



National Transportation Safety Board

Marine Accident Brief

Contact of the *Andrew Cargill MacMillan* Tow with Grain Conveyor

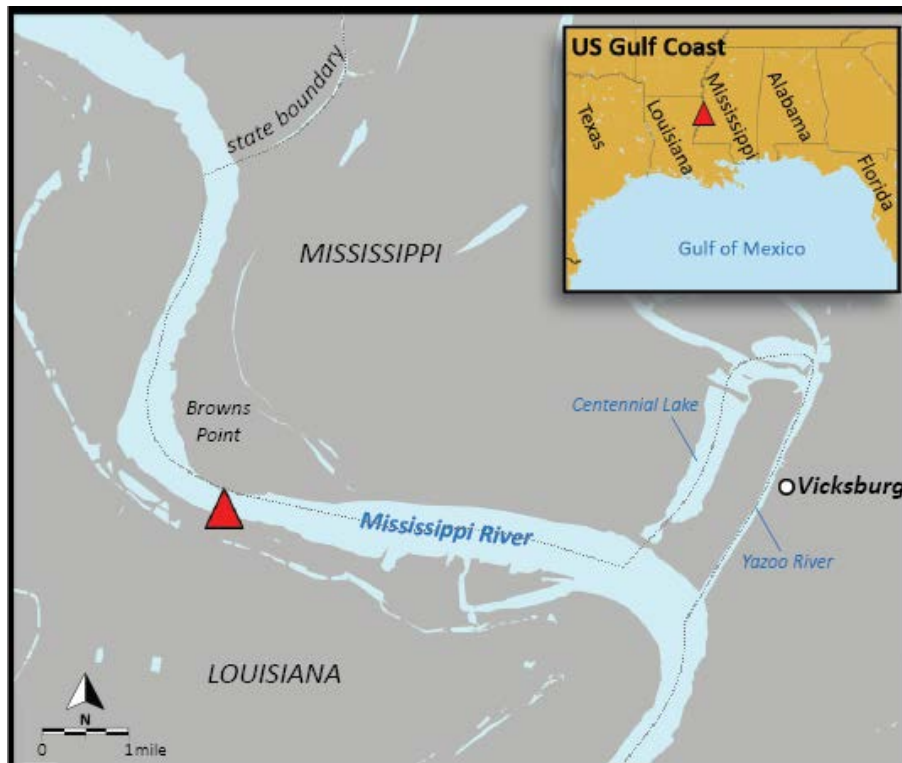
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|-----------------------------|--|-----------------------|
| Accident type | Contact | No. DCA19FM004 |
| Vessel name | <i>Andrew Cargill MacMillan</i> | |
| Location | Lower Mississippi River, near Tallulah, Louisiana, mile 442.4 32°20.87' N, 090°59.02' W | |
| Date | October 23, 2018 | |
| Time | 1426 central daylight time (coordinated universal time – 5 hours) | |
| Injuries | None | |
| Property damage | \$8.07 million est. | |
| Environmental damage | None | |
| Weather | Visibility 7 miles, overcast, light northerly winds, current 5.5 mph est., air temperature 67°F | |
| Waterway information | Lower Mississippi River. River gage at Vicksburg, Mississippi (mile 435.4), was 35.7 ft and rising and at Greenville, MS (mile 531.3), 40.1 ft and rising. Estimated current of 5.5 mph. | |

On October 23, 2018, about 1426 local time, the towing vessel *Andrew Cargill MacMillan* was pushing 42 loaded barges southbound on the Lower Mississippi River, near Tallulah, Louisiana. While rounding a bend, the tow touched bottom, resulting in the head of the tow contacting breasting dolphins and a conveyor at the Farmers Grain Terminal at mile 442.4. The conveyor was destroyed, and the dolphins and a lead barge were damaged. There were no injuries to the ten crew on board or anyone ashore. There was no release of pollutants. Damage was estimated at \$8 million for the conveyor and dolphins and about \$74,000 for the barge.



Preaccident image of *Andrew Cargill MacMillan*. (Source: ARTCO)

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Area of the Lower Mississippi River (at mile 442.4) where the *Andrew Cargill MacMillan's* tow contacted breasting dolphins and a grain conveyor, as indicated by the red triangle. (Background source: Google Maps)

Background

The *Andrew Cargill MacMillan*—a 176-foot-long, 10,500-horsepower, triple-propeller, triple-rudder towboat—was built in 1975 by Dravo Corporation of Neville Island, Pennsylvania. It was owned and operated by American River Transportation Company, LLC (ARTCO) and used as a line haul boat, mainly between St. Louis, Missouri, and New Orleans, Louisiana, on the Mississippi River.

