Casualties: Pilot 'dozed off' before hitting moored tow in Houston Ship Channel

PROFESSIONAL MARINER

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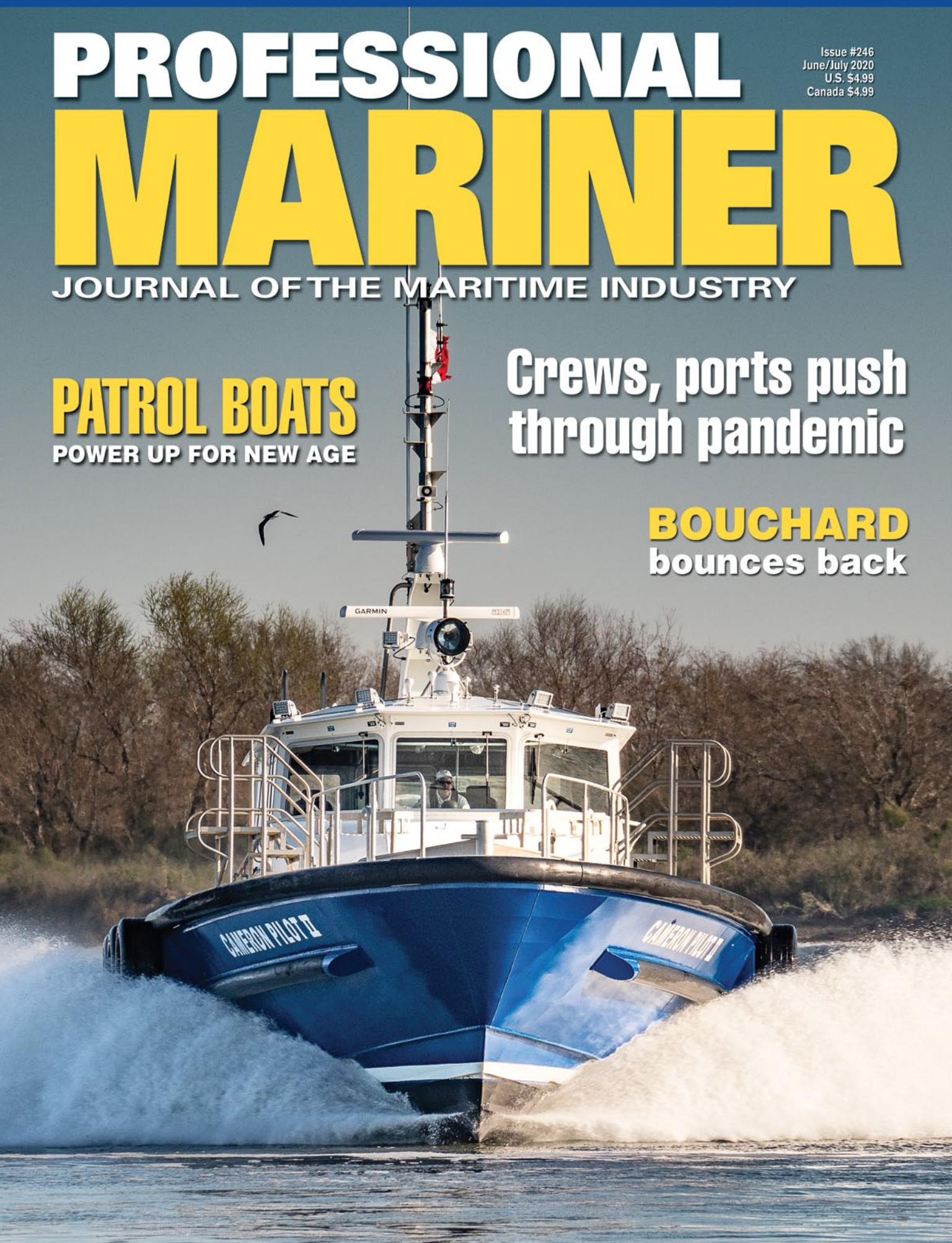

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ON THE COVER

The 70-foot *Cameron Pilot II* powers down the Calcasieu Ship Channel near Cameron, La. The newbuild, delivered in October, is the fourth vessel from Gladding-Hearn for the Lake Charles Pilots. Featuring a deep-V hull by Ray Hunt Design, the launch combines speed and stability for 30-mile runs across the Gulf of Mexico. See story, page 24. Photo by Brian Gauvin

Signals

Industry faces hurdles on crew changes, essential staff in pandemic

With much of the United States shut down due to the COVID-19 pandemic, mariners and port employees keep working, but in a radically different environment. Crew changes and visits to vessels must be done with numerous safety precautions. Personal hygiene on board has become paramount.

"We are treating personal hygiene guidelines like safety practices," said Jim Weakley, president of the Lake Carriers' Association. Failure to follow the new rules is handled like a violation of safety codes before the pandemic.

Guidelines posted on the Seafarers International Union website March 20 stated that crew changes would be suspended for 30 days, with relief crew decided on a case-by-case basis. Personnel designated as "essential," such as repair teams, are allowed on board, according to union spokesman Jordan Biscardo.

Along with U.S. Coast Guard guidelines, companies have been

Courtesy McAllister Towing/David Rider

The tugboats *Capt. Brian A. McAllister, Ava McAllister, Alex McAllister* and *Ellen McAllister* assist the hospital ship *USNS Comfort* to its berth at the Manhattan Cruise Terminal on the Hudson River on March 30.

issuing their own specific sanitation and hygiene rules to protect crews on vessels, which sometimes differ from company to company (see sidebar on page 6). Even more challenging, federal, state and local entities are often at odds as they struggle to cope with COVID-19.

"I wish I could say that they all talk to each other and (have) one unified voice, but this is new to everybody, and they're all trying to figure it out," said Sean Kline, director of maritime affairs for the Chamber of Shipping of America.

Despite initial challenges, Caitlyn Stewart, director of regulatory affairs for the American Waterways Operators (AWO), said that the maritime world was working fairly well as of early April.

"I hesitate to generalize, because there are things that folks are dealing with that are very much outside of the norm," she said. "This is not business as usual, but there needs to be business continuity."

Of the problems facing the industry, the biggest one is ensuring that crew changes are conducted as scheduled.

"We've asked the question directly to (U.S. Customs and Border Protection)," Kline said. "When there's a shelter-in-place order, and mariners are essential, we're still having issues with getting mariners off the ships. They have been on ships well past their due date. That leads to complacency, fatigue and potential safety issues."

The Coast Guard issued a marine safety information bulletin on March 18 stating that port facil-

"We cannot have a virus running through these boats"

In good times and bad, the maritime industry helps keep the U.S. economy moving. For that to happen, boats must be running and crews must be healthy enough to work.

That's particularly challenging during a pandemic, but Western Towboat has taken multiple steps to keep coronavirus at bay. These include fewer crew changes to avoid interactions with potentially sick people, and new protocols for crew before they return.

"We cannot have a virus running through these boats," Capt. Russell Shrewsbury, the company's vice president, said in a recent interview.

Western Towboat, based in Seattle not far from the first U.S. hot spot for the virus, runs more than 20 tugboats, primarily hauling cargo barges between Seattle and Alaska for Lynden Transport. These twice-weekly runs fill a critical need for supplies, particularly in southeast Alaska. Western employs about 150 mariners.

Early in the pandemic, Shrewsbury said the company began limiting crew changes whenever possible. Instead of the normal rotation of one 10-day round trip followed by three days off, Western crews are typically working two round trips. The schedule keeps the same crew together for the entire stretch.

