8.5 ft (2.6 m)	5	34
MIR-25-17	Kirby 29161 (barge of Cocodrie)	Tank barge	United States	297.5 ft (90.7 m)	54.0 ft (16.5 m)	2.0 ft (0.6 m)	0	30
MIR-25-19	City of Louisville	Towing vessel	United States	138.2 ft (42.1 m)	34.6 ft (10.6 m)	9.5 ft (2.9 m)	8	102
MIR-25-21	Baylor J. Tregre	Towing vessel	United States	67.2 ft (20.4 m)	24.0 ft (7.3 m)	9.0 ft (2.7 m)	4	6
MIR-25-23	Tom Frazier	Towing vessel	United States	135.6 ft (41.3 m)	46.9 ft (14.2 m)	11.2 ft (3.4 m)	9	104
MIR-25-25	Duke	Towing vessel	United States	84.5 ft (25.8 m)	35.0 ft (10.7 m)	10.8 ft (3.3 m)	5	38
MIR-25-25	MM-144 (barge of Duke)	Barge	United States	297.0 ft (90.5 m)	54.0 ft (16.5 m)	2.5 ft (0.8 m)	0	38
MIR-25-26	William B Klunk	Towing vessel	United States	170.1 ft (51.8 m)	48.0 ft (14.6 m)	11.6 ft (3.5 m)	10	12
MIR-25-27	Lucinda Smith	Towing vessel	United States	81.4 ft (24.8 m)	28.0 ft (8.5 m)	7.0 ft (2.1 m)	1	72
MIR-25-28	Joe B Wyatt	Towing vessel	United States	157.5 ft (48.0 m)	45.0 ft (13.7 m)	9.0 ft (2.7 m)	8	40
MIR-25-32	Krystal Sea (tug of ITB Krystal Sea/Cordova Provider)	Tugboat	United States	49.9 ft (15.2 m)	34.0 ft (10.4 m)	12.5 ft (3.8 m)	4	108
MIR-25-32	Cordova Provider (barge of ITB Krystal Sea/Cordova Provider)	Freight barge	United States	209.8 ft (65.0 m)	64.0 ft (19.8 m)	4.5 ft (1.4 m)	0	108
MIR-25-37	John M Donnelly	Towing vessel	United States	185.5 ft (56.5 m)	50.0 ft (15.2 m)	9.5 ft (2.9 m)	8	110
MIR-25-43	William E Strait	Towing vessel	United States	184.4 ft (56.2 m)	45.0 ft (13.7 m)	11.7 ft (3.6 m)	9	18
MIR-25-44	Cajole	Towing vessel	United States	64.0 ft (19.5 m)	23.0 ft (7.0 m)	6.5 ft (1.9 m)	2	94
MIR-25-46	Chad Pregracke	Towing vessel	United States	173.0 ft (52.7 m)	48.0 ft (14.6 m)	11.0 ft (3.4 m)	9	96
MIR-25-46	PTC 706 (barge of Chad Pregracke)	Hopper barge	United States	200.0 ft (61.0 m)	35.0 ft (10.7 m)	9.5 ft (2.9 m)	0	96
MIR-25-47	Schweiger	Towing vessel	United States	60.4 ft (18.4 m)	23.0 ft (7.0 m)	8.0 ft (2.4 m)	2	56
 YACHT/BOAT								
MIR-24-36	Atlantis	Yacht	United States	80.0 ft (24.4 m)	19.5 ft (5.9 m)	4.9 ft (1.5 m)	2	20
MIR-25-29	Lovebug	Yacht	United States	122.7 ft (37.4 m)	25.9 ft (7.9 m)	7.5 ft (2.3 m)	5	8
MIR-25-30	6 Saturdays	Recreational vessel	United States	62.7 ft (19.1 m)	17.2 ft (5.2 m)	4.0 ft (1.2 m)	2	106
MIR-25-31	Flagship	Yacht	United States	82.0 ft (24.9 m)	32.5 ft (9.9 m)	10.5 ft (3.2 m)	0	74
 SPECIALTY/OTHER								
MIR-25-36	Titan	Submersible	N/A	22.0 ft (6.7 m)	9.2 ft (2.8 m)	N/A	5	88
MIR-25-39	Stuyvesant	Dredging vessel	United States	392.7 ft (119.7 m)	72.0 ft (22.0 m)	15.5 ft (4.7 m)	78	78

