National Transportation Safety Board

Marine Accident Brief

Allision of *Cooperative Venture* Tow with St. Paul Union Pacific Rail Bridge

Accident no.	DCA18FM003
Vessel name	*Cooperative Venture*
Accident type	Allison
Location	Upper Mississippi River at mile 835.7, near St. Paul, Minnesota 44°55.13' N, 93°03.02' W
Date	October 26, 2017
Time	About 0230 central daylight time (coordinated universal time – 5 hours)
Injuries	None reported
Property damage	$953,000 est.
Environmental damage	None
Weather	Visibility 10 miles, clear skies, winds north-northwest at approximately 15 mph, air temperature 45°F
Waterway information	The Upper Mississippi River has a controlling depth of 9 feet and a width of approximately 350 feet at the site of the accident. The current on the morning of the accident was estimated at 2 mph.

About 0230 local time on October 26, 2017, the towing vessel *Cooperative Venture*, with a crew of 10, was pushing 12 barges downbound on the Mississippi River near St. Paul, Minnesota. As the vessel approached the St. Paul Union Pacific Rail Bridge at mile 835.7, the lead barge on the port side struck a fixed pier of the swing bridge.[1] There were no reported injuries or pollution. Damages to the bridge and barge were estimated at $800,000 and $153,000, respectively.

***Cooperative Venture* before accident. (Photo courtesy of American River Transportation Company)**

[1] In this report, all miles are statute miles.

Allision of *Cooperative Venture* Tow with St. Paul Union Pacific Rail Bridge

The *Cooperative Venture*—a twin-propeller towboat with 3,800 total horsepower—was built in 1976 by St. Louis Ship in St. Louis, Missouri. The vessel had two steering rudders and four flanking rudders controlled by two sets of levers (also called "sticks" by inland waterway operators): one set for steering and the other for flanking.[2] It was owned by Agri-Trans Corporation of St. Louis, Missouri, until 1992, when the towboat was sold to Midland Enterprises of Cincinnati, Ohio. In August 2003, the vessel was acquired by American River Transportation Company (ARTCO), based also in St. Louis.

Location of accident where port lead barge in *Cooperative Venture* tow struck St. Paul Union Pacific Rail Bridge on Upper Mississippi River at mile 835.7 while traveling downriver. (Base map and satellite image from NOAA ENC® Viewer)

Accident Events

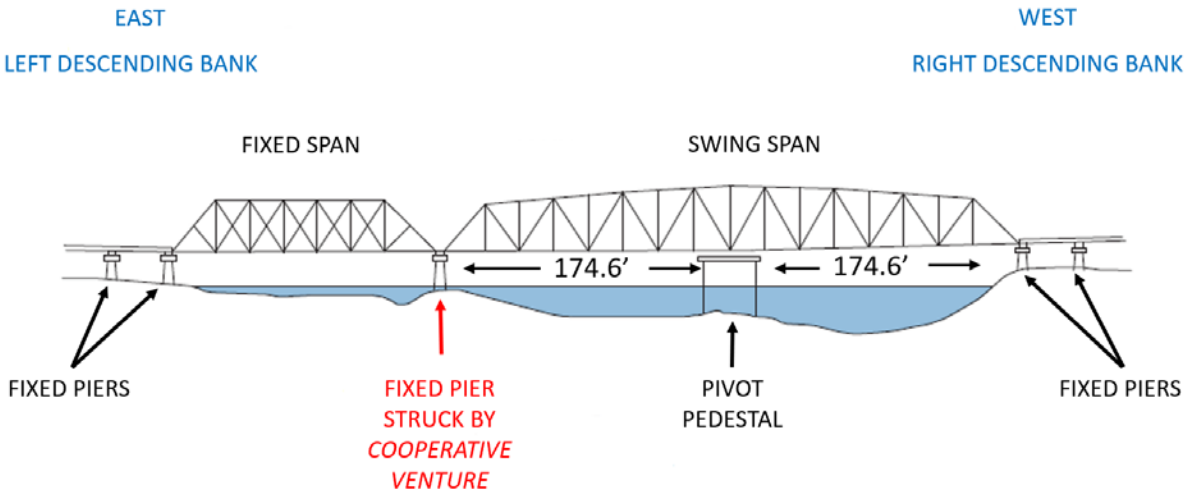
About 0200 on October 26, the *Cooperative Venture* departed the Upper River Services fleet at mile 838.9 in St. Paul, Minnesota, pushing 12 loaded barges full of soybeans. Each barge was 35 feet wide and 195 feet long. The tow was configured three barges across by four deep, measuring approximately 105 feet wide by 948 feet long together with the towing vessel. The tow was transiting downbound on the Mississippi River en route to Clinton, Iowa, where the crew planned to pick up 3 more loaded barges and then continue to St. Louis, Missouri, to deliver the

