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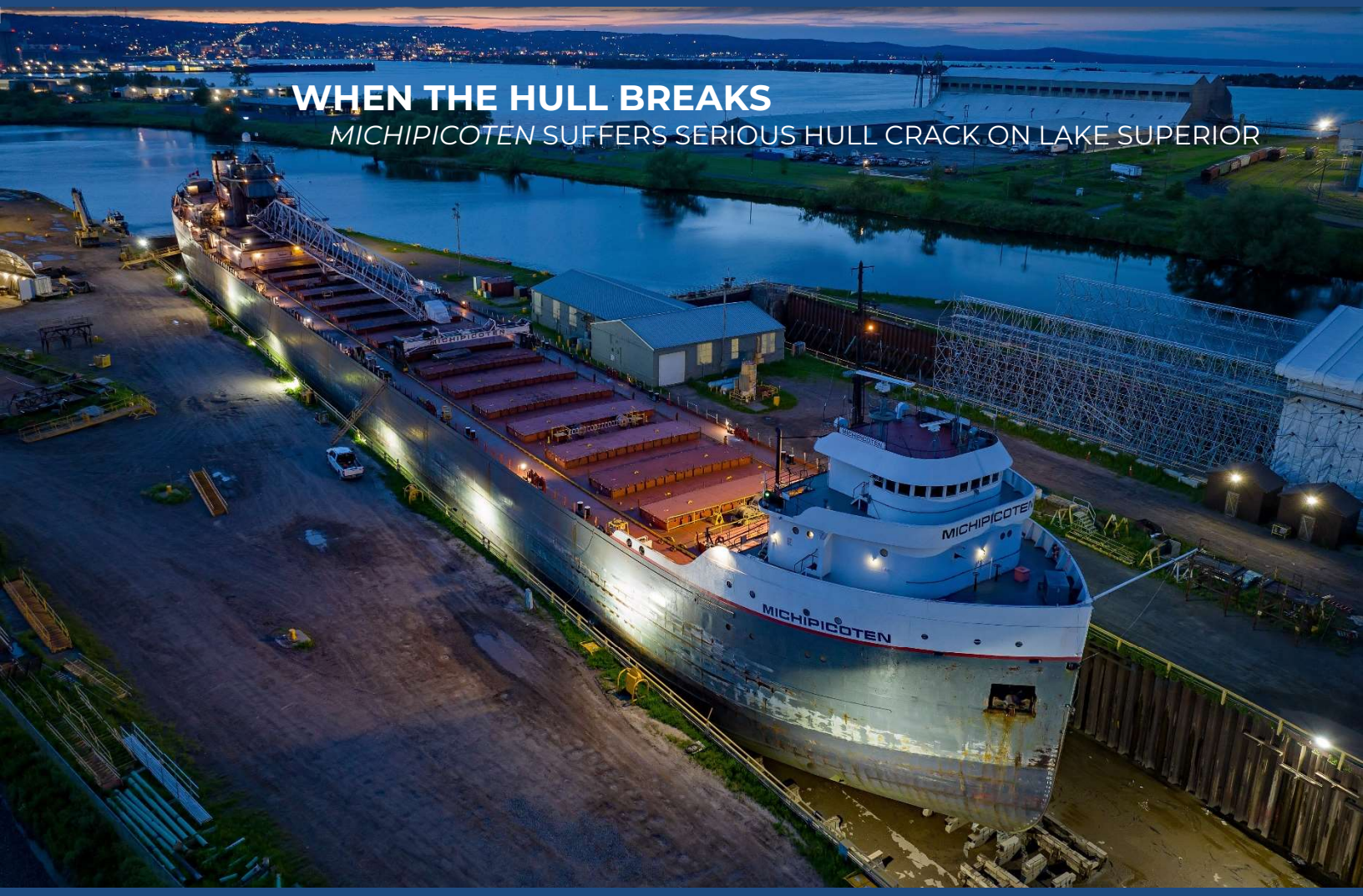


WHEN THE HULL BREAKS

MICHIPICOTEN SUFFERS SERIOUS HULL CRACK ON LAKE SUPERIOR

LAKER REPORTS

NEWS AND HAPPENINGS FROM AROUND THE LAKES

New LNG Barge Delivered | June 23, 2024

Fincantieri Bay Shipbuilding's latest product, the LNG bunkering barge *Progress*, was towed out the Seaway at the end of June for delivery to the East Coast. *Progress* was built for Crowley to provide LNG bunkering services in Savannah, GA, and was towed down the Seaway by the Ashton Marine tug *Meredith Ashton*. (Main Photo) Photo: Sam Hankinson (Inset) Cement carrier *Sunnanvik* heads into the Seaway, April 6, 2024. Photo: Ron Beaupre

EUREKA SHIPPING ANNOUNCES CONSTRUCTION OF NEW CEMENT CARRIER FOR GREAT LAKES SERVICE

APRIL 16, 2024

Eureka Shipping – a joint venture between The CSL Group and Eureka Shipping – recently announced plans to construct a state-of-the-art cement carrier for the Great Lakes-St. Lawrence Seaway. The new ship is intended to replace two existing vessels.

The ship will be equipped with a pneumatic unloading system for handling powdered cement products. She will be of diesel-electric propulsion with four generators onboard to power electric motors while underway or the unloading system while at the dock. The vessel will be equipped with several innovative features, such as energy-efficient equipment, and noise insulations for machinery. The vessel is currently being constructed by Holland Shipyard Group of the Netherlands and will enter service in 2025.

Before the new vessel arrives the cement carrier *Sunnanvik* will fulfill the needs of the cement routes for the time being. *Sunnanvik* is a pneumatic cement carrier that previously operated in Europe. Additionally, *Sunnanvik* is equipped with a pair of "Ventofoil" wing sails to improve efficiency to become the first wing sail-assisted vessel on the Great Lakes. ◘

ALGOMA BEAR ARRIVES IN CANADA

APRIL 29, 2024

Algoma Central's new Equinox self-unloader *Algoma Bear* arrived in Canada on April 29, 2024. She first called on Sept-Iles, QC, before proceeding to Hamilton, ON, to have her added hull strengthening stiffeners removed prior to entering service. The stiffeners were added to increase the strength of the vessel prior to her delivery voyage on the ocean.