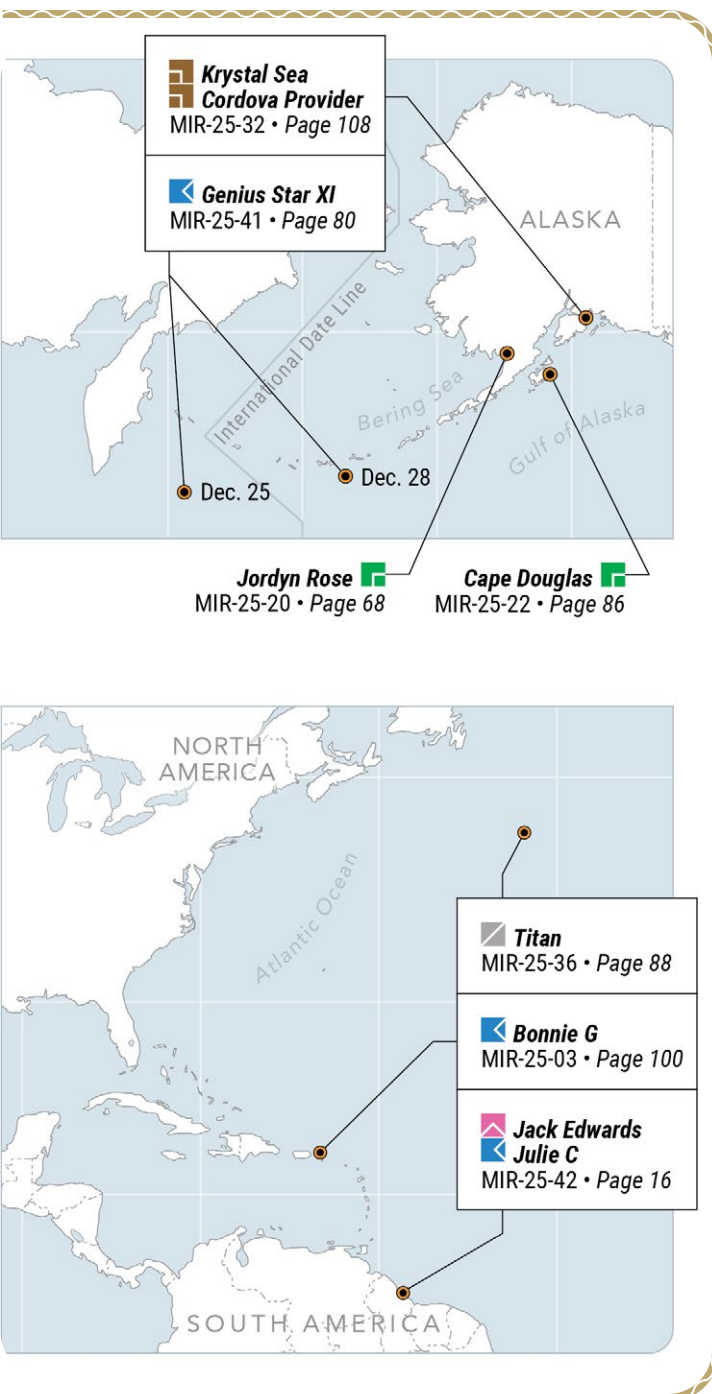
Table of Casualty Locations

REPORT NO.	VESSEL NAME	VESSEL GROUP AND SUBTYPE	CASUALTY LOCATION	PAGE
CAPSIZING/LISTING				
MIR-25-21	Baylor J. Tregre	Towing vessel	Gulf of America, 23 nm south of Galveston, Texas	6
MIR-25-29	Lovebug	Yacht	West River, Cheasapeake Bay, north of Shady Side, Maryland	8
COLLISION				
MIR-25-12	Papa Rod / Appaloosa	Fishing vessel / Bulk carrier	Gulf of America, east of Southwest Pass, 25 nm south of Venice, Louisiana	10
MIR-25-26	William B Klunk	Towing vessel	Lower Mississippi River, mile 227, Baton Rouge, Louisiana	12
MIR-25-33	BBC Africa / Common Faith	Multi-purpose carrier / Bulk carrier	Buffalo Bayou, Houston Ship Channel, Houston, Texas	14
MIR-25-42	Jack Edwards / Julie C	Offshore supply vessel / Cargo vessel	Atlantic Ocean, about 3 nm northeast of Georgetown, Guyana	16
MIR-25-43	William E Strait	Towing vessel	Lower Mississippi River, mile 126, Norco, Louisiana	18
CONTACT				
MIR-24-36	Atlantis	Yacht	Atlantic Ocean, about 1.5 mi east of St. Augustine Beach, Florida	20
MIR-25-01	Kitty / EMS 317	Towing vessel / Barge	Algiers Lock, near mile 88.4 Lower Mississippi River, New Orleans, Louisiana	22
MIR-25-02	Nickelena / BMI 209	Tugboat / Barge	Straits of Mackinac, Mackinaw City, Michigan	24