The *Andrew Cargill MacMillan* operated with a crew of ten. The captain and pilot, who worked an alternating six-hours-on and six-hours-off rotation, navigated the boat.¹ The captain worked the 0600–noon and 1800–midnight watches, and the pilot worked the opposite watches.

The current in the river was reported to be running at an estimated 5.5 miles per hour (mph), with the river stage at 35.7 feet and rising at the Vicksburg gage at mile 435.4.² There were no US Coast Guard reports of aids to navigation off station at the time of the accident. According to the waterways action plan, normal operations were in effect, with voluntary tow size restrictions.³ Per ARTCO's policy, the tow size was reduced from 46 to 42 barges for these river conditions.

¹ *Pilot* is a term used aboard towing vessels on inland waterways for a person, other than the captain, who navigates the vessel.

² Unless otherwise stated, all references to speed in this report are in statute miles per hour.

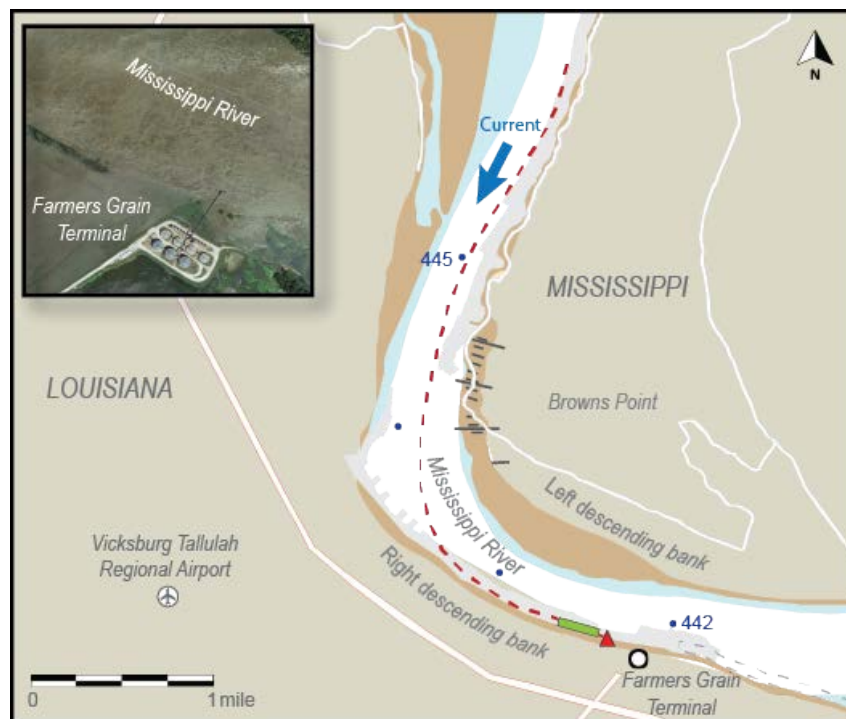
³ The Coast Guard's *Annex 2018* provides general information and reference gages to be used as a guidance for high- and low-water events on the Lower Mississippi River between river miles 869 to 303.

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Accident Events

On October 20, about 2345, the *Andrew Cargill MacMillan* got underway from the ARTCO fleet at mile 954 in Cairo, Kentucky, with 40 barges loaded with grain and 2 loaded with soybean oil, and proceeded southbound on the Mississippi River for its destination in Ama, Louisiana. The tow was arranged in a seven-wide-by-six-long configuration, and the overall length of the tow and vessel combined was 1,376 feet. The deepest draft of the tow was the towboat itself at 12.5 feet, and the drafts of the barges varied from 9 to 11 feet. There were no reported steering or propulsion deficiencies with the vessel.

On the afternoon of October 23, the pilot of the *Andrew Cargill MacMillan* was working his scheduled afternoon watch. Although the vessel was equipped with radar (the pilot said he had one of its range rings set to a half mile and the other set to one mile) and an electronic charting system (ECS), the pilot was navigating solely using visual references in the river. About 1406, with a following current, the vessel and tow were at mile 445 approaching the bend at Yazoo Cutoff, also referred to as Browns Point. At a speed of about 9.5 mph over ground, the pilot began to steer the bend, a turn to port.