Western also has developed an internal document all crew must fill out before they even get in their cars and start driving to work after any time off. The form asks about their potential interactions with anyone with COVID-19, the disease caused by coronavirus. It also asks about each mariner's own health within the previous 72 hours.

Tugboats from Western Towboat tend to an Alaska Marine Lines barge in February in Seattle. Casey Conley photo

Finally, before anyone steps onto their vessel, someone from the company takes the mariner's temperature. Western's crews also now clean the wheelhouse and other workstations with disinfectant wipes before each shift.

"We want other crew to know everyone is doing their best to protect each other. That way they know the other crew are showing up healthy," Shrewsbury said. "People want to work, and we need them to work, but we can't have people coming in sick."

Stocking the boats with cleaning supplies, in a city and state badly hit by the pandemic, has become another challenge. Paper products such as toilet paper and paper towels were hard to come by in March across the United States, and those shortages were especially pronounced around Seattle. Grocery items also have been limited in some cases.

"Luckily we keep a pretty good stock in our warehouse, but we are trying to procure all of these cleaning supplies to keep the boats stocked up," Shrewsbury said.

Western joined a long list of Greater Seattle companies doing their part to help the state's hospitals meet a surge in demand for medical supplies. Shrewsbury donated several dozen N95 respirator masks that were in short supply across much of the country this spring.

"We had about 40 here in the office and we took another 20 off the harbor tugs," he said. "We use them for chipping and painting, but we don't need them now. It's one of the little things we are just trying to do to help."

Casey Conley

ity operators are not allowed to prevent crewmembers from leaving or boarding a vessel. It is up to the Coast Guard or Customs and Border Protection (CBP) to determine if that has occurred.

"Maritime facility operators are reminded they are not permitted to impede the embarkation/disembarkation of crewmembers as permitted under Seafarer's Access regulations," the bulletin said. "The authority to restrict access resides with Customs and Border Protection (CBP), the Coast Guard, and the Centers for Disease Control (CDC) for medical matters. Facility operators should contact their local CBP, Coast Guard or the CDC, state and local health department offices regarding specific questions or concerns about their individual operations."

Despite the U.S. Department of Homeland Security stating that mariners, port workers and equipment operators all work in critical infrastructure, some maritime workers have found it difficult to get to vessels in port. In late March, Texas Gov. Greg Abbott ordered that anyone coming into the state from New York, New Jersey, Connecticut, California, Louisiana or Washington must quarantine for 14 days or face a $1,000 fine and/or 180-day jail term. The order also applied to anyone entering Texas from the cities of Atlanta, Chicago, Detroit or Miami.

"That was a really problematic issue, because even when they had been aware that critical-infrastructure workers were being impacted, they wanted to address it on a case-by-case basis," Stewart said. With help from the Texas Waterway Operators Association, maritime workers were declared exempt from the blanket rule. "But there have been mistakes like that," she said. "I don't want to gild the lily. There have been instances where it has been a bit of a scramble."

Another example is the San Francisco Bay Area, home to one of the first shelter-in-place orders in the U.S. to stop the spread of the coronavirus. "They had included a few categories of critical-infrastructure workers that didn't specifically state that maritime workers were (essential)," Stewart said. "This was really one of the first ones in the country, so there was a bit of follow-up needed on our members' part." With assistance from the Coast Guard, the problem was resolved.

To make sure that all maritime

Stakeholders step up best practices for virus

As part of a critical industry, maritime companies continue to operate during the COVID-19 pandemic. While the Centers for Disease Control and Prevention (CDC) and Coast Guard have issued preventive and procedural guidelines, many maritime stakeholders are supplementing that with their own recommendations.

The American Waterways Operators (AWO) has compiled a list of federal, state and company COVID-19 guidelines on its website (www.americanwaterways.com/covid19). Links include contingency planning guides; all Coast Guard marine safety information bulletins; prevention practices for off-duty mariners; guidance for crew suspected of having COVID-19 on board a vessel; extension forms for mariner credentials and vessel inspections; and pre-boarding questionnaires. The reference page includes guidance from nine companies.

Guidelines from the Seafarers International Union (SIU) include a stipulation that everyone coming up the gangway will complete a questionnaire. Before entering port, the master will review shipboard rules, including the Coast Guard's COVID-19 reporting requirements. No non-essential personnel can come on board, and crew will have their temperature taken by a shore contractor.

The SIU's guidelines also state that all crewmembers who come into contact with visitors are required to sanitize their safety goggles and wash their clothes after the visit. All exterior doors will be locked except for one to allow access to the wheelhouse.

"When practical to do so, the gangway will be flown off the dock to prevent uncontrolled access of people to/from the vessel," according to the union's guidance.

Many companies are following suit on embarkation. Rules from the American Steamship Co. state that only employees essential to the vessel's operations may board it.

"This restriction applies to dock workers, employee families and guests," said Kevin McMonagle, vice president of operations, in a March 27 letter. "No vessel employee has the authority to approve exceptions to these restrictions."

David A. Tyler

workers are protected, the Coast Guard on March 27 updated a previous order and designated 16 categories of personnel as essential, including pilots; stevedores and longshoremen; seafarer and labor union representatives; marine consultants and naval architects; lock and dam operators; commercial fleeting facility personnel; equipment, crane, cargo and dredging operators; and vendors and ship chandlers.

The conflict between federal, state and local governments has been a challenge, with maritime operators and crew often not sure where to look for regulatory guidance.

"A lot of authority has been given to local jurisdictions, whether that's an airport or whether that's a port," Kline said. "They can say, 'Hey, I don't think that's good and we've got to stop him.' They have every right, but it makes it more difficult. It puts serious risk on a shipowner who's trying to send people through Newark, for example, and they get tied up."

Fortunately for U.S. mariners, it has not been a major problem for them to get to port. "I have had two members contact me who have said, 'Hey, there's a shelter-in-place order here and we're having difficulty. … In one case it was not just the crew, but getting their port workers to port," Kline said.

Unfortunately, this is not true internationally, with crew on commercial vessels facing extraordinary difficulties. Crew changes are not being allowed in many ports, forcing an estimated 150,000 mariners to remain on their ships in early April. Crewmembers who have worked stretches as long as 10 months are being prevented from leaving their vessels because they have nowhere to go, according to the International Transport Workers' Federation (ITWF).

"We have problems with crew getting trapped," said Stuart Neil, a spokesman for the International

Courtesy Foss Maritime

The Foss Maritime tugboats *Alta June, Bo Brusco* and *Arthur Foss* escort *USNS Mercy* into the Port of Los Angeles, left, on March 27. The Military Sealift Command hospital ship, providing COVID-19 response, also was assisted by the AmNav Maritime tug *Patricia Ann*. A U.S. Coast Guard boat crew from Station Fort Lauderdale, below, escorts the cruise ship *Zaandam* to Port Everglades, Fla., on April 2. The ship, with 1,200 passengers on board, spent four weeks in limbo at sea after multiple diagnoses of coronavirus among its 1,200 passengers.

U.S. Coast Guard photo

Chamber of Shipping. "When they began lockdowns in India, for example, ports closed and people found they had no food." There have been reports of crew having a hard time getting medical attention as well.

The number of American mariners afflicted with COVID-19 has been extremely small, according to Stewart — about five to six cases as of late March, based on anecdotal information.

"As we understand it, we've had both coastal and inland crewmembers who developed symptoms of COVID-19, were isolated, taken off the vessel, and sent for medical care and testing," she said. "My understanding is that there have been folks who have tested positive once they have disembarked from the vessel."