MIR-25-07	Columbia Gorge	Small passenger vessel	Columbia River, mile 150, Cascade Locks, Oregon	26
MIR-25-09	Royal Engineer / Stevens 1471	Towing vessel / Crane barge	North Charleston Terminal, Cooper River, North Charleston, South Carolina	28
MIR-25-11	Hafnia Amessi	Tanker	Cooper River, north of Charleston, South Carolina	30
MIR-25-14	Amber Brittany	Towing vessel	Ohio River, mile 604.3, Louisville, Kentucky	32
MIR-25-17	Cocodrie / Kirby 29161	Towing vessel / Tank barge	Lower Mississippi River, mile 124.7, near Norco, Louisiana	34
MIR-25-18	American Mariner	Bulk carrier	St. Marys River, about 25 mi south of Sault Ste. Marie, Michigan	36
MIR-25-25	Duke / MM-144	Towing vessel / Barge	Galveston Ship Channel, Galveston, Texas	38
MIR-25-28	Joe B Wyatt	Towing vessel	Upper Mississippi River, mile 384, Fort Madison, Iowa	40
MIR-25-34	Ray Stoker, Jr.	Ferry	US Coast Guard Base Galveston, Galveston Channel, Galveston, Texas	42
MIR-25-35	Cosflourish Lake	Tanker	Corpus Christi Bay, Ingleside, Texas	44
MIR-25-40	Dali	Containership	Patapsco River, Baltimore, Maryland	46
MIR-25-45	Algoma Discovery	Bulk carrier	BNSF Allouez Taconite Facility, Superior, Wisconsin	54
MIR-25-47	Schweiger	Towing vessel	Baker Bay West Channel, Ilwaco, Washington	56

