

GREAT LAKES
SEAWAY REVIEW



GREAT LAKES SEAWAY REVIEW

The international maritime magazine of the Great Lakes/St. Lawrence Seaway system

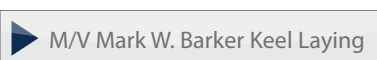
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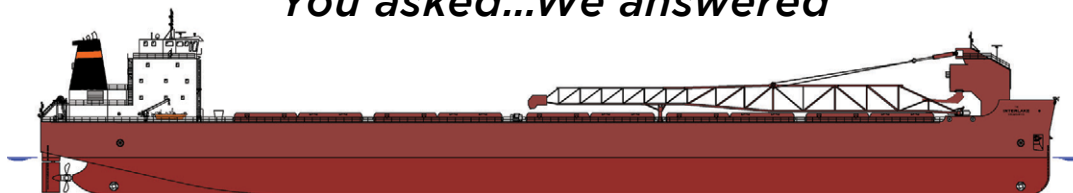
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About the cover: Happy River delivers wind components to Port of Monroe. Photo by Paul LaMarre III.

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IN FOCUS

Mixed lake levels

Highest lake levels hit Michigan-Huron; Lake Ontario down from a year ago

Marinas and lakeside lands are still flooded, especially on Lake Michigan, but the threat of shutting down commercial shipping on the Great Lakes/St. Lawrence Seaway has lessened.

The U.S. Army Corps of Engineers reports that Lake Ontario is down 26 inches from this time last year. From early June to July 2020, the lake fell five inches. However, all five Great Lakes, Lake St. Clair and Montreal Harbor remain above all-time averages and chart datum.

According to Fisheries and Oceans Canada, mariners should exercise extreme caution throughout the system, especially during periods of strong winds when water levels can quickly rise or fall.

Forecasts for the International Joint Commission's International Lake Ontario-St. Lawrence River Board show

the possibility of Lake Ontario's level slightly surpassing last year's late-season level given wet conditions. However, average or dry conditions will see the lake continue to decrease. (Please see the chart below.)

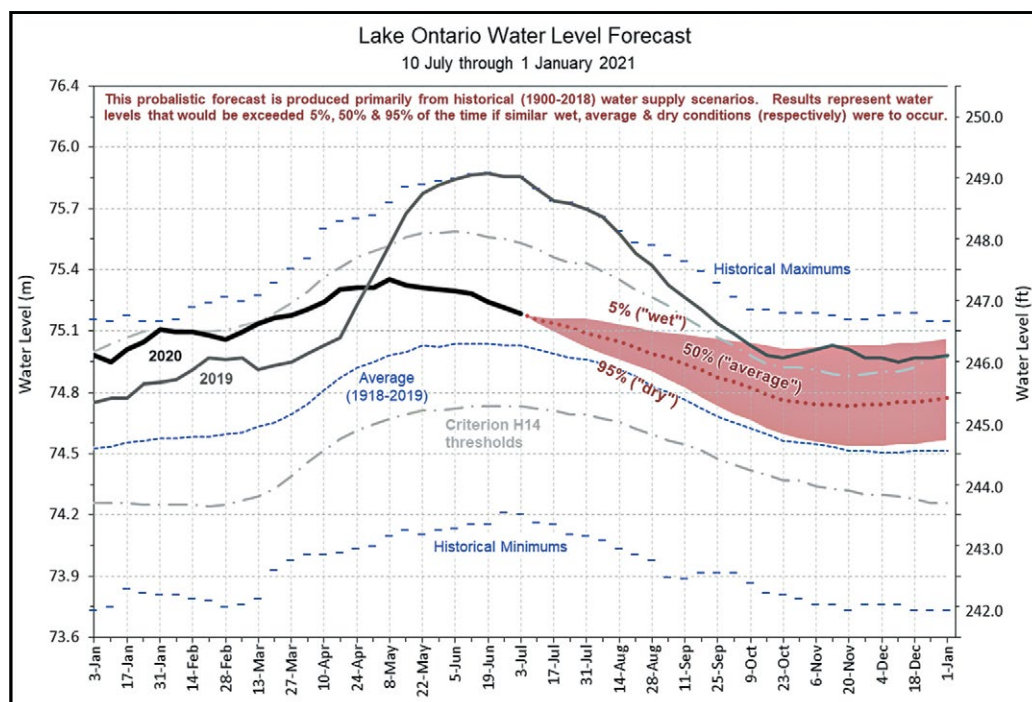
Nature vs. increased water release

While adjustments to the outflow can influence water levels, the main driver of lake levels is weather, especially when wet conditions are as extreme as they were in 2017 and 2019. The river board states: "No flow management plan can eliminate the risk of future flooding."

Outflows at the Moses-Saunders Dam will remain high throughout the rest of the year. The rate is not expected to impede shipping.

Projections by the U.S. Army Corps for the Great Lakes region, released July 3, are:

- *Lake Superior* – Five inches below a year ago (602.79 feet)
- *Lake Michigan-Huron* – Four inches higher than last year (582.22 feet)
- *Lake St. Clair* – One inch below a year ago (577.53 feet)
- *Lake Erie* – Four inches below a year ago (574.38 feet)
- *Lake Ontario* – 26 inches below 2019 (246.78 feet)



SOURCE: INTERNATIONAL JOINT COMMISSION

"The water level of Lakes Michigan and Huron has now risen above the peak level that was reached last year," said John Allis, Corps' Chief of the Great Lakes Hydraulics and Hydrology Office, Detroit District.

The Corps projects Lake Michigan-Huron to continue to set new record high water levels throughout the summer. The July level could come close to surpassing the record high in October 1986.

Helping reduce high water, precipitation was below average in the Great Lakes basin in June—for the third straight month.

For more details on water levels and outflows please refer to www.facebook.com/InternationalLakeOntario StLawrenceRiverBoard or www.ijc.org/en/loslr.

IN SHORT

John Leitch passes

At 99, John Daniel "Jack" Leitch passed away in Toronto, Ontario May 12. Jack greatly influenced Great Lakes shipping throughout his career, most notably as Chairman of Upper Lakes Group Inc.



John Leitch

Jack's father, Gordon Leitch, founded The Northland Shipping Company in 1932 with one ship. He became President when his father died unexpectedly in 1954.

Under his leadership, the company grew into one of the three largest Great Lakes shipping companies in Canada, including subsidiaries of Port Weller Dry Docks and Heritage Pointe, a land development company and golf course near Calgary, Alberta. Jack introduced innovative ship designs and pioneered

self-unloading technology. He is a legend in the Canadian shipping industry and is remembered as the lone marine leader who stood up to Hal Banks in an era of tyranny and corruption in the 1960s.

He was also the Founding Director of the Board of Governors of the Chamber of Maritime Commerce and the recipient of numerous industry awards. He was named The Great Lakes Man of the Year in 1975 and, in 2000, was invested as an Officer of the Order of Canada. Over the years, he served on many boards and was a generous philanthropist. □



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Canadian ballast regs being challenged

The U.S. Federal Maritime Commission (FMC) has formally initiated an investigation of pending Canadian ballast water regulations alleged to be unfavorable to U.S.-flag lakers. The Lake Carriers' Association filed a petition on behalf of its members alleging that Transport Canada's proposed ballast water regulations discriminate against U.S.-flag vessels trading at Canadian ports.

If regulations are finalized as proposed, they would require vessels operating in Canadian waters to develop and implement a ballast water management plan for loading ballast water after offloading export cargo at Canadian ports. Particularly being questioned is why U.S.-flag ships "loading" ballast water in Canadian waters would face the requirement.

Canada contends that the proposed regulations are required pursuant to an International Maritime Organization treaty to which Canada is a party. The United States is not a signatory.

According to FMC Chairman Michael Khouri, the investigation will give the commission the ability to act quickly if it's necessary to "level the playing field for the U.S. Great Lakes fleet."

Public comments are being received. □

Cliffs resumes construction and mining

Halted during the shutdown for COVID-19, construction of Cleveland-Cliffs HBI plant in Toledo, Ohio continues. The plant is now expected to be completed in the fourth quarter of this year.

The Tilden mine primarily supplies the company's AK Steel facilities in Middletown, Ohio and Dearborn, Michigan. The mine was idled in mid-April and restarted in June. The earlier

restart is in response to an improved steel demand from AK Steel's clients, particularly in the automotive sector.

"The demand for our steel, iron ore and metallics products has recovered dramatically over the past month and, in light of this, we are restarting Toledo and Tilden sooner than we originally expected," said Cliffs' Chairman, President and CEO Lourenco Goncalves.

Cliffs has also restarted numerous other idled facilities. □

Heddle, Seaspan jointly bid on Polar Icebreaker

Seaspan Shipyards and Heddle Shipyards have entered into an agreement to compete for the Canadian Coast Guard's future Polar Icebreaker, bringing Heddle and Ontario shipyards into the National Shipbuilding Strategy (NSS). Under the agreement, if Seaspan is awarded the icebreaker, Heddle will fabricate ship modules at its three Ontario shipyards, creating sustained, predictable and long-term work for Heddle in Hamilton, St. Catharines and Thunder Bay.

Without the partnership, Heddle was exempted from the NSS work. Canada's existing Polar Icebreaker, the CCGS Louis S. St-Laurent, the only ship in the Canadian fleet capable of year-round operations in the Arctic, is in its sixth decade of service. □

Green Marine Europe launches

Green Marine and Surfrider Foundation Europe have launched Green Marine Europe, an environmental program for European shipowners. The new organization is based on Green Marine's voluntary environmental certification program in North America, which aims to improve the environmental performance of maritime transport beyond regulatory requirements.

Like the North American model, Green Marine Europe will be transparent, requiring participants to complete a self-evaluation, an external verification and the publication of their results. It targets environmental priorities like greenhouse gases, polluting atmospheric emissions, underwater noise, aquatic invasive species, the management of residual materials and oily discharges.

Surfrider Foundation Europe is an NGO focused on protecting the ocean, aquatic environments and their users. □

IN LEADERSHIP

SLSDC names new Associate Administrator

The Saint Lawrence Seaway Development Corporation (SLSDC) has named Gary Croot Associate Administrator of the Massena, New York operations and facilities. Croot replaces



Gary Croot

Thomas Lavigne, who retired after 40 years of service.

"Mr. Croot brings a wealth of maritime knowledge and experience, and the entire Great Lakes/St. Lawrence Seaway system is fortunate to have him coming aboard," said SLSDC Deputy Administrator Craig Middlebrook.

During his time in the U.S. Coast Guard, Croot held a variety of senior positions around the Great Lakes. For the last nine years, he has been President of an international consulting firm. □

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ESSENTIAL ADAPTATION

REGIONAL SHIPPING INDUSTRY KEEPS GOODS MOVING THROUGH GLOBAL PANDEMIC

From an improving global economy to protectionism—results of COVID-19. With executive orders closing borders and businesses for public safety, elected officials speak of turning inward, socially and economically.

Fluctuating water levels.
Changing regulatory requirements.
Economic recessions. Increasing costs.
Labor disputes and global relations.

The Great Lakes/St. Lawrence Seaway shipping industry has faced them all—adapting to survive and eventually thrive. As the 2020 season commenced, the COVID-19 virus was making its way across the oceans, prompting shelter-in-place orders by governments at state, provincial and federal levels, along with safety requirements that came with little detail.

There was a lot to figure out and little time to do so. Deemed an essential service, the regional shipping industry was forced to adapt quickly.

“With the COVID-19 outbreak, we are living in exceptional times,” said Terence Bowles, President and CEO of the St. Lawrence Seaway Management Corporation (SLSMC). “We continue to witness a tremendous response by our employees and members of the broader marine community in overcoming a range of challenges. The St. Lawrence Seaway provides an essential transportation service that literally feeds nations around the world, including Canada and the U.S., and supplies the inputs which



Terence Bowles

keep many of our industries operating. We will strive to do our part during this difficult period.”

A group effort

During this time, groups like SLSMC, Saint Lawrence Seaway Development Corporation, Lake Carriers’ Association (LCA) and the Chamber of Marine Commerce (CMC) are interfacing between stakeholders, members and governmental agencies.

“We have made sure the government agencies, both the CDC and Coast Guard, were aware of what we were doing and sought their support,” said Jim Weakley, LCA President, on behalf of the regional



Jim Weakley

U.S. fleet. “When needed, we supplemented our team with outside contractors. We received valuable feedback from the operations committee, and they asked some really difficult questions. We updated the plans to better address their concerns. Our quick response guides exceeded government expectations and helped calm the waters.”

As an example, Central Marine Logistics identified a problem with complying with social distancing standards and truck-to-ship fuel transfer documentation requirements, as outlined in the U.S. Coast Guard Marine Safety Information Bulletin. The next day, LCA discussed the problem during the U.S. Maritime Administrator’s national briefing with industry.

“I described the problem and a proposed solution,” Weakley said. “The day after that, the Coast Guard issued a revised Marine Safety Information Bulletin which adopted our solution and solved the problem for the entire country. We literally went from problem identification to a national solution within 48 hours.”

The CMC has developed the Marine Industry Partners Initiative with ship operators to “help assure shipowners, governments and other stakeholders

(including the public) that a mutually-agreed standard of protection, with supporting protocols, is being followed by each partner during ship-shore interactions.”

The initiative is open to any company or organization to join that may be involved with ship-shore interactions in the Great Lakes, St. Lawrence, East Coast and Arctic—and has attracted the participation of ports, ship inspectors, tug operators, Canadian pilotage authorities and marine service/supply firms.

“Everyone wants to get home safely and be confident their job does not put their families and loved ones at risk,” said Bruce Burrows, CMC President and CEO.

“While firms are taking steps to protect their employees, not all organizations are aware of each other’s measures. This initiative opens up the channels of communication and helps reassure participating partners and the public that we’re all on the same page when it comes to COVID-19 safety.”

As a member, CSL Group has worked with the CMC and other associations in devising its safety plan.

“Our greatest challenge has been moving crews and maintenance contractors to and from vessels with differing national and provincial travel and isolation guidelines,” said Allister Paterson, CSL Executive Vice-President & Chief Commercial Officer.

As is the new standard, CSL’s shoreside staff is working remotely with few issues. Employee satisfaction and engagement has risen to its highest level in years.