The Coast Guard requires vessels with suspected cases of COVID-19 to report them immediately to the nearest captain of the port. Mariners thought to have contracted the coronavirus should be isolated in their cabin with the door closed, among other precautions.

A looming issue for the maritime industry involves major vessel repairs, inspections and dry docks during the pandemic. For example, in an April 9 marine safety information bulletin, the Coast Guard granted a 12-month extension for the installation and commission of ballast water treatment systems. Extensions also will be granted, on a case-by-case basis, for certificates of inspection, renewals, annual inspections, periodic inspections, dry-dock examinations and internal structural exams, according to a March 26 Coast Guard information bulletin.

This is helpful for vessel owners and operators, but there are long-term implications, according to Kline.

"The hard part about that is ships that have a dry-dock schedule — where they are going to get an instal-

lation or something done — and the Coast Guard says, 'We'll extend you for 12 months.' Well, you can't just go back into a shipyard (for a time slot)," he said. "These dry-dock schedules are sometimes over a year out. If you miss your slot, you're paying penalties."

The Coast Guard also has extended the deadlines for mariner documentation such as Transportation Worker Identification Credential (TWIC) cards, merchant mariner credentials and medical certificates, and STCW endorsements.

"When compliance with these regulations cannot reasonably be met as a result of COVID-19, the Coast Guard will exercise flexibility to prevent undue delays," according to an April 3 advisory.

A looming issue involves major vessel repairs, inspections and dry docks during the pandemic. For example, the Coast Guard has granted a 12-month extension for the installation and commission of ballast water treatment systems.

As federal and state agencies have struggled to deliver a cohesive and consistent message during the pandemic, the Coast Guard has stepped up, according to Kline.

"I think the Coast Guard has done a really good job," he said. "They've been reaching out. They've been trying to seek solutions. There's no question, that for something that nobody could be prepared for, they've been really good about coming up with ideas and listening to the industry."

David A. Tyler

Panama Canal imposes freshwater levy as lake levels drop

Efforts to conserve fresh water at the Panama Canal could cost the global shipping industry up to $370 million per year and will likely cause year-over-year freight rates on Gulf of Mexico routes to rise markedly.

The Panama Canal Authority (PCA) imposed a $10,000 freshwater surcharge for all vessels over 125 feet in length beginning Feb. 15. The PCA cited rising temperatures that have resulted in historically low water levels in Gatun Lake, which supplies the canal's locks. According to a prepared statement the canal authority provided to *Professional Mariner*, the measures will ensure transit reliability while a long-term solution is implemented.

Vessels will assume a variable fee between 1 percent and 10 percent of their toll, depending on the level of Gatun Lake during transit. If the lake has a higher level, the percentage will be lower and vice versa. Toll rates for ships longer than 100 feet increased from $3,200 to $4,100 starting Jan. 1.

The Panama Canal's new measures also include a reduction in daily reservation slots from 32 to 27. Vessels that book in advance are guaranteed transit for a given date, and the canal may provide additional slots on a first-come, first-served basis, according to the PCA.

The International Chamber of Shipping criticized the freshwater surcharge as global demand weakened due to the coronavirus and higher operating costs following the Jan. 1 implementation of the 0.5 percent sulfur cap on fuel.

Kathy Metcalf, president of the Chamber of Shipping of America, told *Professional Mariner* that CSA members only use the canal occasionally. But she said new issues, such as this one, "should not be financially covered by a surcharge, but rather should be included in the budget and toll rates."

Members of the World Shipping Council (WSC), which represents the global container

A containership heads north through the Miraflores Locks at the Panama Canal on the way to Gatun Lake and the Atlantic Ocean. All ships over 125 feet long must now pay a freshwater surcharge to transit the waterway.

Derek Bruff photo

fleet, were awaiting more information on long-term engineering solutions.

"Operators are hopeful that, to the greatest extent possible, those individual costs can be paid by the revenues of the canal as they stand now," said John Butler, WSC president and chief executive officer.

The Panama Canal is expanding its investment program to find water supply solutions and is evaluating several options, including a pipeline to draw water from a lake at a higher elevation about 100 miles from the canal, the PCA told *Professional Mariner*. A dam to regulate water flow is also being considered.

Faced with higher costs, operators have passed some of the burden of canal transit on to customers. Maersk and the Mediterranean Shipping Co. have instituted Panama Canal surcharges of $30 per container.

For medium-range tankers arriving on the Atlantic side, the typical wait time for a pre-booked slot is eight to 10 days, compared with a maximum of five days before the Feb. 15 changes took effect, according to Marieke Alsguth, a senior pricing specialist for S&P Global Platts.

According to S&P's year-over-year data for March, freight rates for medium-range tankers transporting clean petroleum products from the Gulf Coast to Chile increased by 44 percent. But Alsguth said the increase in bunker fuel prices following the Jan. 1 sulfur cap could have contributed to the increase.

"A lot of pricing is being affected by the reduced number of slots available per day," she added.

According to the PCA, use of the reservation system has increased notably, and there have been longer waits for ships without reservations since Feb. 15. For help predicting the freshwater surcharge, operators can access a 60-day water level forecast on the PCA website (www.pancanal.com).

With the freshwater surcharge and accompanying changes in place until further notice, Butler said the PCA has been open about its search for an engineering solution and will come back to users when it has answers. When that will happen, he added, remains uncertain.

Sam Bojarski

Issue at a glance

Rainfall in 2019 was 20 percent below the historic average along the Panama Canal, the fifth-driest year in 70 years. It followed several years of lower-than-average rainfall coupled by a 10 percent increase in water evaporation levels due to a 0.5- to 1.5-degree Celsius rise in temperature.

Without fee and operational changes, the canal's water levels are projected to drop to a point that would affect the neo-Panamax and Panamax locks. These new measures are intended to better provide reliability for water levels and therefore transit schedules.

Panama Canal Authority

Report finds shift to LNG could worsen shipping's climate impact

Switching to liquefied natural gas (LNG) is being widely touted as a responsible way for ships to reduce their climate impact, but it's actually making greenhouse gas emissions far worse, according to an international environmental advocacy group.

Kendra Ulrich, shipping campaigns director for Stand.earth, said her group commissioned the International Council on Clean Transportation (ICCT) to study LNG's impact, and the findings about the fuel's shortcomings "surprised even us."

When used instead of fuel oil, LNG significantly lowers emissions of sulfur oxides and particulate matter, but unburned fuel from incomplete combustion escapes into the atmosphere. This phenomenon, known as methane slip, is an enormous problem, Ulrich said, because methane is a highly potent greenhouse gas — it traps 86 times more heat than carbon dioxide (CO_2) does.

The report's findings were questioned by Steve Esau, general manager of SEA\LNG, an industry coalition that is promoting LNG as a marine fuel. He called LNG "the most commercially viable alternative fuel to reduce shipping's carbon footprint. It's not the complete answer, but it's a big improvement."

Esau said the coalition had commissioned its own comprehensive, peer-reviewed study of LNG that examined engines from a range of manufacturers. SEA\LNG faulted the ICCT study for relying mainly on results from older engines that have greater methane emissions. The coalition also questioned ICCT's methodologies, saying the council focused on the 20-year global warming potential (GWP) of methane instead of using the industry's "universally accepted" standard of 100 years.

Ulrich called that criticism "a bit perplexing, given that the ICCT report includes both the 20-year GWP and the 100-year GWP in its analysis. For a short-lived but very potent climate forcer like methane, the 20-year GWP is more appropriate to assess the full implications of methane releases." Stretching out methane's warming impact over 100 years makes it seem far more benign than it is, she explained.

