National Transportation Safety Board

Marine Accident Brief

Collision between Towing Vessel *William E Strait* and *Margaret Ann* Tow

Accident no.	DCA16FM010
Vessel names	*William E Strait* and *Margaret Ann* tow
Accident type	Collision
Location	Lower Mississippi River (LMR), mile marker 727.4
Date	December 14, 2015
Time	1122 central standard time (coordinated universal time – 6 hours)
Injuries	None
Property damage	Estimated $2 million
Environmental damage	Approximately 700 gallons of oil and diesel released
Weather	Clear, visibility 10 miles, winds 13 mph with gusts to 23 mph from the southwest, air temperature 45°F
Waterway information	LMR near Memphis, Tennessee; river stage 17.7 feet and falling, current running between 1.5 and 2 knots

On December 14, 2015, at 1122, the uninspected towing vessel *Margaret Ann* was downbound on the Mississippi River pushing 3 tank barges loaded with liquid asphalt when its tow collided with the uninspected towing vessel *William E Strait*, which was pushing a flotilla of 30 loaded gravel barges. The *William E Strait* partially sank on the left descending bank of the river.[1] There were no reported injuries associated with this collision.

***William E Strait* before the collision. (Photo courtesy of Western Rivers Boat Management)**

[1] The banks of the Mississippi River and its tributaries are named *left* and *right* when traveling downstream. Thus, the east bank of the river is its left bank and the west bank is its right bank. To avoid confusion, commercial river traffic often calls the left bank the *left descending bank* and the right bank the *right descending bank*. (Source: US Coast Guard)

Note: This report was reissued on April 3, 2017, with corrections to page 8.

