



# National Transportation Safety Board

## Marine Accident Brief

### Boom Failure aboard Crane Barge *Atlantic Giant II*

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<b>Accident type</b>	Hull/Machinery/Equipment Damage	<b>No.</b> DCA18FM032
<b>Vessel name</b>	<i>Atlantic Giant II</i>	
<b>Location</b>	Brownsville Ship Channel, Brownsville, Texas 25°57.86' N, 097°21.99' W	
<b>Date</b>	August 9, 2018	
<b>Time</b>	2030 central daylight time (coordinated universal time – 5 hours)	
<b>Injuries</b>	3	
<b>Property damage</b>	\$6.4 million est.	
<b>Environmental damage</b>	None	
<b>Weather</b>	Visibility 10 miles, winds southeast 10 mph, seas calm, air temperature 85°F, water temperature 86°F	
<b>Waterway information</b>	In the 14.5-mile-long Brownsville Ship Channel, the section from Goose Island to the Brownsville Turning Basin is 250 feet wide with a controlling depth of 36–39 feet. <sup>1</sup>	

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On August 9, 2018, about 2030 local time, the main boom on the crane barge *Atlantic Giant II* failed while moving a section of a vessel being dismantled in the Brownsville Ship Channel in Brownsville, Texas. The load and crane boom subsequently fell into the harbor. Two shipyard employees working on the barge were injured, as well as a third on board an assisting tugboat. No pollution was reported. Damage to the barge and crane amounted to an estimated \$6.4 million.



*Atlantic Giant II* prior to accident. (Photo courtesy of South Coast Maritime Corporation)

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<sup>1</sup> All miles in this report are nautical miles (1.15 statute miles).

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Area of accident where *Atlantic Giant II* suffered a crane boom failure in Brownsville, Texas, as indicated by red triangle. (Map data from Google Maps)

### Background

The *Atlantic Giant II* was a 225-foot-long crane barge with a 94-foot beam. The vessel was built at the Keppel AmFELS shipyard in 2014 for its affiliate, South Coast Maritime Corporation (hereafter referred to as “SCM”). On the day of the accident, the vessel was contracted to assist with ship-breaking operations at the SteelCoast facility in the Port of Brownsville, Texas.<sup>2</sup> A captain of an SCM tugboat estimated that the barge was moved for this type of work weekly and stated that the vessel had been at SteelCoast the previous week. Once on scene, the barge was held in place by its two hydraulically operated spuds (port and starboard, forward).<sup>3</sup>

The barge crane was mounted on a centerline pedestal located on the main deck 25 feet forward of the transom. The crane included a 245-foot main boom and 100-foot jib. Parts of the crane’s load system, which included an anemometer, a boom angle indicator, a boom upper and lower limit switch, and a winch camera, were all updated in 2017; the crane was subsequently load-tested in September 2017. Based on the load capacity chart, the safe working load for a boom angle of about 66–75 degrees was 700 tons.<sup>4</sup>

<sup>2</sup> South Coast Maritime is not affiliated with SteelCoast.