Beyond the challenge of crew and contractor travel, the CSL team is adapting daily to the logistical issues arising as vessel scheduling changes and customer demands continue to evolve due to their own COVID-19 challenges.

Like others, Great Lakes Towing is taking the pandemic one day at a time, using industry, governmental, U.S. Centers for Disease Control and best practices provided by the World Health Organization to alter its safety protocols. The company qualified for the U.S. Federal CARES Act Paycheck Protection Program which provides interim funding and liquidity, allowing the company to



Allister Paterson



Bruce Burrows



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maintain its employee base through the height of the pandemic.

"It's been a slow start to the season, but we are hopeful for the increased cargo projections being made by the Lake Carriers' Association and domestic operators, ports and other industry contacts," said Joe Starck, President.



Joe Starck

Commodity fluctuations

Early in the season, grain flowed at a healthy level. The Port of Thunder Bay saw unusually strong shipments, about a 25 percent increase from the year before, according to CEO Tim Heney. Demand has brought more ocean vessels into the port.

"As the virus progressed, many companies curtailed grain exports to protect their food supplies, creating a stronger market for Canadian grain in Europe," he said.

The Port of Duluth-Superior also benefited from increased grain exports, topping its five-year average.

At the same time, demand for raw



Tim Heney

materials like iron ore and construction materials have fallen off. With plants shut down and projects like construction of Cleveland-Cliffs HBI plant in Toledo, Ohio temporarily stalled, ships were brought into the docks until volumes increase.

With significant sections of its customer base severely impacted by the sharp economic downturn caused by the pandemic, Algoma Central Corporation saw the greatest hit in moving goods for the steel and construction industries.

"Those impacts are still being felt as we head into the summer months," said Jeff DeRosario, Algoma's Assistant Vice-President, Marketing. "Despite this pandemic and the measures taken to combat it, our fleet was able to answer the bell when the Seaway/Great Lakes navigation season opened in 2020. It is a testament to the flexibility and resiliency of Algoma and other carriers that—without a

playbook—were able to respond to a global crisis and still provide essential transportation services of key bulk commodities to assist in keeping the economy functioning."

As the supply chain goes, DTE Energy



Jeff DeRosario

in Monroe, Michigan was impacted by the loss of regional manufacturing. Demand for power decreased, leading the company to reduce operation to one of four generating units. Coal and limestone deliveries to the Port of Monroe were cancelled. Decreased power generation led to a loss of the byproducts synthetic gypsum and bottom ash which export from the port.

With the plant now operating at full power, business at the Monroe port has increased, which positively impacts Midwest Energy Resources, Interlake Steamship Company, Grand River Navigation, to name a few.

"It is our resilience which will define our 2020 shipping season as a whole," said Paul LaMarre III, Monroe port Director, noting that the port is already on track to handle the most international/Seaway cargo in its history. "Because the port is home to Ventower Industries, which is one of only four wind tower manufacturers in the United States, we are well positioned to be a multimodal congregation and distribution hub for wind components manufactured at



Paul LaMarre III

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This season, BigLift's *Happy River* will call on the port every eight days to deliver wind turbine sections from Becanour, Quebec.

**“It is our resilience
which will define
our 2020 shipping
season as a whole.”**

**– Paul LaMarre III
Port of Monroe Director**

“We always talk about shifting cargo trends and new lines of business to be exploited which could sustain the Great Lakes/St. Lawrence Seaway system in the future,” LaMarre said. “I believe that while the crisis has not yet presented any one specific opportunity, it has allowed us to showcase our resilience and efficiencies. It has had our team working harder and digging deeper to ensure that we keep the cargo we have and give close attention to every opportunity that presents itself.”

“This is a banner year for shipping and seafarers, giving them some of the long overdue credit for being on the front lines of keeping our vital economic supply chains moving,” Paterson said. “We are very proud of the resilience of our staff and crews, and the role that they are playing in getting us through the ‘new normal.’”

In times like these, it is reassuring to see the ports working hard to keep the supply chain moving, said Craig Middlebrook, SLSDC Deputy

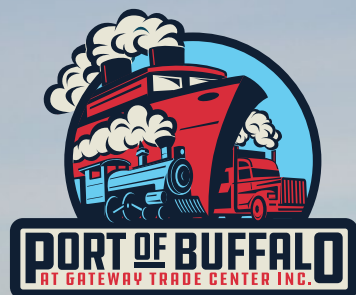
Administrator, noting the industry's vital role in supporting commerce in North America's agricultural, manufacturing, construction, energy and mining industries.

COVID-19 has changed the way the industry works—likely long-term. Companies are using cloud-based computing to better communicate while working remotely. Virtual meetings have, at least for now, replaced industry events where hundreds gathered. And some of the safety protocols will remain after there is a vaccine for virus.



Craig Middlebrook

Janenne Irene Pung ■



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Onshoring.

Tariffs.

Reducing cross-border trade.

Those words are reappearing in the wake of the pandemic—on the heels of the long and difficult negotiations that led to establishing the United States-Mexico-Canada Agreement (USMCA).

“The next six months or year will be very important because all kinds of legislation will be proposed and decisions made that can impact us for a long, long time,” said Catherine Loubier, Delegate General of Quebec in New York. “We are extremely integrated as a region and it’s important to push back against protectionism.”

Loubier is an originator of North American Rebound (www.cabc.co/



Catherine Loubier

rebound), a new campaign consisting of more than 100 signers from throughout the U.S. and Canada. During a phone call with Maryscott Greenwood, CEO of the Canadian American Business Council, the two brainstormed the group to influence continued binational trade.

“It is critical in times of crisis to ensure the maintenance of the Canada-U.S. relationship,” said Greenwood. “This



Maryscott Greenwood

means fighting back against protectionism and buy-American and buy-Canadian. The Canadian American Business Council advocates for an open and efficient supply chain in both times of peace and crisis for the mutual benefit of our two countries.”

North American Rebound is calling the nations to “stand strong for a common cross-border manufacturing response as we tackle the COVID-19 public health crisis and help our shared economies rebuild and recover.”

The group’s response to the pandemic involves:


- Securing personal protection equipment in both countries
- Designing binational manufacturing solutions to replenish and maintain strategic stockpiles of medical equipment
- Continuing to ensure people and goods cross the border efficiently without interrupting critical supply chains
- Expanding market opportunities between the two countries to spur economic recovery and compete globally

“Now more than ever, it’s critical to allow the free flow of goods and personnel necessary to support the biomedical science community,” said Paul Belmonte, Ph.D., Mayo Clinic. “American and Canadian innovation has led to discoveries like a vaccine against polio and the discovery of insulin. Let’s not have this innovation stop with COVID-19 and allow scientists to lend their hand creating the cures for tomorrow.”

“The U.S. and Canada have a unique economic partnership that has moved beyond trade and is unlike any other,” said Garry Douglas, President/CEO of North Country Chamber of Commerce. “Together, we compete with greater effectiveness against the rest of the world. In the past, this special relationship has found itself automatically swept into responses to unfair trade or economic challenges involving other places. As we recover from this pandemic and reclaim economic leadership, it is crucial that this not happen and that we instead move together.”

“We are extremely integrated as a region and it’s important to push back against protectionism.”

**– Catherine Loubier
Delegate General of
Quebec in New York**




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Essential & nonessential

When the pandemic began prompting border closures and travel restrictions, both President Donald Trump and Prime Minister Justin Trudeau agreed to restrict nonessential travel between the countries. The March 18 closure has been extended twice, with the current reopening date set for July 21.

Specifically, border crossings for recreation and tourism were banned.

While cargo movement for the Great Lakes/Seaway shipping industry was not directly hindered, the closing of businesses such as steel mills disrupted demand for products such as taconite and coal. The downturn caused ships to layup mid-season.

North American Rebound isn't disputing COVID-19 safety measures. It is, however, concerned with reactive measures that further hinder North America's economic recovery. It is mounting support for an information and communication plan—targeting leaders who will introduce legislation on trade crossing the U.S.-Canadian border.

"What we call non-essential is, in fact, essential to supporting the health of the relationship and economy between our countries," Loubier said, noting that all sectors of the economy are important. "Protectionism is the wrong way to go, and when I visit legislators with that message, I am surrounded by all of these voices. It makes a huge difference. We need to balance safety and security while recognizing the economic relationship."

Quebec exports about \$92 billion to the world annually, 72 percent of that to the United States. Provincial trade with the State of New York is valued at \$8 billion annually.

Just like the regional shipping industry, Loubier witnessed the impact of President Trump's tariff on aluminum. Quebec exports \$7 billion in aluminum, mostly in the region. The impact of the tariff trickled through the supply chain.

"The Great Lakes/Seaway region represents \$35 billion in economic activity," she added. "We have to support the shipping industry and our clients. Shipping is an absolute pillar in our recovery and our export potential. We have the longest, most secure border in the world and the Seaway is at the heart of it. We must do everything in our power to preserve that."

Protecting USMCA

While the campaign was prompted by the economic crisis resulting from COVID-19, the slow trilateral approval of the USMCA creates its own concerns. Businesses on both sides of the border are jumping in to ensure new legislation doesn't undo the trade deal.

Signers of North American Rebound reached 40 in the first week and are now over 100. Throughout the summer, the group will continue to recruit signers.

Participants represent a mix of businesses based in the United States, Canada and both countries. Some of the signers represent commodities like the American Seed Trade Association and Canadian Food Exporters Association. Manufacturing is well represented, from healthcare technology to freight organizations that move the products for

assembly. A list of signers is found on the campaign website.

While protectionism isn't new, stakeholders in the binational supply chain endured the long, hard fought negotiations of the USMCA. The two-year process included political rhetoric, tariffs, elections and questions on whether a new North American trade agreement could be reached. Negotiations lasted eight rounds.

"We worry about the administrative burden of implementing it by July 1 with

a set of detailed regulations," Greenwood said. "Absent the pandemic is one thing, but people are just trying to get through the current crisis. In addition to influencing legislation, the campaign is a defensive move because as we see the economic rebuild happening, anything that's not consistent with USMCA—we're going to have an opinion about that."

Janenne Irene Pung ■

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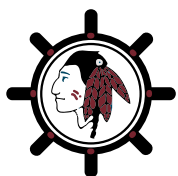


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A high-angle photograph of two workers standing on a red-painted industrial deck. Both workers are wearing white hard hats, sunglasses, and bright orange life vests over dark blue or black work clothes. They are looking towards the camera. The background shows various industrial structures, including a large red vertical pipe on the left and a yellow and red life ring on the right.

ESSENTIAL WORKERS

INDUSTRY ADAPTS TO KEEP CARGO MOVING,
CREW AND CUSTOMERS SAFE

Merchant mariners have always been essential, but when COVID-19 prompted shelter-in-place orders, Great Lakes/Seaway stakeholders began implementing changes to keep crew, cargo and customers safe. The U.S. and Canadian governments identified the uninterrupted flow of commerce as critical to both national security and economic vitality. To continue deliveries, safety protocols were determined and launched.

Through cloud-based computing and remote server access, shoreside workers transitioned to home offices. Crews were

asked to adapt to new protocols.

With an industry as diverse as the cargo it transports—and stakeholders ranging from small family-owned businesses to international corporations—the pandemic has brought new and unique challenges.

“Providing marine transportation services has never been more challenging as marine employers, national governments and regulators strive to maintain the health and safety of essential front-line vessel crew and maritime sector workers amidst the COVID-19 pandemic,” said Wayne Smith, Honorary Director of the

Chamber of Marine Commerce and a member of *Great Lakes/Seaway Review* Editorial Advisory Board. “Every aspect of marine transportation has been significantly affected by COVID-19 yet essential commodities necessary to support our economies and public health and safety have continued to be transported, virtually without interruption, as companies and individuals have responded positively to the threat.”

To achieve the consistency in service, life onboard Great Lakes/Seaway vessels changed. Here are some examples of the safety protocols being practiced.

**Sharon M
McKeil Marine**

It isn't easy to social distance on a tug. The *Sharon M*, just under 115 feet (35 meters) long, regularly pushes a barge carrying cargo. She's been known to haul steel coils and plates from Algoma Steel in Sault Ste. Marie, Ontario to U.S. cities for auto production.

Aboard the *Sharon M*, the interior is much smaller than the bulkers that ply the Great Lakes. The hallways are narrower and the nine-person crew share

accommodation and three bathrooms. But that hasn't stopped the vessel's operator, McKeil Marine, from devising ways to protect the crew during the COVID-19 pandemic.

One of the most important steps has been thoroughly vetting crew members before they arrive for duty, including temperature checks and organizing crew rotations so the same members work together for five weeks and rotate off for five weeks.

When Captain Ray Davis and his crew

arrived for duty, the chief engineer had already been doing winter repair work on the tug for weeks. He volunteered to stay an additional five weeks so that he could continue to rotate with the crew during the pandemic.



Captain Ray Davis

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"We have just a great group of guys. We've been on the same boat for five years," said Captain Davis. "They are really hard working and they buy into our team within a team approach, which really helps when you're dealing with a situation like COVID-19."

Once onboard, after every watch, crew members wipe down all surfaces, door handles, navigation equipment and washrooms. They respect the six feet (two meter) distance wherever they can. There is very little ship-to-shore interaction as the barge is loaded/unloaded by stevedores using forklifts.

At the end of their rotation, the departing crew wash down cabins and the entire tug in full personal protection equipment. Crew changes are only done in Canada, not in the United States, with special provisions made for traveling home.

"We stay together the whole five weeks, with no one else coming onboard," said Davis. "We all leave together and once at home, we self-isolate for two weeks. We also self-isolate for the two weeks before we come back. It's tricky to do when you have family at home, but we understand that we need to know that everyone is healthy before they come back."

Captain Davis' crew is a close-knit group, most of which come from Newfoundland.

"Everybody is doing daily calls to their loved ones back home," he said. "A couple of us have wives on the frontlines, including my lead seaman. My wife works in a hospital. So, we worry about our families back home."

They use humor and good food to get through the difficult times.

"The way we deal with depression here is that we eat a lot," said Captain Davis jokingly. "We have a great cook. I don't think any of us eat as good at home as we do on this tug."

And ultimately, they take pride in helping keep the economy rolling.

"We're happy to be working. We hope what we're doing can help make a difference. That's in the back of our minds."