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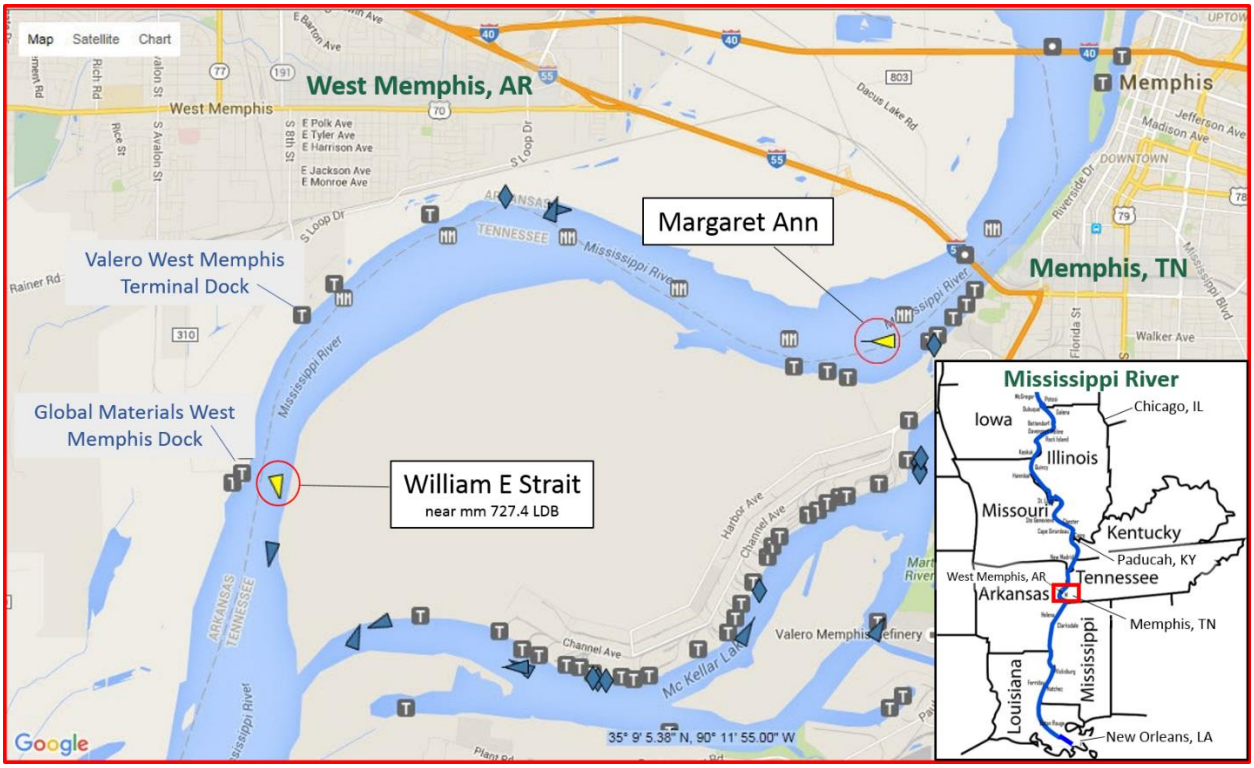
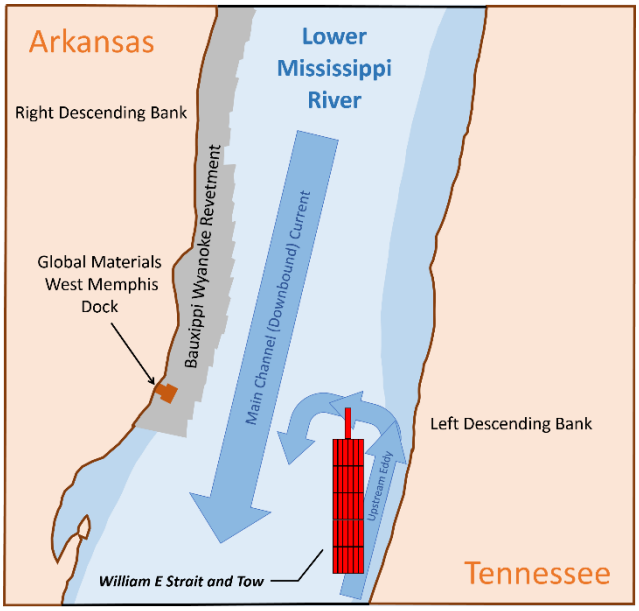
On December 11, 2015, about 1636, the *William E Strait* departed the LaFarge Aggregate facility on the Cumberland River near Smithland, Kentucky. The vessel, pushing 15 loaded gravel barges, then entered the Ohio River and proceeded toward Paducah, Kentucky, where it took on 22,975 gallons of diesel fuel. After fueling, the vessel proceeded down the Ohio River and into the Mississippi River. On December 12, it held position on the left bank near mile marker (mm) 950, Lower Mississippi River, so that it could accept additional gravel barges. *William E Strait*'s final destination was to be the Port of New Orleans, Louisiana. At 1706, it departed with 30 loaded gravel barges and began its downbound transit of the Mississippi River. The approximate dimensions of each barge were 200 feet long by 35 feet wide, and the tow was configured in a flotilla five barges long by six barges wide. The total combined length and width of the vessel and tow was 1,185 feet by 210 feet.

The vessel was operating on a two-watch system, with duty rotations occurring every six hours. The senior captain stood the 0600–1200 and 1800–0000 navigation watches, while the pilot stood the 0000–0600 and 1200–1800 watches. "Pilot" is a term used aboard towing vessels on the Mississippi River and its tributaries for the person who is second-in-command, similar to a mate on other vessels.

On December 13, at 1540, the *William E Strait* allided with the Valero West Memphis Terminal barge dock, located in West Memphis, Arkansas, on the right bank of the river. The pilot was on watch at the time of the allision. After the incident, the vessel pushed its flotilla onto the left bank near mm 727.4 to await the arrival of Coast Guard personnel and a vessel surveyor.



PortVision AIS data playback image showing the river contour and the positions of the downbound *Margaret Ann* and *William E Strait* at 1045 on the morning of the accident.