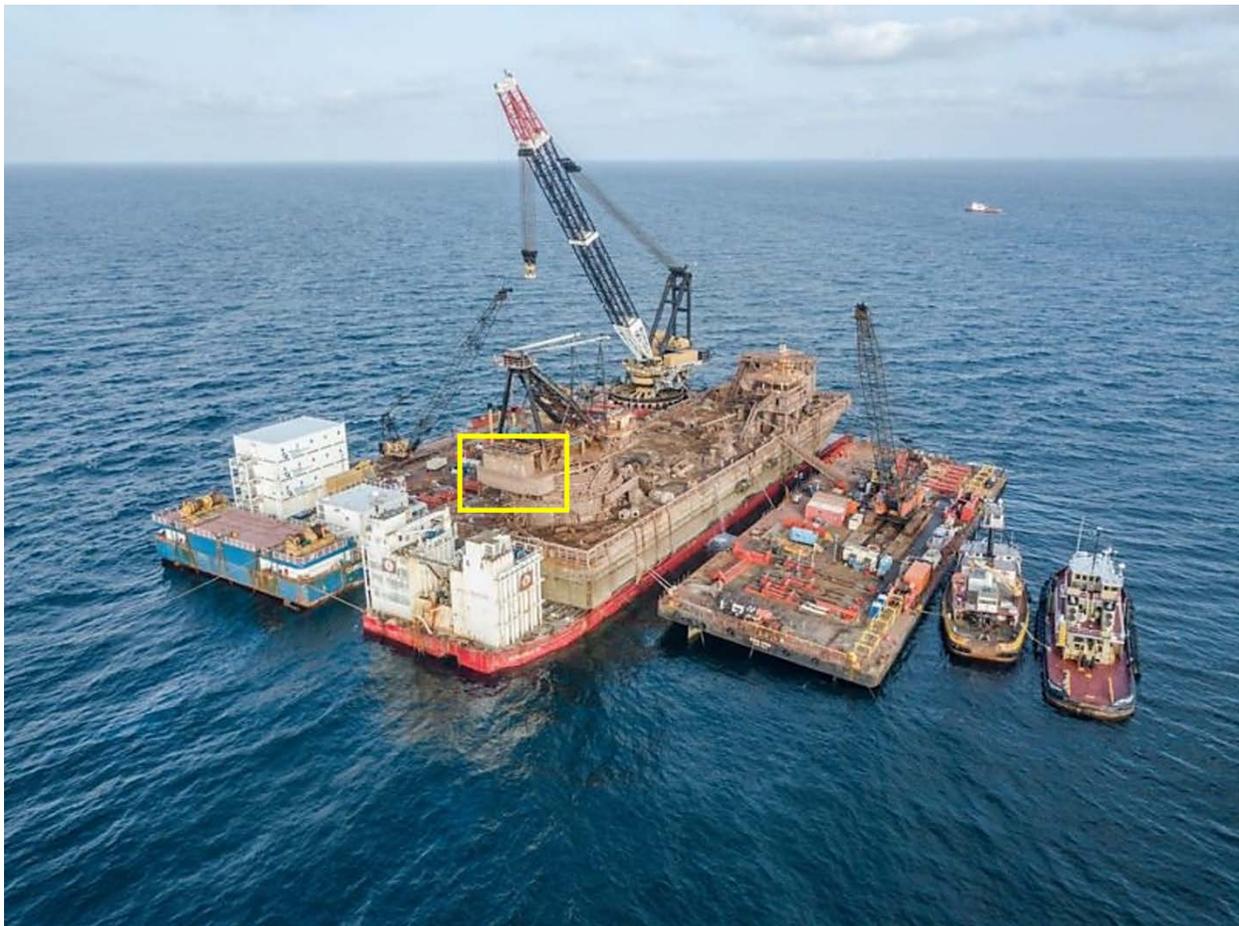
<sup>3</sup> *Spuds* are sections of pipe driven into the seafloor.

<sup>4</sup> Tons in this report refer to short tons (2,000 pounds).

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The Port of Brownsville is a deepwater port near the Mexican border, located 14.5 miles inland of the Gulf of Mexico. The port handles a variety of cargo, including steel products. At the time of the accident, SteelCoast, a ship recycling firm, was dismantling the former derrick barge *TOPS DB1* at its facility on the north bank of the Brownsville Ship Channel. The 47-year-old *TOPS DB1*, which sank in a Gulf of Mexico storm in October 2017, was a 350-foot-long, 7,581-ton barge outfitted with accommodations for 110 people. Salvaged in August 2018, *TOPS DB1* was still aboard the *BOABARGE 29*, which had transported it to Brownsville.<sup>5</sup>

On the evening of the accident the weather was clear with a gentle southeast breeze. Low tide was at 1956 with a range of 2 feet.



Derrick barge *TOPS DB1* loaded on *BOABARGE 29* during offshore salvage operations in early 2018. Yellow rectangle highlights counterweight lifted by *Atlantic Giant II*. (Photo courtesy of Resolve Marine Group)

<sup>5</sup> *BOABARGE 29* was a Norwegian-flagged, 407-foot-long, semi-submersible barge.

### Accident Events

SCM and Keppel AmFELS representatives made visits to SteelCoast beginning on August 1 to plan for the lifts and inspect lifting points.<sup>6</sup> By 0730 on August 9, tugboats shifted the *Atlantic Giant II* to the SteelCoast facility. Using internal checklists, SCM crewmembers inspected *Atlantic Giant II*'s equipment and found no deficiencies. Crews from SteelCoast, SCM, and Keppel AmFELS then conducted a pre-job meeting that included a review of the lift plan, sequence of events, hazards, controls, and emergency preparedness. The lift plan for that day included the *TOPS DBI* crane's A-frame, the counterweight to the crane, and the crane pedestal.<sup>7</sup> The plan also included a job risk analysis form with a checkbox that had been marked to indicate the lifts would not exceed 75 percent of the crane's capacity.

