March 13, 2025 MIR-25-09

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

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 a ship-to-shore crane at the North Charleston Terminal (see figure 1 and figure 2).[1] There were no injuries, and no pollution was reported. Damage to the terminal's crane was estimated to be over $4.5 million.[2]

Figure 1. *Royal Engineer* underway on unknown date before the contact. (Source: Lisa Kolibabek)

[1] In this report, all times are eastern standard time, and all miles are nautical miles (1.15 statute miles).

[2] Visit ntsb.gov to find additional information in the public docket for this NTSB investigation (case no. DCA24FM014). Use the CAROL Query to search investigations.

Casualty Summary

Casualty type	Contact
Location	North Charleston Terminal, Cooper River, North Charleston, South Carolina 32°54.18′ N, 079°57.48′ W
Date	January 4, 2024
Time	1620 eastern standard time (coordinated universal time –5 hrs)
Persons on board	4
Injuries	None
Property damage	$4.5 million est.
Environmental damage	None
Weather	Visibility 10 nm, overcast, winds north-northwest 13 kts, air temperature 55°F, water temperature 55°F, sunset 1854
Waterway information	River; width 600 ft, depth 45 ft, current 0.5 kts ebb

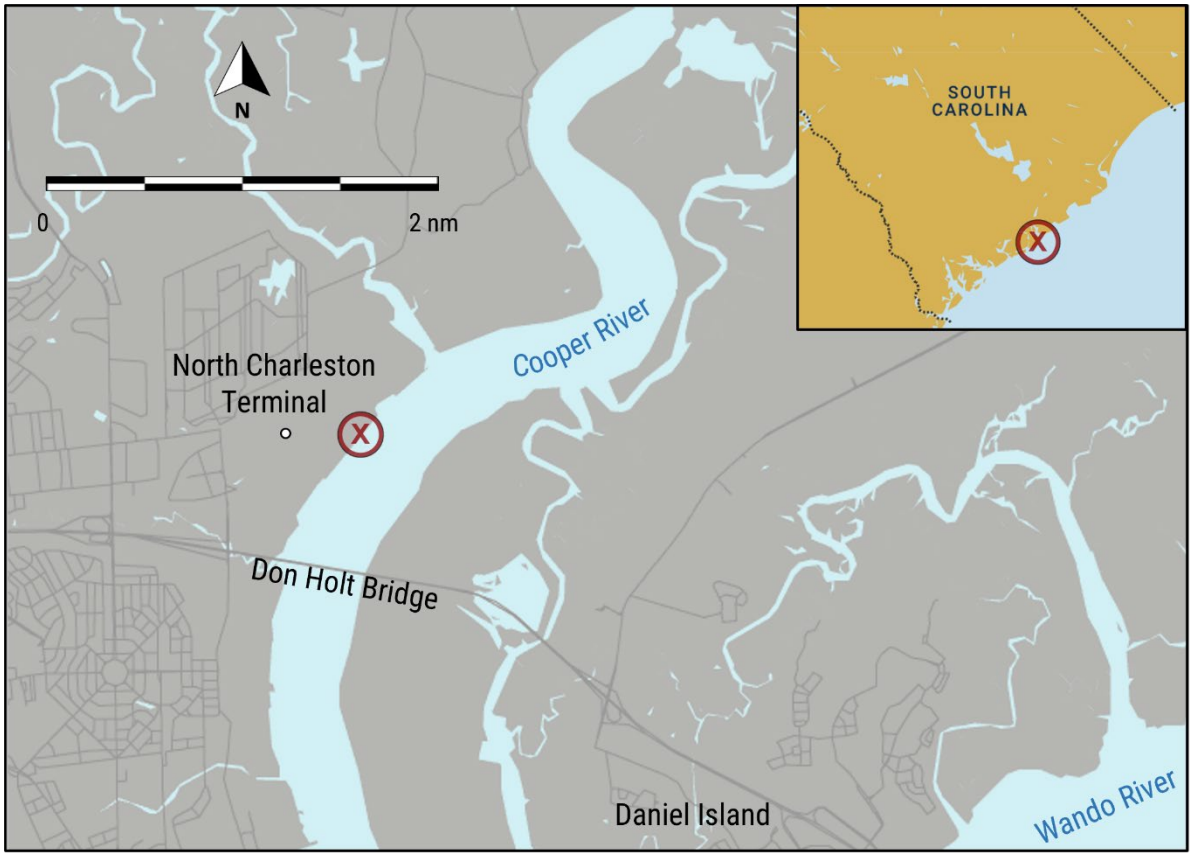

Figure 2. Area where the *Royal Engineer* pushing the *Stevens 1471* contacted a ship-to-shore crane at the North Charleston Terminal as indicated by a circled *X*. (Background source: Google Maps)

1 Factual Information

1.1 Background

The 61-foot-long *Royal Engineer* was a twin propeller, 800-hp, steel-hulled towing vessel built in 1965. The vessel was owned and operated by Stevens Towing Company Incorporated of Yonges Island, South Carolina.

The *Stevens 1471* was a 140-foot-long, 70-foot-wide crane barge that held a Manitowoc 4100w Ringer crane with a 130-foot-tall fixed mast and 200-foot-long boom.