In that section of the river, the US Army Corps of Engineers maintains a 300-foot-wide navigation channel dredged to a 9-foot depth at low water. From mm 732 to 727, downbound vessels must navigate a bend in the river that requires the vessel to make a wide port turn and transition gradually from a course over ground of roughly 300 degrees to 199 degrees. The river current flows more rapidly along the right bank and in the center channel than it does along the left bank. This is based upon several factors, including the geological aspects of the river bottom, bank contour, shoaling, and the volume of water moving in the river at any given time. During certain conditions, an upstream eddy—a short reverse current—was known to develop in the southernmost section of the bend along the left bank where the *William E Strait* was holding position. The eddy, when present, flowed upstream close to the bank and then westerly toward the center of the river to a point where it was influenced by the stronger downbound current.

On December 14, about 0936, the Coast Guard cleared the *William E Strait* to resume normal operations. The captain was on watch at the time and continued to hold the tow's position on the bank while awaiting the arrival of a vessel bringing food provisions and other supplies. At 1100, the captain was relieved by the pilot. During the watch relief, the captain briefed the pilot on expected vessel traffic, including the *Margaret Ann*, which was upriver and proceeding downbound.

According to the pilot, the lead barges of the tow were on the left bank and the stern of the *William E Strait* was out in the river an estimated "two and a half barge lengths" (roughly 500 feet) from the bank at the time of the watch turnover. The pilot further stated that an upstream eddy was present, and the eddy was acting on the vessel and tow in a manner that pushed the flotilla away from the bank. He indicated that he attempted to hold position by using slight astern propulsion and the vessel's flanking rudders. Flanking rudders are positioned forward of the propellers and significantly improve a vessel's maneuverability when operating astern propulsion.

The uninspected towing vessel *Margaret Ann* had departed the port of Chicago, Illinois, on December 7, 2015, and was en route to Baton Rouge, Louisiana. The vessel transited through the Chicago Sanitary and Ship Canal to the Des Plaines River, then to the Illinois River and into the Mississippi River. It was pushing ahead three tank barges, designated *MM-41B*, *MM-66*, and *MM-68*, which were loaded with asphalt. They were configured in a linear manner with *MM-66* as the lead, *MM-41B* in the center, and *MM-68* in the last position made up to the bow of the *Margaret Ann*. The approximate dimensions of each barge were 297 feet long by 54 feet wide. The combined length and width of the vessel and tow was 997 feet by 54 feet. According to the vessel's automatic identification system (AIS), the vessel passed underneath the Interstate 40 bridge, which spans the Mississippi River near downtown Memphis, Tennessee, on December 14 at approximately 1025. At the time, the vessel was making a speed over ground of 8.6 knots.

April 2015 image of the *Margaret Ann* on Lake Ferguson in Greenville, Mississippi, at the time the vessel was delivered to Magnolia Marine by the builder, Nichols Boat Company. (Photo courtesy of Waterways Journal)

About 1100, near mm 731, the captain of the *Margaret Ann* was relieved by the pilot. During the watch relief, the captain briefed the pilot on vessel traffic that was located downriver, including the *William E Strait*. According to the pilot on the *Margaret Ann*, once he assumed the watch, he performed a general callout for vessel traffic in the area over VHF radio channel 16. He broadcast his vessel's name, direction of travel, and the number of barges being pushed. Receiving no response to the callout, he made a second radio transmission on the same radio channel, which also received no response. The pilot then used the vessel's electronic chart system (ECS) to identify the *William E Strait* by name and called the vessel directly on channel 13 to determine its intentions and arrange for passage. At this time, neither vessel had visual contact with the other.