Trackline of the *Andrew Cargill MacMillan* showing the vessel's course from north of mile 445 to the accident location at Farmers Grain Terminal. (Inset image background source: Google Earth)

About 1410, he steered the head of the tow toward a line of three red, conical buoys (which were not shown on the navigation chart displayed on the ECS) marking shallow water on the left descending bank to commence his turn through the bend.⁴ About a minute later, he lost sight of the closest red buoy. Sighting an object in the water in the vicinity of the red buoy, and thinking it was the buoy, he steered the vessel toward it. About two minutes passed before the pilot saw the

⁴ The inland towing industry refers to the shorelines of western rivers as the left and right banks when traveling (facing) downstream. The left bank is called the left descending bank, and the right bank is called the right descending bank.

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red buoy pop up from under the water. By that time, the head of the tow was in the center of the river and in the trough of the current. Realizing the *Andrew Cargill MacMillan*'s tow had “slid out of the turn,” with the current pushing the vessel and tow towards the right descending bank, the pilot applied hard rudder to steer the head of the tow to port toward the other red buoys and the left descending bank.⁵

As the vessel and tow were pushed by the current and slid closer to the right descending bank, the pilot stated that he shifted his focus to keeping the stern, propellers, and rudders off the bank. About 1418, the speed of the vessel began to slow as a result of “dead water” near the bank. Steering to port and full ahead on all three propellers, he tried to maneuver the vessel to keep off the right bank. Around 1421, the tow started to come out of the dead water, and the ground speed began to increase. At that time, the aftermost barge on the starboard side of the tow struck the bottom, causing the head of the tow to veer to starboard towards the Farmers Grain Terminal, which had four steel-pile breasting dolphins in the river with a conveyor and catwalk to the shore, at mile 442.4. The pilot placed the steering rudders to midships and took all three propulsion engines out of gear (neutral), then placed all three propellers to full astern. He sounded the general alarm to alert the crew.

At 1422, with the vessel in astern propulsion and tight to the right descending bank, the ground speed began to decrease. The pilot sounded five short blasts on the boat's whistle in order to alert anyone at the terminal of the danger of the approaching tow. At that time, there were no crew on the tow, no barges at the terminal, and no people observed at or near the grain conveyor.

About 1426, the barges at the head of the tow contacted the breasting dolphins and grain conveyor. The third lead barge from the starboard side came to rest on top of the dolphins, and two of its voids were punctured and began to take on water. Two (of four) steel breasting dolphins and the conveyor were knocked over. Once the vessel came to a stop, the pilot used the flanking rudders and astern propulsion to keep the stern of the *Andrew Cargill MacMillan* off the bank. The captain arrived in the pilothouse shortly after the contact and relieved the pilot at the controls.



Left: Postaccident photo of the damaged conveyor and catwalk laying across the forward deck of barge ART 44160. Right: Postaccident picture of damaged conveyor as seen from the bank looking toward the river. (Source: Budwine and Associates Inc.)

⁵ A *slide* refers to the sideways or lateral movement of a vessel or tow when steering a sharp bend. As the vessel moves deeper into the bend, the slide towards the bend side (outside of the bend) of the steering maneuver increases due to faster current in the bend than on the bar side (inside of the bend). (Lehman, C.F., *A Riverman's Lexicon*, 2009, 403)

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The tow of the *Andrew Cargill MacMillan* remained on the bank at the site of the contact until the next morning. The vessel departed and resumed its voyage with all but three of the barges. Of those three barges, two were damaged: *ART35743* had two voids penetrated on its starboard side but remained afloat, and *ART44160* sustained minor damage. The damage cost to the barges was estimated at \$74,000. The breasting dolphins, catwalk, and conveyor sustained substantial damage; representatives for the terminal estimated the cost of the damage at \$8 million.

Additional Information

In March 2017, during a drydock period, the *Andrew Cargill MacMillan*'s two outboard steering rudders were replaced with high-lift, flap-type rudders.⁶ The three steering rudders were operated by one steering tiller in the wheelhouse and could not be operated separately. Both the port side and center propellers rotated in a clockwise direction when in ahead propulsion, while the starboard propeller rotated in a counterclockwise direction. The maximum rudder angle was 45 degrees to port and starboard.