The North Charleston Terminal was a 201-acre container terminal located on the Cooper River, about 1 mile north of the Don Holt Bridge, in North Charleston, South Carolina. The terminal, which had a capacity of 500,000 TEUs, operated five ship-to-shore (STS) cranes.[3]

1.2 Event Sequence

On January 4, 2024, about 1448, the towboat *Royal Engineer* and crane barge *Stevens 1471* departed the Nexans Charleston facility along the Cooper River and headed south en route to the Pierside Docks, located 2.3 miles south of the Don Holt Bridge. The voyage plan indicated the expected transit time to be 2 hours and 50 minutes. The Cooper River was at the beginning of an ebb current that would reach about 0.6 knots by 1620 and a maximum current of 0.9 knots at the Ordnance Reach Harmonic Station, located near the North Charleston Terminal.

The crew of the *Royal Engineer* consisted of a captain, mate, and two deckhands. Each worked a 6-hours-on/6-hours-off rotation. The captain and a deckhand stood watch from 0530 to 1130 and 1730 to 2330. The mate stood the opposite watches, from 1130 to 1730 and 2330 to 0530, with the other deckhand.

While in transit, the crane boom on the *Stevens 1471* was positioned over the wheelhouse of the *Royal Engineer* toward the stern of the tow (see figure 3). The fixed mast of the crane created the highest air draft of the tow while stowed for transit.[4]

[3] A *TEU* (20-foot equivalent unit) is a measure of the carrying capacity of a containership based on the number of 20-foot-long containers the vessel is capable of loading.

[4] *Air draft* describes the vertical distance from the top of a vessel's highest point down to the waterline.

According to technical drawings, the mast reached a height of 144.6 feet above the deck of the barge. The air draft of the crane barge was noted on the towboat's voyage plan as 145 feet.