Algoma Bear is the 11th Equinox Class ship and is considered part of the 2.0 class, featuring dual rudders, increased cargo capacity, and a slightly modified after deckhouse. She was built over the past year in Yangzijiang Shipyard in China. *Algoma Bear* replaced the now-retired *Algoma Transport*. ◘

MICHIPICOTEN DEVELOPS SERIOUS HULL CRACK WHILE UNDERWAY ON LAKE SUPERIOR

JUNE 8, 2024

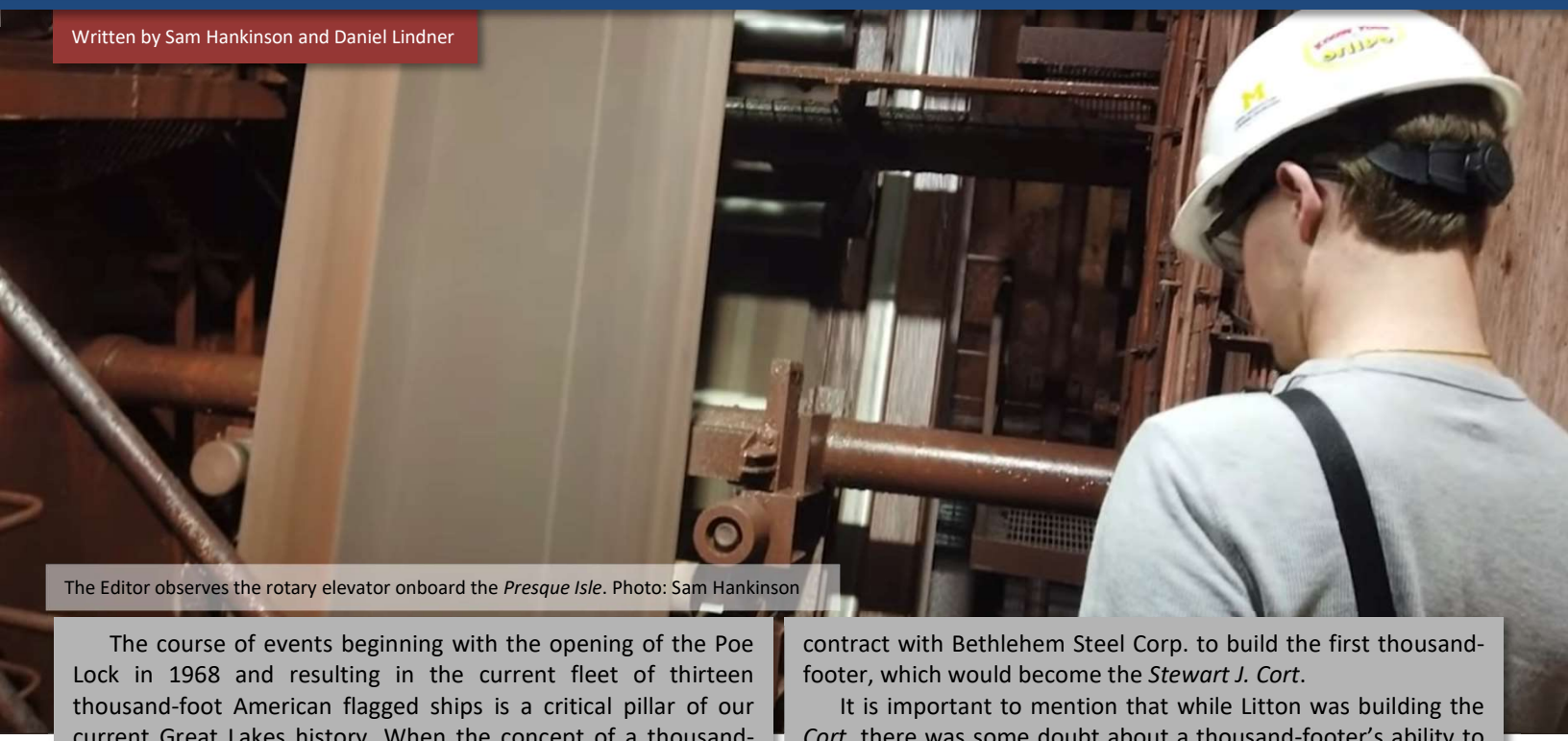
The *Michipicoten* encountered an issue while sailing on Lake Superior on the morning of June 8, 2024. A leak was found in the ship while downbound south of Isle Royale, with reported flooding onboard. *Michipicoten* made a course change for Thunder Bay, ON, shortly after first reports of the situation, with the nearby *Edwin H. Gott* escorting her until authorities could arrive on the scene. Half of the crew was taken off of the ship for safety purposes while en route to Thunder Bay. Lake Superior was calm when the incident occured, reducing further complication of the situation. *Michipicoten* made port in Thunder Bay in the late afternoon, tying up at the Keefer Terminal. She had a list of approximately 10-15 degrees by the time she arrived in port.

After arriving at Thunder Bay *Michipicoten* unloaded her cargo into her fleetmate *Manitoulin*. Divers found a 13-foot-long crack in the hull near the turn of the bilge. Temporary repairs were made to the vessel at the dock in Thunder Bay before she headed to Superior, WI, for drydocking at Fraser Shipyards. She arrived on June 20, 2024, and was drydocked for inspection and repairs. ◘

WHEELS OF WONDER

THE STORY OF THE ROTARY UNLOADING ELEVATORS

Written by Sam Hankinson and Daniel Lindner



The Editor observes the rotary elevator onboard the *Presque Isle*. Photo: Sam Hankinson

The course of events beginning with the opening of the Poe Lock in 1968 and resulting in the current fleet of thirteen thousand-foot American flagged ships is a critical pillar of our current Great Lakes history. When the concept of a thousand-foot ship existed only on paper, it was a given that construction of such a vessel would require a level of shipbuilding that had not been attempted on the Great Lakes. It also meant shipping companies and their engineering departments had to be intensely committed to outside-the-box ideas to meet the needs of an entirely new way of hauling cargo on the Great Lakes.

The first two thousand footers, *Stewart J. Cort* and the ITB *Presque Isle*, were especially unique, as they had no references to work from and were a first of their kind, representing the next generation of super ships. Later thousand footers would come out of the yard with more efficient designs and cargo handling systems built on what was learned from these two vessels.

The construction of the *Cort* and *Presque Isle* cannot be described without making mention of Litton Industries. Litton was a multinational conglomerate that had taken an interest in Great Lakes shipping and made aggressive investments on the Lakes to build vessels reaching 1,000 feet in length that could fully take advantage of the construction of the new Poe Lock at Sault Ste. Marie, MI. This also included the construction of a highly automated shipyard at Erie, PA, capable of producing ships on such a scale.

Litton first began exploring the design of a thousand-foot vessel in 1966. In 1968, Litton absorbed Ingalls Shipbuilding of Pascagoula, MS, which had acquired the Wilson Transit fleet the year prior. The concept was developed by Litton and engineering partner Marine Consultants and Designers, Inc. MC&D became a wholly-owned subsidiary of Litton during the construction of the *Cort*, and later separated to become an independent designer/consultant again after the completion of the vessel.

Litton planned to construct large vessels using a series of prefabricated modules for the cargo midsection in addition to bow and stern sections at the Erie yard. In 1968, Litton signed a contract with Bethlehem Steel Corp. to build the first thousand-footer, which would become the *Stewart J. Cort*.

It is important to mention that while Litton was building the *Cort*, there was some doubt about a thousand-footer's ability to navigate some of the turns on the St. Marys River. The American Shipbuilding Co. at Lorain was also interested in building large vessels, but not of the thousand-foot length. This yard ended up building the 858-foot *Roger Blough*, which entered service in 1972. The *Blough*, although less than 1,000 feet long, was built to the maximum width of the Poe Lock and served as a bridge between the Footers and the smaller Lakers of years past.