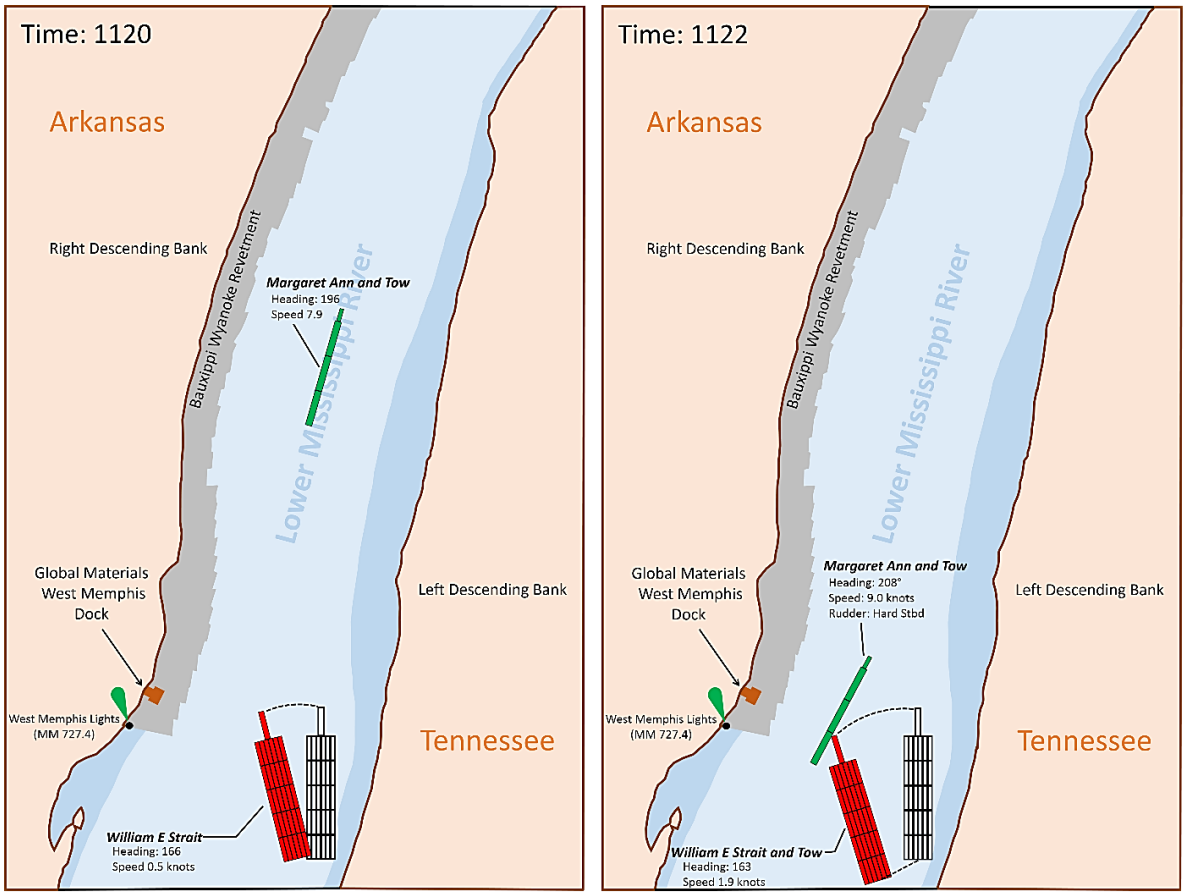
During the initial radio conversation, the pilots on both vessels agreed to a passing arrangement in which the *William E Strait* would back slowly off the left bank and then hold position to allow the *Margaret Ann* to pass safely. The *William E Strait* would then follow the *Margaret Ann* downriver. As part of the agreed arrangement, the *Margaret Ann* would widen its port turn and stay close to the right bank to provide the *William E Strait* with more maneuvering room. The AIS-reported true heading of the *William E Strait* at 1100 was due south, or 180 degrees.

As the *Margaret Ann* approached mm 728.8, the pilot noticed both visually and on the ECS display that the *William E Strait* was maneuvering in a manner he felt was not consistent with the initial passing arrangement. Specifically, he told investigators that he was concerned that the stern of the *William E Strait* was "coming out towards the middle of the channel." This prompted him to contact the vessel a second time.