Assiniboine Canada Steamship Lines

Aboard the CSL Assiniboine, the crew of 22 is skilled at operating the domestic laker. Whether moving Western Prairie grain from the Port of Thunder Bay or canola to Quebec for transloading, they continue to move high-demand food staples during the pandemic.



Captain James Ryan

When the crew boarded at the end of March to start the season, Canada Steamship Lines (CSL) had already created a COVID-19 task force to ensure the safety of the crew and continue safe

operations for their customers.

All crew and any essential workers that board a vessel go through a comprehensive pre-screening questionnaire developed by FutureCare. Once onboard, the crew follows new procedures for sanitizing and social distancing. Shore leave is minimal, only for special circumstances like a medical appointment. Policies are being regularly updated as the situation evolves.

"I think the company has handled things really well," said Captain Jim

Ryan. "I believe these protocols are really keeping us safe. You could sense at the beginning that everybody was worried about the situation. But we've all come together as a crew and followed the practices, hand-washing, social distancing. Everyone feels pretty safe onboard."

As a self-unloader, the CSL Assiniboine is able to load or unload its cargo mechanically without any interaction with port personnel. And CSL is providing crew members with care packages containing hygiene products



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“Every aspect of marine transportation has been significantly affected by COVID-19 yet essential commodities necessary to support our economies and public health and safety have continued to be transported, virtually without interruption, as companies and individuals have responded positively to the threat.”

– Wayne Smith, Honorary Director, Chamber of Marine Commerce



and essentials to make up for the lack of shore leave.

“If I need something in the shop, I know I’m set. The company is sending us extra things, giving us treats with the groceries. Everything helps,” said Captain Ryan.

While it may sound lonely, crew members—who are from all parts of Canada—keep in touch with their families and friends through personal cell phones, ship computers and the ship’s satellite phones if they are out of cell range. At the onset of the crisis, CSL also created a series of new communication channels including daily email newsletters, a dedicated webpage and private Facebook group to support crews and families, and online resources through CSL’s intranet.

“The crew always has the ability to reach their family. I FaceTime all the time with my wife and puppy dog,” said Captain Ryan, who is from Coley’s Point, Newfoundland. “I love my job. I love my crew. Everybody is doing 100 percent to get through this situation and that makes me really proud.”

AlgoCanada

Algoma Central Corporation

Captain Peter Norman boarded the *AlgoCanada* after his rest rotation back home with his wife and two sons, just as the COVID-19 pandemic was escalating in Canada.

AlgoCanada is a tanker vessel that carries gas and diesel to Sault Ste. Marie, Sarnia and Nanticoke, and delivers petroleum products to Oakville, Montreal and Thunder Bay. The fuel is destined for gas stations in the region.

“We’ve been designated an essential service during this crisis,” said Captain Norman, who is from Pacquet, Newfoundland. “I have 15 crew members onboard my ship ranging in age from 22 to 65 and they’re from all over Canada—from Vancouver, Ontario, Quebec and the Maritimes.”

“When I first got onboard, everything was really changing. There were so many questions, borders were closing,” he added. “I was struggling to keep on top of things. I had to just spend an hour and half each day reviewing all the news and updates. We created a bulletin board where we post anything new from the company.”

Typically, crew members aboard the tanker fleet work 12 months a year and are on monthly rotations, spending one month onboard and the next month on break.

Algoma Central had to develop a system to ensure that crew changes could be safe during the pandemic.

Before returning to the ship, every crew member is screened by Algoma Central’s COVID-19 taskforce through a questionnaire similar to those used by Public Health Service Canada. If anyone has COVID-19 symptoms, they are asked to self-isolate at home and provided

financial benefits to help support their 14-day quarantine.

“We want to make sure that crew members feel fully supported to stay home if they need to and that they can be completely forthcoming to us about their situation and any symptoms they may be experiencing,” said Captain Norman.

Algoma Central has contracts with a number of car services to transport its employees, where the cars are being completely disinfected and drivers screened.

“If flights are needed, they are practically empty, so it’s very easy to social distance.”

Arriving crew members board through the back access of the ship, immediately changing their clothes and having a shower before having contact with the crew onboard. Then, social distancing kicks in with crew members.

“Algoma also suspended shore leave for all crew members, which we were happy about. The reality is we feel safer staying on the vessel,” said Captain Norman.

“Everyone is being very respectful of what has to be done to protect ourselves from COVID-19. A lot of our crew are actually considering staying onboard longer,” he added. “We’re happy to be working. There’s definitely a sense of pride that we’re essential workers and keeping trade moving.”

The Chamber of Marine Commerce provided the crew stories for this report.



NEW CAPACITY, CAPABILITY

ASSEMBLY OF MARK W. BARKER BEGINS AT WISCONSIN SHIPYARD



WATCH VIDEO!

A major milestone was reached June 23 during the keel laying of Hull 788 and the naming of Interlake Steamship Company's new self-unloader—the *Mark W. Barker*. The ceremony at Fincantieri Bay Shipbuilding celebrated construction of the first U.S.-flag laker in more than 35 years.

The ceremony involved moving prefabricated modules into the graving dock to be joined.

To date, about 3,500 tons of steel has been cut for the ship's 85 structural modules. Assembly of the 60-ton modules continues through December.

According to Ian Sharp, Interlake's Director of Engineering for Special Projects and Project Manager, work on the midbody of the 639-foot, River Class vessel is farthest along. Twenty of 36 sections are fabricated. Work has begun

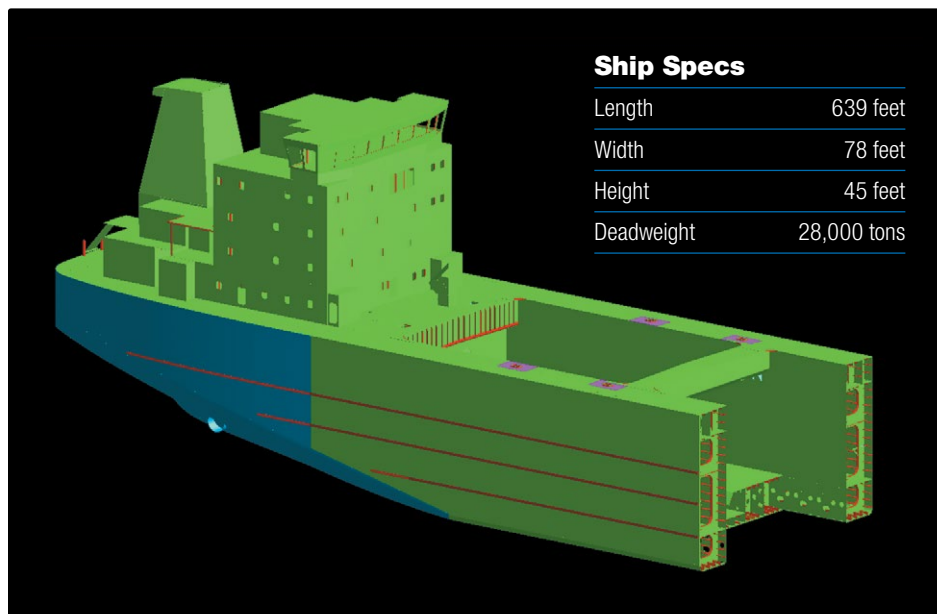
on the afterbody, with eight of the 22 modules in process. The forebody is being engineered.

"This ship is more than the steel assembled here by Fincantieri Bay Shipbuilding," said James Barker, who has led the family-run business for more than three decades. "This ship represents Interlake's determination to be an active and responsible participant in all aspects of Great Lakes trade."

The senior Barker said the vessel is being named after his son for several reasons: to recognize his many contributions to the company, the industry and community, to reflect his leadership and to affirm Interlake's commitment to remaining a family-run company.

"It is truly amazing to have a ship that is built here in Wisconsin and made from steel from Indiana that came from iron

A 3-D virtual model is allowing both the Interlake and Fincantieri teams to “walk through” the ship throughout the building process.



Ship Specs

Length	639 feet
Width	78 feet
Height	45 feet
Deadweight	28,000 tons



LEFT: The first module of the Mark W. Barker is placed in the graving dock June 23. TOP: 3-D technology is being used to “tour” the new ship as it’s being built. ABOVE LEFT: A ship module is carefully lowered. ABOVE RIGHT: James Barker speaks on the company building the first new U.S.-flag laker for the Great Lakes in 35 years.

ore mined in Minnesota with U.S. crews, U.S. workers and U.S. miners all doing this for our great country,” said Mark Barker, Interlake President. “This is just an amazing story that I am absolutely privileged and so proud to be a part of as we continue the long tradition in this country of building, running and operating the U.S. fleet.”

“This large-scale bulk carrier is being built on the Great Lakes and will operate right here on the Great Lakes, which creates a sense of local and regional pride,” said Fincantieri Bay Shipbuilding Vice President and General Manager Todd Thayse.

Beginning with technology

The Mark W. Barker is a new generation of U.S.-flag self-unloader being built with modern shipyard processes. The

modules are fabricated on land and assembled into 120-ton super modules. Computer aided drafting lays out ship parts to minimize waste when automated steel cutting occurs.

A 3-D virtual model is allowing both the Interlake and Fincantieri teams to “walk through” the ship throughout the building process. They use it to help prepare for projects within the build. According to Fincantieri, the AVEVA technology is being used in two forms.

AVEVA Marine involves the hull structure from design to production output. It helps develop detailed models for design and production packages that include profile cut sheets, plate nesting, CNC code, assembly drawings and more.

AVEVA Everything 3-D software is used in detailing placement of ladders, handrails, piping and wiring for the

ship’s outfitting. It also allows collaboration between the structural and outfitting groups to minimize interferences.

“It’s the first time I’ve seen this technology used on the Great Lakes,” Sharp said.

More advanced than the process of the early 1980s when the last round of U.S. lakers was built, the technology at the yard and onboard the ship represents the new generation.

Onboard advancements

With U.S.-flag lakers lasting decades, Interlake is designing in modifications to increase the ship’s versatility in carriage, ports of call and operations.

While the exterior of the River Class vessel will look similar to other self-unloaders, the cargo holds are square, making the ship able to haul more than



MEET THE PROJECT MANAGER

IAN SHARP GREW UP IN SCOTLAND and joined the shipbuilding industry in 1964 when helping convert the 35-year-old *Thomas W. Lamont* from steam to diesel. Working all over the world, he's since been involved in designing or building tug barges, self-unloaders, ammonia carriers, ferries and bulk carriers, including the *Stewart J. Cort*.

At 77 and Director of Engineering for Special Projects for Interlake Steamship Company, he's in charge of building a new generation of River Class self-unloader. He expects this labor of love to be his final project.

Sharp's favorite moment of each project: The satisfaction of watching it sail away for the first time.

bulk. Between its box-shaped holds and five large hatches, the ship will be equipped to move oversized steel coils, steel slabs and even wind turbine components. The flexibility to haul project cargo and the raw materials that support manufacturing throughout the Great Lakes region diversifies Interlake's contract options.

The 54- by 80-foot hatches are designed to align with the loading shoots at the ore dock in Marquette, Michigan, a principal commodity for Interlake. Each hatch cover has two leaves, allowing a single leaf to cover half of the hatch at a time.

There are only 25 clamps securing each cover and automated hatch opening and closing will be handled by one crew member. A traditional laker has 16 to 18 hatches and hundreds of hatch clamps that must be released and secured manually.

"There's going to be a lot less maintenance because you won't have as many clamps and they won't be taken off as often," Sharp said.

In addition to accommodating project cargo, the square box maximizes cubic yards available for the haul.

"We designed to make her as versatile

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as possible,” Sharp said, noting that a special coating and materials are being used on the holds, automated gates, hydraulic cylinders and equipment in the tunnels to provide corrosion protection.

One of the ship's unseen advancements is how the basket gates operate. Located underneath the hoppers, the ship's 34 gates open transversely rather than port and aft. The change in direction helps prevent cargo hang-ups in the hopper. At each end, seals minimize spillage into the cargo tunnel, according to Sharp. A single crew member will control the speed of the belt, the boom and changes to the ballast during loading and unloading.

The new vessel will be powered by an environmentally improved propulsion plant. Control and operations of the plant will be highly automated. Modernized cabins and living spaces offer the crew creature comforts like individual rooms with toilets and private temperature controls, changing rooms to accommodate both genders and office space for meetings.

“When this vessel sails in 2022, it will be new capability and capacity for the Interlake fleet and the Great Lakes,” Mark Barker said. **Janenne Irene Pung** ■

More advanced than the process of the early 1980s when the last round of U.S. lakers was built, the technology at the yard and onboard the ship represents the next generation.



(From left) Eli and Luke Barker, Mark Barker's sons, have the honor of placing the newly minted coin under the keel.



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Working the niche



CAPTAIN SCOTT BRAVENER LEADS EXPANSION OF McKEIL MARINE

Contrary to Captain Scott Bravener's original plan to settle into a large shipping company and build his career, he's traveled a more varied path. While his choices have been heavily influenced by shifts in the economy and shipping industry, his nimble nature has paid off.

The Georgian College graduate worked as a deck officer and captain aboard Great Lakes ships for more than two decades. In 1994, he founded Lower Lakes Towing and led the fleet through affiliation with Grand River Navigation and later with Rand Logistics. Under his leadership, the company grew to own and operate 16 dry bulk vessels.

When Bravener and his partners founded Lower Lakes Towing, they owned a small tug and barge—something he had sailed prior to working the pilothouse on lakere. A long-time friendship with Blair McKeil and the departure of McKeil Marine's former president led to another shift in 2019—Captain Bravener became President of McKeil Marine.

Now, 35-plus years into his career, he's still "beating the bushes," as he calls it, to move cargo from land-based transportation to the ships he can both sail and oversee. As the top executive of one of the fastest growing Canadian shipping companies, Captain Bravener is focusing on the people, the products and adding to the fleet.

His recurring pace and focus explain Captain Bravener's selection as the 2013 Great Lakes Maritime Man of the Year and his induction into the Great Lakes Marine Hall of Fame.

Great Lakes/Seaway Review Editor Janenne Irene Pung connected with Captain Bravener to talk through his journey and the details of his newest station.

GL/SR: Looking back, how did you originally get involved in the maritime industry?