[2] *Flanking rudders* are mounted on either side of the propeller shafts forward of the propellers to allow improved maneuverability astern, especially for towing vessels.

entire load. Ten crewmembers were aboard the *Cooperative Venture*, with the pilot, a mate, and a deckhand on watch.[3]

As the tow left the fleeting area, the pilot called the bridge tender of the St. Paul Union Pacific Rail Bridge, located 3.2 miles downriver, to report that the *Cooperative Venture* would be passing through the area and to request that the swing bridge be opened. The bridge typically took about a minute to open. The *Cooperative Venture* pilot also requested the assistance of a towboat to guide the head of the tow through the bridge. He told investigators that using assist vessels when navigating a tow through the rail bridge was not a requirement but a "suggested practice" by other pilots.

Built in 1910, the St. Paul Union Pacific Rail Bridge was a swing bridge located just south of a bend (referred to locally as "the chute") and south of the St. Paul Downtown Airport.[4] The swing span opened by rotating horizontally on a central axis, or pivot pedestal, in line with the navigable channel. When closed, the span rested on two piers: a west fixed pier on the right descending bank and an east fixed pier on the outside of the navigable channel near the left descending bank. The channels on both sides of the pivot pedestal, each measuring 174.6 feet wide, were navigable by downbound and upbound traffic.



St. Paul Union Pacific Rail Bridge in closed position, as approached by *Cooperative Venture*. (US Army Corps of Engineers)

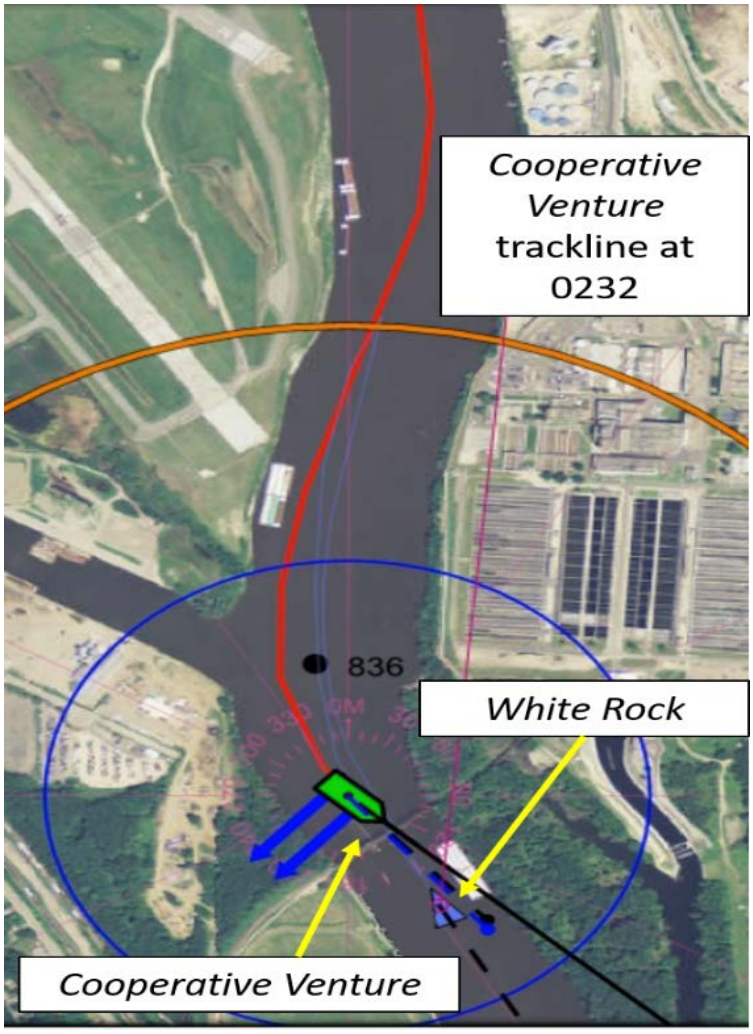
The current was flowing downbound at an estimated 2 mph, which the pilot on the *Cooperative Venture* considered to be a "normal" speed. The river height was reportedly 7 feet, which he also qualified as "normal" for that time of year. The wind was blowing approximately 15 mph from the north-northwest.