Courtesy VT Halter Marine

The production and distribution of liquefied natural gas is moving ahead for U.S. offshore customers. In October, VT Halter Marine launched the LNG bunkering barge *Q-LNG 4000* in Pascagoula, Miss. Capable of carrying 4,000 cubic meters of product, the vessel and ATB tugboat *Q-Ocean Service* will deliver LNG to ports in Florida and the Caribbean.

The Intergovernmental Panel on Climate Change has called for methane emissions to be reduced at least 35 percent from 2010 levels by 2050. Achieving that will require "rapid and far-reaching" transitions in energy, industry, buildings, transport and cities, according to the group.

"It is clear that LNG is not the climate solution that the (maritime) industry wishes it to be," Ulrich said. "And the 20-year GWP absolutely should be considered when making policy decisions and investments in technology and infrastructure."

She also said that of the 756 LNG ships currently in use or on order, the most popular LNG engine by far — on at least 300 of the vessels — was the worst offender for methane slip. And only 90 of the 756 use the most efficient engine type.

Ulrich said it's important to note that these vessels stay in operation for decades, and thus "we are advocating for an immediate switch to low-sulfur distillate fuels, with diesel particulate filters to reduce particulate matter, including black carbon. Ships could switch to distillates today, without any new infrastructure or massive engine retrofits required."

Stand.earth also is pushing for investments to develop and implement "truly zero-emissions technologies," such as hydrogen fuel cells, battery power storage and wind-assisted propulsion.

Asked about the ICCT report, International Maritime Organization spokeswoman Natasha Brown said the IMO secretariat doesn't comment on reports from other organizations unless an IMO committee is asked to do so. She said that might have occurred at the March meeting of the Intersessional Working Group on Reduction of GHG Emissions from Ships, or at the 75th Marine Environment Protection Committee session scheduled for late March and April. Both of those events were postponed, however, because of the global coronavirus outbreak.

"What we can say is that, yes, the problem of methane slip from LNG is recognized and IMO has this on its agenda," Brown said.

Patricia McCarthy

Study sounds alarm on black carbon in VLSFO emissions

As the International Maritime Organization (IMO) grapples with controlling the shipping industry's use of heavy fuels, substituting very-low-sulfur fuel oil (VLSFO) may do more harm than good – at least in the Arctic.

That's because some of the more aromatic blends of VLSFO may drastically increase – by up to 85 percent – emissions of black carbon, the term used for carbon compounds laden with dark sooty particulates. A recent study in Germany and Finland that reached this conclusion was put before the IMO's Subcommittee on Pollution Prevention and Response (PPR 7) in February in London.

Sian Prior, a marine science and policy specialist and lead adviser to the Clean Arctic Alliance, a coalition of 18 nonprofit groups, explained why black carbon emissions are particularly threatening in the region.

"Black carbon doesn't stay in the atmosphere long and settles onto snow and ice, and it's warm and therefore increases the melt," she said. "It's dark, so it attracts sunlight. And where it does melt, the surface of rock and water is darker too, and attracts more sunlight, creating a never-ending cycle."

The Clean Arctic Alliance is in the process of commissioning more research on the various blends of VLSFO, and gaining a better understanding of the previous study funded by the German Environment Agency. That will take critical time and the risks of environmental damage will increase, all while another substitute is already available, Prior said.

"Even if it turns out that black carbon from very-low-sulfur fuels is of lesser concern, we still want to move toward requiring ships to use safer distillate fuels in the Arctic, and to install filters that can reduce black carbon by over 90 percent," she said.

IMO spokeswoman Natasha Brown said the International Standardization Organization (ISO) told panelists at PPR 7 that it is already in the process of monitoring the properties of VLSFO and high-sulfur fuel oil.

Brown said the ISO also established a group to advance the development of a standardized sampling protocol to make accurate and comparable measurements of black carbon emissions, and to investigate links between measurement systems and policy options.

Patricia McCarthy

Washington state following Norway's lead to decarbonize shipping

Achieving the International Maritime Organization (IMO) goal of reducing carbon emissions in maritime shipping by at least half by 2050 will require a fundamental shift toward zero-carbon energy sources such as liquefied natural gas (LNG), electric power and ammonia. It also will require a substantial investment: between $1 trillion and $1.4 trillion over the next 20 years, according to analysis by London-based University

Courtesy DNV GL

In April 2018, the International Maritime Organization adopted a greenhouse-gas reduction strategy to decarbonize shipping. The aim is to reduce GHG emissions 50 percent by 2050 compared to 2008.

Maritime Advisory Services and the Energy Transitions Commission.

As is often the case with maritime innovation, Europe is leading the way on decarbonization. Norway has been electrifying its coastal fleet — including launching an all-electric ferry in 2015 — and is now turning its attention to the more daunting carbon challenges of containerships, freighters, tankers and cruise ships on the high seas.

Norway-based NCE Maritime CleanTech is leading the ShipFC project anticipated to launch the world's first emission-free supply vessel by 2024, Eidesvik's 17-year-old offshore supply vessel *Viking Energy*, which is being retrofit with an ammonia-powered fuel cell with an output of 2 megawatts.

"The ammonia in this project will be produced by Yara from renewable sources — desalinated water, air, renewable electricity — using proven technologies. This will result in a carbon-neutral fuel," said Hege Okland, chief executive officer of NCE Maritime CleanTech. "Using conventional fossil fuels and (energy savings) alone will not enable the maritime industry to fully eliminate harmful emissions, which is the ultimate goal set up by IMO regarding greenhouse gas emissions. Ammonia is considered a balanced solution in terms of volumetric energy density and renewable synthetic production cost compared to other renewable fuels."

In January, the European Union awarded 10 million euros, or the equivalent of $11 million, to the ShipFC project helmed by a consortium of 14 companies and institutions coordinated by CleanTech.

The need for flexibility will be paramount as the industry weighs options for different shipping sectors. Joshua Berger, maritime sector leader for Washington state Gov. Jay Inslee, said there will be a different solution for getting a containership across the Pacific Ocean than getting a ferry across Puget Sound.

"We need to determine the right fuels for containerships as opposed to ferries, workboats and passenger ships," Berger said. "If we're going to meet the IMO's goal by 2050 and a ship is operational for 25 years, we really only have seven or eight years to determine the fuel choice for that, which is why we need to invest in research and development now."

Modeled after and in partnership with the ShipFC cluster organization in Norway, Washington Maritime Blue was founded in January 2019 to accelerate innovations for the blue economy in the Pacific Northwest. Ongoing projects include converting the 22-vessel Washington State Ferries (WSF) fleet to electric propulsion. Ridership in the WSF system is 24 million passengers a year and growing, and by 2023 the state is anticipated to have the largest all-electric car ferry in the world.

"In Washington, like in Norway, we have everything needed to help decarbonize the shipping industry," Berger said. "Washington state has very clean and very cheap electricity. We have all the shipbuilding capabilities and all the design and supply chain needs. We have extensive research and development, not only in the maritime industries but in digital and technology sectors, and carbon-fiber technologies and synergies with the aerospace industry."

Washington Maritime Blue is poised to be the North American leader in maritime electrification.

"We've been pushing hard to use

our region as a model for federal government action and a framework for how the United States engages in decarbonizing the shipping industry," Berger said. "We have a ways to go to see the impact they're having in Scandinavia. Right now, Europe and Asia are leading. But we're building for the future — for zero emissions and clean energy — and we're seeing the global supply chain come here to be part of it. And we're seeing the same desire from California and partners in New England in planning ahead for a clean energy future."