REPORT NO.	VESSEL NAME	VESSEL GROUP AND SUBTYPE	CASUALTY LOCATION	PAGE
FIRE/EXPLOSION				
MIR-25-04	Three Girls	 Fishing vessel	Gulf of Maine, 118 nm east-southeast of Portland, Maine	58
MIR-25-05	Stride	 Containership	Barbours Cut Marine Terminal, Galveston Bay, LaPorte, Texas	60
MIR-25-15	Johnny M	 Towing vessel	Tennessee River, mile 22.4, Grand Rivers, Kentucky	62
MIR-25-16	Grande Costa D'Avorio	 Ro/Con	Port Newark, berth 18, Newark, New Jersey	64
MIR-25-20	Jordyn Rose	 Fishing vessel	Naknek River, Naknek, Alaska	68
MIR-25-24	Tarka II	 Fishing vessel	Pacific Ocean, 4 nm southwest of Tatoosh Island, Washington	70
MIR-25-27	Lucinda Smith	 Towing vessel	Acushnet River, New Bedford, Massachusetts	72
MIR-25-31	Flagship	 Yacht	RMK Merrill Stevens Shipyard, Miami River, Miami, Florida	74
MIR-25-38	Cuyahoga	 Bulk carrier	Ashtabula Harbor, Lake Erie, Ashtabula, Ohio	76
MIR-25-39	Stuyvesant	 Dredging vessel	St. Johns River, Jacksonville, Florida	78
MIR-25-41	Genius Star XI	 General cargo vessel	North Pacific Ocean, about 371 nm southwest of Agattu Island (December 25), and about 57 nm southeast of Seguam Island (December 28), Alaska	80
FLOODING/HULL FAILURE				
MIR-24-23	Uncle Blue	 Towing vessel	Lower Mississippi River, mile 184, Ascension Parish, Louisiana	84
MIR-25-22	Cape Douglas	 Fish tender (Industrial vessel)	Chiniak Bay, 4 nm southeast of Kodiak, Alaska	86
MIR-25-36	Titan	 Submersible	North Atlantic Ocean, 370 nm southeast of St. John's, Newfoundland and Labrador, Canada	88
MIR-25-44	Cajole	 Towing vessel	Lower Mississippi River, mile 112, Waggaman, Louisiana	94
MIR-25-46	Chad Pregracke / PTC 706	 Towing vessel /  Hopper barge	Lower Mississippi River, mile 260.6, near New Roads, Louisiana	96
GROUNDING/STRANDING				
MIR-24-19	John J Boland	 Bulk carrier	Port Dolomite, Lake Huron, about 4 nm east of Cedarville, Michigan	98
MIR-25-03	Bonnie G	 General cargo vessel	Caribbean Sea, near Cyril E. King Airport, St. Thomas, US Virgin Islands	100
MIR-25-19	City of Louisville	 Towing vessel	Upper Mississippi River, mile 42.6, near Thebes, Illinois	102
MIR-25-23	Tom Frazier	 Towing vessel	Ohio River, mile 355.1, Portsmouth, Ohio	104
MIR-25-30	6 Saturdays	 Recreational vessel	St. Augustine Inlet, St. Augustine, Florida	106
MIR-25-32	Krystal Sea/Cordova Provider	 Tugboat/Freight barge	Axel Lind Island, Alaska	108
MIR-25-37	John M Donnelly	 Towing vessel	Lower Mississippi River, mile 246.5, near Baton Rouge, Louisiana	110
MACHINERY DAMAGE				
MIR-25-13	Ocean Navigator	 Coastal cruise ship	Ocean Gateway Terminal, Pier 2B, Portland, Maine	112
SHIP/EQUIPMENT/CARGO DAMAGE				
MIR-25-06	President Eisenhower	 Containership	Pacific Ocean, 94 nm south of Oakland, California	114
OTHER				
MIR-25-08	Ovide J	 Towing vessel	Chalmette Refinery crude oil dock, Lower Mississippi River near mile 89, Chalmette, Louisiana	116

Casualties Map





NTSB Office of Marine Safety



NTSB investigators examine the recovered wreckage from the Titan.

The **Office of Marine Safety** (OMS) investigates and determines the probable cause of major marine casualties in US territorial waters, major marine casualties involving US-flagged vessels worldwide, and marine accidents involving a public (government) vessel and any other vessel. Additionally, the NTSB fulfills US obligations with regard to foreign accident investigations, established under the auspices of the IMO, by participating with the Coast Guard as a substantially interested State in investigations of certain serious marine casualties involving foreign-flagged vessels in international waters. The office also may investigate accidents when the Board determines that they are catastrophic or the accident involves problems of a recurring character.

Investigations of “Major Marine” Casualties

The Coast Guard conducts preliminary investigations of all marine casualties and notifies OMS when an event qualifies as a major marine casualty, which is a casualty that results in:

- the loss of six or more lives.
- the loss of a mechanically propelled vessel of 100 or more gross tons.
- property damage initially estimated to be \$500,000 or more.¹
- a serious threat, as determined by the Commandant of the Coast Guard with the concurrence of the NTSB Chairman, to life, property, or the environment by hazardous materials.

Independent Investigations

The NTSB is the only federal organization that performs independent, comprehensive, and transparent multidisciplinary investigations to determine the probable cause of marine accidents, with the goal of making safety recommendations to prevent similar events from occurring in the future. The thoroughness and independence of these investigations maintain public confidence in marine transportation systems and provide policymakers with unbiased analysis.

After investigating each major marine casualty, OMS identifies safety issues and releases an investigation report with a probable cause, which may include safety recommendations to federal government agencies (such as the Coast Guard), state agencies, vessel owners and operators, vessel classification societies, or maritime industry organizations. We may also issue close-out memos, which note the general facts of an accident, in cases where we do not produce an investigation report.

¹ On October 1, 2025, the NTSB began operating under a \$2 million property damage threshold for major marine casualties, cited in 46 *United States Code* section 6101. The Coast Guard is in the process of updating 49 *CFR* section 850.5.

Who Has the Lead: USCG or NTSB?