The accident pilot had 35 years of experience on towing vessels, 25 of which had been in the capacity as either captain or pilot with ARTCO. He normally worked on a sister vessel, the *Viking Queen*, but he was placed on the *Andrew Cargill MacMillan* because the *Viking Queen* was being serviced in a shipyard. He joined the *Andrew C MacMillan* on October 11 but stated he had been under way on the vessel for only two and a half days before the accident. He stated that both vessels were identical, except that the *Viking Queen* had traditional, semi-balanced, spade-type rudders and therefore steered differently than the *Andrew Cargill MacMillan*. Although the pilot had worked on the *Andrew Cargill MacMillan* previously, it was before the high-lift flap rudders were installed in March 2017. According to the company, the pilot received training from the captain who worked the opposite watch, but there was no documentation of the training for the steering configuration on the *Andrew Cargill MacMillan*. The pilot tested negative for drugs and alcohol.

Analysis

During high water and strong current conditions, as were present in the river at the time of the accident, buoys can "dive," meaning they momentarily submerge partially or fully, thus making them difficult to see, especially with about 1200 feet of tow in front of the wheelhouse. The pilot, who was steering the head of the tow to the buoy closest to him, momentarily lost sight of the red buoy and mistakenly steered on an object drifting in the vicinity of where he last saw the buoy. By the time the buoy had re-appeared and the pilot realized he was steering on the drifting object, the tow was in the center of the river and sliding towards the right descending bank. He tried to steer to the left bank using hard rudder, which was 45°, but the vessel slid deeper into the bend, where the stern of the aftermost starboard barge struck the bottom, thus deflecting the head of the tow to starboard and towards the breasting dolphins and conveyor.

The pilot relied on visual means to navigate the vessel and tow in a sharp bend by using buoys. Although steering vessels by visual reference is a primary means to navigate in western rivers, there was equipment (ECS, radar, swing meter) on the vessel that could have aided in cross-checking the vessel's position and rate of turn in the bend. Had they been effectively used, he may

⁶ A high-lift flap is located at the trailing edge of a rudder and executes nearly twice the angle of the main rudder blade, which produces added lift that generally improves the vessel's turning ability.

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have been able to detect that he was out of position earlier, thus allowing him to make corrections to keep the tow from further sliding into the bend.

Although the *Andrew Cargill MacMillan* was a vessel similar to the *Viking Queen*, which the pilot normally operated, there was one difference between the two: the *Andrew Cargill MacMillan* was fitted with two high-lift, flap-type rudders and one traditional spade-type steering rudder, while the *Viking Queen* was fitted with three spade rudders. In an attempt to bring the tow back into position, the pilot used hard rudder, steering as he would have done on the *Viking Queen*, in order get the tow back up into the bend. However, on a vessel fitted with high-lift rudders, the most effective lift would have been to a maximum of about 35° of rudder angle.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the contact of the tow of the *Andrew Cargill MacMillan* with the Farmers Grain Terminal breasting dolphins and conveyor was the pilot's overreliance on floating aids to navigation, which resulted in the tow being out of position and sliding too deep into the bend before the terminal to recover and successfully complete the turn.

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Vessel Particulars

| Vessel | <i>Andrew Cargill MacMillan</i> | <i>ART35743</i> |
|----------------------------|---|-----------------------------------|
| Owner/operator | American River Transportation Co. | American River Transportation Co. |
| Port of registry | Philadelphia, PA | Wilmington, DE |
| Flag | United States | United States |
| Type | Towing vessel | Hopper/raked (dry bulk) barge |
| Year built | 1975 | Unknown |
| Official number (US) | 562640 | 1242410 |
| IMO number | Not applicable | Not applicable |
| Classification society | Not applicable | Not applicable |
| Construction | Steel | Steel |
| Length | 176.1 ft (53.7 m) | 195 ft (59.4 m) |
| Draft | 12.5 ft (3.8 m) | 10 ft est. (3 m) |
| Beam/width | 54 ft (16.5 m) | 35 ft (10.7 m) |
| Tonnage | 1,022 GRT | 1,489 GRT |
| Engine power; manufacturer | 3 X 3,500 hp (2,610 kW) EMD 16 cylinder 710, triple screw | Not applicable |
| Persons on board | 10 | 0 |

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

For more details about this accident, visit www.nts.gov and search for NTSB accident ID DCA19FM004.

Issued: December 3, 2019

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).