Georgios Plevrakis, global sustainability director for the American Bureau of Shipping (ABS), sees Scandinavia, the Pacific Northwest and the Great Lakes — regions where most commercial voyages are short — as breeding grounds for alternative fuels. But for owners of international trading ships facing complex investment decisions about new vessels, he said, most practical carbon-neutral and zero-carbon solutions remain in development.

"Ammonia-fueled engines are not currently available and would require another three to four years for the first one to be delivered," Plevrakis said, adding that there are safety considerations with ammonia, a toxic substance, that need to be addressed. "Another problem with ammonia for long-haul operations is that it has a small energy content; that is, ammonia takes up a lot of space on a vessel."

As shipowners invest today without knowing what fuels will make the most sense 20 or 30 years from now, ABS helps them identify the right strategy for each ship, with safety always in mind. One way that owners can "future-proof" their investment, Plevrakis said, is to introduce electrical components that make the entire design more efficient and — with the generation of onboard electricity — become fuel-agnostic.

"In doing so," he said, "owners would take another small step toward minimizing the carbon footprint of their fleet." •

Amy Paradysz

Towing

by Bill Bleyer

Bouchard restoring pay, making repairs after Coast Guard orders

After obtaining additional financing, Bouchard Transportation has begun to address deferred maintenance and crew payment problems that led to Coast Guard captain of the port orders against the towing company in four harbors.

The New York-based operator has begun paying crews who had gone without paychecks for months, and it is now dealing with maintenance issues that prompted the Coast Guard to restrict the operation of company tugboats and barges in New York, New Orleans, and Port Arthur and Corpus Christi, Texas.

At press time, Bouchard had resolved its issues in New York and partially resolved them in Port Arthur and Corpus Christi. The situation was unchanged in New Orleans, where the Coast Guard assumed legal control of two articulated tug-barges (ATBs).

In a prepared statement released on March 11, the company's president and CEO, Morton S. Bouchard III, said that during the past two months Bouchard Transportation "has been faced with enormous challenges both financially and operationally. … Over the weekend, Bouchard was able to close on financing to start paying back vessel wages and meet other outstanding indebtedness necessary to meet all our obligations."

Bouchard followed up with another statement March 16 in which he said he was "pleased to announce that all back

Don Pitolo photo

Barbara E. Bouchard **guides a Bouchard Transportation barge up the Mississippi River south of Belle Chasse, La., in 2013. The tug was idled in late February by a captain of the port order in Corpus Christi, Texas, and remained there in late March.**

pay has been processed. Bouchard Transportation Co. Inc. continues to work on raising capital that will enable the company to return all vessels back to operation."

In mid-February, the Coast Guard captain of the port of New York and New Jersey ordered three of the company's articulated tug-barge (ATB) units — tugboat *Ellen S. Bouchard* and barge *B. No. 262*, *Evening Star* and *B. No. 250*, and *Frederick F. Bouchard* and *B. No. 260* — to be immediately moved from anchorage in New York Harbor and docked at safe berths. The ATBs were required to remain there with their crews aboard until undergoing additional safety inspections. The Coast Guard said the inspections revealed that Bouchard was unable to maintain safe fuel and manning levels, and it did not have adequate emergency contingencies in place for weather or other conditions requiring movement within the port.

Daniel Henry, spokesman for Coast Guard Sector New York, said in mid-March that "there are currently no restrictions on Bouchard operations in the Port of New York and there are no captain of the port orders in effect. There are no pending actions."

On Feb. 14 in New Orleans, Capt. Kristi Luttrell, commander of Coast Guard Sector New Orleans and captain of the port, issued notices of federal assumption (NOFA) for the tugs *Donna J. Bouchard* and *Bouchard Girls* and their associated barges. The vessels had been at anchor outside the port since mid-November. The orders allowed the Coast Guard to take possession of the vessels and clean any potential pollution from the barges. *Bouchard Girls* was moved to Associated Terminals in Chalmette, La., a few days later, while *Donna J. Bouchard* remained at the Nine-Mile Anchorage. The crews remained aboard both vessels.

Lt. Rachel Ault, public affairs officer for Sector New Orleans, said in late March that *Donna J. Bouchard* and its associated barge, *B. No. 272*, and *Bouchard Girls* and its associated barge, *B. No. 295*, had been relocated to Yellowfin Marine Services docks at Fourchon Shorebase in Leeville, La.

"The federal government … continues to take unilateral response actions to eliminate the pollution threat posed by the vessels.

The federal on-scene coordinator remains in contact with Bouchard," she said.

The Coast Guard Marine Safety Unit in Port Arthur, Texas, announced in late February that it was pursuing enforcement action against Bouchard after the company failed to comply with a captain of the port order for one of its anchored vessels.

The tugs *Kim M. Bouchard* and *Danielle M. Bouchard* and their barges had been anchored off Texas Point since mid-December with no known plans to move them, and their crews had been unpaid since Dec. 31, the Coast Guard said. Capt. Jacqueline Twomey, captain of the port in Port Arthur, had issued orders to both tugs on Feb. 10 to resolve problems regarding manning and safety. *Danielle M. Bouchard*'s order was amended to require additional repairs or have the tug moved to a dock. The Coast Guard added that the company faced criminal prosecution and fines of up to $94,219 for each violation.

Petty Officer 2nd Class Johanna Strickland, a Coast Guard spokeswoman in Port Arthur, said in late March that the manning issue on *Danielle M. Bouchard* had resolved, but there was still an unresolved maintenance issue. All issues for *Kim M. Bouchard* had been resolved and there were no further Coast Guard orders in effect for that vessel. Both remained at anchor, Strickland said.

In Corpus Christi, the ATB tug *Barbara E. Bouchard* and barge *B. No. 240*, whose crew had not been paid since Jan. 1, were docked at Martin Energy Services on Harbor Island in Port Aransas. With Bouchard in debt to the fuel company, Martin Energy had liens on the vessels so they could not be moved. The Coast Guard ordered the crew to remain aboard for safety reasons.

Ensign Hailye Reynolds, a spokeswoman for Coast Guard Sector/Air

Station Corpus Christi, reported in late March that "there is no captain of the port order (still in effect for the ATB), but it is still docked with liens on it."

In a statement to *Professional Mariner* on March 25 after the coronavirus outbreak had intensified across the country, Bouchard said that the company "and its remarkable staff on the water and ashore are doing everything possible to meet the energy and commercial needs of the United States at this time of unprecedented crisis. Despite complex refinancings made all the more difficult by the demands of sheltering at home and financial market turmoil, Bouchard Transportation was able to raise the funds to meet all of its salary responsibilities, work with U.S. Coast Guard to remove captain of the port orders, and return to serving the needs of its valued clients." •

Bill Ward photo

Captain of the port actions against Bouchard included an order affecting the tug *Donna J. Bouchard* and barge *B. No. 272*. The ATB remained docked in late March in Leeville, La., "to eliminate the pollution threat posed by the vessels," a Coast Guard spokeswoman said.

Expecting the unexpected simply routine for WSF ferry crews

Story and photos by Casey Conley

Washington State Ferries (WSF) Capt. Joel Michelson barely finished explaining how every Elliott Bay passage is a little different when he got a message proving his point. Down below, a passenger was unconscious and suffering a seizure.