In a memorandum of understanding signed June 17, 2021, the NTSB and the Coast Guard agreed that when both agencies investigate a marine casualty, one agency will serve as the lead federal agency for the investigation. The NTSB Chairman and the Coast Guard Commandant, or their designees, will determine which agency will lead the investigation.

The NTSB may lead a major marine casualty investigation when, as defined in the memorandum of understanding, there is another transportation mode involved; serious threat of, or presumed loss of six or more lives on a passenger vessel; serious threat of, or presumed loss of 12 or more lives on a commercial vessel; serious threat of, or presumed high loss of life beyond the vessel(s) involved; significant safety issues relating to the infrastructure of the maritime transportation system or the environment by hazardous materials; safety issues of a recurring character; or significant safety issues relating to Coast Guard statutory missions, specifically aids to navigation, search and rescue, and marine safety.



NTSB and Coast Guard personnel at the Coast Guard Marine Board of Investigation 2024 hearing into the loss of the *Titan* submersible.
SOURCE: KATE KILROY, COAST GUARD.



The crew of the Coast Guard Cutter *Sailfish*, an 87-foot Marine Protector-class vessel, prepares to escort the *Dali* during its transit from the Port of Baltimore to the Port of Virginia, June 24, 2024.
SOURCE: CHRISTOPHER BOKUM, COAST GUARD.

Acknowledgment

For many of the marine casualties the NTSB investigated in 2025, investigators from the Office of Marine Safety worked closely with the **US Coast Guard Office of Investigations and Casualty Analysis** in Washington, DC, and with the following Coast Guard units.

REPORT NO.	VESSEL NAME(S)	UNIT
MIR-24-19	<i>John J Boland</i>	Coast Guard Sector Sault Ste. Marie
MIR-24-23	<i>Uncle Blue</i>	Coast Guard Marine Safety Unit Baton Rouge
MIR-24-36	<i>Atlantis</i>	Coast Guard Sector Jacksonville
MIR-25-01	<i>Kitty / EMS 317</i>	Coast Guard Sector New Orleans
MIR-25-02	<i>Nickelena / BMI 209</i>	Coast Guard Sector Sault Ste. Marie
MIR-25-03	<i>Bonnie G</i>	Coast Guard Marine Safety Unit St. Thomas
MIR-25-04	<i>Three Girls</i>	Coast Guard Sector Northern New England
MIR-25-05	<i>Stride</i>	Coast Guard Sector Houston-Galveston
MIR-25-06	<i>President Eisenhower</i>	Coast Guard Sector San Francisco
MIR-25-07	<i>Columbia Gorge</i>	Coast Guard Sector Columbia River