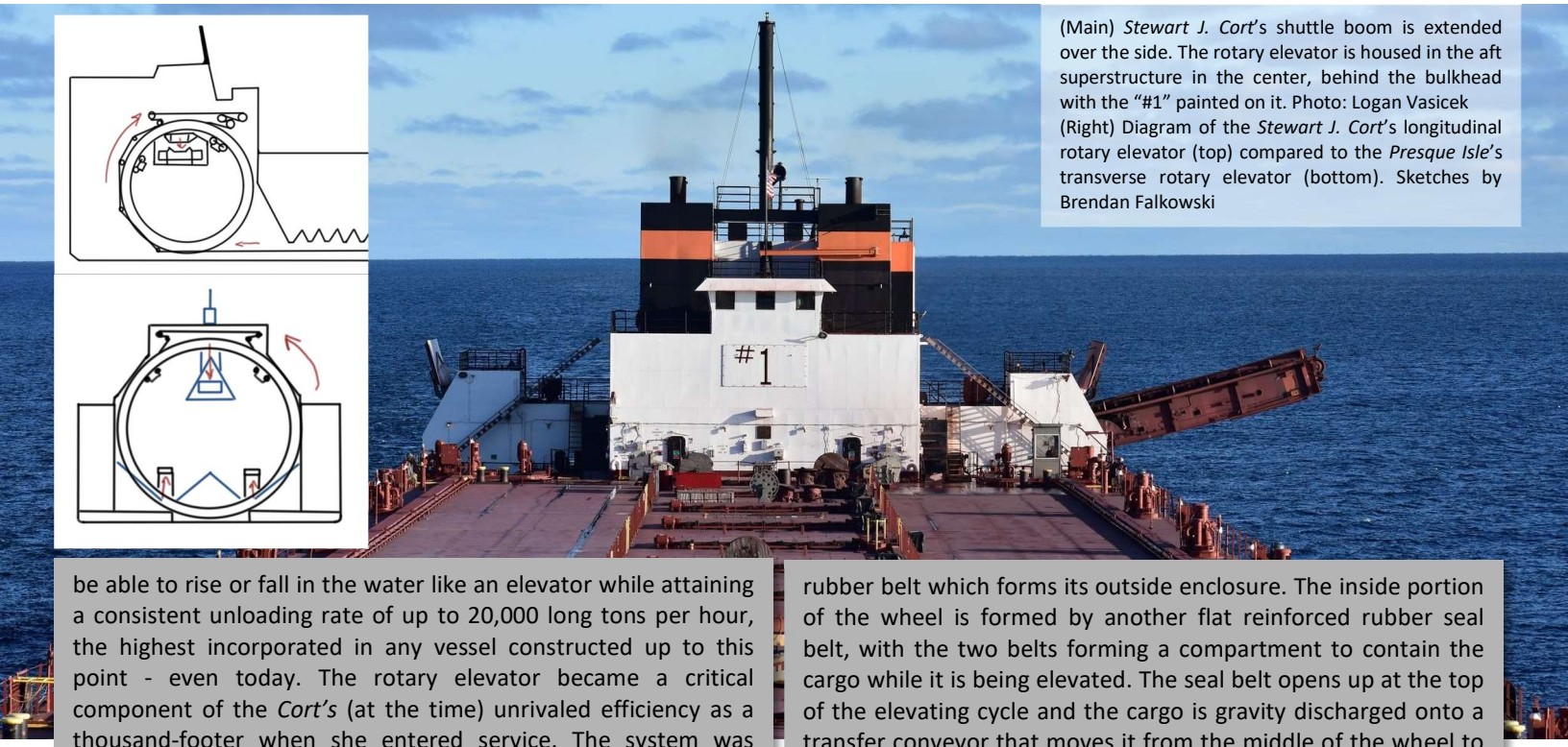
STEWART'S WHEEL

The *Cort's* design represented a number of advancements for the Great Lakes shipping industry. Construction of the vessel prompted the adoption of new longitudinal hull strength standards, and higher-strength steel was used to reduce the weight of the ship when empty, a move that gained 1,000 long tons of cargo capacity over the use of conventional steel. The *Cort* was also the first vessel to be built with a combination of both bow and stern thrusters.

The size of these vessels - and the amount of cargo they would be able to carry in one voyage - was unquantifiable, and significant thought was put into how the ship would be able to efficiently and safely discharge its cargo and how the distance from the bottom of the cargo hold to the top of the ship's deck would be connected. To this point in history, Great Lakes self-unloaders employed bucket or incline belt elevators to raise cargo from the conveyor belt under the cargo hold to reach the unloading boom. The loop belt elevators prevalent on Lakers today were still being conceptualized.

The solution: a giant wheel.

The technical term is a rotary elevator, which was Litton's solution to ensure that the conceptual thousand-footer would be capable of uniformly loading and unloading with very little cargo trimming throughout the length of its cargo hold. The ship would



(Main) *Stewart J. Cort*'s shuttle boom is extended over the side. The rotary elevator is housed in the aft superstructure in the center, behind the bulkhead with the "#1" painted on it. Photo: Logan Vasicek
(Right) Diagram of the *Stewart J. Cort*'s longitudinal rotary elevator (top) compared to the *Presque Isle*'s transverse rotary elevator (bottom). Sketches by Brendan Falkowski

be able to rise or fall in the water like an elevator while attaining a consistent unloading rate of up to 20,000 long tons per hour, the highest incorporated in any vessel constructed up to this point - even today. The rotary elevator became a critical component of the *Cort's* (at the time) unrivaled efficiency as a thousand-footer when she entered service. The system was designed and built by Hewitt-Robbins, a division of Litton Industries.

The *Cort's* 60-foot diameter rotary elevator is mounted longitudinally and enclosed in the ship's aft superstructure. Her two sets of twin engines were installed on either side of the rotary elevator, which allows clearance for the elevator without affecting space in the engine room or cargo hold. The conveyor belt carrying cargo from the cargo hold wraps around the wheel, and cargo is trapped between the belt and compartments around the outside of the wheel. When the cargo reaches the top of the wheel, it falls into a hopper that feeds the 99-foot shuttle conveyor running the width of the hull above the main deck. The boom can be extended out over the side of the ship to a maximum distance of 40 feet and was specifically designed to feed iron ore pellets into shoreside hoppers. The rotary elevator is not powered; rather, it rotates as a result of the friction between itself and the conveyor belt, and can turn at about five revolutions per minute. On the *Cort*, all 105 gates in the unloading tunnel can be opened simultaneously, compared to other self-unloaders that can only open a few gates at a time during cargo offload operations. This efficient system, specifically designed for a select few docks around the Lakes, gives the *Cort* a resemblance to a traditional straight-decker, with no self-unloading equipment visible on deck.

PRESQUE ISLE

The *Presque Isle's* unloading system was also designed by Hewett-Robbins. Unlike the *Cort*, a transverse rotary elevator was installed on the barge, which was a better fit for the vessel's stern configuration and maximized cubic capacity. The *Presque Isle* was also fitted with a more traditional 250-foot deck-mounted discharge boom that can swing up to 90 degrees to port or starboard, unlike the *Cort's* shorter, transverse shuttle boom, giving her more versatility.

The rotary elevator on the Presque Isle is a centerless wheel made up of two circular 4-foot-deep girders, measuring 67 feet, 6 inches in diameter. The wheel is driven by a flat reinforced rubber belt which forms its outside enclosure. The inside portion of the wheel is formed by another flat reinforced rubber seal belt, with the two belts forming a compartment to contain the cargo while it is being elevated. The seal belt opens up at the top of the elevating cycle and the cargo is gravity discharged onto a transfer conveyor that moves it from the middle of the wheel to the hopper over the tail end of the self-unloading boom. The rotary elevator is fed by two conveyor belts running the length of the barge beneath the holds.