Michelson increased *Puyallup*'s speed to about 19 knots to hasten its arrival into downtown Seattle. For 90 tense seconds, he coordinated the emergency response with the crew and made arrangements for paramedics to meet the ship at the dock. Finally, word came that the man was conscious and stable. Michelson gave a reassuring look to the wheelhouse personnel. "OK," the captain said, "he's awake."

"We have medical emergencies often," said Michelson, an 18-year ferry system employee. "When you move this many thousands of people, you are going to get heart attacks, seizures, you name it. I think I have seen everything except somebody giving birth, but other (crewmembers) have."

WSF is the largest ferry operator in the United States. Its 22 passenger and vehicle ferries carried nearly 24 million people in 2019. The system's 1,900 employees include hundreds of mariners working in the wheelhouse, on deck and below in the engine rooms.

Michelson led 15 crew aboard *Puyallup* on a brisk, breezy late February day. Morning fog nearly burned off by the 0935 departure from Colman Dock in downtown Seattle to Bainbridge Island. The roughly 6.5-mile run across Elliott Bay takes 35 minutes each way, and the ferries run almost 20 hours a day.

The 460-foot *Puyallup*, above, one of three Jumbo Mark II-class vessels in the Washington State Ferries fleet, departs Colman Dock in downtown Seattle for the transit to Bainbridge Island. The 382-foot *Kaleetan* approaches from Bremerton. *Puyallup* Capt. Joel Michelson, above right, describes the S-turn leading into Eagle Harbor, home to the WSF terminal on Bainbridge Island.

Puyallup is one of three Jumbo Mark II-class ferries. They are the largest in the WSF fleet and the second largest double-ended ferries in the world. The 460-foot behemoths can hold 202 vehicles and 2,499 passengers. *Tacoma* and *Wenatchee* are the other

two in the class. All three were built in the late 1990s.

Michelson was describing *Puyallup*'s attributes when chief mate Mike Edwards, positioned about 250 feet away in the aft-facing wheelhouse, guided the vessel off Colman Dock. The crossing itself is straight, and mostly straightforward, much of the way. Ferries make an S-turn into the tight confines of Eagle Harbor during the final approach to Bainbridge Island.

Michelson speaks highly of the Jumbo Mark II series. The

16,000-hp workhorses have plenty of power and typically cruise at 18 knots. They also are incredibly maneuverable despite their size.

"We have a propeller on both ends (of the ferry) and a rudder on both ends, so when you get down to a certain speed, you can walk the boat and spin the boat in a spot almost," he said.

Michelson is something of a ferry lifer. His father and grandfather worked as WSF captains, and he recalled tagging along on voyages as a child. He started working on deck in 2002 and became a mate in 2010. He moved up to captain about two years ago.

"There was never any pressure to come do this, but it was cool having a dad as a ferry boat captain," Michelson said. "I got a photography degree and an art history degree from Western Washington (University) in Bellingham and was working here at the same time. I just decided I liked this better."

Deck officers work 10 days in a row, followed by four days off. *Puyallup* has overnight accommodations, although Michelson and Edwards live close enough to the Bainbridge Island terminal to spend their off-time at home. Alarm clocks ring as early as 0315 on work-

The engineers have a genuine admiration for *Puyallup*, and their efforts have gotten plenty of attention over the years. Plaques honoring the ferry's near-perfect service record line the control room walls.

***Puyallup* is powered by four 4,000-hp EMD diesel engines paired with Siemens electric drive motors, above right, shown behind oiler Jesse Sutton. At left, the ferry takes on passengers and vehicles at Bainbridge Island. WSF carries 6.2 million passengers a year on the Seattle-to-Bainbridge route.**

days, but the trade-off is they get home by midafternoon.

"It is a beautiful thing," said Edwards, who joined the ferry system about two years ago after working on tugboats and offshore supply vessels in the Gulf of Mexico. "There is no other maritime job that touches this as far as family life goes."

There was relatively little traffic on Elliott Bay, but these waters can get extremely crowded during the summer with sailboats, powerboats, other ferries and workboats moving to and fro. Deep-draft commercial ships, bound for Seattle or Tacoma, bisect the routes between Seattle and Bainbridge Island and Seattle and Bremerton to the southwest. The Seattle-to-Bremerton run is the longest in the system at 17.5 miles. Seattle to Bainbridge Island is the busiest run overall. Its 6.2 million riders a year account for more than a quarter of all ferry system passengers.

Edwards eased off the throttles as the ferry made its hard turn to starboard near Tyee Shoal off Bainbridge Island. He continued to slow the ferry as it entered the narrows between Bill Point and Wing

Point leading to the terminal in Eagle Harbor.

"We normally come in at about 9 or 9.5 knots," Michelson said as Edwards steered for the landing. "This is fast for most people but it is common for us." Edwards backed the engines to slow the ferry into position, pushing a massive amount of water forward as the ship slowed to a crawl.

Propulsion aboard each of the Jumbo Mark II ferries comes from a diesel-electric hybrid power system below the main passenger deck. Four 4,000-hp EMD diesel engines generate electricity through Kato alternators that can produce up to 3 million volts of power. All of that energy goes through Siemens electric motors that turn a single propeller on the fore and aft ends of the ship. The engine compartments are mirror images of one another with two mains and two electric motors.

Just three engines are used on most crossings to save fuel and reduce emissions. Even so, those big engines burn a lot of diesel. In a normal year, WSF vessels consume 18 million gallons of diesel fleetwide. *Puyallup* and its Jumbo Mark II sisters together use 5 million gallons, or 26 percent of the overall total.

Those figures will almost certainly be lower in the years to come. WSF plans to install battery-electric hybrid propulsion systems aboard the Jumbo Mark II vessels during their upcoming 20-year engine replacement periods. Siemens won a contract to design the new system, which is still under development. Ferry officials expect the new propulsion package will reduce emissions by a quarter and cut operating costs by $14 million a year.

Separately, WSF has partnered with Vigor for the design and construction of up to five new hybrid-electric Olympic-class ferries. The vessels will run entirely in electric mode for most voyages. Construction of the first new ferry should begin within a year.

Until the conversions happen, the engineering crews aboard each Jumbo Mark II ferry must keep the older propulsion systems running. *Puyallup* alternate staff chief John McGarrity and his team monitor vessel performance from a control room sandwiched between the fore and aft engine compartments. The control panel, outfitted with numerous gauges and monitors, provides a real-time look at engine output and myriad other data sets.

Puyallup **leaves Colman Dock in Seattle, right, with a relatively light lunchtime load. The ferry, named for a Native American tribe in Washington, has earned numerous awards for reliability. Serving on the four-person day-side engineering crew are, from left, assistant engineer Rick Hughes, oilers Jesse Sutton and Dan Kelly, and alternate staff chief John McGarrity.**

"This is like an EKG of the boat," assistant engineer Rick Hughes said as he gestured toward a series of monitors with lines that rise and fall depending on power demanded by the captain, power produced by the plant, and other metrics. When the engines are running optimally, the lines will rise or fall more or less in lockstep. "As long as these lines are getting along, I'm happy," he said.

Jumbo Mark II hybrid conversions

- *Puyallup, Tacoma* and *Wenatchee* are the largest ferries in the fleet.
- Siemens is designing the battery-electric propulsion system.
- Upgrades are projected to reduce carbon emissions by 25 percent.
- Operating costs are projected to fall by $14 million a year.
- Smoother, quieter ride will have less impact on marine animals.
- First conversion is scheduled to start in late 2021.

WSF engineers are assigned to a particular boat, and they stay with that boat even if its route changes. They work seven days followed by a week off, alternating weeklong day and night shifts. McGarrity and Hughes have each spent nearly two decades working aboard *Puyallup*. They have a genuine admiration for the vessel, and their efforts have gotten plenty of attention over the years. Plaques honoring the ferry's near-perfect service record line the control room walls.

