



National Transportation Safety Board

Marine Accident Brief

Allision of *Steve Plummer* Tow with CSX Railroad Bridge

Accident no.	DCA17FM009
Vessel name	<i>Steve Plummer</i> and barges <i>HMT301</i> , <i>H4128B</i> , and <i>HMT316</i>
Accident type	Allision
Location	Cumberland River, mile 190.4; Nashville, Tennessee 36° 10.27' N, 086° 46.68' W
Date	March 11, 2017
Time	1120 central standard time (coordinated universal time – 6 hours)
Injuries	None
Damage	\$71,355 to the barges; \$1,715,112 to the upstream bridge guard pier
Environmental damage	None
Weather	Overcast, visibility 7 miles, winds north at 12 mph, air temperature 35°F
Waterway information	Cumberland River, downtown Nashville. The river had a projected navigational depth of 9 feet at a normal pool reading of 16.8 feet. At the time of the accident, the river gage was 23.5 feet and rising due to heavy precipitation from the previous day, corresponding to a navigational depth of 15.7 feet.

On March 11, 2017, at 1120 local time, the towing vessel *Steve Plummer* was pushing three loaded barges on the Cumberland River in Nashville, Tennessee. As the tow passed beneath the CSX Railroad Bridge at mile 190.4, the second and third barges allided with the bridge's upstream guard pier.¹ No injuries or pollution resulted from the accident; however, the two barges sustained damage and the guard pier was destroyed in the allision.



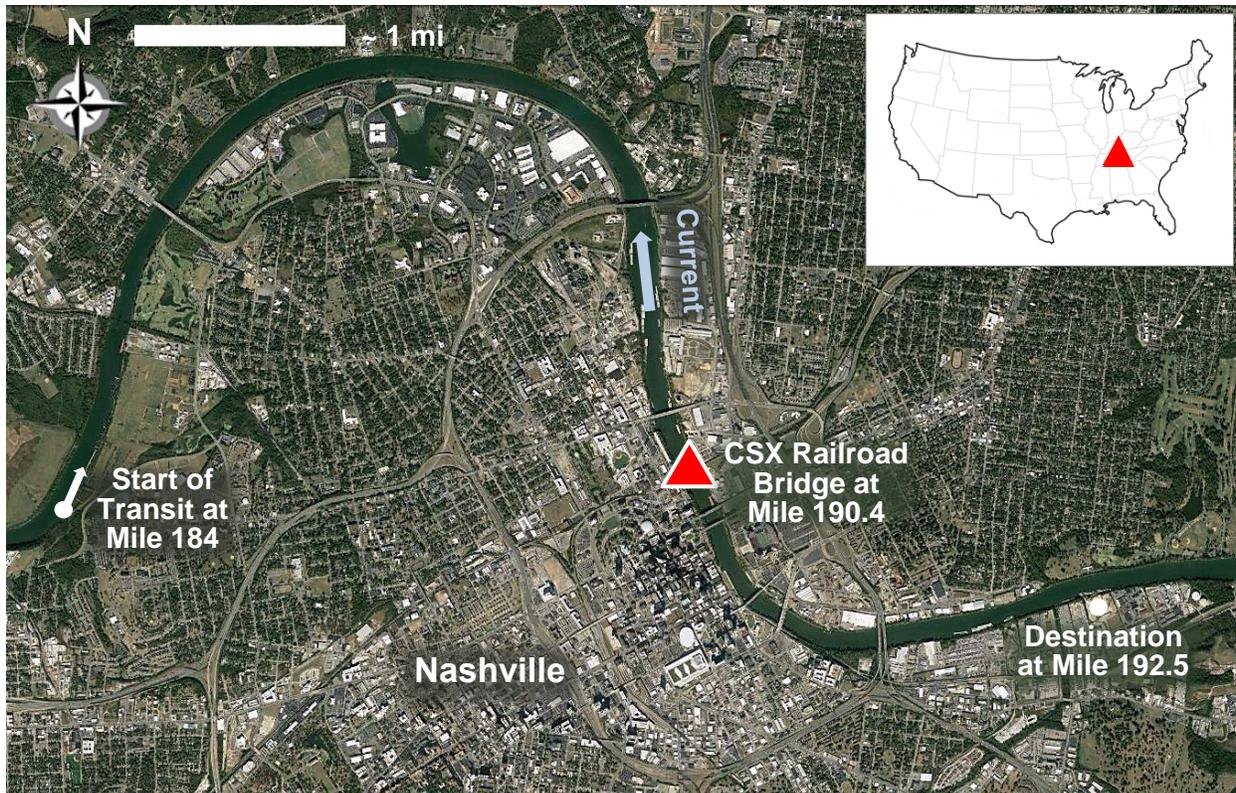
The undamaged *Steve Plummer* under way after the accident.