By 0930, SteelCoast and Keppel AmFELS crews had rigged *Atlantic Giant II*'s main hoist to the A-frame aboard the *TOPS DBI*, which per the work order was expected to weigh 30 tons. The crane took up 30 tons of tension on the A-frame while crews cut the lift free of the *TOPS DBI*. Once free, the *Atlantic Giant II* swung the lift around and set it down on the scrap yard dock. However, the SCM crane operator told investigators that the suspended A-frame's final weight measured 53 tons, according to the load sensor.

Next, tugboats moved the *Atlantic Giant II* into position for the counterweight, and the spuds were lowered. In the pre-job meeting, SteelCoast had stated that the *TOPS DBI*'s crane counterweight weighed 350 tons, which correlated with the original work order from SteelCoast dated August 1.<sup>8</sup> By 1500, the lift was rigged using a four-part sling, along with four 200-ton chains and 200-ton shackles (the written lift plan called for four 20-foot, 130-ton slings rather than 200-ton chains). According to the crane operator, it was initially rigged for a 550-ton lift at a 60-degree boom angle. Following the lift plan, Keppel AmFELS instructed the crane to take up 350 tons of tension with the main hoist while crews cut the lift free of the *TOPS DBI*. By 1645, after the lift was cut free, the crane was ordered to take up 400 tons, but the lift did not move. All parties then agreed to take up 500 tons of tension.

At 500 tons of tension, the load still did not move. After confirming the load was not attached to *TOPS DBI*, Keppel AmFELS ordered an increase of tension to 550 tons. When the lift did not move under 550 tons of tension, Keppel AmFELS contacted SCM's president who stopped the operation and came to the SteelCoast yard. There, he suggested to SteelCoast that they secure the load on *TOPS DBI* and regroup. SteelCoast believed that stopping the job at this time would be more hazardous as the load was already cut free from *TOPS DBI* and partially suspended from the *Atlantic Giant II*. At 1932, SCM's president instructed the crane operator to come up to, but not exceed, the crane's maximum working load (700 tons). If that increase did not move the weight, he intended to cancel the work.

Tugboats again repositioned the *Atlantic Giant II* in order for it to boom up to a maximum weight. The operator told investigators that when the crane first hoisted the load, the load sensor measured about 675 tons while fully suspended at 69–70 degrees to clear the drydock pilothouse. Crewmembers overheard the crane operator on the radio stating the load was 698.1 tons at

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<sup>6</sup> Keppel AmFELS is a minority owner closely affiliated with SCM.

<sup>7</sup> A fourth lift, the crane cabin, was not discussed, because supervisors believed there would not be time to complete it in one day.

<sup>8</sup> Counterweights supply an opposite force to large crane loads, providing balance and stability to pedestal cranes.

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60.7 degrees. The crane operator later indicated that the sensor was fluctuating between 650 and 700 tons.

The operations stopped briefly to cut away a handrail on which the load had snagged. With the load suspended above and clear of any obstructions, crews prepared to move the barge out into the channel toward the SteelCoast west dock. At this time, the *Atlantic Giant II* was trimmed by the stern. Both tugboat captains and a mechanic on the tugboat *JCT III* noticed the barge's bow 1.5 feet out of the water due to the suspended weight aft and communicated this issue to the crane operator.

Two tugboats were used to rotate and move the *Atlantic Giant II* and the counterweight toward the dock. Before they rotated the barge from facing east to southeast, the port spud was raised. After it was lowered, one of the tugboats repositioned. The port spud was then raised again, followed by the starboard spud. However, at about 2030, shortly after the starboard spud was raised, the barge heeled to starboard and the crane's boom collapsed. The port stay failed first, dropping the load into the channel.<sup>9</sup>



Collapsed crane boom on *Atlantic Giant II*. In background are *TOPS DB1* and *BOABARGE 29*. (Photo by Coast Guard)

