

References for the Science vessel workshop participants

Water Levels

International Lake Superior Board of Control – Update on Lake Superior Outflows and Expected Conditions – February 2021

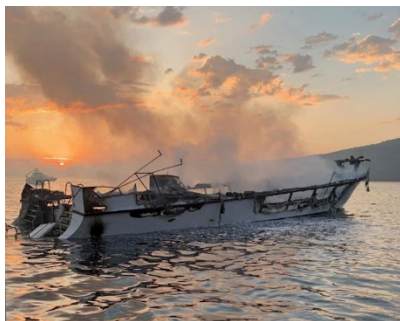
<https://www.ijc.org/en/lisbc/update-lake-superior-outflows-and-expected-conditions-february-2021>

USACE- The Connecting Channels Forecast is updated each week on Thursday afternoon or Friday morning. Link:

<https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Water-Levels/Water-Level-Forecast/Connecting-Channels-Forecast/>

Dive Boat Conception Fire

Owners of California dive boat faulted for fire that killed 34



The NTSB said the Conception's captain failed to post a roving night watchman, which allowed the deadly fire to quickly spread.

Thirty-four passengers and crew died in the dive boat Conception fire.

Photo: Ventura County Fire Department

<https://www.nbcnews.com/news/us-news/owners-california-dive-boat-faulted-fire-killed-34-n1244107>

<https://www.npr.org/2019/09/12/760197676/ntsb-releases-report-on-fatal-boat-fire-in-california>

NTSB preliminary report link:

<https://www.nts.gov/investigations/AccidentReports/Reports/DCA19MM047-preliminary-report.pdf>

NTSB news release – 20 Oct 2020

<https://www.nts.gov/news/press-releases/Pages/NR20201020.aspx>

USCG may require safety management systems on all passenger vessels –

<https://www.workboat.com/uscg-may-require-safety-management-systems-on-all-passenger-vessels>

See: <https://www.regulations.gov/document?D=USCG-2020-0123-0001>

Comments must be received by April 15, and may be submitted on www.regulations.gov, docket number USCG–2020–0123.

Anchor Strike: April 2018 ITB Clyde S VanEnkevort/Erie Trader with Underwater Cables and Pipelines, Straits of Mackinac

Link to whole NTSB Report:

<https://www.nts.gov/investigations/AccidentReports/Pages/SPC2004.aspx>

Pages 30-31 from NTSB Safer Seas Digest 2019 (attached)

ACCIDENT TYPE
CONTACTVESSEL GROUP
TOWING/BARGE

Anchor Contact of Articulated Tug and Barge *Clyde S VanEnkevort/Erie Trader* with Underwater Cables and Pipelines

LOCATION
STRAITS OF MACKINAC, MICHIGAN, ABOUT 2 MILES WEST OF MACKINAC BRIDGEACCIDENT DATE
APRIL 1, 2018REPORT NUMBER
MAB 19/12ACCIDENT ID
DCA18FM019ISSUED
MAY 21, 2019

Figure 59. ATB *Clyde S VanEnkevort/Erie Trader*.
SOURCE: P. MARKHAM

At 1732 local time on April 1, 2018, the ATB *Clyde S VanEnkevort/Erie Trader* was westbound with a crew of 14 in the Straits of Mackinac, Michigan, when the barge's starboard anchor, which had unknowingly released and was dragging on the bottom, struck and damaged three underwater electrical transmission cables and two oil pipelines. About 800 gallons of dielectric mineral oil leaked into the water from the cables; the oil pipelines sustained only superficial damage. Repair and replacement of the cables was estimated at more than \$100 million. No injuries were reported.

During the 2017–2018 winter season, the *Clyde S VanEnkevort/Erie Trader* was laid up in Superior, Wisconsin. The ATB underwent maintenance and repairs, including a top brake band liner replacement on the

barge's starboard anchor windlass brake, which had been out of service since October 2017. The port engineer informed the captain that the anchor had been repaired and tested.

On March 30, the ATB began its second voyage of the season, from Duluth to Indiana Harbor, Indiana. During the voyage, the ABs, who were responsible for clearing and securing the anchors, believed the starboard anchor was still out of service awaiting repair. The anchors were first ordered cleared on March 31, when the vessel passed Gros Cap Reef for the transit through the Soo Locks and St. Marys River. However, the AB on watch at that time stated he did not clear the starboard anchor because he had an understanding with the other AB to not clear it.