¹ In this report, all miles are *statute miles* and speeds are *speed over ground*.

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Accident Events

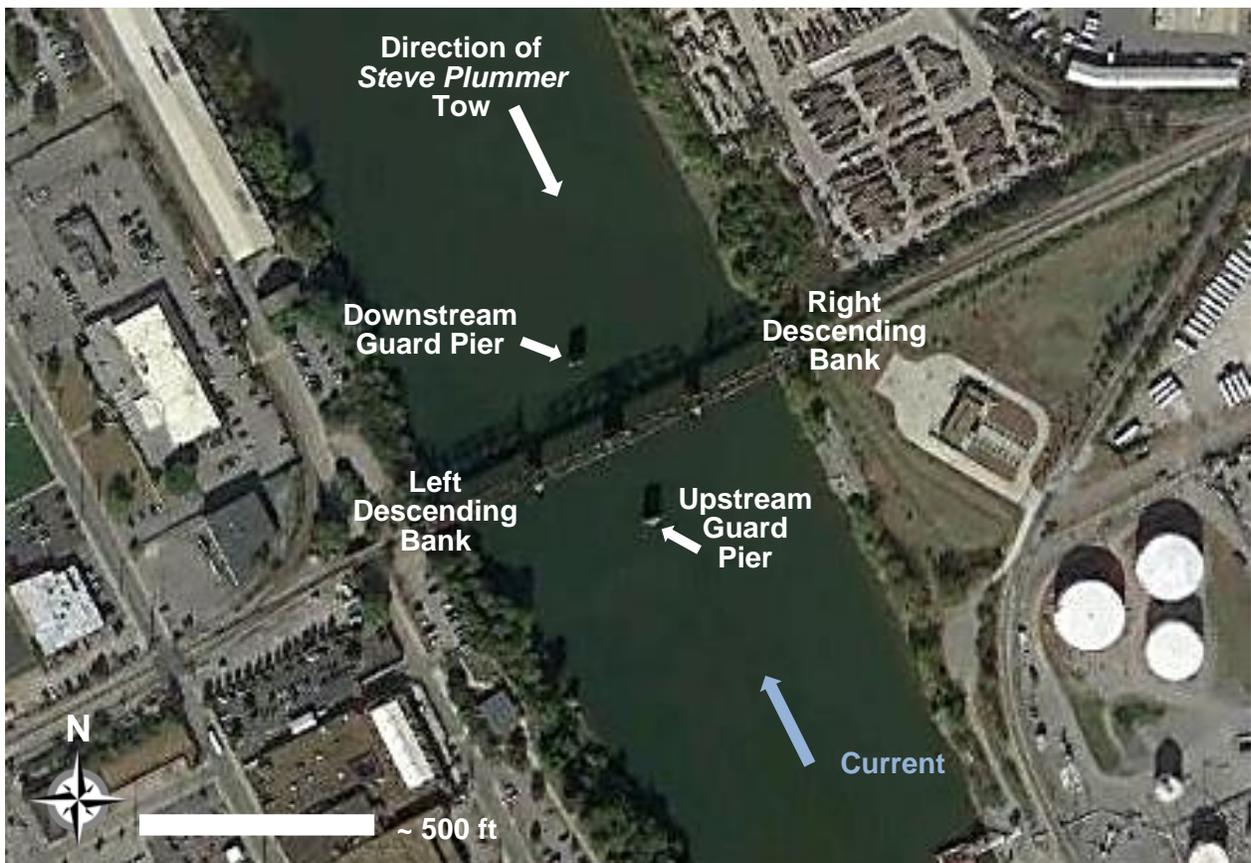
At 1022 on the morning of March 11, 2017, the 50-foot-long towing vessel *Steve Plummer*, with three crewmembers on board, got under way from the Pine Bluff Materials fleeting area at Cumberland River mile 184, pushing ahead three loaded open sand barges in a single tow-string. *HMT301* was the lead barge; *H4128B* the second (middle) barge; and *HMT316* the third barge, connected to the bow of the *Steve Plummer*. The tow, 590 feet long by 35 feet wide, was on a routine 8.5-mile upstream transit (against the current) to the Pine Bluff Materials sand yard at mile 192.5 to drop off the loaded barges.



Satellite image of the Cumberland River in Nashville, with the accident site marked by a red triangle. (Background by Google Earth)

At 1030, the *Steve Plummer* operator (also called “pilot” on inland rivers) noted that the river stage was higher than the previous day, with a swift current of about 3 mph that limited the vessel’s upstream speed to about 3.5 mph. At 1110, the *Steve Plummer* tow approached the CSX Railroad Bridge at mile 190.4, which spanned a 693-foot-wide section of the river and provided a rail-cargo link between Louisville, Kentucky, and Nashville. The swing span was centered on a pivot pier—pier 2—and vessels could transit on either side with 116 feet of horizontal clearance. When the bridge was in the closed position and in train operational mode, each end of the swing span was supported on a rest pier: pier 1 near the right descending bank; pier 3 near the left. The bridge also had two guard piers to protect the swing span when in open position: one guard pier was located 134 feet upstream of pier 2; the other 134 feet downstream of it. Each guard pier was 28 feet wide and constructed with concrete and stone blocks. On the day of the accident, the bridge’s vertical clearance, accounting for the river level at the time, was 45 feet. The *Steve Plummer* tow’s air draft was 30 feet and therefore did not require the bridge’s swing span to open.