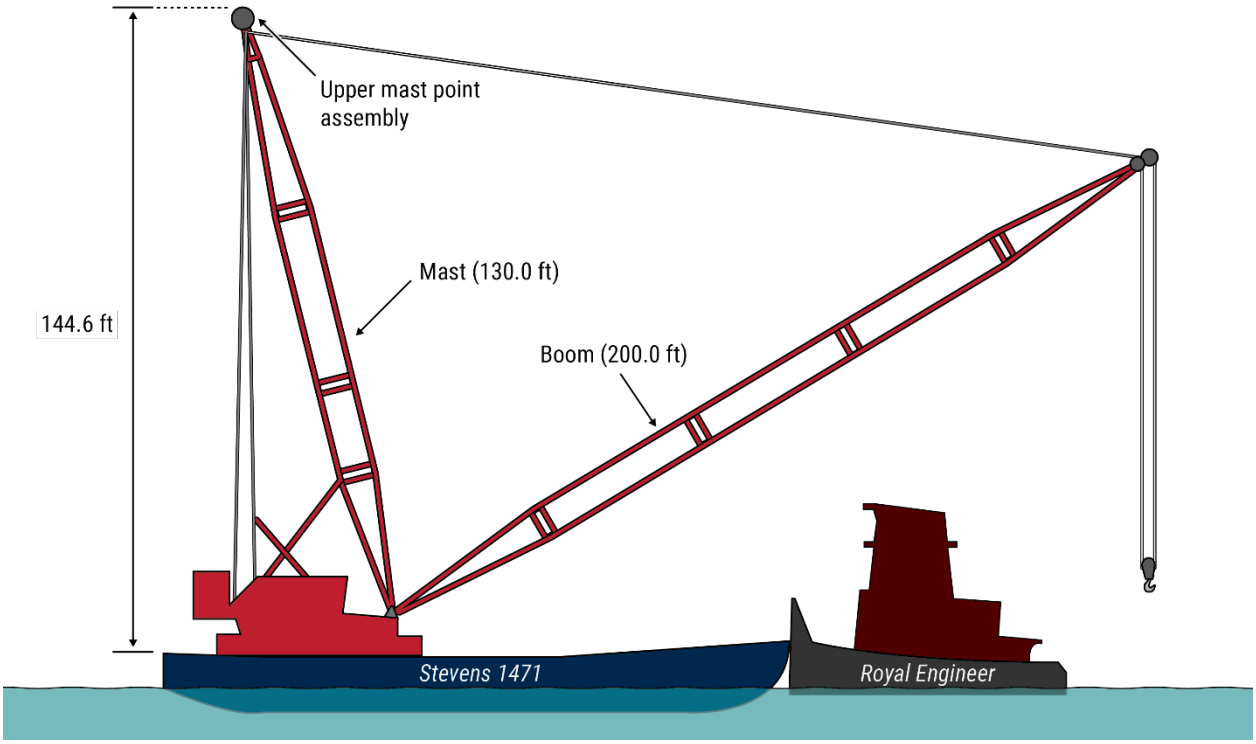

Figure 3. Approximate towing configuration of the *Royal Engineer* pushing the *Stevens 1471*. The crane components and their measurements are labeled.

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, located about 1 mile north of the Don Holt Bridge. 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.

To pass the area where the *Brunswick* was dredging, a vessel would need to either (1) request that the *Brunswick* move the floating discharge pipeline so that it was not extending across the river, or (2) pass to the west of the *Brunswick*, along the west bank of the Cooper River. The dredge crew moved the floating discharge pipe frequently to accommodate passing traffic during normal operations.

On the *Royal Engineer*, the mate was on watch in the wheelhouse. During the transit south, he attempted to hail the dredge via VHF radio about 1 hour before the tow reached the dredge's location. According to the mate, he intended to request

that the dredge "break the pipeline," and was attempting to give the dredge crew enough time to do so. However, the *Brunswick* crew did not respond to his radio call. The mate again attempted to contact the *Brunswick* crew via VHF radio about 45 minutes before meeting, again with no response from the dredge crew.

At 1605, the *Royal Engineer* passed green buoy 69, about 1.3 miles from the North Charleston Terminal, where 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 *Royal Engineer* tow was within sight of the *Brunswick*, which was working about 300 feet east of the northern end of the North Charleston Terminal seawall, close to where the *Celsius Nicosia* was berthed. The mate was then able to reach the *Brunswick* crew over VHF radio to make passing arrangements.

The dredge captain informed the *Royal Engineer* mate that his preference was for the tow to pass between the dredge and the dock because "I had guys downstairs that were working on something. … and I'd have to stop them to go do something else." He said he could swing the dredge around and provide about 300 feet of clearance to the seawall, not including the width of the *Celsius Nicosia*. The mate informed the dredge captain that he would have enough room to maneuver the *Royal Engineer* tow so it would pass between the *Brunswick* and the *Celsius Nicosia* (see figure 4).