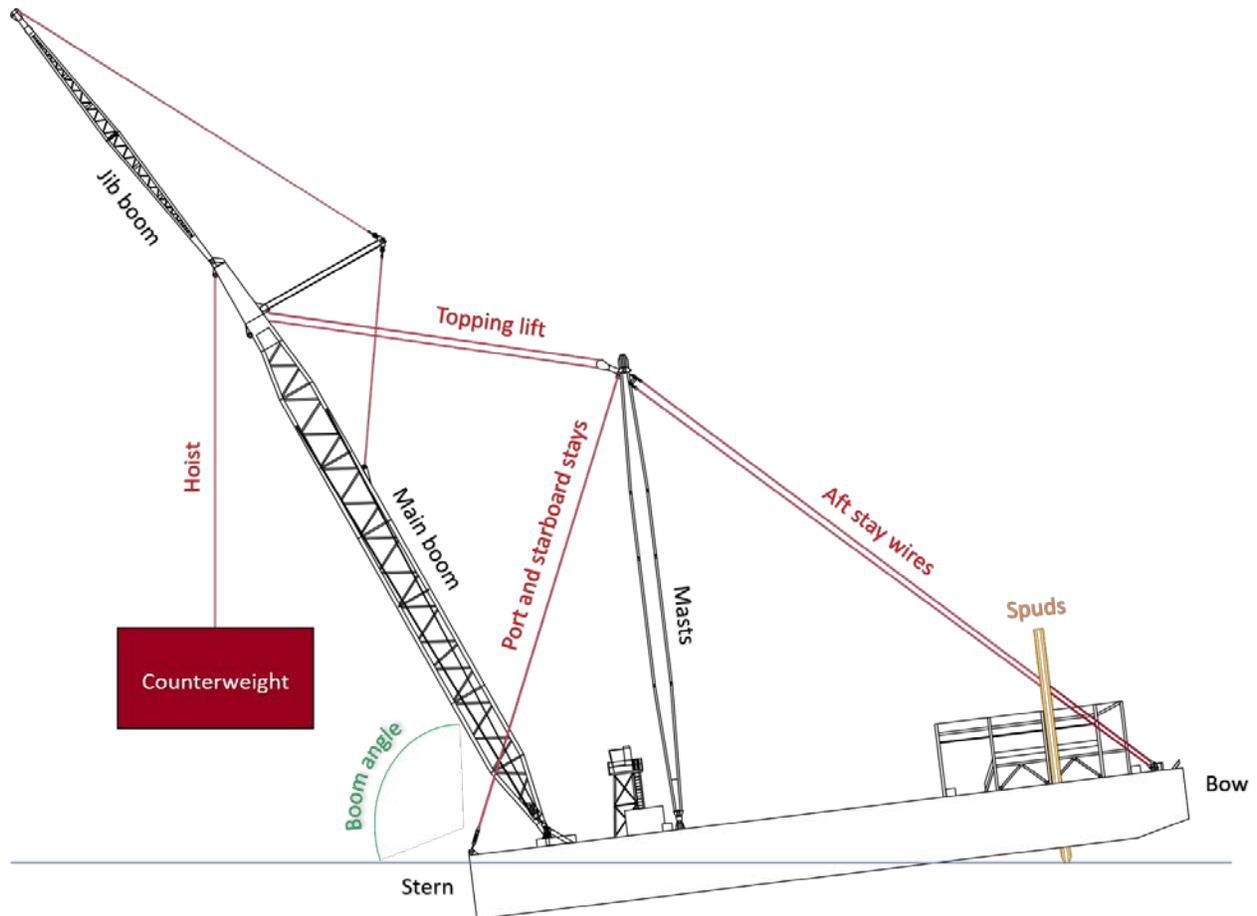
Immediately following the crane collapse, a mechanic aboard the *Atlantic Giant II* fell and fractured his ankle, and the crane operator fell to the deck injuring his shoulder and back. A deckhand on the assisting tugboat *BND Tug II* also fell and suffered an injury to his right leg. Despite their injuries, all hands on the *Atlantic Giant II* were able to evacuate to the tugboats.

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<sup>9</sup> Stay wires stabilize a mast in place.

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When the counterweight was later recovered from the water, salvors reported the lift weighed 671 tons.