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Top, the approximate vantage point of the *Steve Plummer* tow as it approached the CSX Railroad Bridge from downstream. (Photo by Coast Guard) Bottom, aerial view of the CSX Railroad Bridge and the guard piers. (Background by Google Earth)

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Barges from the *Steve Plummer* tow pinned against the upstream side of the CSX Railroad Bridge. (Photo by Coast Guard)

As the *Steve Plummer* tow approached the bridge, the pilot positioned the tow to transit through the opening near the right descending bank; however, he noticed that the tow was being set toward the middle of the river. He then tried to correct for the set by increasing speed and adjusting the rudders. *HMT301*, the lead barge, successfully passed beneath the bridge span and past the upstream guard pier. However, at 1120, the second barge, *H4128B*, allided with the guard pier and caused pieces of stone to break off and fall onto the barge deck and into the river. The pilot sounded the general alarm, reversed the throttles, and shifted the rudders to prevent third barge *HMT316* from hitting the guard pier and to keep the forward barges from wrapping around it, but to no avail. *HMT316*'s stern struck the upstream guard pier, causing it to collapse into the river. The wire lines connecting the barges parted, and the barges drifted with the current, becoming pinned against the bridge.

The *Steve Plummer* pilot radioed for assistance and, at 1145, reported the accident to the Coast Guard, who informed the bridge owner,

CSX. About 1150, CSX stopped rail traffic to the bridge, and the towing vessels *Traci K* and *James Hunter* arrived on scene to help recover the three barges, which were subsequently moored upstream from the bridge. The Coast Guard established an emergency safety zone and closed the waterway to navigational traffic 200 yards from the bridge in each direction. A CSX inspector confirmed that the bridge's upstream guard pier had collapsed. CSX later opened the bridge to rail traffic with a speed restriction until divers had surveyed the main bridge structure. No pollution or injuries were reported. The tow was later reassembled, and the *Steve Plummer* delivered the barges to the Pine Bluff Materials sand yard. Samples were taken from the crew for toxicological testing; all results were negative.

The *Steve Plummer* and *HMT301* were undamaged. The other two barges had the following damage: *H4128B* had a 20-inch inset to the no. 5 starboard void space, which cost \$33,253 to repair. *HMT316* sustained a hole about 3 feet by 5 feet to the no. 1 port void space below the waterline about 15 feet aft of the forward bulkhead. The void space flooded to the waterline and had to be dewatered. The cost to repair *HMT316* was \$38,102. The upstream guard pier was destroyed by the allision. A replacement pier, constructed with corrugated steel, was built to the same dimensions and position as the original, for a total cost of \$1,715,112. The new guard pier was completed on September 21, 2017.

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Looking downstream at the CSX railroad bridge with the swing span closed. From left, the new steel upstream guard pier, pier 2 (the center/axis pier of the swing span), and the downstream guard pier.

Background

The vessel. The *Steve Plummer*, an uninspected towing vessel, was built in 1966 by the Barbour Metal Boat Works, St. Louis, Missouri, as the *Philip S. II*. The vessel was sold several times and, in 2015, renamed the *Steve Plummer*. The following year, 2016, the vessel was purchased by Pine Bluff Materials LLC, a company that distributed sand and gravel by barge in the Ohio, Tennessee, and Cumberland river systems, with six distribution sites and a fleet of 7 towing vessels and 147 barges. The *Steve Plummer* had twin propellers, each powered by a diesel engine rated at 350 horsepower (hp).

The pilot. The *Steve Plummer* pilot, age 44, held a credential as master of towing vessels upon Western Rivers, issued on December 8, 2016. He had worked for a previous company for 10 years – 9 years as deck/steersman and his last year as pilot on the Ohio River with a master's credential obtained in 2013. When Pine Bluff Materials acquired that company and its vessels, the pilot continued his employment under the new ownership and had been working for the current company for 3 months. The company had him work under the observation of a senior company pilot in the Nashville area, and he was recommended to company management as ready to work as the single pilot of a tow. His schedule was 2 weeks of day shift, 2 days off, and 2 weeks of night shift. He made the transit almost daily – taking loaded or empty barges back and forth, passing through 10 bridges each way without incident.