CLOSING THE CIRCLE

In 1985, Richard K. Quinn, Carlton E. Tripp, and George H. Plude received the Elmer A. Sperry award for their work in developing the *Stewart J. Cort*, the first thousand-footer on the Great Lakes. Quinn was the director of Great Lakes Operations for Litton Industries, while Tripp and Plude were the President and Director of Engineering for Marine Consultants & Designers, respectively. The Sperry award recognizes a distinguished engineering contribution that has advanced the art of transportation through land, sea, or air.

No other rotary elevator systems were installed on other thousand-footers; additional super ships that followed used more modern unloading configurations, namely the loop belt. The rotary elevator is essentially a combination of a loop belt and bucket elevator and served as a segue between the two. An interesting note regarding rotary elevator systems is that most unloading docks these vessels call on are served by hoppers that require slow unloading speeds. The *Cort's* schedule maintains a consistent shuttle of iron ore from Superior, WI to Burns Harbor, IN, whose hopper can only receive cargo at a rate less than one-fifth of what the ship's unloading system is capable of delivering. The *Presque Isle* often calls on ports such as Nanticoke, Ontario, and Gary and Indiana Harbor, Indiana, thanks to her more versatile unloading boom. Each of these ports also have slow-speed hoppers, which means that the full capacity of the rotary elevators often cannot be effectively utilized.

Although later thousand-footers have more efficient unloading systems, the innovation that Litton brought to the Great Lakes shipping industry is still being put into practice today as long as these systems are still operating on the Lakes.□

Special thanks to Dan Lindner for make it possible for the authors to see the rotary elevator onboard the *Presque Isle* in action.

STANDING TALL AGAINST THE SANDS OF TIME

SAND PRODUCTS CORPORATION REACHES CENTENNIAL IN 2024 – PART II: A NEW ERA

Wisconsin Michigan Steamship vessels *David Z.*, *Earl W.*, and *Wolverine* laid up at Sarnia, ON, summer 2007. Photo: Jim Hoffman, MHSD Collection

Continued from the previous issue:

In 1999 Sand Products made a major addition to the team when they hired a young engineer by the name of Chuck Canestraight. Over the next two and a half decades Chuck would go on to spearhead the effort to revive the company's involvement in the Great Lakes maritime industry. Canestraight worked to further the sand business, get the company back into shipping, and open up new opportunities for the company.

Company chairman Max McKee notes "We are now operating more vessels than we ever have in our history and without Chuck and his leadership we most very likely would not be operating any vessels."

When the McKee Sons came off charter in 2000, Canadian shipping startup Lower Lakes Towing organized a legal US entity - Grand River Navigation Co. - to operate an American fleet. The then-available *McKee Sons* was chartered to become their first US vessel. Grand River purchased the tugboat Invincible from the east coast to push the barge. A year later Lower Lakes continued the expansion, purchasing the *Calcite II*, *George A. Sloan*, and *Myron C. Taylor* from USS Great Lakes Fleet. The *Sloan* was reflagged Canadian for the Lower Lakes fleet and the other two kept on the US side for Grand River.

In 2003, Lower Lakes Towing and Grand River Navigation officials decided to sell the companies to a Canadian bank, which would mean the Grand River vessels would lose Jones Act-compliance. The team at Sand Products Corp. was approached about becoming a majority shareholder of Grand River to maintain the company's Jones Act compliance. Sand Products agreed, purchasing a 75% share of the company while the remaining was owned by the parent organization of Lower Lakes Towing. Lower Lakes Towing created the organization Lower Lakes Transportation to manage the fleet while Grand River acted as the owner of the American fleet.

"I just remember seeing a big firm's conference table full of documents, just packed, that's the deal we were doing," recalled Max McKee, Chairman of the Board at Sand Products Corporation. "I'm an attorney and I just said 'woah!'. I've never seen a table like that before, or since."

Sand Products helped facilitate the purchase of the Richard Reiss in 2004 to continue to expand the fleet. As part of the deal, Sand Products made agreements with Lower Lakes Transportation to haul their sand. The purchase was a move to maintain the idea of keeping the sand and shipping businesses connected within the company.

In early 2006, Lower Lakes Towing and Grand River decided to sell the companies to a newly-created blank check, special-purpose entity. The company, then known as Rand Acquisition Corp., was led by Laurence Levy. Rand changed its name to Rand Logistics and purchased Lower Lakes Towing and Grand River in March of 2006. During the process, the charter agreement for the *McKee Sons* was strengthened and contracts for moving Brevort sand were amended.

Lower Lakes president Scott Bravener pushed Sand Products to purchase the three remaining vessels of the Oglebay Norton fleet and charter them to Lower Lakes Transportation in 2006. Sand Products organized the subsidiary Wisconsin Michigan Steamship Co. to purchase the vessels, and Pete Groh, Mike Moran, Shannon Connorman, and Capt. Ed Hogan were all brought in to run the show. The company purchased the *David Z. Norton*, *Earl W. Oglebay*, and *Wolverine* on August 2, 2006. The boats were chartered over to Lower Lakes Transportation with the option to purchase the ships at a later date. New names for the vessels following Lower Lakes' scheme of using Native American names for regional rivers were explored but not changed at this time. The purchase option was exercised in early 2008 and like before one of the vessels, this time the *Wolverine* was reflagged Canadian for Lower Lakes Towing while the other two were kept on the American side in the Grand River fleet.

In the late 2000s the company again looked to reinvest in new sand business opportunities. The sand industry changed drastically in this time period, changing from demand for industrial sand for raw materials to meeting the needs of the evolving process of hydrofracking. This change hit its peak in the 2009-2010 era. Sand Products wanted to maintain its significance in the market so they went out and prospected for new opportunities. The search for new sand property ventured further away from the Great Lakes region, reaching as far as Missouri. A large property was purchased in Wisconsin with railroad frontage and access to the CN rail system. Sand Products built a fully functional facility on the land, one of the largest in the region. The market kept fluctuating though so the property was sold after about three years in.

(Main) *Commander / Caroline McKee* unload cement in Cleveland, OH, June 10, 2024; (Inset) Port City Marine Services stack herald, *Caroline McKee*, June 7, 2024. Photos: Brendan Falkowski

After yet another exit of the shipping business, it was about time to make another entrance. Chuck Canestraight and Ed Hogan discussed the options on the table. As Chuck recalls, he asked Ed "Well, what do you want to do?" Hogan suggested the company should pursue the operations of the St. Marys Cement American fleet as then-current operator Hannah Marine was running into troubles. Chuck and Ed brought a proposal to St. Marys, and came out of the conference room with a deal to go find a tug to push the barge *St. Marys Conquest*. Port City Tug was formed as a subsidiary of Sand Products Corp., and the tug *Michaela McAllister* was purchased from the East Coast and refit with a Bludworth ATB coupling system in 2008. She was renamed *Prentiss Brown* after one of the shareholders of Sand Products.

After Hannah folded, much of the company's equipment was seized by the U.S. Marshal and put up for auction. Port City went with the intent of acquiring the tug *Susan W. Hannah*, which formerly pushed the *Conquest*. The Hannah happened to be one of the few pieces of equipment at the auction to go up in a bidding war. Port City won against a Canadian operator and took the tug to Muskegon for layup until her service was needed. She was renamed *Bradshaw McKee* in 2011 and put in service with the self-unloading aggregate barge Cleveland Rocks, which was purchased by Sand Products subsidiary Michigan-Ohio Barge LLC that year. The barge was not efficient in long-haul aggregate trades and the pair was laid up at the end of the 2012 season.