During that second communication, the pilot on the *Margaret Ann* asked the *William E Strait*'s pilot if he was going to be able to hold the vessel's stern where it was. The pilot on the *William E Strait* replied that he intended to apply some ahead propulsion and swing the stern of

his vessel back in toward the left bank. The pilot on the *Margaret Ann* estimated that his tow was approximately one quarter mile upriver from the stern of the *William E Strait* at that time, and he stated that he was attempting to ease closer to the right bank.

The pilot on the *Margaret Ann* told investigators that, shortly after the communication, the stern of the *William E Strait* continued to swing toward the center of the channel with increased speed. The *Margaret Ann* took evasive maneuvers, which included application of hard-starboard rudder with full-ahead throttle, in an attempt to keep the raked bow of the lead barge, *MM-66*, from impacting the stern of the *William E Strait* and subsequently riding up onto the vessel. The *Margaret Ann* pilot used the internal communication system to alert the crew of the imminent collision. On the *William E Strait*, the captain, who had returned to the wheelhouse, sounded the vessel's horn to alert his crew of the emergency. The aft port side of barge *MM-66* and the port bow of barge *MM-41B* struck the aft starboard corner of the *William E Strait* hull. At 1122, just prior to the collision, the *Margaret Ann* speed was 9 knots.



The *William E Strait* and *Margaret Ann* tows in the moments leading up to the collision. Scale approximate based on vessel dimensions and AIS data.

As a result of the collision, barge *MM-66* sustained a hull penetration to its stern void and broke free from the tow string of the *Margaret Ann*, while barge *MM-41B* received damage to its bow and forward deck area. Both barges had significant structural damage as well. The *William E Strait* sustained a 6-foot by 5-foot opening in its hull at the point of impact, which allowed rapid flooding of the engine room. Additionally, the force of the collision pushed the port bow of the *William E Strait* into barge *MTC 6401*, which was in the last row of its tow flotilla, holing the barge's stern void.

The pilot on the *William E Strait* managed to maneuver the vessel and its flotilla back to the left bank with the assistance of the uninspected towing vessel *Paige L Strait*. The crew then boarded the aftermost barge in the flotilla before the *William E Strait* partially sank and came to rest on the river bottom with the uppermost structure of the vessel still above the water's surface. The *Margaret Ann*, with the assistance of the uninspected towing vessel *Lee Leavell*, recovered the *MM-66* and proceeded to McKellar Lake, just off of the Mississippi River near the accident site. There it began pumping out the water in the stern void of the *MM-66* while awaiting the arrival of Coast Guard personnel.

Left image is of the partially submerged *William E Strait* taken shortly after the collision. The wheelhouse, exhaust stacks, davit system, and aft flag staff are seen above the surface of the river. Right image, taken after the vessel was salvaged, is of the damaged hull near the starboard stern.

The pilot on the *William E Strait* told investigators that he felt his vessel was holding position on the left bank, as he had agreed to do, until he engaged forward propulsion and steered to starboard in an effort to swing his stern back toward the bank. He said that these maneuvering actions were taken to avoid the collision. Based on his perception, the *Margaret Ann* had not swung wide enough toward the right bank and its heading was such that it appeared to be bearing down directly upon the stern of the *William E Strait.*

Investigators determined that the navigational equipment on both vessels was operating satisfactorily, and both pilots stated there were no known concerns with steering, propulsion or other vital systems at the time of the collision.

In October 2014, the Coast Guard performed a towing vessel examination on the *William E Strait* and the examiner identified several watertight integrity concerns on the vessel. The discrepancies, including watertight hatches in need of gaskets and improper penetrations of a watertight bulkhead, were both in the area of the engine room known as shaft alley. The report also stated the need to ensure all watertight hatch securing devices were functioning correctly, but did not specify exact locations. In a post-accident drydock survey, there was no evidence found by investigators that indicated these items in engine room had been corrected, which possibly accounts for the rapid down flooding after the collision.