REPORT NO.	VESSEL NAME(S)	UNIT
MIR-25-08	Ovide J	Coast Guard Sector New Orleans
MIR-25-09	Royal Engineer / Stevens 1471	Coast Guard Sector Charleston
MIR-25-11	Hafnia Amessi	Coast Guard Sector Charleston
MIR-25-12	Papa Rod / Appaloosa	Coast Guard Sector New Orleans
MIR-25-13	Ocean Navigator	Coast Guard Sector New England
MIR-25-14	Amber Brittany	Coast Guard Sector Ohio Valley
MIR-25-15	Johnny M	Coast Guard Marine Safety Unit Paducah
MIR-25-16	Grande Costa D'Avorio	Coast Guard District 1 Formal Marine Board of Investigation
MIR-25-17	Cocodrie / Kirby 29161	Coast Guard Sector New Orleans
MIR-25-18	American Mariner	Coast Guard Sector Northern Great Lakes
MIR-25-19	City of Louisville	Coast Guard Marine Safety Unit Paducah
MIR-25-20	Jordyn Rose	Coast Guard Sector Western Alaska
MIR-25-21	Baylor J. Tregre	Coast Guard Marine Safety Unit Texas City
MIR-25-22	Cape Douglas	Coast Guard Marine Safety Unit Kodiak
MIR-25-23	Tom Frazier	Coast Guard Marine Safety Unit Huntington
MIR-25-24	Tarka II	Coast Guard Sector Puget Sound
MIR-25-25	Duke / MM-144	Coast Guard Marine Safety Unit Texas City
MIR-25-26	William B Klunk	Coast Guard Marine Safety Unit Baton Rouge
MIR-25-27	Lucinda Smith	Coast Guard Sector Southeastern New England
MIR-25-28	Joe B Wyatt	Coast Guard Marine Safety Detachment Quad Cities
MIR-25-29	Lovebug	Coast Guard Sector Maryland-National Capital Region
MIR-25-30	6 Saturdays	Coast Guard Sector Jacksonville
MIR-25-31	Flagship	Coast Guard Sector Miami
MIR-25-32	Cordova Provider	Coast Guard Marine Safety Unit Valdez
MIR-25-33	BBC Africa / Common Faith	Coast Guard Sector Houston-Galveston
MIR-25-34	Ray Stoker, Jr.	Coast Guard Marine Safety Unit Texas City
MIR-25-35	Cosflourish Lake	Coast Guard Sector Corpus Christi
MIR-25-36	Titan	Coast Guard Office of Investigations and Analysis
MIR-25-37	John M Donnelly	Coast Guard Marine Safety Unit Baton Rouge
MIR-25-38	Cuyahoga	Coast Guard Sector Eastern Great Lakes
MIR-25-39	Stuyvesant	Coast Guard Sector Jacksonville
MIR-25-40 and MIR-25-10	Dali	Coast Guard East District
MIR-25-41	Genius Star XI	Coast Guard Sector Western Alaska and US Arctic
MIR-25-42	Jack Edwards / Julie C	Coast Guard Sector New Orleans
MIR-25-43	William E Strait	Coast Guard Sector New Orleans
MIR-25-44	Cajole	Coast Guard Sector New Orleans
MIR-25-45	Algoma Discovery	Coast Guard Marine Safety Unit Duluth
MIR-25-46	Chad Pregracke	Coast Guard Marine Safety Unit Baton Rouge
MIR-25-47	Schweiger	Coast Guard Sector Columbia River



Coast Guard marine safety engineers examine the aft titanium dome from the *Titan* on October 1, 2023, in the North Atlantic Ocean. The dome was recovered from the seafloor and transferred to a US port for analysis.

NTSB Marine Safety Recommendations

The NTSB issues safety recommendations to address specific safety concerns uncovered during investigations and to specify actions to help prevent similar casualties from occurring in the future. Safety recommendations are our most important product because they alert government, industry, and the public to the critical changes that are needed to prevent transportation accidents and crashes, reduce injuries, and save lives.

We issue these recommendations to the organizations best able to take corrective action, other federal and state agencies, manufacturers, operators, and industry and trade organizations. We also monitor the progress of action to implement each recommendation until it is closed, which usually takes several years.

Overview

Since 1967, the NTSB has issued **more than 2,600** marine safety recommendations. At the end of 2025, there were 112 marine safety recommendations still open. Historically, we have issued about two-thirds of our marine safety recommendations to the US Coast Guard.

Recommendations Closed in 2025

In 2025, we closed **16 marine safety recommendations** acceptably, as follows:²

- two (M-12-8 and M-12-10) to the Coast Guard from our investigation into the December 29, 1997, sinking of the recreational sailing vessel **Morning Dew**;
- three to NOAA (M-17-9 and M-17-52) and the NWS (M-17-10) related to the October 1, 2015, sinking of the cargo vessel **El Faro**, in which all 33 crewmembers died;
- seven (M-20-14 through -20) to the Coast Guard from our investigation into the September 2, 2019, fire aboard the small passenger vessel **Conception**, in which 33 passengers and one crewmember died;
- two (M-24-8 and M-24-9) to the American Bureau of Shipping from our investigation into the December 22, 2022, engine room fire aboard the passenger ferry **Sandy Ground**; and
- two to the Passenger Vessel Association (M-24-10) and City Cruises (M-24-12) from our investigation into the March 24, 2023, fire aboard the passenger vessel **Spirit of Boston**.

CASE ANALYSIS AND REPORTING ONLINE (CAROL)

The NTSB maintains a searchable public database of all safety recommendations, including status and related correspondence, available through our CAROL query tool.

Ask **CAROL** at carol.nts.gov »



² Recommendations closed in an acceptable status include those classified (1) **Closed—Acceptable Action**, (2) **Closed—Acceptable Alternate Action**, and (3) **Closed—Exceeds Recommended Action**. Please note that recommendations closed in 2025 may have been issued in previous calendar years.



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