After Hannah folded, management of St. Marys' other vessel, *St. Marys Challenger*, was passed off to Central Marine Logistics. Central Marine willingly handed over the operating agreement to Port City's newly created Port City Steamship Services in 2009. At the time the vessel was owned by Wilmington Trust in order to keep the vessel Jones Act-compliant. Wilmington Trust was disinterested in owning the vessel, so St. Marys approached Port City to purchase her. The 1906-vintage steamship was brought under the Port City flag in 2010 and John Hayes, an experienced Chief Engineer with a distinguished career on the Lakes, was hired as the Director of Engineering and Maintenance to help handle the growing fleet.

Discussion of converting the *Challenger* to a barge began as early as she joined the fleet. The situation had no clear answer, as it was hard to justify converting a perfectly operable Jones Act ship into a barge, but at the same time spare parts were not available for the nearly 60-year-old steam engine and she took 23 crewmembers to run. By the time her next 5-year drydocking survey came around, the difficult decision to convert the *Challenger* to a barge was made. Port City Marine made the investment in the vessel, hiring Bay Engineering to design the conversion. The work was performed by Fincantieri Bay Shipbuilding over the winter of 2013-2014, and the Challenger returned to service the following spring with the refit tug *Bradshaw McKee*. After the conversion to a barge, the *Challenger* has continued to sail for almost another decade with many more still in her, making 50 to 60 trips per season on average.

A couple years down the road, St. Marys Cement began discussions on expanding production capacity at their Charlevoix, MI, cement plant that the Port City boats served. St. Marys submitted a request for proposal to Port City to expand transportation capacity. The staff at Port City began to lay out the options, ranging from repurposing a Jones Act hull or a new build. The decision to repurpose an existing vessel was chosen, closely following the precedent set by earlier company principals of innovating with existing capital. The options for the barge included *McKee Sons*, *Cleveland Rocks*, and *C.T.C. No. 1*. Of the selection, *Cleveland Rocks* was the best option. Designs for the barge's transformation were drawn up by Bay Engineering and called for the replacement of the vessel's entire bow section as well as the reconstruction of the entire cargo hold. Meanwhile, an additional tug to push the barge was needed. Port City reached out to McAllister Towing and purchased another tug, and got a package deal with *Colleen* and *Katie G. McAllister*. Ed Hogan and a crew brought the pair into the Great Lakes from Staten Island in New York harbor, towing the Colleen with the Katie in late December. When the tow was nearly to the destination of Muskegon, the tow cable on the Colleen snapped, coincidentally enough just off Charlevoix. The tug was retrieved and the pair made it back to Muskegon on Christmas Eve in 2016. Once the contracts were all set, *Cleveland Rocks* was sent to Bay Shipbuilding for conversion into a self-unloading cement carrier. It was soon realized that more horsepower was going to be required to push the barge, so the hunt for another tug began. The tug that became the *Caroline McKee* was purchased

(Main) *St. Marys Cement / Petite Forte* on the Cuyahoga River, Cleveland, May 17, 2024. (Inset) *Aquastar* cruises the Muskegon channel, July 17, 2021. Photos: Brendan Falkowski

and underwent a lengthy refit in New Orleans, LA, while the barge was being rebuilt in Wisconsin.

In 2017 Sand Products sold off the mining operations and business at the Brevort facility to CSI North America, while Sand Products retains ownership of much of the untouched land and loading terminal. After selling off most of the sand business, the company had the ambition to develop some of its other property. The permitting process and preparation work was begun around this time to develop the old Pigeon Hill sand mine at Muskegon into a marina and housing development along the shores of Lake Michigan. The company had previously been involved in property development and management since the late 1970s when Sand Products purchased the Tyler Creek golf course in Ada, MI.

In 2018 Sand Products again expanded in the maritime department with the purchase of the excursion vessel *Port City Princess* from the Precious family. The *Port City Princess* was a former Mackinac Island Ferry that was bought by Sylvia and Ralph Precious in 1987 and brought to Muskegon as a tour boat. The Princess was docked at the Mart Dock for many years, and Sand Products was granted the right of first refusal if the Precious family wished to sell the business. Ralph passed away and Syliva decided to sell the business, and Sand Products bought in. Port City Princess was renamed *Aquastar* and continues to offer tours and cruises in Muskegon harbor.

After nearly two years in the shipyard the *Cleveland Rocks* emerged from the shipyard from her conversion in 2019 as the cement barge *Commander*, and was paired with her tug C*aroline McKee* in early 2021. The lengthy and complex conversion process proved to be a success, only adding to the history of one of the most unique vessels sailing the Great Lakes.

The most recent expansion of Sand Products' share in the maritime industry came in early 2023 when the Canadian subsidiary Port City Marine Services Canada was organized to purchase Fettes Shipping and Great Lakes & International Towing & Salvage from Mirek Gassowski and Magda Gassowska. Fettes and GLITS provided marine transportation and ship management services for St. Marys Cement's Canadian fleet. With the acquisition Port City Marine Services Canada purchased the tug *Petite Forte* and began managing the barge *St. Marys Cement* and tug-barge pair *Sea Eagle II* and *St. Marys Cement II*.

Over the years several common themes have become apparent in the way that Sand Products does business, focusing on remaining self-sufficient and staying connected to the shipping business. They have shown that a company is capable of supporting the fleet through creating something and being involved in the industry without having to be in the front.