Post-accident toxicological testing was performed on all crewmembers in safety sensitive positions, and the results were negative for the presence of drugs or alcohol. Each pilot's cell phone records were examined, and investigators found no evidence to suggest either device was in use during the time preceding the accident.

Collision between Towing Vessel *William E Strait* and *Margaret Ann* Tow

Inland navigation rules apply to all vessels upon the inland waters of the United States.[2] These rules provide mariners with well-established regulations outlining specific actions to be taken to prevent a collision. All vessels, regardless of the waterway transited, have the fundamental responsibility to take all actions necessary to avoid collision and to not impede the safe passage of other vessels. On the Mississippi River and its tributaries, downbound power-driven vessels with a following current, such as the *Margaret Ann*, have the right of way over power-driven vessels that are either upbound in the river or crossing the river. Downbound vessels are provided this priority because the river's current and decreased flow of water across the vessels' rudders reduces steering responsiveness and overall maneuverability.

Investigators reviewed playback information from ECSs and extracted position data from the AIS transmissions of both vessels. The data indicated that the position of the *William E Strait* from 1559 on December 13, 2015, through approximately 1010 on December 14, 2015, remained relatively constant just off the left bank. During this period, there was little variation in the broadcasted AIS speed, true heading, course over ground, latitude, or longitude of the vessel.

From 1011 through 1119, the data indicated that the *William E Strait* began a slow, continuous shift of position in a westerly direction of about 739 feet toward the Global Materials West Memphis, Arkansas, lower dock. The approximate width of the channel from the left bank to the Global Materials lower dock is 1,880 feet. The vessel's true heading decreased gradually from 180 degrees at 1100 to 163 degrees at the time of collision. Although the data indicated that the *William E Strait* managed to attain some forward and downriver movement in the moments just prior to the collision, the true heading of the vessel remained at 163 degrees, and there was no appreciable swinging of the vessel's stern back toward the bank. Therefore, it is likely that this movement was the result of the river current acting on the port aft area of the vessel and its tow.

The pilot of the *William E Strait* did not hold the vessel and tow's position along the left bank as he had agreed to do when arrangements were made with the pilot on the *Margaret Ann*. Additionally, his attempt to apply forward propulsion and starboard rudder in an effort to swing the stern of the *William E Strait* back toward the bank was neither timely nor effective.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the collision between the *Margaret Ann* and the *William E Strait* was the *William E Strait* pilot's inability to hold his vessel in position along the left descending bank, as had been agreed on, to allow the safe and unimpeded passage of the *Margaret Ann*.

[2] Title 33 *Code of Federal Regulations*, §83.01.

Vessel Particulars

Vessel	*William E Strait*	*Margaret Ann*
Owner/operator	Smithland Towing & Construction, LLC / Western Rivers Boat Management, Inc.	Magnolia Marine Transport Company
Port of registry	Paducah, Kentucky	New Orleans, Louisiana
Flag	United States	United States
Type	Towing vessel	Towing vessel
Year built	1955	2015
Official number (US)	270550	1256158
IMO number	N/A	N/A
Construction	Welded steel	Welded steel
Length	184 ft 5 in (56.2 m)	105 ft 7 in (32.2 m)
Draft	11 ft 8 in (3.6 m)	10 ft 2 in (3.1 m)
Beam/width	45 ft 1 in (13.7 m)	32 ft (9.7 m)
Gross/net tonnage	1,103/750	342/102
Engine power; manufacturer	2-3,600 hp (5,369 kW), 20-645 E7B, EMDs, twin screw	2-3,000 hp (2,237 kW),3512C, Series 3 Caterpillars, twin screw
Persons on board	9 persons	6 persons

For more details about this accident, visit www.ntsb.gov and search for NTSB accident ID DCA16FM010.

Issued: August 12, 2016

NTSB investigators worked closely with our counterparts from Coast Guard Sector Lower Mississippi River, Memphis, Tennessee, throughout this investigation.