Captain Bravener: I grew up on the water in Port Dover, Ontario. My grandfather and father were in the commercial fishing business. I spent quite a bit of time on the water with my father, but he didn't encourage me to follow in commercial fishing.

GL/SR: Why didn't he encourage commercial fishing as a career choice?

Captain Bravener: It is hard work and a tough life, and he didn't see a bright future for it. Both my dad's father and his brother-in-law were drowned in separate commercial fishing incidents.

The industry has changed over the years. When I was growing up, we had a very large fleet in Port Dover and today it's a shadow of itself.

So, I started working at a local shipyard at the age of 12 in the summers and after school until graduating high school. Then, I went to Georgian College and studied Marine Technology Navigation. In college, I wanted to go to work for a company like Canada Steamship Lines and build my career there. I did go to work for Canadian Steamship Lines as a cadet and worked for them until the spring of 1992.

I was terminated for conflict of interest due to the fact that I was looking to start a company with some investors, but it ended up that we couldn't get the financing right away. In the interim, I went to work for P&H Shipping, as they did not object to our continued pursuit of purchasing a self-unloader.

We started Lower Lakes in the spring of 1994 with a small tug and a 2,000-ton deck barge carrying aggregates across the west end of Lake Erie. In the summer of 1995, we completed our purchase of the J. Burton Ayers, which is now the Cuyahoga. That is when I joined the company on a full-time basis.

GL/SR: What changed your mind about working long-term for a shipping company?

Captain Bravener: In the early '80s, there were no jobs and it was best to get into a shipping company and build your career. Once I did that, I saw a lot of the steel mills close and vessels on both sides of the border lay up—not scheduled to sail again.

The U.S. and Canadian fleets moved away from operating smaller vessels because the operating costs for the larger vessels were the same. Back then there were 100 bulkers with the Canadian flag and now there are 15. I saw there was still a customer need for those smaller ships, especially with the aggregates. We formed Lower Lakes to take advantage of that niche.

GL/SR: In those early years, how did you manage to both sail the ships and oversee the company and do you still maintain licensing to sail?

Captain Bravener: In the early years, one of my partners, Jim Siddall, and myself rotated between the office and the ships as vessel masters. We were able to do this until 2001 when we grew to six vessels and it was no longer possible to manage the fleet in this fashion. I still maintain an active license today.

GL/SR: Summarize how your various roles in the industry benefit you and those you lead.

Captain Bravener: One of the advantages I've had over the years is learning through osmosis—the hard way. I learned from seeing our mistakes and the mistakes of others.

I've also learned that you have to surround yourself with people who provide complementary strengths. Some people want to surround themselves with people who agree with everything they say. But eventually, you're going to fail because you need other points of view around the table to draw upon.

GL/SR: Since joining McKeil Marine you've stated that workforce development is your No. 1 priority. Please explain why.

Captain Bravener: We've added five vessels to the fleet in the past 18 months—and that's significant. We are focused on developing crew from the

ground up rather than recruiting them from other companies. There may be a point in your growth when you have to do that, but as a company grows and matures, you should be able to develop the people for yourself.

This was the approach we used at my previous company. When I left Lower Lakes the first time, the average age of our workforce was 35 years old, compared to our competitors' average age of 57 years old. The industry has many workers who are now reaching retirement age.

With two of our five vessels still foreign flagged, we don't have to crew them the same. For the other three ships, we've added in excess of 60 people, most of them younger. We are focusing on building our pipeline.

GL/SR: What approach are you using to recruit?

Captain Bravener: We are partnering with the maritime schools and the Chamber of Marine Commerce in putting an emphasis on developing our people. As a company, we focus on hiring from areas where there's already a high composition of people working in maritime. The young people already know about maritime.

We can only grow as fast as we can grow people. So, that's why the development of our workforce has been my priority since I've come in the door.

GL/SR: Why is McKeil able to expand at this time?

Captain Bravener: It goes back to being agile and innovative. We're used to pounding the bushes, looking for new business and providing solutions to customers. Our niche is looking in areas of modal shifts, to move cargo off truck and rail and onto the water. We're very customer focused both on our commercial and operating side of the business.

Alouette Aluminum is a prime example. The aluminum ingots were moving entirely by truck. We transitioned it to the water with an open barge, then a covered barge and then to a ship with cranes—making it more and more efficient over time.

Recently we have transitioned to the liquid bulk side of the business. We were presented with a unique opportunity in a segment with limited market participants by a customer looking for the movement of their product both internationally and domestically.

With previous experience in that business, we added four tankers to service PetroCanada Lubricants. We're operating four liquid bulk carriers—two internationally and two domestically. We provide service from the European market to the Great Lakes/Seaway system and we provide them with domestic movements in the Canadian market. We are shipping both raw materials and their products for them.

GL/SR: Do you have plans for more fleet expansion?



Captain Bravener: We are always looking. We're still in the growth mode and are looking at several opportunities and continue to focus on movements of modal shifts onto the water. We look at customers who have a need for smaller parcel sizes or specialized equipment. Everything we do is under long-term contract and long-term relationships.

GL/SR: What are the most important factors you consider when assessing new cargo areas?

Captain Bravener: There's nothing we won't look at. We are looking for long-term, solid customers that are complementary to existing business. We have an East Coast projects business with larger tugs and barges, and we move project cargo on the Great Lakes with smaller tugs and barges. We also have the transportation side of our business.

In total, we have four tankers, four vessels and four larger tug-barge units on the transportation side. Two of the smaller vessels are specialized—one is fit with automated cranes for the carriage of aluminum and one is a pneumatic cement carrier. The fleet is almost entirely owned.

Project cargoes are still a core part of our business.

GL/SR: What other types of diversification are in play?

Captain Bravener: We have gone into cement and tankers in the last couple of years with projects still being a

core of our business. We are looking at delivering turnkey solutions for mining products. It's about what fits within the markets we are in now.

GL/SR: As an executive in the industry, what do you consider the most pressing concerns for shipowners?

Captain Bravener: Regulatory burden. In the last 35 years I've been in the industry, and especially in the last 10 years, the regulatory burden has increased substantially, making it very difficult to operate.

Most of the recent changes address environmental concerns. While regulations on emissions have produced a return on investment for the environment and the shipowner, other regulations have not. On ballast issues, the practicality of what's being proposed is still to be determined, especially regarding domestic ships not leaving the Great Lakes or St. Lawrence Seaway. The argument is that we are transporting invasive species from lake to lake, but most of them swim and there are over 47 other vectors for moving them.

The cost benefit of what we're being asked to do as an industry is just an added capital burden with technology that has not been proven in the Great Lakes environment. It seems there's an imaginary line at Anticosti Island. It's difficult spending millions of dollars on technology and retrofitting on equipment that may not work as desired.

Ballast water exchange has been working very well. The international vessels that are a threat to bringing invasive species into the system have been doing this successfully for years.

GL/SR: How are you addressing high water levels?

Captain Bravener: High water impacts us by forcing slower vessel speeds in the river and it increases risks. But the impact of shutting the Seaway down like we did in the spring was not worth it. For one inch of water, what are the consequences to the economy? It looked good that we did something, but have we actually accomplished anything at the end of the day?

Changing water levels are a natural phenomenon. In the mid-1980s, we had similar water levels. Water levels are cyclical and have been tracked for many years.

GL/SR: Do you have anything to add?

Captain Bravener: With all of the challenges the industry faces, it's still a great place to be and work. It's fun. The opportunities and team at McKeil have reinvigorated my passion for the business. ■

Tug Leonard M and barge Niagara Spirit in Quebec City supporting the expansion of Vale's nickel mine in Voisey's Bay, Newfoundland. Last season, the crew made 11 challenging trips to this remote mining site. The cargo mix made for additional complexity: rolling machinery, containers, steel modules, camp modules, precast concrete sections and gantry cranes.





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UPSTREAM DEEPENING

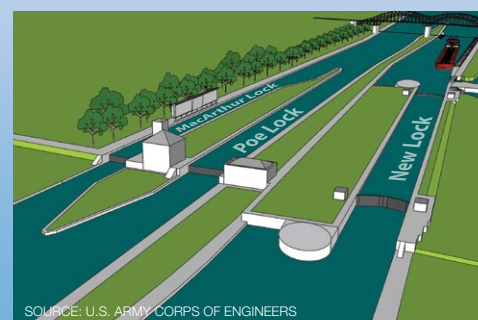
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WORK
ON NEW
SOO LOCK
MOVING
FORWARD

After a decade of inactivity at the Sabin and Davis locks, the two decommissioned passageways are being transformed into the new Poe-sized lock. But before the new super lock can be constructed, the upstream approach channel must be dredged to accommodate the largest freighters.

“It’s incredible that we’re starting this construction a year earlier than even the most optimistic projections when the project was reauthorized in 2018,” said Lt. Col. Gregory Turner, Commander, U.S. Army Corps of Engineers, Detroit District. “Getting the first phase started sets the conditions for the project’s ultimate completion.”

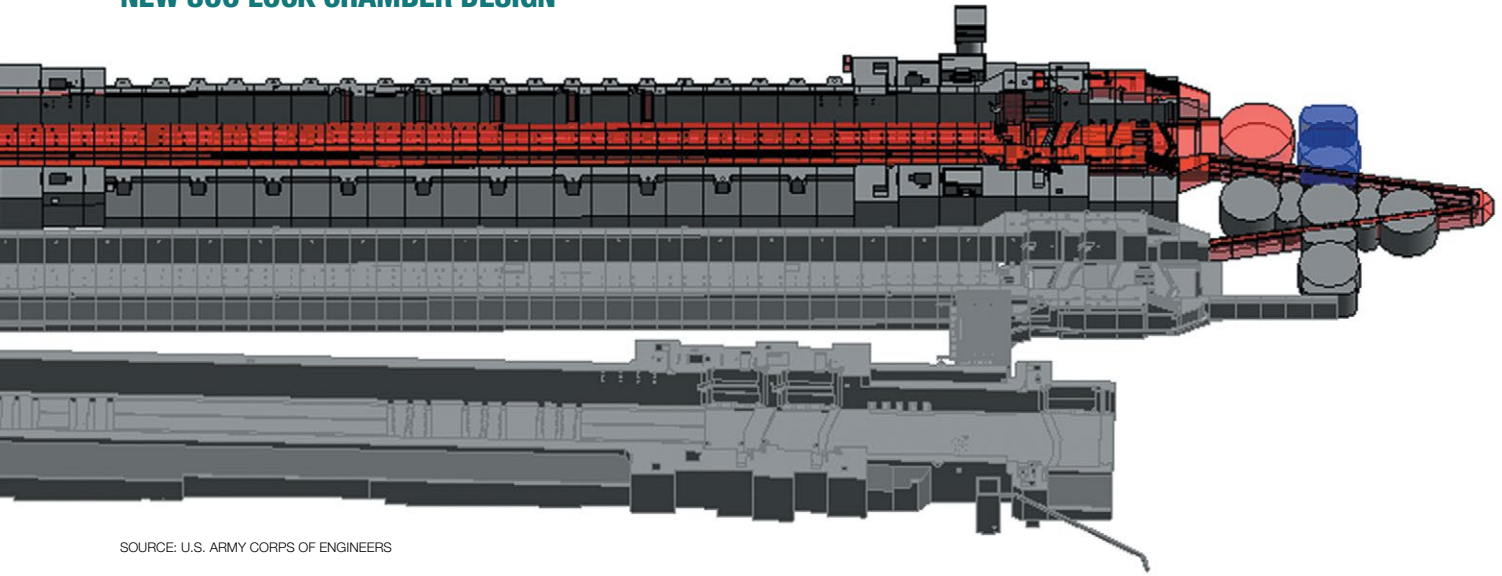
The new lock is expected to provide annual benefits of \$77.4 million and a benefit-cost ratio of 2.32, according to Corps calculations. It will be 110 feet wide and 1,200 feet long, consuming much of the space occupied by the two smaller locks.



The new lock is expected to provide annual benefits of \$77.4 million and a benefit-cost ratio of 2.32, according to Corps calculations.

LOCKS

NEW SOO LOCK CHAMBER DESIGN



SOURCE: U.S. ARMY CORPS OF ENGINEERS

First steps, three phases

In May, Trade West Construction, Inc. began moving equipment to the site. The Nevada-based company won the \$53 million contract, which covers much of the remaining phase one construction. It is busy removing silt and sandstone bedrock for a 7,500-foot stretch and to a depth of 31 feet on the St. Marys River.

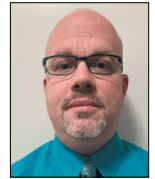
After years of idled work due to a flawed study and funding disruptions, the Soo Locks are abuzz with dredging and new team members who are settling into the area. The process is visible to crew on locking ships and those watching from the shores of Sault Ste. Marie, Michigan and Ontario. Day in and day out, the Trade West team uses barged scows and an excavator to remove material from the upstream approach.

The dredging is extensive; it is estimated that 280,000 cubic feet of material are being removed. The material is being used to create a hill on the northwest pier.

The Davis and Sabin locks were built during World War I, when smaller ships were passing through the locks. They were each 80 feet wide and had a depth of 23.5 feet. The new lock will make use of north wall of the Sabin, with improvements, but requires extensive deepening and the construction of a lock within a lock to keep commerce moving. (See the graphic above.)

Based on a plan to free up space for other work in 2021, Trade West is currently removing silt in the heart of the Sabin, working 1,400 feet up the approach channel this season. The plan frees up the lock for the next contractor to work as Trade West finishes dredging.

“Every one of these projects is offset by a year to allow one contractor in the space without encumbering the next contractor,” said Steven Pautz, Resident Engineer, New Soo Lock Integrated Project Office. Pautz just relocated to the Soo from his last assignment in Louisiana.