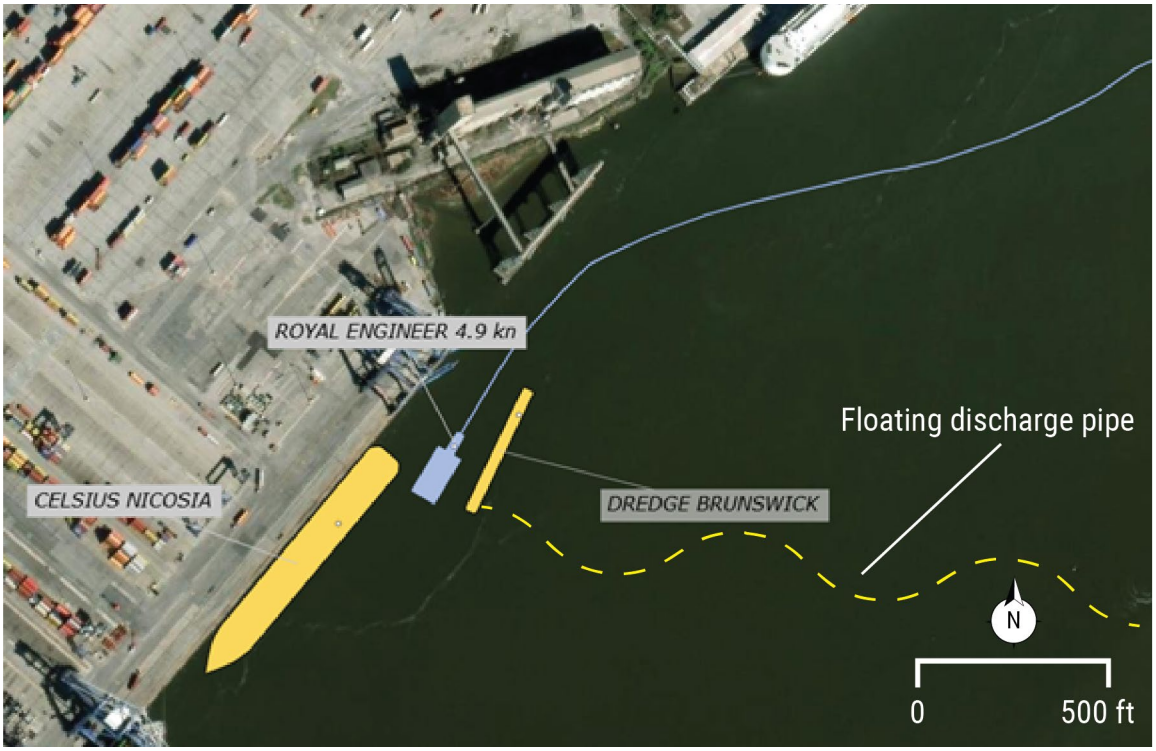

Figure 4. The *Royal Engineer*'s path between the dredge *Brunswick* and the containership *Celsius Nicosia* at 1620. (Background source: Esri satellite image as viewed on Made Smart)

Due to the expected close passage, the mate sent the deckhand on watch to the bow of the barge to relay lateral distances from the barge to the *Celsius Nicosia* and the *Brunswick*.

At 1619, the mate maneuvered the *Royal Engineer* tow past the *Brunswick* at a speed of about 4.5–5 knots. According to the mate, "that's when I realized the ship-to-shore crane was overhanging the ship [*Celsius Nicosia*]. … I didn't realize that they would be boomed out past the ship" (see figure 5). The mate asked the deckhand to watch the height of the STS crane, reduced speed, and continued toward the overhanging crane. As the *Royal Engineer* tow moved closer to the STS crane, the mate and the deckhand were in constant communication about whether the tow's crane barge would clear the STS crane. Just after the deckhand informed the mate that he thought they would clear the STS crane, the mate stepped out of the wheelhouse and, "[I] realized we were not going to clear it." He told investigators that he then went back into the wheelhouse and reversed the engines.