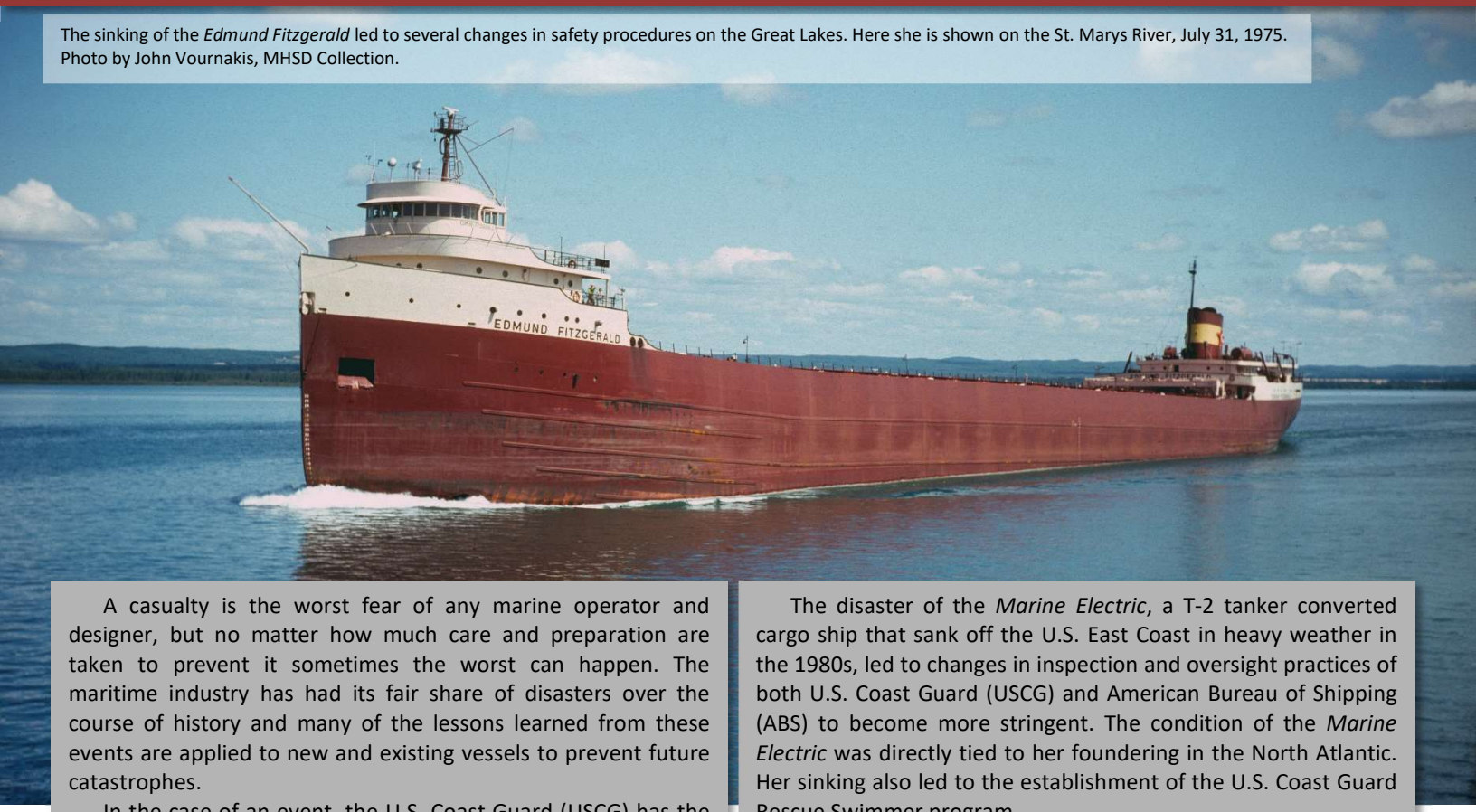
Today Sand Products Corp. is led by third-generation McKee family members with Max McKee (not to be confused with Max B. McKee, founder of the company) serving as chairman of the board and Patrick McKee as vice president, with the talents of Chuck Canestraight serving as President and Scott Musselman as CFO. Leaders of the company leading up to the current team include Max B. McKee (1891-1988) from Port Crescent Sand & Fuel's founding in 1924 until the late 1970s, followed by Miles F. McKee (1911-2004) from the late 1970s until the early 1990s, and Bradshaw C. McKee (1925-2001) from the early 1990s until 2000.

"What we extend out there is that we are humble and grateful for the opportunity to have a 90-to-100-year relationship with the Great Lakes," remarked Chuck Canestraight, President of Port City Marine Services. "The things we do may not be mind-bending on scale but are rather designed for longevity."□

Special thanks to Chuck Canestraight, Max McKee, and Patrick McKee for their time and assistance in preparing this article.

THE WAKE OF DISASTER

LOOKING AT SAFETY IMPROVEMENTS ACROSS THE MARITIME INDUSTRY STEMMING FROM DISASTERS



The sinking of the *Edmund Fitzgerald* led to several changes in safety procedures on the Great Lakes. Here she is shown on the St. Marys River, July 31, 1975. Photo by John Vournakis, MHSD Collection.

A casualty is the worst fear of any marine operator and designer, but no matter how much care and preparation are taken to prevent it sometimes the worst can happen. The maritime industry has had its fair share of disasters over the course of history and many of the lessons learned from these events are applied to new and existing vessels to prevent future catastrophes.

In the case of an event, the U.S. Coast Guard (USCG) has the authority to investigate most maritime casualties. When things reach a particular level of seriousness, the National Transportation Safety Board (NTSB) gets involved. There are specific cases where the NTSB opens an investigation, when a casualty involves any of the following: recurring problems among several incidents, a Coast Guard vessel and a non-public vessel, at least one fatality, or any incident involving civilian aircraft. Both USCG and NTSB give recommendations following the release of their reports, though NTSB recommendations are the primary executable action items following an accident.

When it comes to taking action to prevent catastrophe, vessel operators stand on the forefront. Regulatory bodies are primarily reactive, adjusting vessel rules following issues revealed through accidents. Design meets in the middle where it is pushed to be proactive to the level desired by clients when ordering new vessels or changes to existing ships.

NOTABLE MARITIME DISASTERS AND THEIR IMPACTS

Several notable maritime disasters have led to the introduction of key rules of ship design and regulation today, ranging from ocean ships to those on the Great Lakes as well. The *Titanic* preceded much of the regulation system we know today and serves as the archetype for regulations resulting from reactions to disasters. The first Safety of Life at Sea (SOLAS) ruleset can be traced back to the *Titanic*, which mandated that lifeboat capacity must match the number of people onboard as well as requirements for equipment onboard lifeboats and launching mechanism specifications.

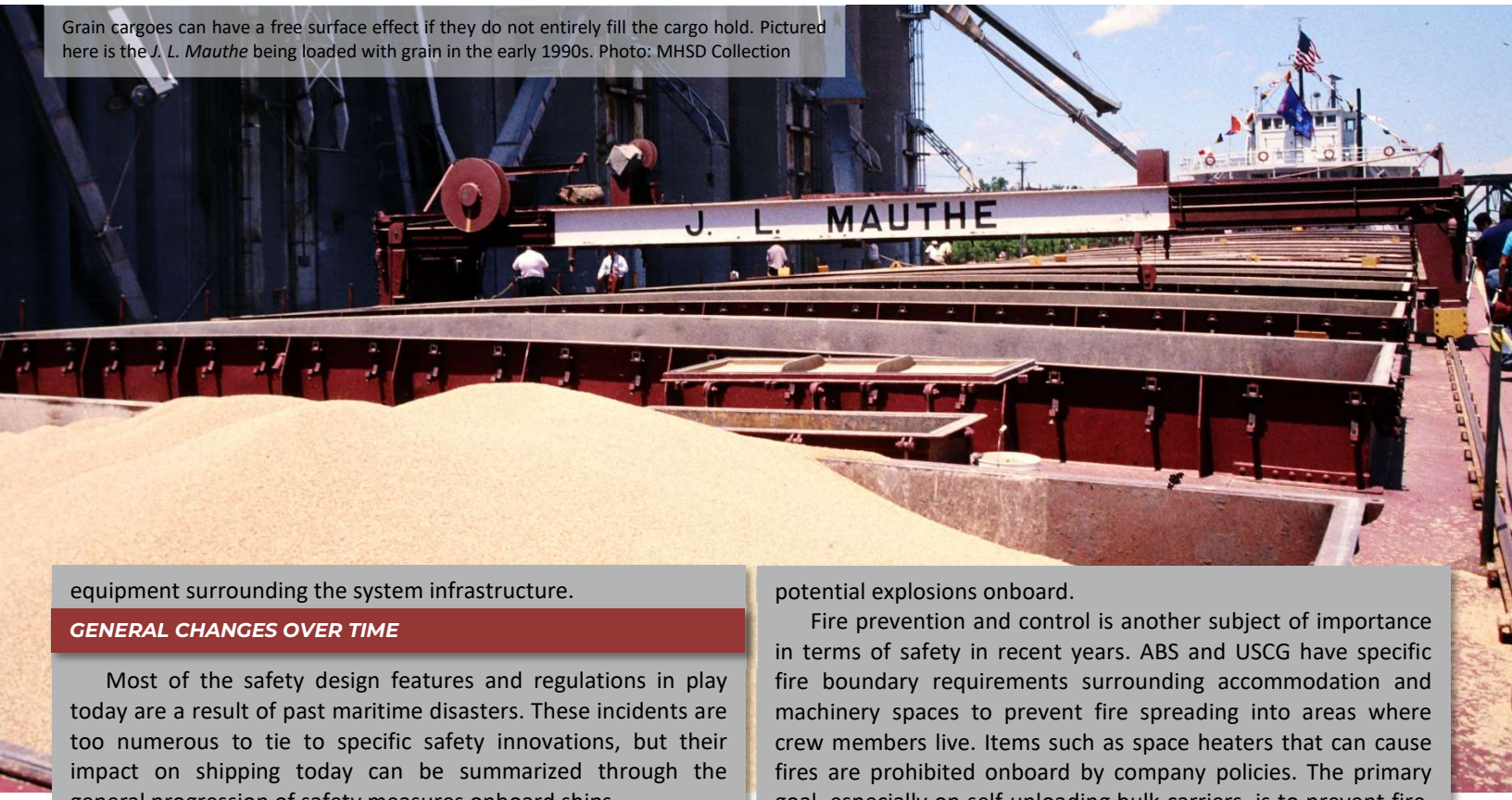
The disaster of the *Marine Electric*, a T-2 tanker converted cargo ship that sank off the U.S. East Coast in heavy weather in the 1980s, led to changes in inspection and oversight practices of both U.S. Coast Guard (USCG) and American Bureau of Shipping (ABS) to become more stringent. The condition of the *Marine Electric* was directly tied to her foundering in the North Atlantic. Her sinking also led to the establishment of the U.S. Coast Guard Rescue Swimmer program.