Steven Pautz

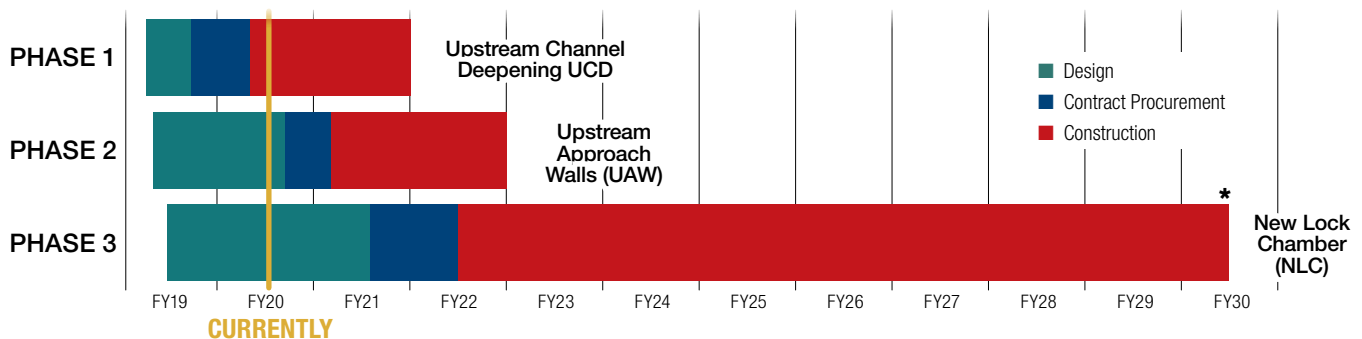
The new start follows work done prior to 2018 valued at \$32 million. Already completed is:

- Design and planning
- Downstream channel deepening
- Installation of the cofferdam at the Sabin

In 2019, about \$69.2 million was spent completing the design of the current channel deepening, the upstream approach walls and the main lock chamber.

In 2020, spending doubles, reaching \$125.3 million to cover the upstream dredging and completing the design of the upstream approach walls and the lock chamber, as well as awarding and managing the contract for the approach wall.

NEW LOCK STATUS



* Early completion could be realized with efficient funding and favorable weather conditions.

SOURCE: U.S. ARMY CORPS OF ENGINEERS

A mirror image?

After considering other options, the Corps decided to build the new lock in the mirror image of the existing Poe, the only lock able to accommodate the largest lakers. However, a deeper look reveals differences, improvements.

Hands-Free Mooring technology is being installed. The systems being used at the other Great Lakes/Seaway locks were installed post-construction. The vacuum system for the new Poe-sized lock will be adapted to accommodate the largest ships. The arms that extend and lock the ships into place as the water raises and lowers will need the power to hold the larger, heavier ships through the process.

Funds being used to modernize the existing Poe and MacArthur locks includes a \$37.7 million expense for a new pump well system. Design showed the original 100- to 120-year-old wells, located under the existing operational buildings, as unable to service all three locks. As a result, a new system is being built.



SOO LOCK STATS

90% – U.S. taconite through the locks

86% – tonnage moving through Poe Lock

74 million – tons of commodity through Soo Locks in 2019

7-10 – years to construct

1,240 – annual jobs created

735,000 – tons of domestically-quarried limestone or granite

35,000 – tons of American-made cement

20,000 – tons of American-made steel

Phases two and three of the project are still in the design phase. The project remains on track with timetables virtually unaffected by the coronavirus pandemic.

Phase two involves rehabilitation of the upstream approach walls, which will stabilize the existing approach walls to allow modern vessels to tie up and wait their turn to pass through the new lock. The third phase, construction of the new lock chamber, will include rehabilitating downstream approach walls.

“In the next quarter, we are focusing on two milestones: getting the contract for the upstream approach walls awarded and getting to a flat 31 feet for 1,400 feet from the Sabin,” Pautz said.

Contingent on efficient funding, the \$1 billion lock could be complete in as few as seven years.

Janenne Irene Pung ■

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Poe Lock celebrates its 20th year

This year the Poe Lock at Sault Ste. Marie, Michigan celebrates its 20th anniversary. When the famous lock was dedicated on June 26, 1969, it became an instant part of the celebration of the 10th anniversary of the St. Lawrence Seaway.

As the Poe—the largest lock in the Great Lakes—opened, newspapers throughout the Great Lakes region heralded the event. The *Detroit News* called it a new standard for the future development of the St. Lawrence Seaway.

The Duluth News Tribune called the Poe an investment in the future, remarking that the lock completed the greatest transition period in Great Lakes history, linking investments in the northern taconite-producing plants and the southern blast furnaces, which had been converted to handle high-grade taconite pellets.

The newest of the Soo Locks was 1,200 feet long and 110 feet wide with a 21-foot draft. It made possible the construction of the land-locked super freighters, the 1,000-foot carriers which today move taconite to the mills in the lower Lakes.

Constructing for \$40 million

The Poe was built over a period of seven years, at a cost of more than \$40 million. Named after a Michigan Civil

War Corps of Engineers officer, General Orlando M. Poe, it became the third lock to be built in 114 years in the same site at the St. Marys Rapids. The first was completed in 1855 by Charles T. Harvey and the second in 1896 by General Poe.

The Poe was built as a “lock within a lock.” During construction, the waters of Lakes Superior and Huron had to be kept out of the lock excavation in order for the builders to have a “dry hole” in which to work. At the same time, however, the other three locks in the system had to be kept operational to prevent Great Lakes traffic from being slowed or halted.

To offset this problem, coffer dams were constructed across the excavation pit at the east and west ends of the lock and pumps were installed to keep the waters of the upper and lower St. Marys River out of the area. The result was a pit in the center of the locking system some six city blocks long, 400 feet wide and over 70 feet deep.

Construction on the modern-day Poe Lock began in 1961 with the demolition of the old lock which was to be replaced, also named for General Poe. At that point, the Corps of Engineers agreed that a planned lock of 1,000 feet by 100 feet was not large enough to handle shipping of the future.



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Several vessels pass through the Soo Locks on June 26, 1969, the day the Poe Lock was dedicated.

Construction was halted in 1962, while studies were conducted to reevaluate the size of the lock. The studies recommended that the Poe be extended to 1,200 feet with a width of 110 feet, still allowing 32 feet of water over the sills.

Completed in 1968

The McNamara Construction Company of Canada served as prime constructor for the job on a bid of \$21,471,690. Lock construction was completed in the summer of 1968 and testing of the facility occurred with the passage of the *Phillip R. Clark* on October 30.

The Sault Ste. Marie *Evening News* commented in an editorial that the new lock “means that the entire St. Lawrence Seaway system of locks will have to be one day rebuilt to allow greater flexibility of this nation’s and the world’s commerce. It means that the channels in the Great Lakes system will have to be deepened and the turns widened to handle bigger and faster boats.”

The famous Sault Ste. Marie had been a navigation bottleneck for the Great Lakes, of course, ever since the earliest days of water transportation. A 19-foot fall in the St. Marys River, slight though it was, had become a barrier which ground interlake navigation to a complete halt.

Ships downbound from Superior and upbound from the other four lakes were forced to unload their cargoes at the Sault. The cargoes were then carried overland for a full mile until they could be loaded aboard another ship.

Economic value

In 1975, the Corps initiated a study to determine the economic value of replacing the Sabin Lock with another lock the size of the Poe, or larger. The need for a second large lock has arisen out of the growing construction of 1,000-foot supercarriers for use in the taconite trades from Superior to the south.

A periodic inspection of the locks carried out in 1983 indicated serious deterioration of several portions of the Sabin and Davis locks. It has been determined that without rehabilitation these locks would be unsuitable for use within 10-15 years.

The proposed construction of a new Poe-size lock would result in the demolition of those two deteriorating locks. The new lock would be 115 feet wide by 1,294 feet long by 33.2 feet over the sills at normal pool elevation.

The lock would accommodate a vessel 1,014 feet long by 105 feet wide with 23.5-foot draft. A clearance of 90 feet is provided to protect each gate through

guard boom action in unreeling cable.

Today, the full federal facility at St. Marys Falls Canal consists of two hydroelectric power plants, the compensating works, information center, administration building, warehouse dockage facilities, park and associated public facilities.

The four parallel locks, located abreast of one another, have dimensions as follows (in feet):

LOCK	LENGTH	WIDTH	DEPTH
Davis	1,350	80	23.1 (closed 2010)
Sabin	1,350	80	23.1 (closed 2010)
MacArthur	800	80	31
Poe	1,200	110	32

A staff of some 300 people run the Soo Locks for the U.S. Army Corps of Engineers. In 1974-75 under a federally-funded Winter Navigation Demonstration Program, the Sault Ste. Marie locks operated for 12 uninterrupted months—the first time for such a feat—recording well over 100 million tons of transiting cargo that one year. ■



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New recruiting strategies

A look at how to best draw young talent into shipping

SARAH RICKLI, Coordinator, Talent Development and Evolution, Fednav Limited

Editor's Note: This new department is designed to give the youngest members of the Great Lakes/St. Lawrence Seaway shipping industry a voice. They share how they learned about the industry, what most appeals to them and strategies for attracting more future leaders.

The maritime industry faces new and unique challenges due to shifting workforce demographics. Strategies to attract and retain talent must adapt to the current generation to succeed.

In 2020, it is estimated that Gen Y comprises 50 percent of the global workforce and, as part of that demographic, I see how this generation favors strategies different than those of previous generations. While experts categorize generational groups for analysis, individuals must still be judged on their own merits to avoid overgeneralizing.

I was introduced to the maritime industry a year ago through a summer internship with Fednav Limited. I have since joined Fednav's Talent Management team as Coordinator, Talent Development and Evolution. We ensure that our employees have opportunities for continuous development through training and coaching, leadership programs and proactive succession management. Through personal experience, I can confirm that Fednav understands Gen Y. Our many development opportunities, our push toward new and collaborative technologies, and our capacity to create a true sense of belonging and value are all elements that contribute to Fednav's success.

With an increasingly competitive market for talent, companies must offer benefits that appeal to Gen Y's values. Indeed, one of the main obstacles facing employers today is that the market consists of more job openings than candidates to fill them. This puts employees and job seekers at an advantage. Given this context, it is critical to understand this significant demographic.

Gen Ys are characterized by their technological savviness, their eagerness to

learn and collaborate, and their desire to find passion and excitement in their work.

Attraction and retention

Gen Ys generally have high expectations of their employers. They seek growth and challenges.

When selecting a company, they will strongly consider culture and values. In other words, how will this demographic be able to build relationships and create connections with their colleagues to eventually feel part of a community?

Because Gen Ys seek a global work experience, companies would do well to offer teambuilding opportunities: organize happy hours, host company-wide events and more to instill a sense of loyalty. Other strategies to retain Gen Ys include opportunities for continuous learning, such as cross-training or assigning special projects to increase their visibility within the company and develop their skills.

At Fednav, we conduct psychometric assessments as an additional step before hiring candidates to ensure the right fit for the role. These tools support not only the onboarding process but our managers in developing employee potential. As our high retention rate indicates, we do everything to set employees and managers up for success.

Other important factors to attracting and retaining this generation are to offer

flexibility at work to achieve work/life balance. This could mean flexible schedules or even four-day workweeks.

Managing

Generally, a Gen Y employee will value a communicative manager who provides constructive and positive feedback through mentoring, public recognition within the company and managerial support. Weekly one-on-one meetings are useful to gauge how the employee is doing, personally and professionally, answer questions about work projects, address career ambitions, share the latest company news and discuss professional development.

As a result, the employee will have a clear sense of direction for the upcoming week and an understanding of how their work is impacting the overall success of the company. This contributes to a sense of autonomy and accomplishment, crucial to their development.

Since this generation enjoys change, mobility within the company could be a good strategy in allowing the employee to try different roles and learn other aspects of

the business. This approach benefits both the employee's growth and the company's ability to groom high-potential candidates for the future.

At Fednav, highly experienced employees are proud of their work and openly share their experiences with and mentor the newer employees. They provide practical work assignments to provide them rich and comprehensive learning experiences.

Generally, a Gen Y employee will value a communicative manager who provides constructive and positive feedback through mentoring, public recognition within the company and managerial support.



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Training

A negative stereotype of Gen Ys is that they aren't loyal. However, research suggests that when companies invest time and resources in developing their employees professionally and personally, 87 percent of Gen Y employees will stay with the company.

To effectively train Gen Ys, interactive or hands-on training is usually the best approach. They will retain more information by "doing" versus "listening." Implementing coaching and/or mentorship programs for these employees is also a more effective method than in-class training. With these types of programs, Gen Ys receive direct and timely feedback, which helps them know if they are on the right track and grows their confidence.

A negative stereotype of Gen Y is that they aren't loyal. However, research suggests that when companies invest time and resources in developing their employees professionally and personally, 87 percent of Gen Y employees will stay with the company.

Finally, capitalizing on their propensity for technology allows the use of just-in-time training materials and key information through an information hub. Such materials should be easily accessed through a company portal or intranet, for example. This encourages autonomy and self-directed learning.

Fednav has implemented a new Learning Management System to enhance the training experience while making it accessible to global employees. This system allows the Talent Management team from all departments to provide training modules in a timely manner while facilitating the use of knowledge management.

The maritime industry may be one steeped in tradition, but new generations require new ways of managing talent. Organizations that understand Gen Ys will be able to capitalize on top talent in these competitive markets and better position the company for long-term success and sustainability. After all, these Gen Ys are the future. ■

Long-awaited upgrade

U.S. SEAWAY PREPARES
FOR SEA TRIALS OF
NEW TUGBOAT



As part of its Asset Renewal Program (ARP), the Saint Lawrence Seaway Development Corporation (SLSDC) funded construction of a new ice-class tugboat to perform its icebreaking, vessel assistance and buoy commissioning and decommissioning.

The current tugboat, *Robinson Bay*, was built in 1958. The new tug will operate as *Seaway Guardian*, the name selected from a list of suggestions submitted by employees. The name reflects the unique and significant role the tug plays in supporting and protecting users of the Great Lakes/St. Lawrence Seaway system.