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

[4] The St. Paul Union Pacific Rail Bridge is also known as the Hoffman Swing Bridge, Pigs Eye Bridge, and Belt Line Railroad Swing Bridge.

About a mile above the bridge, the 800-horsepower fleet towboat *White Rock* met the *Cooperative Venture* and faced up (connected) to the center lead barge to assist the tow with passage through the bridge. To avoid impairing the pilot's visibility during the dark early morning, the captain of the *White Rock* turned off the lights above the wheelhouse on his towboat. At 0223, the pilot maneuvered the tow from the center of the channel toward the right descending bank, according to the *Cooperative Venture*'s electronic chart system (ECS) recording. The towing vessel was traveling at approximately 3 mph on a heading of 186 degrees.

The captain of the *White Rock* later told investigators that although he was communicating with the pilot of the *Cooperative Venture* via handheld radio, the pilot was not providing him with specific orders for assisting in the maneuvering of the tow. In a postaccident interview, the pilot stated that he had been through the St. Paul Union Pacific Rail Bridge about 8 times as a deckhand and a steersman, but only once as a pilot prior to the accident. He also said that he had been instructed to conduct transits only through the span near the left descending bank (left span).



Screenshot from *Cooperative Venture*'s ECS about 2 minutes after vessel struck pier. Red trackline represents position of vessel through turn upon approach to bridge. The blue arrows generated by the ECS indicate the vessel's predicted movement.

As the *Cooperative Venture* pilot approached the bridge, he sought the advice of the *White Rock* captain about how to navigate the span. The captain advised him to stay to the red buoy side of the channel, near the left descending bank, because the current was stronger on the other bank. Yet, at about 0223, the ECS recording indicates that the pilot positioned the vessel's stern closer to the green buoys, near the right descending bank, around mile 836.3. At an estimated 2 mph, the following current in the bend along the right descending bank, where the towboat was situated, was moving faster than in the river closer to the left descending bank, where the head of the tow was positioned.

While transiting along the right descending bank, the pilot made several heading changes to align the vessel with the opening of the left span to pass through the bridge. Over the next several minutes, the tow's heading changed from 170 to 145 degrees. As the tow approached the span, the pilot of the *Cooperative Venture*

increased the vessel's speed from 3 to 4 mph and steered to starboard to increase the turn rate of the head of the tow. To help pivot the tow away from the bridge pier, the captain of the *White Rock*, which was still faced up to the center lead barge, placed his throttles to full ahead and turned his rudders hard to starboard. The pilot, nonetheless, was unable to properly navigate the *Cooperative Venture* tow through the turn, because the stern of the towing vessel had been positioned closer to the right descending bank in the stronger current. At 0230, the bow of the lead barge on the port side, *ART 35157*, allided with the east fixed pier of the swing bridge, puncturing the barge's bow and damaging the concrete pier.