The grounding of the oil tanker *Exxon Valdez* in 1989 and the subsequent environmental disaster it caused in Alaska drove changes for safety requirements for tank vessels. The Oil Pollution Act of 1990 – OPA-90 – was passed into law requiring tank vessels to be double-hulled and mandated unmanned tanker barges meet damage stability requirements while unmanned bulk carrier barges do not.

Further reform within ABS and USCG inspection practices came more recently following the loss of the *El Faro* in 2015. The *El Faro* was an aging Jones Act container ship that was lost in Hurricane Joaquin. In addition, NTSB recommended phasing out outdated open-top lifeboats with newer, SOLAS-compliant, lifeboats on grandfathered ships.

On the Great Lakes, the sinking of the *Edmund Fitzgerald* has played a major role in advancing safety. Following the loss of the *Fitzgerald*, winter load line regulations were revised, survival suits mandated on Great Lakes ships, damage stability requirements were updated for Lakers on the US side, and outdated navigational chart surveys on Lake Superior and weather prediction systems. Now captains and mariners have access to much more weather data that allows them to better plan their voyages and take shelter ahead of time when things get rough.

More recently, the fire on the *Roger Blough* while in layup paved the way for regulations related to oil-fired heaters and boilers regarding fire detection and prevention, and system maintenance. Rules have now been set in place for emergency fuel shutoffs for these systems as well as fire detection



Grain cargoes can have a free surface effect if they do not entirely fill the cargo hold. Pictured here is the *J. L. Mauthe* being loaded with grain in the early 1990s. Photo: MHSD Collection

equipment surrounding the system infrastructure.

GENERAL CHANGES OVER TIME

Most of the safety design features and regulations in play today are a result of past maritime disasters. These incidents are too numerous to tie to specific safety innovations, but their impact on shipping today can be summarized through the general progression of safety measures onboard ships.

Operational safety standards have been put in place by both regulatory and by operators. When there is need to enter confined spaces onboard the vessel such as ballast tanks or void spaces, a person with confined space certification must be present and a certified Marine Chemist must check the tank for any hazardous gases. Some operators have put in place a policy to notify the local fire department when entering tanks so that they are able to respond appropriately if there is an issue as they are the most qualified agency to assist with rescue in case of emergency.

New regulations are coming into effect to help prevent assault and harassment of crewmembers onboard ships. New mandates as part of the USCG Sexual Assault/Sexual Harassment (SASH) prevention program call for locks on all doors and cameras inside hallways onboard U.S. ships.

Articulated Tug-Barges have had their fair share of safety updates over recent years. USCG Subchapter M came into effect in mid-2016, bringing about a slew of new requirements for tug and towboats, including requirements for monitoring vessel systems as well as the Bridge Navigational Watch Alarm System (BNWAS) – a dead-man alarm to ensure the person standing watch on the bridge is still alert while underway. Other industry-led initiatives include company policies for accessways to the upper pilothouse onboard tugs and methods to get someone down from the bridge in case of a medical emergency.

Cargo Specific safety precautions have come into play as well. Grain and liquid cargoes can create a free surface effect – meaning that they tend to increase the moment, or easily shift around in the hold, when the hold is not entirely full. Liquid cargoes are carried in smaller tanks to increase stability. Other cargoes such as coal or petroleum products are required by class and USCG to have hazardous-rated equipment and use non-combustible materials onboard. Liquid cargo carriers handling hazardous cargo are required to use inert gases to prevent potential explosions onboard.

Fire prevention and control is another subject of importance in terms of safety in recent years. ABS and USCG have specific fire boundary requirements surrounding accommodation and machinery spaces to prevent fire spreading into areas where crew members live. Items such as space heaters that can cause fires are prohibited onboard by company policies. The primary goal, especially on self-unloading bulk carriers, is to prevent fire. ABS also has class rules requiring water mist over diesel engines to prevent fire spread in machinery spaces. As a result of several recent fires onboard Great Lakes ships, there has been increased cooperation between operators, shipyards, and fire departments for training in case of fires while in layup.

WHEN THINGS GO WRONG

When disaster strikes, training and preparation determines how well crews are able to respond. Authorities such as the USCG attend to lifesaving and environmental response duties and NTSB begins investigation depending on the severity of the event.

Other operators begin to look inwards, reviewing USCG and ABS regulations and recommendations as they come out and implementing changes to their own fleet to prevent similar catastrophes from happening to their own vessels. Disasters are a grim reality check that makes operators self-evaluate to make sure they are staying proactive to prevent future losses of their own.

Similarly, designers and engineers consider the situation and how it could have been prevented. They ask, could the accident have been caused by an engineering flaw, operator error, or something out of anyone's realm of control? They think about their own designs and how they may be affected by the outcome of the disaster.