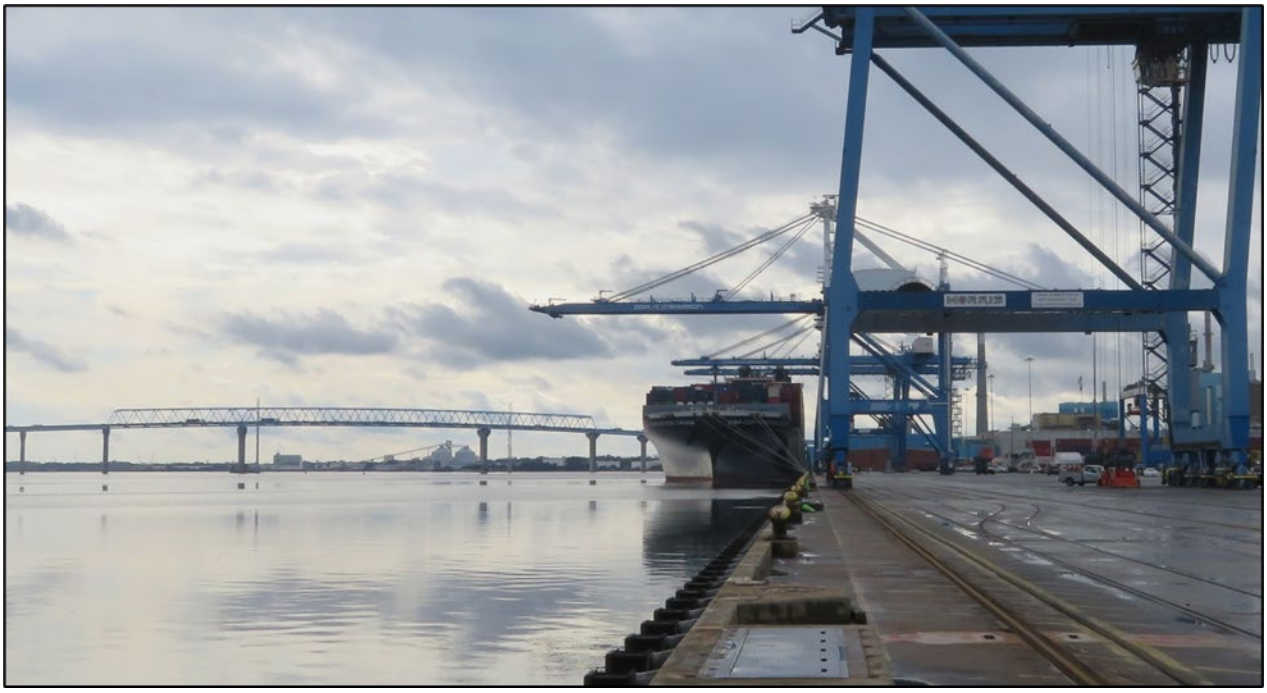

Figure 5. View of a North Charleston Terminal STS crane extending over the side of the *CMA CGM F. Sagan* and the Cooper River. The *CMA CGM F. Sagan*'s mooring configuration is similar to the *Celsius Nicosia*'s configuration when the crane on the *Royal Engineer* tow contacted the STS crane. The *CMA CGM F. Sagan* has a 131-foot beam, 26 feet wider than the *Celsius Nicosia*.

The STS crane operator, who was in the operator's cabin on the boom, was looking down toward the *Celsius Nicosia* as he was positioning the crane to lift a container. As the *Stevens 1471* crane's mast came into his field of view, he became aware that it would likely contact the STS crane. The crane operator did not have a

means of radio communication with the *Brunswick* or the *Royal Engineer*. He sounded the STS crane's horn and braced himself for impact.