"Our reliability is off the charts," McGarrity said. "We haven't missed a trip in eight years."

For the engineering crew, that statistic is the ultimate measure of their work. Michelson, as captain, feels a similar responsibility to keep the ferries running exactly on time. Early-morning runs typically have 1,000 or more passengers, nearly all of whom are headed to work in Seattle. Arriving a minute or two late can mean the difference between riders catching or missing transit connections to get to work on time. Afternoon commutes carrying people back home are similarly busy.

"We don't miss a lot of trips … and we are pretty much on time for the most part," Michelson said, with the caveat that countless factors, most out of the ferry system's control, can slow things down. "For the community it is important we keep on time. That is our number-one job, to get people to work on time."

"When you move this many thousands of people, you are going to get heart attacks, seizures, you name it. I think I have seen everything except somebody giving birth, but other (crew-members) have."

Capt. Joel Michelson

Right on schedule, Michelson prepared to guide *Puyallup* east across Elliott Bay back to Seattle. He was joined in the forward wheelhouse by quartermaster Tommy Gall, who executed the captain's speed and course changes through the S-turn leading out of Eagle Harbor. Michelson paid close attention to TOTE Maritime's *Midnight Sun* on the Furuno radar as the cargo ship, bound for Tacoma, approached from the north.

"I see it," Gall said of the 839-foot roll-on/roll-off vessel.

"He's screaming," Michelson said. "He is making 21 knots. That is about the fastest deep-draft traffic we'll see around here."

Michelson adjusted his crossing plan to account for the approaching ship, noting that there is "no cookie-cutter way" to make the transit. Gall, following Michelson's commands, steered alongside Bainbridge Island before turning sharply to port to line up with downtown Seattle. *Puyallup* made about 13 knots, a little faster than normal, to keep plenty of distance from *Midnight Sun* before speeding up to the ferry's usual 18 knots.

The cargo ship ultimately passed roughly two miles behind *Puyallup*, while the Centerline Logistics tugboat *C.E.* towed the fuel barge *Professor Karen Ann Brown* well in front of the ferry's path. The westbound WSF vessels *Chimacum*, heading for Bremerton, and *Tacoma*, bound for Bainbridge Island, both passed on *Puyallup*'s starboard side. *Tacoma*'s route was a little farther north than usual, pushing *Puyallup* a little farther north as well.

Michelson got the call about the passenger's seizure as the ferry approached downtown Seattle. He increased speed, and kept the ferry's speed up, to get the passenger medical attention as soon as possible. The additional speed also provided a little relief from the 15- to 20-knot wind gusts.

"The main thing I am thinking about now is that wind," the captain said as he lined up with the terminal. "With that side wind (from the south) and this huge sail area, when I get down to about 3 or 4 knots it is really going to start pushing me to the north. So I set it way to the south so the wind, with the boat and the steering, will set me into the dock."

Michelson approached the landing at 2 or 3 knots before putting the forward engines astern, sending a torrent of whitewater ahead of the bow. The ferry eased into position with barely a nudge against the dock. Crews rapidly mobilized to ensure the seizure victim could be seen by paramedics, which delayed offloading vehicles by 10 or 15 minutes.

The westbound voyage back to Bainbridge Island would be a little late getting underway. But for a ferry service that makes thousands of runs each year, carrying millions of people and vehicles, the occasional hiccup is unavoidable. •

At Work

New Lake Charles launch keeps pace with LNG boom

Story and photos by Brian Gauvin

In front of the Lake Charles pilot station in Cameron, La., the 70-foot *Cameron Pilot II* went from zero to 28 knots in a matter of seconds, and did it as smoothly as the hand of Capt. Mark Foster advancing the throttles.

The boat derives its elegant lines from the classic Ray Hunt Design deep-V hull, synonymous with the pilot boats built by Gladding-Hearn Shipbuilding of Somerset, Mass. The launch is fast for its length and weight, and it needs to be. From the Cameron jetties, it is 30 miles to the sea buoy across the open, and often rough, Gulf of Mexico.

"I've been a pilot for 27 years and it's the best pilot boat I've ever been on," said Capt. Brett Palmer, president of Lake Charles Pilots Inc. "It's solid and rides really flat, and cuts the waves with no pounding in 5-foot seas. It has incredible visibility and is a very functional, purpose-built pilot boat."

In 2016, local pilots and industry saw a need for new infrastructure to support the expected surge in vessel traffic because of the turn from importing liquefied natural gas (LNG) to exporting it. Currently, Cameron LNG is up and exporting, Venture Global LNG is under construction, and three more LNG terminals have received permits and are expected to be built along the Calcasieu Ship Channel.

"We have 14 jobs today," Palmer said. "Six months ago, we were not nearly that busy. But we knew this was coming."

With three Gladding-Hearn/Ray Hunt Design boats already in its fleet, the Lake Charles Pilots had the confidence of outstanding history when ordering *Cameron Pilot II*. It was delivered in October.

"Not wanting to reinvent the wheel, we rode the Galveston (Texas) boat and knew that it was the boat we wanted," Palmer said. Gladding-Hearn delivered *Galveston* to the Galveston-Texas City Pilots in 2010.

The Calcasieu Ship Channel cuts through marsh, replete with sediment, floating grass and hyacinth. For that reason, the Lake Charles Pilots deviated from *Galveston* and chose propellers instead of waterjets.

"The jets act like a vacuum cleaner in the shallows," Foster said.

The Lake Charles Pilots also chose to have shaft tunnels fabricated into the hull. Winn Willard, president of Ray Hunt Design, explained

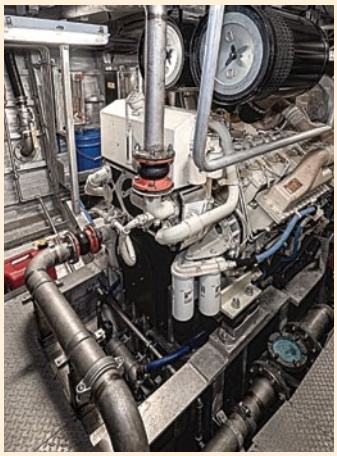
that the tunnels reduce draft and, most importantly, allow for a lower shaft angle. The effect is to improve water flow into the propellers, reducing turbulence and cavitation.

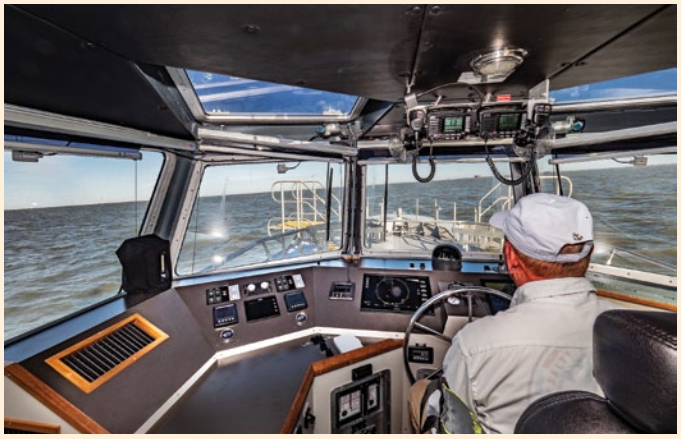
"Efficiency is improved and cavitation damage is then limited, giving longer propeller life," Willard said.