In September 2017, the SLSDC awarded a small business set-aside contract to Gulf



ROBINSON BAY

Keel Laid	1958
Launched	1958
Length Overall	103 feet
Breadth	24 feet
Navigation Draft	13 feet
Gross Tons	213
Horsepower	1,890
Bollard Pull	18 tons
Max Speed	8 knots
Main Engine	One 1,890 HP
Propulsion	Four Bladed, Single Screw
Hull	Steel, Ice Reinforced
Icebreaking	12 inches at 3 knots
Crew Accommodations	8
Tow Winch	None
Crane	None



SEAWAY GUARDIAN

Keel Laid	June 26, 2018
Launched	September 12, 2019
Length Overall	118 feet
Breadth	45 feet
Navigation Draft	17 feet
Gross Tons (estimated)	720
Horsepower	5,350
Bollard Pull	65 tons
Max Speed	13 knots
Main Engines	Two 2,675 HP
Propulsion	Two Ice Classed Z-Drives
Hull	Steel, Ice Class 1A
Icebreaking	36 inches at 3 knots
Crew Accommodations	14
Tow Winch	Rated for full bollard pull with 1,000 feet of tow cable
Crane	20-ton capacity



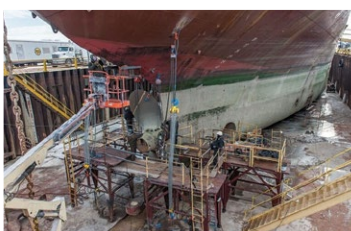
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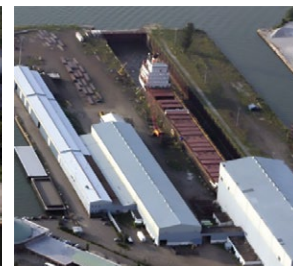
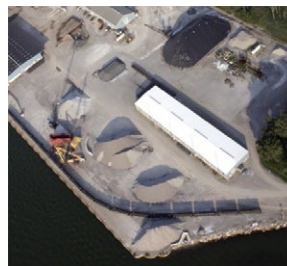
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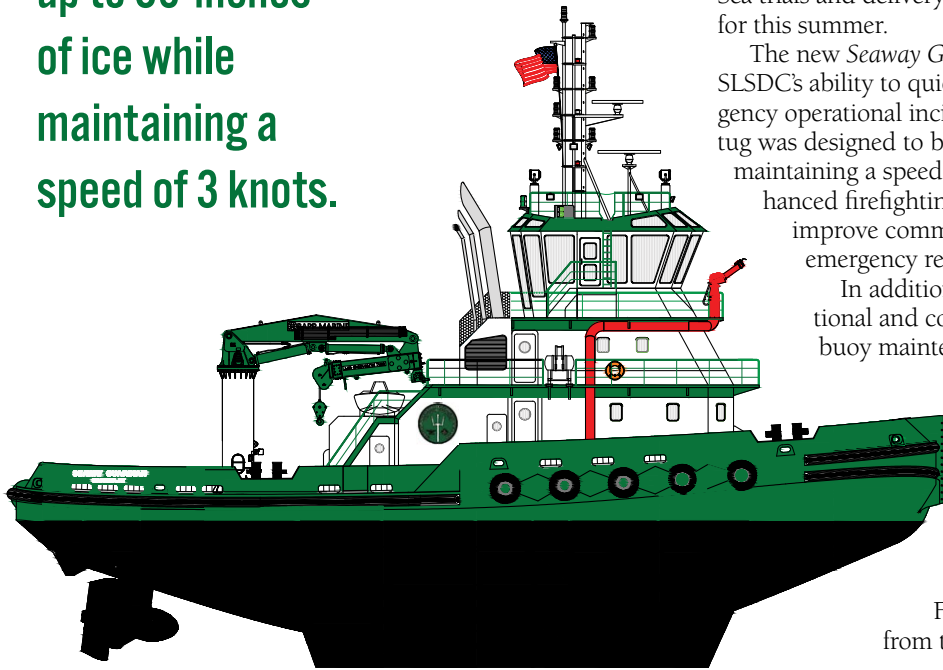
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The tug was designed to break up to 36 inches of ice while maintaining a speed of 3 knots.



Island Shipyards, of Houma, Louisiana, for construction of the new tugboat—estimated to cost \$24 million. Construction began in 2018 with the keel laid on June 26 and the vessel launched on September 12, 2019.

Construction on the *Seaway Guardian* is being completed. Sea trials and delivery to Massena, New York are scheduled for this summer.

The new *Seaway Guardian* tugboat will further enhance the SLSDC's ability to quickly and effectively respond to emergency operational incidents on the St. Lawrence Seaway. The tug was designed to break up to 36 inches of ice while maintaining a speed of 3 knots. It is equipped with enhanced firefighting capabilities and a command center to improve communication and coordination during emergency response.

In addition, the tug will achieve greater operational and cost-savings efficiencies, especially for buoy maintenance and the retrieval/placement

process at the end and start of each navigation season.

Unlike the *Robinson Bay*, the new tug will be equipped with a deck-mounted crane and sufficient deck space to pick up and/or deploy up to three full-size buoys without the use of the buoytending barge.

Finally, the new tug reduces emissions from the *Robinson Bay*. ■

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Tugboat *Mississippi* has joined the Great Lakes Maritime Academy (GLMA) fleet. The leased tug increases cadet options for completing sea time requirements and the credentials they receive at graduation.

Even the tug's arrival at the Traverse City-based campus involved training. Captained by Cary Godwin, a crew of four departed from Cleveland, Ohio May 29 and sailed her to Traverse City, Michigan-based campus.

Adding the *Mississippi* to the academy's fleet offers greater assurance cadets that they will be able to complete the required 360 days of sea time before graduation. Cadets complete sea time requirements during three sea projects, the first of which is completed aboard the *T/S State of Michigan*, GLMA's flagship vessel since 2002.

TUG



The GLMA tugboat Mississippi crew in Cleveland about to get underway. From left: Ryan Anderson (Engine), Zach Drenth (Deck), Dan Zassick (Mate) and Cary Godwin (Captain).

In March, Northwestern Michigan College trustees unanimously approved leasing the Mississippi for six months at a cost of \$73,800.

Many cadets accrue the remaining sea time aboard commercial vessels. However, berths on commercial vessels are increasingly difficult to obtain, said GLMA Superintendent Jerry Achenbach. This is due to GLMA being at full enrollment, with at least 21 students on a waiting list for admission this fall.

In addition to giving cadets another option for sea time, *Mississippi* allows deck cadets to earn an additional endorsement—enabling them to serve as a licensed officer on a tow vessel. This will substantially increase employment options.

“It would be great to come out of the academy with pilotage and a towing endorsement. That’s going to be amazing in terms of job opportunities,” said Margaret Handel, a 2020 GLMA graduate who needs to complete just 35 days of sea time.

She had hoped to do so aboard a commercial vessel, but said the tugboat would be a great substitute, especially since the coronavirus pandemic has made it even more difficult to get sea time.

Cadet Zachary Ferguson agreed. He is set to graduate in 2021 and needs 96 more days of sea time, noting how cadets are behind on sea time due to the pandemic.

“The tug is really going to help to try and make up those days,” he said. “Every day counts.”

In March, Northwestern Michigan College trustees unanimously approved leasing the *Mississippi* for six months at a cost of \$73,800. Including fuel (\$100,000), insurance and instructor salaries, it will cost an estimated \$188,000 to operate the tugboat this year. ■

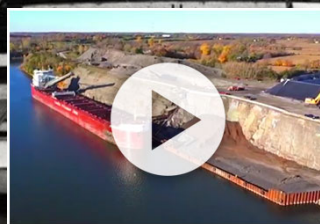
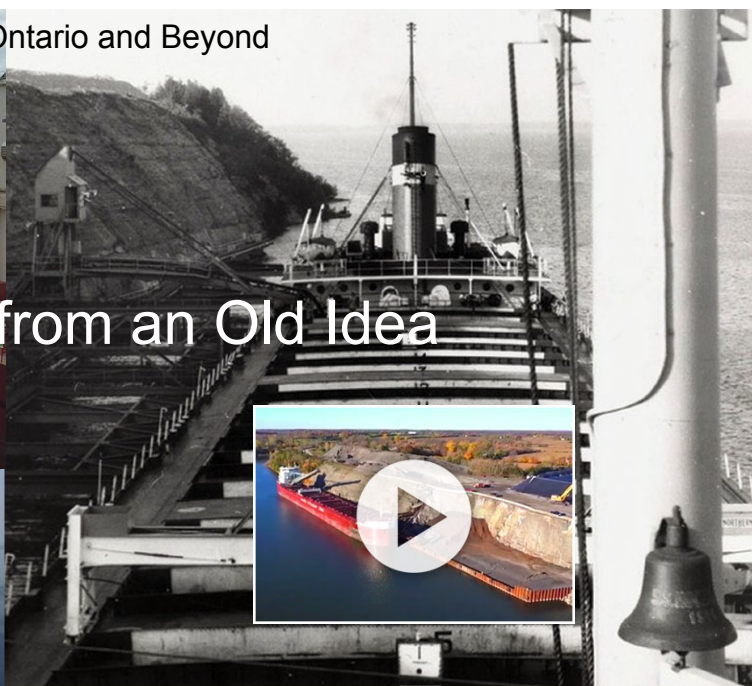


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FUEL REVIEW

NEW ABS REPORT ANALYZES FUEL OPTIONS
FOR MEETING IMO EMISSION STANDARDS

SOURCE: ABS

GEORGIOS PLEVRAKIS
Global Sustainability Director
ABS



As the shipping industry sets the course to meet ambitious greenhouse gas (GHG) targets set by the International Maritime Organization (IMO) for the next 30 years, ABS has published a new outlook on the latest trends in carbon-reduction strategies.

The outlook, *Setting the Course to Low Carbon Shipping*, looks at the latest fuels, technologies and operational measures and matches them with forecasts for the world's key trade lanes to envision what shipping's carbon output may look like in 2030 and 2050.

The outlook is the second in the series of forward-looking documents published by ABS—the first was released in June 2019—and suggests that the pace at which low- and zero-carbon marine fuels are adopted will have the most profound impact on the maritime industry's ability

to reduce its carbon footprint.

"The decarbonization challenge can be regarded as a complex riddle with three elements: vessel energy efficient technologies, operational optimization and low- and zero-carbon or carbon-neutral fuels," said ABS Chairman, President and CEO, Christopher J. Wiernicki. "All elements have a role to play, but we have identified that the rate of shipping's transition to lower carbon fuels will have the single biggest impact on its global carbon footprint—more than any predictable shifts in commodity demand, enhancements to operating practices, vessel routings, or ship designs."

Meeting goals

In April 2018, the IMO committed the industry to reducing its collective 'carbon intensity' (CO₂ emissions per 'transport work') by 70 percent before the end of 2050 and an outright 50 percent reduction in greenhouse gasses (GHG) by that time. The latter is the most ambitious

carbon-reduction target ever set by IMO.

However, Wiernicki said the results from ABS's latest research suggest shipping is likely to meet the targets for reducing carbon intensity, but it might miss the target for outright reduction in GHGs.

"In short," he said, "there is a gap between the industry's present course and its stated ambition."

The report uses two scenarios to generate forecasts: a 'standard' scenario based on the stated policies of International Energy Agency (IEA); and an 'accelerated climate action' scenario that aligns with the IEA proposed Sustainable Development Scenario.

In ABS's standard scenario, petroleum-based fuels are projected to retain about a 40 percent market share of shipping's fuel consumption in 2050, which, if realized, will make it difficult for the industry to achieve the IMO's target for outright GHG reductions by 2050.

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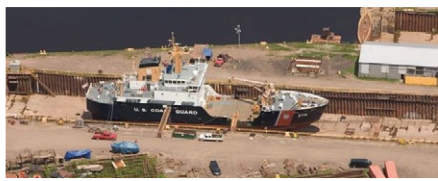
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FLEET: Key ship types and their size ranges, number of vessels and typical CO₂ emissions

Ship Type	Size Ranges/Ship Class							Total Mn gt	Total vessels	Typical Emissions (gCO ₂ /dwt/nm)
Dry Bulk Carrier (k dwt)	10-40	40-65	65-120	120+				482	11,536	3-9
Oil and Chemical Tanker (k dwt)	10-70	70-125	120-200	200+				352	8,681	2.5-7.5
Containerships (k TEU)	0.1-1.3	1.3-2.9	2.9-3.9	3.9-5.2	5.2-7.6	7.6-12	12+	246	5,170	6-19
LNG Carriers	Steam Turbine	D/TFDE	Motor Diesel	Gas Injection				58	518	6-11
LPG Carriers (k M3)	6-22	22-40	40+					21	779	7-15
Other Ship Types (gt)	100+							221	40,620	N/A

SOURCE: ABS

The report uses two scenarios to generate forecasts: a ‘standard’ scenario based on the stated policies of International Energy Agency (IEA); and an ‘accelerated climate action’ scenario that aligns with the IEA proposed Sustainable Development Scenario.

options, ABS has identified three basic fuel pathways that lead to meeting the IMO’s goals for decarbonizing the fleet:

- Light gas
- Heavy gas and alcohol
- Bio- or synthetic fuels

For shipowners, choosing the right technology mainly will be influenced by two key criteria: the type of vessel and its operating profile, meaning where and what it trades.

Light-gas pathway

These fuels generally offer high energy content and are composed of small molecules. Due to their structure, they require more demanding, cryogenic fuel supply and storage systems.

This fuel family includes LNG and bio-methane (in bio-LNG and bio-natural gas [BNG] forms); production of the latter variety will need to be scaled up and the related technologies further developed before they become viable as marine fuels.

LNG is a relatively mature low-carbon fuel, which reduces a ship’s carbon footprint about 20 percent compared with heavy fuel oil (HFO), if the impact of methane slip is not considered. Bio-methane, derived from organic materials, may be carbon ‘neutral,’ if the methane slip is not considered. Methane slip is when gas leaks unburned through the engine.

For LNG and BNG, reducing the methane slip is a key to unlocking their commercial potential, which is why the industry is actively developing a range of related emission-control technologies. Without them, using LNG could increase

CO₂ output, relative to HFO or marine gas oil (MGO).