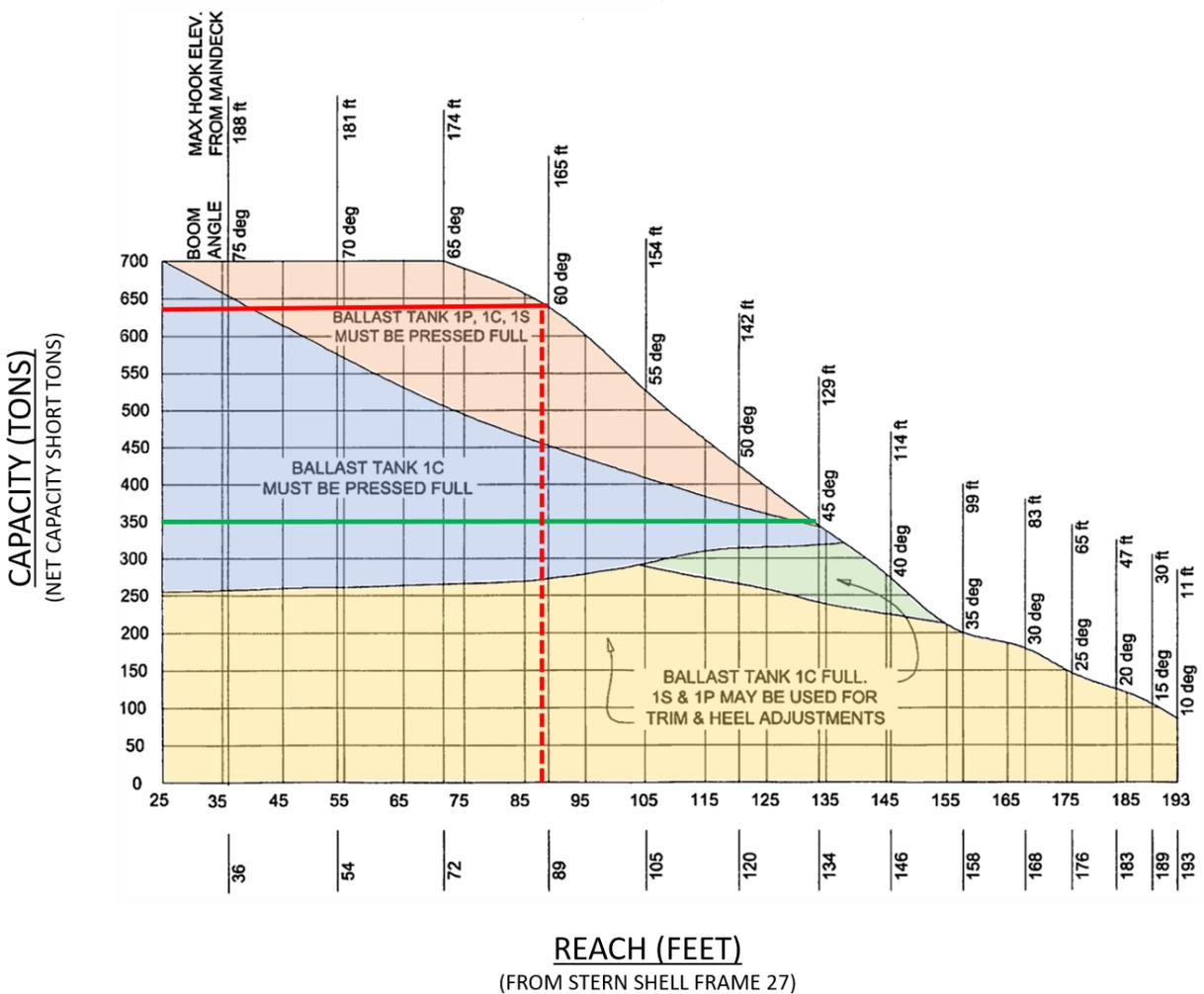


Simplified diagram of *Atlantic Giant II* illustrates barge's trim and boom angle relative to sea level, as crane hoists *TOPS DB1*'s counterweight. (Dimensions and angles not drawn to scale.)

### Additional Information

The *Atlantic Giant II* had 16 ballast tanks. The no. 1 port (P), center (C), and starboard (S) tanks were across the bow, opposite the crane. As indicated in the load capacity chart for the main boom (below), which specified the minimum ballast for given loads and boom angle, the no. 1C tank was required to be pressed full for lifts of approximately 270–450 tons at a 60-degree boom angle. Nos. 1P, 1C, and 1S were required to all be pressed full for lifts greater than 450 tons, also at a boom angle of 60 degrees. According to SCM management, these three tanks were always kept pressed with fresh water to keep the barge ready for maximum load.