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The river. The Cumberland River in Nashville was within its normal range at the time of the accident. River gage NAST1, 0.72 miles upriver from the accident site, showed 23.48 feet and rising. According to the National Weather Service (NWS) Nashville, from March 10 to March 11, the river stage rose about 3 feet and the discharge rate increased 43 percent, from 28,000 to more than 40,000 cubic feet per second, due to heavy precipitation that had fallen the previous day. The NWS Nashville hydrologist calculated the current at the time of the accident to be about 3 mph, which was the same as the pilot's estimate of the current on the day of the accident.

The bridge. The accident bridge was completed in 1932 and was the fifth railroad bridge on the site, rebuilt on the same piers as the original 1858 bridge. Other than an 1864 photo, no records exist of the original bridge guard piers. In 1897, they were reinforced with stone. According to the Coast Guard, during the 9 years before the accident, CSX encased the piers in concrete to strengthen them.

The CSX Railroad Bridge was the fifth bridge on the *Steve Plummer*'s accident transit and, from 2008 to 2017, there were 12 allisions associated with this bridge. According to the Coast Guard District 8 Bridge Office, the cost to the government to remove the swing span and replace it with a fixed span with 300 feet of horizontal clearance would be more than \$75 million.

Analysis

Investigators researched industry and Coast Guard guidance for installed towing vessel hp requirements per typical loaded river barge. Industry discussion varied from 175 to 240 hp per 2,000-ton barge in normal- to medium-high river conditions, using an experienced operator. The Coast Guard's Towing Vessel Center of Expertise stated that there are no regulatory vessel-hp-to-barge requirements or guidance, but both Coast Guard and industry have widely used 250 hp per loaded barge as "best practice" on inland rivers. Based on these hp-to-barge ratios, the 700-hp *Steve Plummer* pushing three barges (carrying a total of 3,934 tons of cargo) was within the industry norm for an experienced operator. Although the Cumberland River was rising from recent rain, at the time of the accident the river was within its normal range.

The *Steve Plummer* pilot was familiar with the route, having made the transit almost daily in both directions for the previous 3 months without incident. He said that, on the day of the accident, the current was swift at 3 mph and his 3.5-mph speed was the maximum forward speed that the tow could make. The *Steve Plummer* tow had little additional power and thus limited maneuvering ability when passing through the bridge's right descending bank channel span.

The company stated that the number of barges the *Steve Plummer* towed depended on the river conditions, weather, the area of transit, and the pilot's level of comfort. The *Steve Plummer* could tow four barges during slack-water conditions, typically towed three barges during normal river conditions, and towed one or two barges during high-water conditions. The company stated that it left the barge number decision to the individual tow pilots. Although not required in company guidance, a pilot could check with a more senior pilot (if conditions warranted) about reducing the tow size to allow for more control in high-water conditions. The accident pilot did not check with a more senior pilot before the transit. After the allision, the company reduced the tow size to a maximum of two barges through the CSX Railroad Bridge.

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Probable Cause

The National Transportation Safety Board determines that the probable cause of the *Steve Plummer* tow's allision with the CSX Railroad Bridge was the pilot's decision to tow three loaded barges during rising river conditions with swift currents, which overwhelmed his ability to maneuver the tow through the bridge.

Vessel Particulars

Vessel	<i>Steve Plummer</i>	<i>HMT301</i>	<i>H4128B</i>	<i>HMT316</i>
Owner/operator	Pine Bluff Materials	Pine Bluff Materials	Pine Bluff Materials	Pine Bluff Materials
Port of registry	Nashville	Nashville	Nashville	Nashville
Flag	United States	United States	United States	United States
Type	Uninspected towing vessel	General barge	General barge	General barge
Year built	1966	1993	2016	1998
Official number (US)	506165	996888	CG1434131	CG1434133
IMO number	N/A	N/A	N/A	N/A
Classification society	N/A	N/A	N/A	N/A
Construction	Steel	Steel	Steel	Steel
Length	50 ft (15.2 m)	195 ft (59.4m)	200 ft (61 m)	195 ft (59.4m)
Draft	6.6 ft (2 m)	11 ft (3.3 m)	11 ft (3.3 m)	11 ft (3.3 m)
Beam/width	23 ft (7 m)	35 ft (10.7 m)	35 ft (10.7 m)	35 ft (10.7 m)
Gross and/or ITC tonnage	66 gross tons	630 gross tons	646 gross tons	630 gross tons
Engine power; manufacturer	Twin 350-hp Caterpillar 3406 (700 hp, 522 kW total)	N/A	N/A	N/A
Persons on board	3	0	0	0

NTSB investigators worked closely with our counterparts from Coast Guard Marine Safety Detachment Nashville throughout this investigation.

For more details about this accident, visit www.nts.gov and search for NTSB accident ID DCA17FM009.

Issued: May 1, 2018

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. 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).