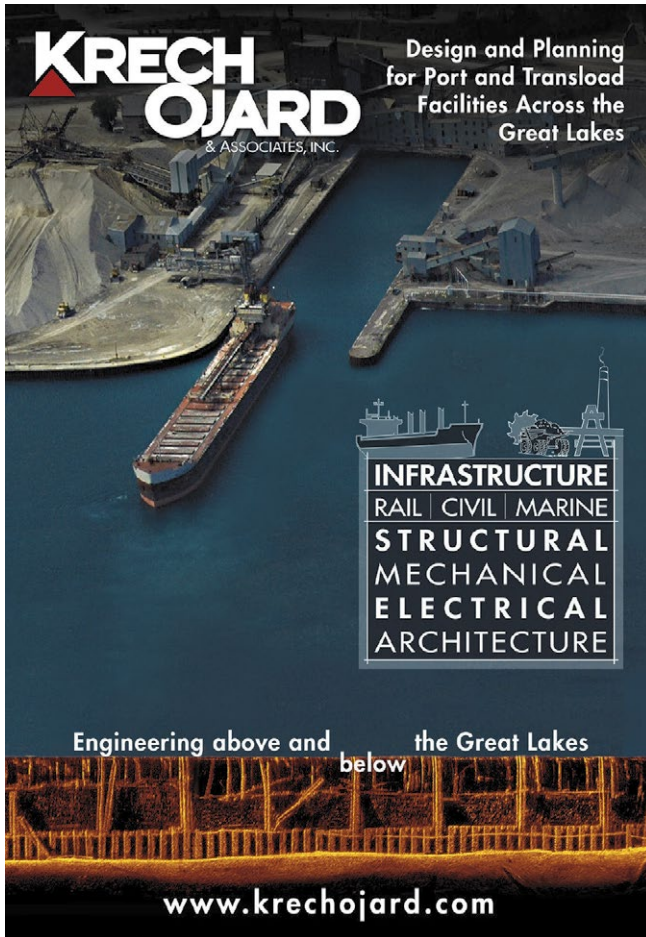
From a tank-to-wake perspective—consumption within the vessel—high-pressure diesel cycle engines already operate with negligible or no methane slip. There are technologies in development—such as catalytic converters—that minimize methane emissions throughout the entire LNG-production chain.

Given its limited CO₂-reducing potential, it would be easy to dismiss LNG as a mere contributor to meeting the IMO’s 2030 emissions-reduction goals (a 40 percent reduction in carbon intensity). But its future potential may be greater.

If bio-methane or electro-methane (see electro/synthetic information below) fuels prove viable on a commercial scale, LNG’s carbon output could be reduced proportionate to the fuel blend. BNG or electro-methane fuels are potentially carbon neutral, and there is currently significant industry investment dedicated to exploring these solutions.

In terms of commercial readiness, at the end of the light-gas pathway is hydrogen, which needs at least a decade to prove viable and even that timeframe may prove to be ambitious. The biggest technical obstacle to its use as a marine fuel is storage. More research is needed to find the most effective way to use it for marine propulsion, either in internal combustion engines or fuel cells; some technological challenges need to be addressed to make it a cost-effective solution.

Nevertheless, hydrogen does have significant promise. Its energy density



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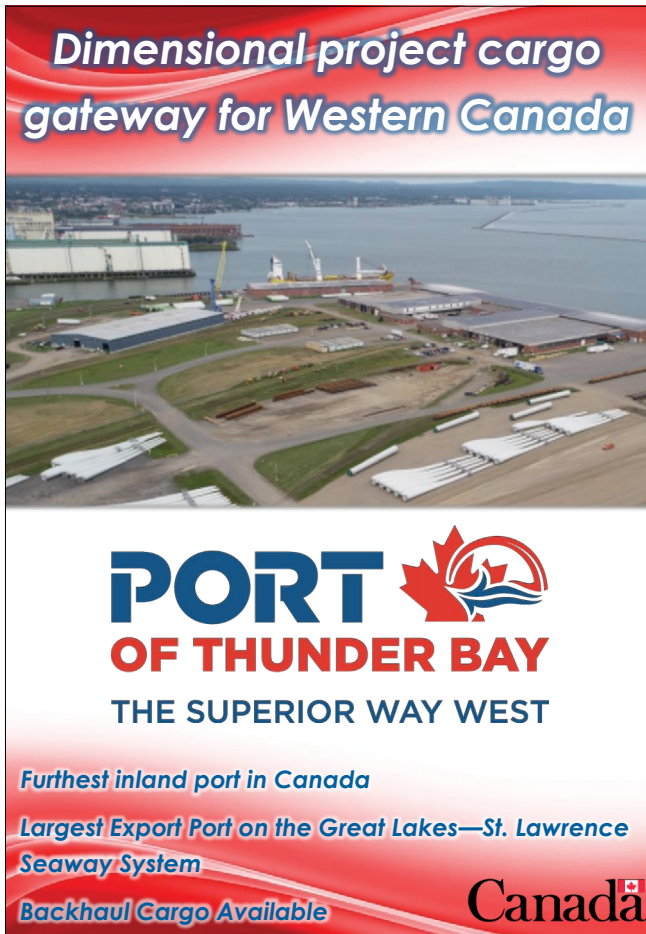
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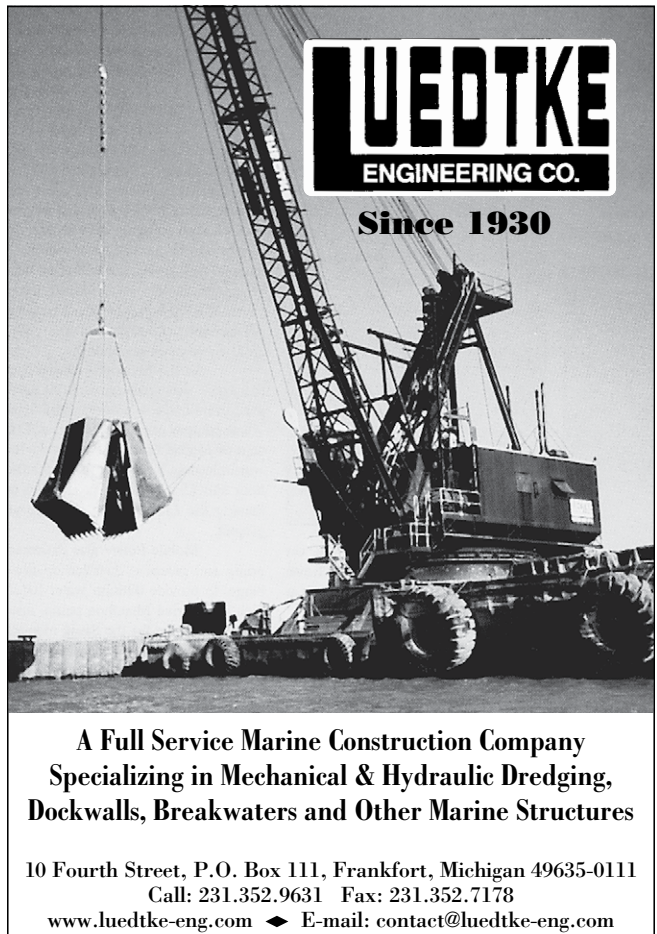
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Given its limited CO₂-reducing potential, it would be easy to dismiss LNG as a mere contributor to meeting the IMO's 2030 emissions-reduction goals (a 40 percent reduction in carbon intensity). But its future potential may be greater.

(energy per volume) may be comparatively low, but it has by far the highest energy content (energy per weight) of the new marine fuels. One unit of hydrogen would deliver three times more energy than an equal unit of LNG or HFO. It also has the potential to be a zero-carbon fuel.

Heavy-gas pathway

These fuels generally consist of heavy, more complex molecules making their requirements for fuel storage and supply less demanding. This pathway includes liquid petroleum gas (LPG), methanol (and ethanol, part of the alcohol family), bio-methanol and ammonia. As some of these fuels have low energy content, they may be only suited for limited types of vessels, trades and routes; access to frequent bunkering may be necessary.

The exception is LPG, the use of which has not matured as rapidly as LNG, in part because of its different safety requirements and lower potential to reduce emissions.

As with LNG, LPG and methanol are already part of the current technology mix. Their bio-derived versions may become options in the medium term.

Methanol in its present form reduces CO₂ output by around 10 percent when used as a fuel (compared with HFO). Bio- and electro-methanol have the potential to be carbon neutral but are far

from being commercially viable.

Ammonia-fueled engines are not currently available and will likely require another three to four years to be delivered, with first users potentially coming from the ammonia carrier fleet. Ammonia is potentially a zero-carbon fuel, if renewable energy is used in production, which comes with additional cost. The fuel itself is a long-term option for owners.

Bio/synthetic pathway

These fuels are produced from bio-derived raw materials and sources. Their properties are close to diesel oil, potentially minimizing the onboard technologies that would need to be developed and the associated changes to ship designs. Based on this, they are often referred to as 'drop-in fuels.'

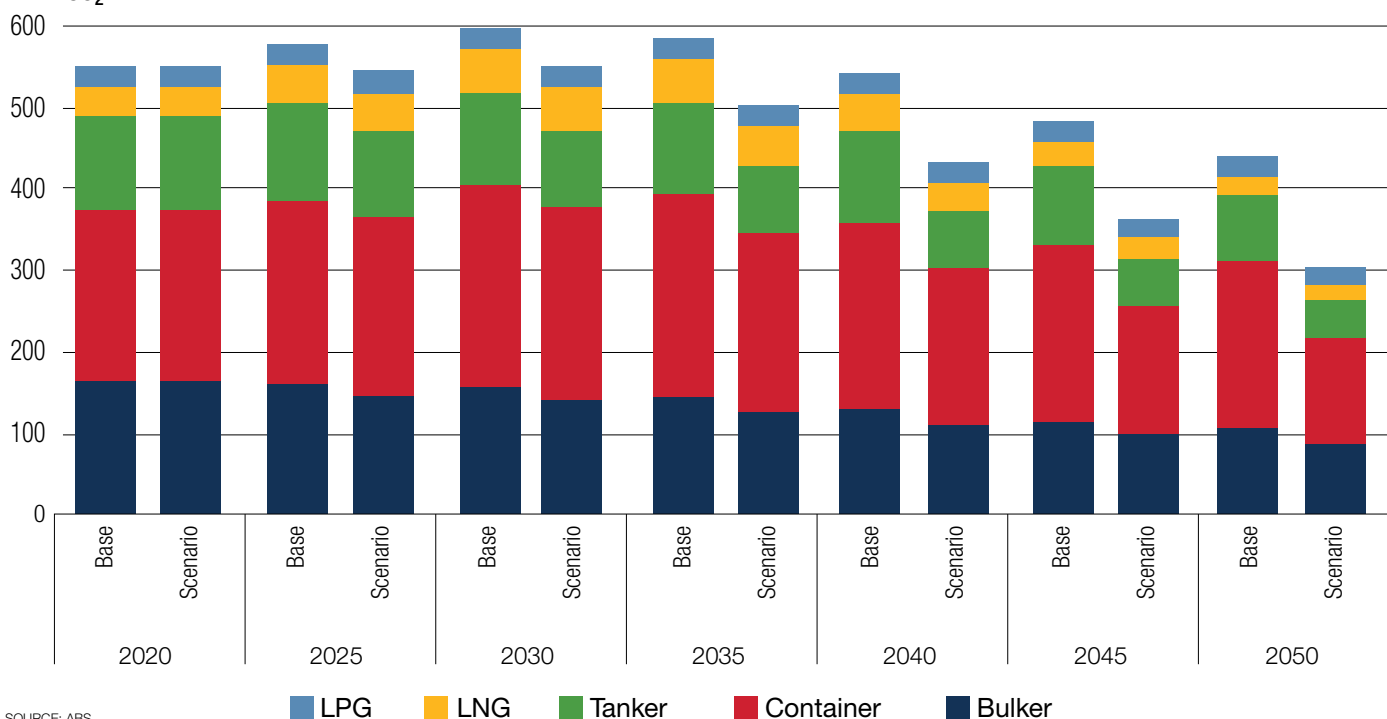
Currently, the most widely used is biodiesel, or FAME (Fatty Acid Methyl Esters), which is offered by all oil majors. The related ISO standard allows for 7 percent biodiesel in the fuel blend, but some shipowners are testing richer blends, from 20-100 percent.

Another biofuel, HVO (hydro-treated vegetable oil), or renewable diesel, is being considered for marine applications; it has a high energy content, similar to MGO.

The bio/synthetic family also includes gas-to-liquid fuels, produced either by carbon capture and electrolysis, or by

CARBON: CO₂ emissions by ship type

Mn T CO₂



SOURCE: ABS





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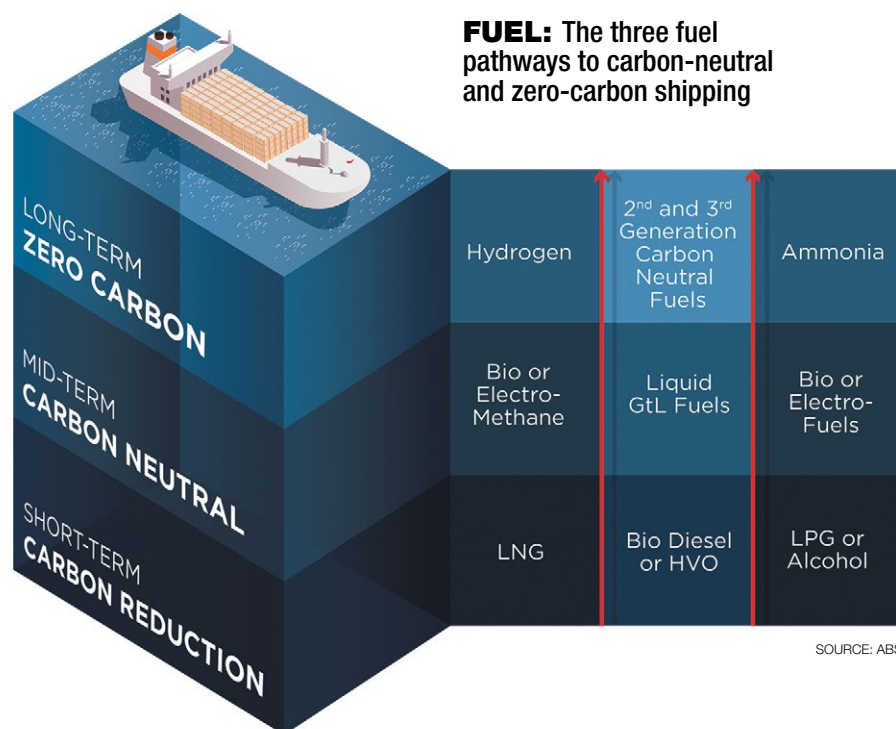
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Fuels such as methanol and ammonia may have strong potential to lower carbon output, but their low energy content—which limits the amount of energy they can store in the standard tanks of today's ships—presents a challenge.



converting the syngas that is produced from biomass into liquid fuels, such as methanol or diesel.