Figure 60. The bow of barge *Erie Trader* after the accident. At right: the remnant shank of the starboard anchor in the anchor pocket is highlighted. SOURCE: COAST GUARD

After passing the Soo locks, the vessel moored for the night (the anchors were not handled) and got underway the morning of April 1. At 1358, the ATB passed De Tour Reef Light, entered the open waters of Lake Huron and was ordered to full speed. The mate radioed the AB to secure the anchors, which was routine practice, and received an answer back that all was secure. The AB later stated that he secured only the port anchor, because the port anchor was the only anchor that he cleared the previous evening at Gros Cap Reef. Thinking the other AB would not have cleared the starboard anchor, he did not physically check it, assuming it was already secured. It could not be determined when the starboard anchor was last cleared.

The ATB continued toward Mackinac Bridge and through the Straits of Mackinac at a speed of about 11 mph. About 2320 the night of April 2, the ATB was approaching the entrance to Indiana Harbor, when an AB headed to the barge's bow to clear the anchors found the starboard anchor chain in the water trailing aft against the hull. He also found the starboard anchor cleared (meaning the devil's claw was not on the chain, hoisted up by a pulley away from the chain), the pawl off, and the chain paid out. The wildcat was also not engaged. When the anchor was heaved in, its flukes were missing, but the shank remained. None of the ATB crewmembers knew when the anchor paid out. Other than about a 1-knot speed reduction noticed by the captain, a change in handling characteristics was not noticed. Throughout the voyage, the ATB operated in ice, wind, and waves that created noise and movement. An AB stated that it was not customary to check anchor-handling spaces when underway. Had procedures been in place to regularly monitor these spaces, the unsecured anchor may have been detected earlier.

The Straits of Mackinac had underwater pipelines and transmission cables running in a general north and south direction. On April 3, the Coast Guard was notified of damage to the underwater transmission cables and the contact with the pipelines. The *Erie Trader's* starboard anchor was the likely source of the damage. The anchor damaged three of the six electrical cables, one could be repaired while two required complete replacement. The

anchor also struck the west leg of Enbridge's Line 5 dual pipeline, which transported crude oil from Canada to the United States, causing one minor dent in one pipeline and two minor dents in the other.

The anchor likely paid out slowly until it reached the water, at which point the additional force and the increasing weight of hanging chain likely hastened the payout as the brake was overwhelmed. Although anchor windlass brakes are not intended to hold an anchor and chain indefinitely during the dynamic conditions that vessels typically encounter on voyages, a properly adjusted brake should have had ample holding capacity for the weight of the *Erie Trader's* anchor and chain. However, during the postaccident teardown and replacement of the *Erie Trader's* starboard anchor windlass brake-band liners, the brake band had to be adjusted to ensure proper contact between the liner and drum with the brake activated. Based on the friction contact pattern on the upper liner, it is likely that the chief engineer and crew who replaced the top liner over the previous winter did not properly adjust the brake band. The brake band liner and hardware were replaced without the training, supervision, or instructions to properly carry out the task and ensure appropriate adjustments. Aside from the improperly adjusted band, investigators found no other defects in the anchor assembly.

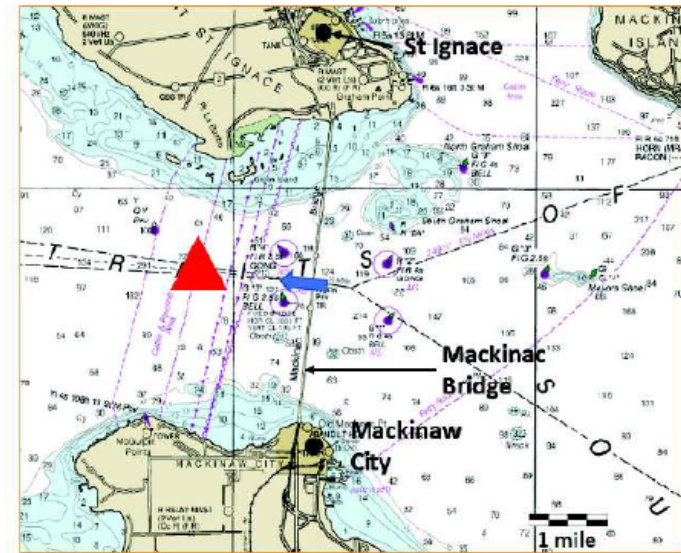


Figure 61. Section of NOAA chart 14881 showing a portion of the Straits of Mackinac. The location of contact with the underwater cables and pipelines is indicated by a red triangle. The blue arrow indicates the ATB's direction of travel. The soundings are indicated in feet.

The probable cause of the anchor contact of articulated tug and barge *Clyde S VanEnkevort/Erie Trader* with underwater electricity transmission cables and oil pipelines was the failure of the anchor detail to secure the barge's starboard anchor, and the improper adjustment of the anchor brake band after the engineering crew replaced the brake liner, the combination of which allowed the anchor and chain to pay out under way.