At 1620, 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. Immediately after the contact, the STS crane operator exited the cabin, using the crane's catwalks and stairs to reach the pier deck. The force of the contact abruptly stopped the forward momentum of the *Royal Engineer* tow. The *Royal Engineer* mate then reversed the tow and maneuvered to a safe area upriver from the dredge and marine terminal.

At 1630, the mate radioed the *Brunswick* to inform the crew of the contact and request that they break the dredge pipeline connection and allow the tow to pass. At 1650, the crew of the *Brunswick* disconnected the pipeline and moved the piping clear. The *Royal Engineer* tow then passed to the east of the dredge and proceeded on its southbound route. The *Royal Engineer* tow arrived at its destination at 1725. At 1740, the *Brunswick* relocated to the eastern side of the river and clear of the STS crane as a precaution in the event of collapse. The *Celsius Nicosia* sailed from the marine terminal at 2000.

1.3 Additional Information

1.3.1 Damage

The contact caused the STS crane to twist along its vertical axis, damaging the crane and dislodging it from the pier's gantry rail system. According to a damage assessment report, the damage to the crane included a "nearly complete wrecking" of the gantry assemblies at each corner, which compromised the crane's stability; minor damage to the operator's cabin; damage to the platforms and equipment at the boom tip where the contact occurred; and surface damage to the pier structure (see figure 6). The crane was deemed to be structurally unstable immediately following the incident, and it was subsequently relocated, stabilized, and stored for repairs. Repairs were completed in February 2025. Damage to the terminal's crane was estimated to be over $4.5 million.

Figure 6. *Left to right*: The damaged STS crane. Circled areas show (1) metal distress and (2) damage to one of four gantry assemblies.

The *Stevens 1471* crane barge suffered minor superficial damage at the point of impact on the upper mast point assembly.

1.3.2 Dredging Operations

Information regarding the dredging operations on the Cooper River was originally published in the Coast Guard District 7 Local Notice to Mariners 51/23 on December 20, 2023, and was included in the most recent Local Notice to Mariners at the time of the contact.[5] The mate told investigators that he was aware of the dredging operations and had transited the area between the dredge and the North Charleston Terminal on January 3, 2024, the day before the contact. However, during the previous transit, there was no ship berthed at the terminal, and the STS cranes' gantry booms had all been stowed in the near-upright position.

1.3.3 Ship-to-shore Crane Information

The STS crane that was struck reached 110 feet past the outboard side of the *Celsius Nicosia*, according to technical drawings, and 134 feet above the deck of the pier at the point of contact (see figure 7). At the time of the incident, the water level was about 8 feet 4 inches below the deck of the pier.

[5] See https://www.navcen.uscg.gov/sites/default/files/pdf/lnms/LNM07512023.pdf and https://navcen.uscg.gov/sites/default/files/pdf/lnms/lnm07012024.pdf.