These fuels are mid-to-long-term options for shipowners. However, because they could become 'drop-in biofuels' and minimize capital expenditure, electro-synthetic fuels are being actively explored.

In the long term, second- and third-generation biofuels (from waste biomass, lignocellulose [woody plant fibers] or algae) also have the potential to yield annual fuel volumes that exceed current requirements.

With multiple fuel choices emerging, acquisition-minded shipowners are clearly faced with some complex decisions before their next purchase.

However, the trade profiles of their vessels could help to narrow the viable options. The short- and deep-sea markets are distinctly different in terms of their ability to adopt new technology, available resources and the complexity of regulatory frameworks.

Potential proving grounds

Short-sea vessels tend to operate in environmentally sensitive areas, such

as the Great Lakes, U.S. coastal waters, the Baltic Sea and inland rivers, locations where emissions are more strictly regulated.

Their trade and regulatory landscape can make them ideal candidates for the early adoption of emerging fuels and the technologies that support environmental sustainability, including LNG, methanol and ammonia, and hybrid-electric power generation and propulsion systems.

Fuels such as methanol and ammonia may have strong potential to lower carbon output, but their low energy content—which limits the amount of energy they can store in the standard tanks of today's ships—presents a challenge. Similar challenges arise from the use of batteries in hybrid-electric propulsion systems that require frequent recharging.

Short-sea shipping is more suited to using fuels and systems that require frequent bunkering and/or charging. Many also operate in single regulatory jurisdictions, which can be attractive proving grounds for emerging technologies.

As the new fuels and technologies become viable, the operational profile of each vessel will have a great influence on where they are first adopted as owners pursue their most efficient pathway to a zero-carbon future.

To download a copy of the outlook, go to ww2.eagle.org/en/innovation-and-technology/sustainability-for-the-maritime-sector.html.

Surveying shipowners

Assessing preferences and plans

A recent ABS survey shows that nearly 60 percent of industry responders see ammonia and hydrogen as the most attractive fuel options for the long term. Those surveyed include shipowners and operators registering for an ABS seminar, Pathways to Sustainable Shipping.

Additional highlights from the survey include:

- Nearly two-thirds of shipowners currently have no decarbonations strategy in place
- About 70 percent prefer fuels in the light gas pathway, which includes LNG and hydrogen, as future fuel solutions

"These results are in line with the findings in our recently released Low Carbon Shipping Outlook. Based on the fuel pathways that we have identified and can shape the future of marine propulsion, hydrogen and ammonia are solutions that are expected to contribute to the reduction of carbon emissions in the long term," said Georgios Plevrakis, ABS Global Sustainability Director. "LNG, as the most mature of the alternative fuel solutions, can pave the way to a less carbon intensive maritime industry. We are working through our network of Sustainability Centers with global clients to define solutions to meet regulatory and market demands related to Green House Gas reduction."



Lock-based ship design

Getting creative with the haul

RICHARD A. MUELLER, *President/CEO, NETSCo., Inc.*

NICK HUNTER, *Naval Architect, NETSCo., Inc.*

For centuries, locks and canals have been critical components of our waterways, allowing us to efficiently move goods from port to port. In Part 1 of this column, we looked at the history and impact of lock-based design on ships and the design characteristics of vessels that are largely prescribed by lock dimensions. Designing a vessel that will traverse the Seaway or Soo Locks results in narrow, shallow vessels that make pursuits to carry volume-limited cargoes, like containers, very difficult.

The concept of volume-limited cargo versus weight-limited cargo comes from Bernoulli's principle of buoyancy that keeps the vessel afloat; a vessel must displace its weight in water to float. Therefore, if you want to carry more cargo, you only have two options: increase your vessel's size or decrease its weight.

In an environment like lock-based ship design, where the vessel's maximum size and volume is constrained, the cargo carrying capacity is also limited. This is where the concept of volume-limited cargo versus weight-limited cargo comes into play.

Cargo designation as weight or volume limited largely comes from its density. Generally, a bulk product like taconite or oil has a high density. The weight of the cargo will limit how much a vessel can carry. Alternatively, a vessel will run out of cargo volume when carrying a lighter density cargo like coal or limestone before it is limited by the weight of the product. This important distinction is easily seen in a ship's design when comparing, for example, the size of an oceangoing containership to a liquid product tanker.

Maximizing cargo

If you compare a containership and product tanker of similar dimensions, like those designed to transit a specific lock system, you will notice that the containership (carrying the volume-limited cargo) is wide and tall with a good portion of the cargo above the waterline. The containership grows vertically to add as much cargo carrying volume as possible.

The tanker (carrying the weight-limited cargo) may have similar waterline dimensions, but almost all of the cargo carrying volume is below the waterline. Adding volume vertically does not help the tanker to carry more cargo because it is weight-limited, so the tanker's hull form becomes more full and "boxy" to displace as much water as possible in the lock dimensions. Both vessels are designed to maximize the cargo they can carry through the lock.

The size limitations through the Seaway, however, are such that any economies of scale for containerships, or other dedicated volume-limited cargo ships, are limited, therefore, forcing more creativity in vessel design and operation.

Business acumen

Creativity is a key for successfully shipping volume-limited products on the Seaway. One clever method for moving light-weight product is to back-haul grain. After a foreign vessel has brought in steel or iron products into the system, the crew will load grain for export instead of returning with ballast. This practice has been commonplace for years, and it consistently makes up about a quarter of the overall Seaway tonnage traffic.

Other emerging products have also been embraced by shippers to diversify and augment their business models for low density cargoes. Project cargoes (windmill blades, fermenters, etc.)—too large and costly to move over land—have been increasingly more evident on the Seaway.

An increasing number of containers are moved on the Seaway every year, too. Despite a limited number of Great Lakes ports capable of handling containers, the traffic has nearly tripled in the last 20 years, and the world market continues to see an optimistic future for container movements.

Great Lakes cruising is also a well-documented industry that has seen substantial recent growth despite the volume-limited nature of its "cargo." While COVID-19 closures have hampered the cruise industry recently, there has been a steady growth in the number of cruises offered through the Great Lakes/Seaway system.

Aided by technology

In lock-based ship design, when so many design criteria are controlled or limited, shipowners, operators and designers find creative ways to continue using the infrastructure to their benefit. However, not only do the vessels and owners adapt to their environment but, in some cases on the Seaway, the environment adapts to the vessels. As more pressure is put on the Seaway and its management to find ways to keep the waterway cost competitive with truck and rail transportation, methods and tools that can cut locking time, maintenance costs and improve operating efficiencies become more important.

The St. Lawrence Seaway system has had a long history of being in the forefront of using cutting edge technology, often in unique and novel ways, to make the passage of ships happen as rapidly as possible, yet more safely.

One of the earliest "new" technologies to take hold in the system was the use of the Automatic Identification System (AIS). Beginning in 2002, the system was the first inland waterway in North America to see the value and use the technology.

Combined with more accurate GPS technology, the use of AIS allowed lock operators to have much more accurate knowledge of vessel positions, real time vessel speeds and courses, and the

Despite a limited number of Great Lakes ports capable of handling containers, the traffic has nearly tripled in the last 20 years, and the world market continues to see an optimistic future for container movements.

ability to plan accurate vessel transits, dramatically improving events like pilot scheduling and flag-state inspections. Shipowners like to keep their vessels moving and employing GPS and AIS allowed the system to dramatically streamline vessel traffic.

With the success of AIS, shipowners looked for other technologies to improve operations. One such area involved ice. Given the winter climate, ice formations in the locks have long been an issue. The ice formations had to be locked through, much like the ships, during the opening and closing periods when ice was heaviest.

With the Seawaymax vessels, the lock must be flushed of ice before these large vessels can enter the lock. Beginning in 2011, ice flushing systems that reduced the strain on the locks and water valves were installed, resulting in fewer delays and the ability to keep the locks ice-free throughout the season.

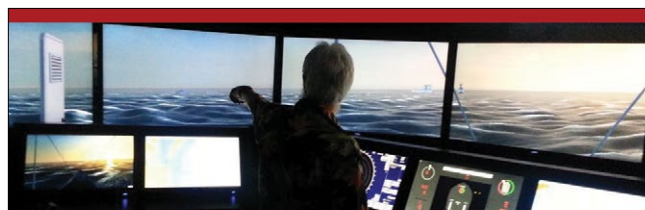
About the same time, in 2012 and 2013, draft information systems allowed vessel owners and system authorities to accurately assess a vessel's under keel clearance, making transits safer and reducing the risk to physical assets, in particular, the locks. In 2013 and beyond, systems at each lock allowed the vessel to spot itself, improving operations even more by eliminating the need to have shoreside personnel spot each vessel as it entered the lock. These technology improvements, largely invisible to the public, played a major role in the system's ability to operate more efficiently.

Such innovations have continued. Hands-Free Mooring for vessels in the locks has been in use in the Welland Canal locks since 2007 and is now deployed across the system. This is a significant safety and time improvement, for both the crew and shoreside personnel, who no longer need to handle wire ropes and operate high speed deck winches.

Lastly, but by no means least, ongoing projects to test and eventually deploy all season buoys and aids to navigation on both sides of the border will likely result in safer navigation and reduced operating costs as we find ways to permanently mark important buoy locations without putting them in and removing them each year.

As you can see, merging vessel design with the physical realities of lock and canal designs and employing the latest technologies are working together to maximize the efficiency and effectiveness of the system.

Today, we're seeing the benefits as we watch hi-tech newly designed Seawaymax vessels transit the system, maximizing their loads, optimizing their transits and operating with the optimal crew size; so that in total, system and shipowner, and eventual the consumers, benefit from those savings. Now that's what good design engineering is all about. ■



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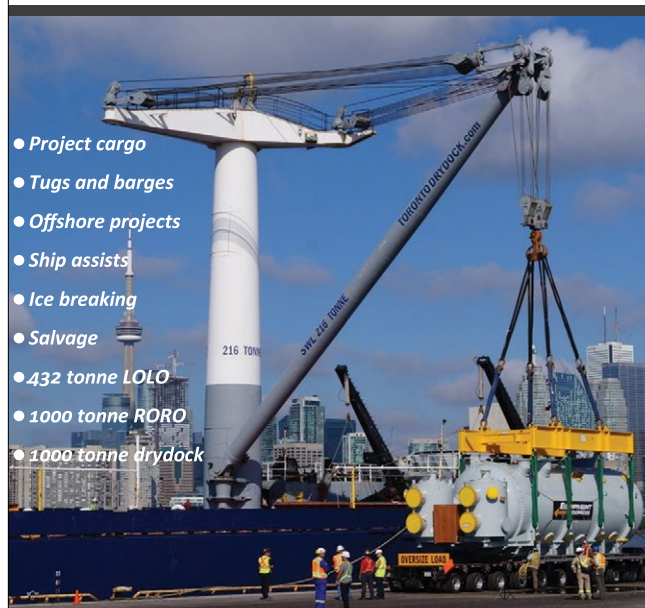
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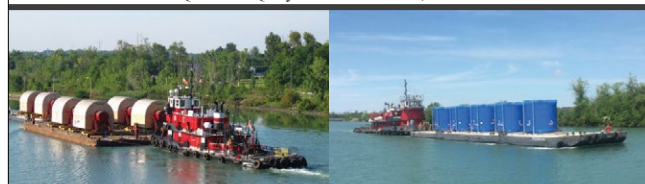
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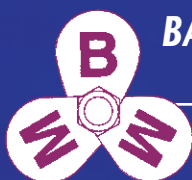
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TECUMSEH

FROM SALTWATER TO THE GREAT LAKES

The straight-deck bulk freighter *Tecumseh* began her career far from the Great Lakes. She was built at the Lockheed Shipbuilding and Construction Company in Seattle, Washington.

The vessel was launched on August 22, 1972 and completed in August 1973. When entering service, she sailed as the *Sugar Islander*, owned by the Bankers Trust Company. She was 641 feet in overall length, 78 feet wide and had a depth of 45 feet, 3 inches. True to her name, the ship's six cargo holds—with a carrying capacity of 30,124 tons—were filled with sugar en route from Hawaii to California.

Islander Shipholding Inc. took over ownership of *Sugar Islander* in 1996 and renamed her *Islander*. Later that year, she was sold to United Maritime Group of Tampa, Florida and became *Judy Litrico*. In 2006, she was renamed *Tina Litrico*. During this period, the boat's trade patterns evolved. She carried many different types of cargoes all over the world.

The ship was purchased by Lower Lakes Towing in July 2011 and re-registered with Transport Canada in November of that year. She was named *Tecumseh*.

Before coming to the Great Lakes, *Tecumseh* was taken to a shipyard at Veracruz, Mexico for a refit to Canadian standards and was painted in Lower Lakes colors. When her refit was completed, she was sailed to Canada on the morning of December 17, 2011—arriving at the Port of Montreal on December 29, where she spent the winter.

Ready for Lakes service—powered by two 6,000 bhp Pielstick 12PC-2V-400 diesel engines driving one controllable pitch propeller at 16 mph—she was put to work in the grain trade between the head of the Lakes and the St. Lawrence Seaway.

December 16, 2019, *Tecumseh* was downbound in the Detroit River—bound for the ADM elevator in Windsor, Ontario with a load of canola—when she experienced an engine room fire in U.S. waters near Zug Island. The fire was initially beat back by the ship's CO₂ suppression system. A contracted firefighting team finished extinguishing the blaze. The crew was safely evacuated without injury.

The cause of the fire is being investigated by the Transportation Safety Board of Canada with help from the U.S. Coast Guard, Canadian Coast Guard and the Windsor Harbor Master. She remains in Windsor for the duration of the investigation.

Ed Bansek ■

This jail cell (below) is located at the rear of the engine room, remnant of Tecumseh's time sailing the oceans.



The ship was purchased by Lower Lakes Towing in July 2011 and re-registered with Transport Canada in November of that year. She was named *Tecumseh*.



SHIP SPECS

LENGTH	DEPTH	MIDSUMMER DRAFT	UNLOADING BOOM LENGTH
641ft	45ft 3in	25ft 6in	25ft 6in
CAPACITY	OPERATING SPEED	AVERAGE CREW	
29,510 tons	1.2ft³ million	12.6 knots	13-15

The *Tecumseh* while at the ADM grain elevator in Toledo, Ohio.

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