The impact caused a breakaway of the port string's lead barge and its other three barges, which remained connected to each other. The lead barge and port string drifted downriver with the current and were later recovered. The center and starboard strings of barges remained connected to the *Cooperative Venture.*

The port lead barge sustained damage and took on water in the raked (angled) bow, but none of the other barges were affected. Designed to transport bulk cargo, *ART 35157* was a hopper barge constructed of welded steel with fiberglass cargo covers. Due to the allision, the double-bottom hull sustained a 17-foot-high-by-1.5-foot-wide hole, along with deformation of the steel framing. There was no damage to the cargo in the holds.

The concrete pier that was struck by the tow was displaced by approximately 4 to 5 feet and angled approximately 5 degrees, preventing the bridge's swinging portion from connecting to the fixed support. Consequently, no railroad traffic was permitted to cross the bridge. The waterway remained open to river traffic, but only for passage of one tow at a time through the span near the right descending bank (right span).

Damage from allision: (at left) raked bow of port lead barge, *ART 35157*; (at right) fixed pier of swing bridge near left descending bank struck by barge (downstream view).

Other Information

The pilot had worked in the maritime industry for about 8 to 9 years in several positions on various towboats. As a watchman for about 4 years, he built tows, performed maintenance, and steered the vessel at times. Afterward, as an apprentice steersman for about 2 years, he worked under the guidance of a captain. During this time, he attended a one-week class that provided him instruction on flanking operations, approaching bends, and using radars. He had no other formal maritime training. His only pilot experience was on the *Cooperative Venture*.

According to the pilot, there was no other traffic in the area that affected his maneuverability, the buoys were in their proper positions, and the bridge was properly illuminated. The pilot said that there were no issues with propulsion or steering but that the current affected his ability to steer.

The pilot stood a 6-hour watch from 2400 to 0600 and then from 1200 to 1800. He told investigators that he felt rested at the time of the accident and had no issues with sleep, vision, or medication. He had just completed about 3 weeks of his 28-day rotation. Postaccident drug and alcohol testing was conducted: the results were negative.

Analysis

According to data from the vessel's ECS, the pilot of the *Cooperative Venture* had been traveling in the center of the channel as he approached the St. Paul Union Pacific Rail Bridge until 0223, at approximately mile 836.3, where he then began maneuvering to the right descending bank. The reason the pilot deviated from the center of the channel is unknown, but it placed the stern of the *Cooperative Venture* into the stronger following current in the bend along the right descending bank, thereby reducing the pilot's ability to correct the heading and properly align the tow with the channel for safe passage through the bridge span.

For the accident voyage, ARTCO assigned a pilot who had navigated through the St. Paul Union Pacific Rail Bridge only once as a pilot prior to the accident. Although the pilot had worked on towboats for many years, he had limited experience operating in this position and had only a week of formal maritime training. Furthermore, the pilot sought the advice of the *White Rock* captain just before approaching the bridge, demonstrating his lack of certainty for maneuvering the tow through the span.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the allision of the towing vessel *Cooperative Venture* with the St. Paul Union Pacific Rail Bridge was the operating company's assignment of an inexperienced pilot who incorrectly positioned the tow prior to maneuvering through a turn with a following current when approaching the bridge span.

Vessel Particulars

Vessel	*Cooperative Venture*	*ART 35157*
Owner/operator	American River Transportation Company	American River Transportation Company
Port of registry	St. Louis, Missouri	St. Louis, Missouri
Flag	United States	United States
Type	Towing vessel	Freight barge
Year built	1976	2010
Official number (US)	577609	1225240
IMO number	N/A	N/A
Classification society	N/A	N/A
Construction	Steel	Steel
Length	168 ft (51.2 m)	195 ft (59.4 m)
Draft	9 ft (2.7 m)	13 ft (4 m)
Beam/width	40 ft (12.2 m)	35 ft (10.7 m)
Gross tonnage	693	745
Engine power; manufacturer	2 @ 1,900 hp (1,417 kW); GM 16-645E6 diesel engines	N/A
Persons on board	10	0

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

For more details about this accident, visit www.ntsb.gov and search for NTSB accident ID DCA18FM003.

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