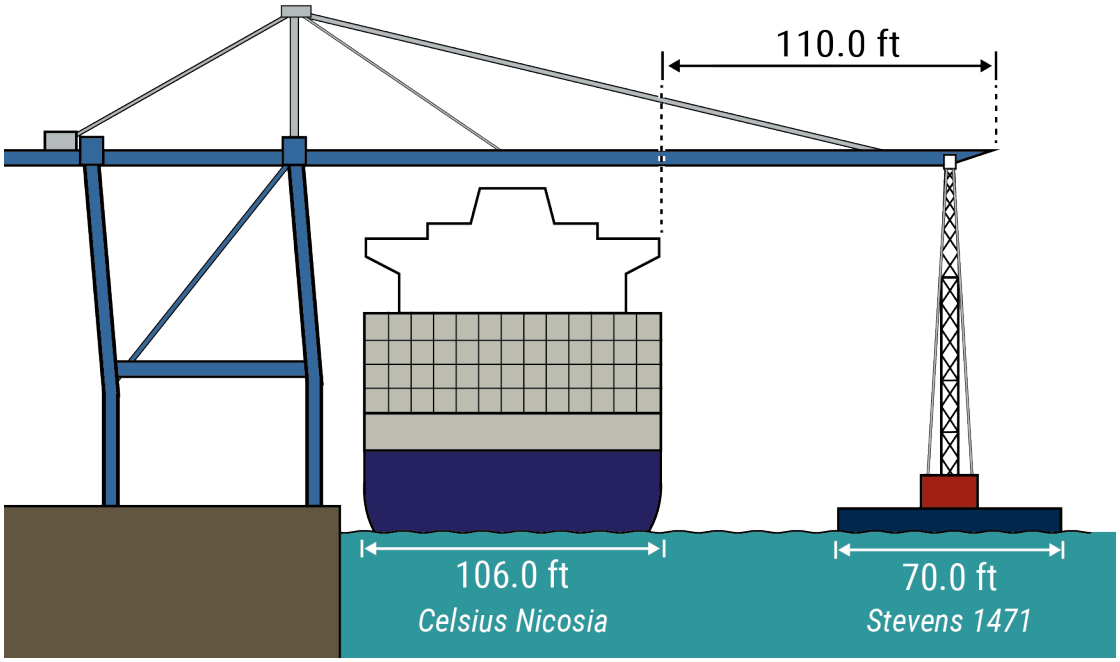

Figure 7. The horizontal extent of the North Charleston Terminal STS crane.

1.3.4 Other Information

The *Royal Engineer* did not operate under a towing safety management system (TSMS). Towing vessels are not required to have a formal TSMS if they are regularly inspected by the Coast Guard in accordance with Title 46 *Code of Federal Regulations* Chapter 1 Subchapter M.

Postcasualty alcohol and other drug testing was conducted for the mate and deckhand of the *Royal Engineer*, with all results negative.

2 Analysis

While the towing vessel *Royal Engineer* was pushing the crane barge *Stevens 1471* in the Cooper River, the tow transited underneath an STS crane at the North Charleston Terminal while maneuvering through a narrow area between a docked containership and a dredging vessel because the dredge's floating discharge pipeline was blocking the rest of the channel. The barge crane contacted the STS crane, resulting in extensive damage to the STS crane.

The *Royal Engineer* mate 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*.

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 mate asked the deckhand if it looked like the top of the crane barge's mast would pass beneath the STS crane boom, and the deckhand responded that he thought it would. However, from the deckhand's position on the deck of the barge, about 144 feet lower than the highest point of the crane mast, his angle of view would have precluded him from making an accurate judgment. Had the *Royal Engineer* mate been aware of the STS crane boom

extending beyond the containership when he was determining passing arrangements, he likely would have realized the STS crane was a potential hazard and made a plan to avoid it.

3 Conclusions

3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the contact of the crane barge *Stevens 1471* with a North Charleston Terminal ship-to-shore crane was the towing vessel mate not identifying that the ship-to-shore 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.

3.1 Lessons Learned

Identifying that Ship-to-shore Cranes May be an Overhead Hazard

Ship-to-shore 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.

Vessel Particulars

Vessel	*Royal Engineer*	*Stevens 1471*
Type	Towing/Barge (Towing Vessel)	Towing/Barge (Crane barge)
Owner/Operator	Stevens Towing Co Inc. (Commercial)	Stevens Towing Co Inc. (Commercial)
Flag	United States	United States
Port of registry	Yonges Island, South Carolina	Yonges Island, South Carolina
Year built	1965	2002
Official number (US)	501746	1306872
IMO number	N/A	N/A
Classification society	N/A	N/A
Length (overall)	60.6 ft (18.5 m)	140.0 ft (42.7 m)
Breadth (max.)	22.2 ft (6.8 m)	70.0 ft (21.3 m)
Draft (casualty)	9.2 ft (2.8 m)	6.0 ft (1.8 m)
Tonnage	103 GRT	1,029 GRT
Engine power; manufacturer	2 x 400 hp (298 kW); Volvo D 165	N/A

NTSB investigators worked closely with our counterparts from **Coast Guard Sector Charleston** throughout this investigation.