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Crane capacity chart for *Atlantic Giant II*. Solid red line overlaid onto chart indicates maximum weight of 645 tons for a 60.7-degree boom angle (dashed red line). Green line indicates planned lift of 350-ton counterweight. (Colors added to distinguish between ballast tank requirements)

### Analysis

The weight of the lifts to be made were provided by the *TOPS DBI*'s previous owners, according to SteelCoast. Keppel AmFELS' internal investigation of the crane failure determined that when the spuds were retracted to move the *Atlantic Giant II*, the crane was affected by additional factors: including "wind, wave action, and drifting action." These factors resulted in the suspended counterweight shifting to starboard, thereby sidelading the crane boom. Because the suspended load was not centered below the boom, the crane collapsed to the starboard side of the barge.

Typically, load chart ratings are based on the crane being perfectly level in all directions. A crane that is not level due to a list causes sidelading of the boom, thus reducing the rated capacity. The crane operator stated that he boomed up to 69 or 70 degrees; the Keppel AmFELS' incident report stated 68 degrees. Therefore, the vessel would have trimmed at least 7 degrees by the stern—hence the 1.5 foot of air gap the tugboat captains witnessed at the barge's end opposite of the crane—for the boom angle to read 60.7 degrees when the weight was suspended. At 60.7 degrees of boom angle, the maximum capacity of 645 tons was exceeded by 26 tons. The trim

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likely contributed to the crane being overloaded by reducing the boom angle relative to the water. After the accident, SCM issued additional internal guidelines for crane barge lifting operations that call for more detailed weight, structural, and stress information from clients.

Ballasting and stability information was not included in the job risk analysis or lift plan. Although SCM stated that the *Atlantic Giant II* was always ballasted for its maximum load of 700 tons, no additional ballasting was completed when the load was discovered to be heavier, nor were any stability calculations completed, including longitudinal center of gravity and expected trim.



**Counterweight being recovered from harbor. (Photo by Coast Guard)**

The first lift, the A-frame, made by the *Atlantic Giant II* was almost double the planned weight, yet work proceeded with the next much heavier lift. There were numerous opportunities for employees to stop the work, including the times when the lift was initially at 400 tons, then increased to 500 tons, and later to 550 tons of tension—yet none of those attempts moved the load. The deviation from the planned 350 tons communicated by the client was not immediately investigated to determine the source of the discrepancy. Furthermore, there was no discussion that the 75 percent of the maximum lift (525 tons) indicated on the job risk analysis form had been exceeded. Similarly, the tugboat captains' reports of *Atlantic Giant II*'s stern coming clear of the water went unanswered.

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### Probable Cause

The National Transportation Safety Board determines that the probable cause of the boom failure aboard the crane barge *Atlantic Giant II* was the decision by South Coast Maritime and SteelCoast to continue with a lift that exceeded the planned weight without conducting additional risk assessments for the continuation of work as the crane neared its maximum capacity.

### Dynamic Risk Assessment

Unplanned changes to work plans can move operations incrementally toward states of higher risk. Dynamic risk assessment requires that work stop when new hazards are identified, the situation is evaluated, and action is taken to control the added risks. Vessel operators should ensure crews at all levels of the organization have the authority and/or obligation to stop work when such hazards are identified.

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### Vessel Particulars

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Vessel	<i>Atlantic Giant II</i>
Owner / operator	Wells Fargo Equipment Finance, Inc. / South Coast Maritime Corp.
Port of registry	Brownsville, Texas
Flag	United States
Type	Freight barge
Year built	2014
Official number (US)	1256368
IMO number	Not applicable
Classification society	Not applicable
Construction	Welded steel
Length	225 ft (68.6 m)
Beam / width	80 ft (24.4 m)
Tonnage	3,553 gross / 3,553 net
Engine power; manufacturer	None
Persons on board	4

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NTSB investigators worked closely with our counterparts from Coast Guard Marine Safety Detachment Brownsville and Occupational Safety and Health Administration Corpus Christi Area Office throughout this investigation.

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For more details about this accident, visit [www.nts.gov](http://www.nts.gov) and search for NTSB accident ID DCA18FM032.

### Issued: July 16, 2019

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The NTSB has authority to investigate and establish the probable cause of any major marine casualty or any marine casualty involving both public and nonpublic vessels under Title 49 *United States Code*, Section 1131(b)(1). This report is based on factual information either gathered by NTSB investigators or provided by the Coast Guard from its informal investigation of the accident.

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

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

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