Maritime disasters have a huge impact on the future of the marine industry, from new regulations to implementation of safety innovations and practices. While disasters are unfortunate, they bring hidden issues to light and in a way make the industry safer. ☐

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VESSEL FEATURE

CUYAHOGA

(Main) *Cuyahoga* arriving at Muskegon, MI, August 15, 2019. Photo: Sam Hankinson; (Inset), *J. Burton Ayers* on the St. Marys River, early 1970s. Photo: Roger LeLievre

The U.S. Maritime Commission began to lay out plans to construct a class of bulk carriers to upgrade the Great Lakes fleets in preparation for wartime manufacturing in October 1941. The plans were for the Maritime Class, a group of 16 sister ships of two design variants – L6-S-A1 and L6-S-B1. The Maritime Commission contracted American Shipbuilding (AmShip) to build six of the L6-S-A1 variants at their shipyards in Cleveland and Lorain, OH, and Great Lakes Engineering Works to build ten of the L6-S-B1 variant at their yards in River Rouge, MI, and Ashtabula, OH. The design for the new class of ships was largely based on Pittsburgh Steamship Co.'s AA – "Supers" – class built in 1942. The A1 subclass featured more rounded forward cabins, a short stack, modern cruiser stern, and was powered by a 2500 IHP Lentz Standard Double Compound reciprocating steam engine. The B1 ships had square forward cabins, a tall stack, a more traditional elliptical stern, and a yard-built 2500 IHP triple-expansion steam engine. All ships of the class were 620' long, 60' wide, 35' deep with a capacity of 16,300 tons. Four cargo holds were accessed by 18 hatches on the spar deck.

The new ships were offered to shipping companies for 60% of their construction cost in cash, and the remaining 40% of the value was fulfilled by trading in equivalent tonnage in older vessels. The ships traded in were leased back and eventually scrapped after the war. A total of nine operators participated, trading in a total of 36 ships in exchange for the 16 new vessels. The keel for the tenth vessel in the class – AmShip's Hull #828 – was laid at Lorain on November 20, 1942. The L6-S-A1 vessel was originally laid down as Mesabi but renamed *J. Burton Ayers* after she was traded as one of two vessels to Great Lakes Steamship Co., the other being the L6-S-B1 *J. H. Hillman Jr.* The *Ayers* was launched on May 15, 1943, and entered service on August 19, 1943, sailing to Duluth, MN, to load iron ore. Several members of the class suffered from cracking on the spar deck during their first season of operation, and all were fitted with 3'x2" strapping along the sides of the upper hull.

J. Burton Ayers was purchased by Northwestern Mutual Life Insurance Co. along with her fleetmates *J.H. Hillman Jr.* and *Richard M. Marshall* in 1957. The sale came after Great Lakes Steamship went out of business. All three vessels were chartered to Wilson Marine Transit of Cleveland, though the *Ayers* saw limited service due to being too large to serve many of Wilson customers' docks.

Wilson purchased the *Ayers* in 1966. Wilson went through several ownership changes over the next several seasons, first being purchased by Litton Systems subsidiary Ingalls Shipbuilding in 1967, then being transferred directly to Litton in 1968. Litton ended Wilson operations in 1972 and the fleet was sold to American Shipbuilding Co., to be owned by their subsidiary Kinsman Marine Transit. Litton originally purchased Wilson with the intent to operate a fleet of 1,000'-long self-unloading

(Main): *Cuyahoga* on the Saginaw River, August 20, 2019. Photo: Logan Vasicek; (Inset) *J. Burton Ayers* in Columbia colors on the St. Marys River, August 1977. Photo: Roger LeLievre

integrated tug-barge units, but financials did not warrant keeping the Wilson fleet before the first vessel, *Presque Isle,* was complete.

J. Burton Ayers was sold once again in 1974, this time to Oglebay Norton's Columbia Transportation Division. She was converted to a self-unloader by AmShip's Toledo yard that season, with the installation of a two cargo hold belt system, forward bucket elevator, and 250' deck-mounted boom. The new system took the place of her two forward deck hatches and reduced her cargo capacity to 15,675 tons. Bridge wings were added and her boilers converted to oil-firing by G&W Welding in 1975.

The *Ayers* had a relatively quiet career earlier on as far as incidents, but ran aground at Stoneport, MI, on September 10, 1980. She spent the 1987, 1988, and a large portion of the 1989 season in layup. When she returned to service, she notably ran aground near Bois Blanc Island in Lake Huron on September 23, 1989. *J. Burton Ayers* was laid up at Toledo, OH, on December 22, 1989, which transitioned into long-term layup status in August 1991 when she was retired by Columbia. It was speculated that her scrapping was imminent. Her frequent layup status was due to her small size, despite her self-unloading capability.

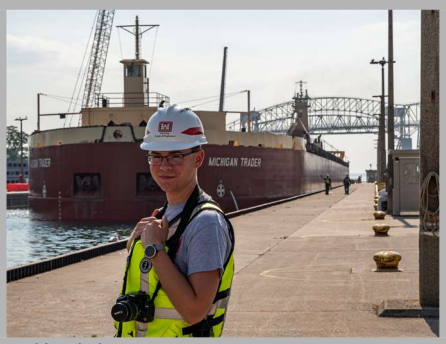
In 1995 the *Ayers* was sold to Lower Lakes Towing LTD. Of Port Dover, ON – a small tug-barge operator that began operating in the Lake Erie stone trade the year prior. The *Ayers* was the first large, self-powered vessel for the young company. She was drydocked in Toledo for a hull survey, steelwork, and painting of the lower hull. From there she was towed to Sarnia, ON, on August 23, 1995 for a continuation of her refit, fit-out, and painting. *J. Burton Ayers* was rechristened *Cuyahoga* on October 7, 1995, and registered in Canada a month later. She sailed on her maiden Canadian voyage on November 12, 1995, bound for Meldrum Bay, ON, to load stone for Cleveland.

Cuyahoga was repowered over the winter of 1999-2000 in Sarnia, ON. Her original steam engine was replaced with a modern Caterpillar 3608 diesel engine providing 3084 BHP. *Cuyahoga* notably delivered the first load of grain via self-unloading vessel to the General Mills Elevator at Buffalo, NY, on August 30, 2002. The shipment officially ended the transport of grain by gearless bulk carrier to Buffalo and placed the American flagged bulker *Kinsman Independent* – future fleetmate *Ojibway* – to the wall.

The *Cuyahoga* remained in steady operation for Lower Lakes Towing while the company underwent a series of ownership and leadership changes, namely when LLT was sold to Rand Logistics in 2006 and when Rand was sold to American Industrial Partners in 2017 and finally Oaktree Capital in 2023. The *Cuyahoga* represents the beginning of this now massive conglomerate of Great Lakes vessels.

On the evening of May 23, 2023, *Cuyahoga* suffered an engine room fire while sailing on Lake Erie with a load of stone from Marblehead, OH for Kingsville, ON. Nearby vessels *Indiana Harbor* and *Radcliffe R. Latimer* arrived on scene to assist until the U.S. and Canadian Coast Guards could arrive. The fire was eventually put out after issues with the CO2 fire suppression system were resolved. An anchor was dropped for the night and the disabled vessel was towed into Kingsville a few days later. Her cargo of stone was unloaded with the use of mobile generators. She was towed to Ashtabula, OH, in early June where her engine was removed and refurbished and the fire damage was repaired. *Cuyahoga* returned to service on October 4, 2023.

Fire struck *Cuyahoga* once again on March 15, 2024, while in winter layup at Ashtabula. The origin of the fire was unknown, but the conveyor belt on her self-unloading boom caught fire and burned. The extent of damage is unknown but all crewmembers were reported safe. The future of the last active-sailing Maritime Class vessel is uncertain as she remains in layup in Ashtabula, OH. This once-proud vessel served several owners faithfully for over eight decades. ◻



Scott Bjorklund photo

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Cover Photo: *Michipicoten* drydocked for repairs at Fraser Shipyards, Superior, WI, June 21, 2024. Photo: David Schauer