Currently, about 1,000 ships visit the Lake Charles area each year. Palmer expects the number to double in 10 years.

"We got the new boat in October, and the first of the LNG ships started arriving," he said. "That was how it was supposed to work." •

The 70-foot *Cameron Pilot II*, left, built by Gladding-Hearn Shipbuilding, gets up to speed on the Calcasieu Ship Channel near the Lake Charles pilot station in Cameron, La. Capt. Mark Foster, right, mans the helm of the newbuild on the channel. The boat is equipped with eight Llebroc seats, below, one each for the captain and deck hand and six for pilots and passengers.





Two Cummins QSK38-M main engines, above, deliver a combined 2,600 horsepower through Twin Disc gears.

Foster heads for the sea buoy, above, off Cameron, La. The pilot boat's wheelhouse provides operators with easy-to-reach controls and impressive visibility. The foredeck, right, has port and starboard boarding platforms and a Harken rail and trolley system for increased pilot safety.

Cameron Pilot II
SPECIFICATIONS

Owner/operator: Lake Charles Pilots Inc., Lake Charles, La.
Designer/builder: Ray Hunt Design, New Bedford, Mass./Gladding-Hearn Shipbuilding, Somerset, Mass.
Dimensions: L: 70' B: 21' D: 6'8"
Crew size: Two

PROPULSION
- (2) Cummins QSK38-M Tier 3 engines, 1,300 hp each at 1,800 rpm
- Twin Disc MGX-6620A gears
- Cummins C Command and Twin Disc EC300 engine controls
- Bruntons five-blade nibral propellers
- (2) Humphree HE 1500 interceptors
- (2) Northern Lights M864W3 25-kW gensets
- Maximum speed: 28 knots

NAVIGATION/COMMUNICATIONS
- (2) Garmin xHD2 open-array radar units
- Garmin 8616xsv MFD chartplotter
- Garmin 19x GPS
- Garmin B260 depth sounder
- Furuno FA170 AIS
- (2) Standard Horizon GX6000 VHF radios
- Ritchie compass

ADDITIONAL EQUIPMENT
- (8) Llebroc seats
- Harken TR31 rail and trolley restraint system
- (5) MarinAire reverse-cycle air-conditioning units
- Winch-operated J-basket rescue system

Casualties

Poor coordination between master, pilot cited in San Juan pier strike

Norwegian Epic sailed into San Juan, Puerto Rico, for repairs to its port-side propeller motor. While docking, the cruise ship's port bow struck two mooring dolphins, gouging the hull and causing $3.5 million in damage to port infrastructure.

National Transportation Safety Board (NTSB) investigators identified communication failures and poor coordination between the master and pilot while docking the 1,080-foot ship. As a result, the maneuver itself, conducted with two tugboats, went badly awry.

"There was a point in the maneuver when both the tugboats and the (ship's) thrusters were in opposition to each other's actions, demonstrating the lack of coordination between the master and the pilot, beginning with the master/pilot exchange and continuing throughout the docking evolution," the NTSB said in its accident report.

The allision happened Feb. 12, 2019, at about 1730 as the ship approached Pier 3 in San Juan. There were 6,023 passengers and crew aboard. No injuries were reported, and there was no pollution.

Norwegian Epic diverted to San Juan after suffering problems with its hybrid propulsion system while en route to Tortola. The system consists of diesel engines generating electricity for 32,184-hp electric shaft motors turning the port and starboard propellers. The motor driving the port propeller lost half its power two days before the pier strike, and a day before it lost all power. Crew locked it at sea to avoid damage to the turning gear, the NTSB said.

Joe Tolley/NTSB photos

Norwegian Epic **in the Port of Miami in 2014. In two photos from the NTSB report, above right, the cruise ship strikes a mooring dolphin and catwalk at Pier 3 in San Juan, Puerto Rico, then hits a second dolphin. Damage to port infrastructure totaled $3.5 million.**

Norwegian Epic's captain had never before docked the ship in San Juan. The San Juan pilot boarded the ship at 1640 as the vessel approached the entrance to the harbor. The two men discussed the propulsion issues that limited the ship's speed to 12 knots. They also made initial plans about who would conn the vessel during different parts of the maneuver, with the master guiding the ship into its berth facing north.

The tide within the harbor was ebbing at 1 knot, while winds from the east blew 15 to 20 knots with occasional higher gusts. The pilot articulated a plan to steer east toward Pier 4, occupied by the cruise ship *Caribbean Princess*, and let the wind, thrusters and tugboats *Beth McAllister* and *Dorothy McAllister* guide the vessel into Pier 3, just to the west.

The master took the conn at 1717, moments after the pilot warned about the ship's proximity to Pier 3. The wind was blowing at 25 knots from the north-northeast.

"*Norwegian Epic* continued its turn to the left, with its bow about 1,250 feet from the end of Pier 3 and about 1,500 feet from *Caribbean Princess*," the NTSB said. "With all four bow thrusters and all three stern thrusters online, the master began maneuvering *Norwegian Epic* toward Pier 3 east, using a combination of the bow thrusters, stern thrusters, rudders and the starboard engine."

The report stated that the master "did not always announce his actions or relay orders to anyone on the bridge." Meanwhile, the pilot alternated between English and Spanish in his tugboat commands. The master's lone communication regarding the tugs occurred at 1723, when he told the pilot to order them to pull full astern to pull the cruise ship closer to Pier 4.

Less than a minute later, the captain recognized the ship would "touch" the pier. The first impact happened at 1724:55, causing a dolphin and its connecting catwalk to collapse into the harbor. The ship then hit a second dolphin closer to shore, and it also collapsed along with its catwalk.

The ship sustained two 6-foot-long gashes in its port-side bow above the waterline that cost about $200,000 to repair. The two damaged dolphins and catwalk segments cost roughly $3.5 million to replace, the report said.

NTSB investigators highlighted shortcomings in communication between the master and pilot leading up to the pier strike. For instance, the two never discussed which of them would control the tugboats. The master also appeared to use gestures rather than verbally articulating his orders.

NTSB investigators said the voyage data recorder revealed only one instance when distances to Pier 3 and *Caribbean Princess* were relayed to the bridge, depriving the master of crucial information as he guided the ship into position.

"This would have given the master better indication of what thrusters to use, the power at which to run them, and direction to move the ship, as well as how to use the tugs," the report said.

Norwegian Cruise Lines, which owns the now 12-year-old ship registered in the Bahamas, did not respond to an inquiry about the NTSB findings. The San Juan Bay Pilots could not be reached for comment.

Casey Conley

NTSB: Pilot dozed before hitting moored towboat, barge near Houston

At about 0400 on March 15, 2019, the towboat *Dixie Vandal* made an abrupt turn to port in the Houston Ship Channel near Pasadena, Texas. Less than a minute later, its tank barge hit the moored towboat *Trinity* and one of its barges at nearly 6 knots.

The impact at 0408 pushed *Trinity*'s tow 100 feet upriver. It also caused extensive damage to the Kinder Morgan Pasadena Liquids Terminal at mile 44 in the Houston Ship Channel. Pollution was limited to a half-gallon of jet fuel.

Dixie Vandal's pilot told National Transportation Safety Board (NTSB) investigators he didn't remember making the sudden turn. He also never heard the bridge navigational watch alarm system blaring.

"The pilot on *Dixie Vandal* told investigators that he believed he had dozed off in the seconds before striking *Trinity* and was awakened by the impact," the NTSB said in its accident report. "He was unsure how the tow had turned to port."

The agency attributed the accident to the fatigued pilot, who fell asleep and lost control of the tow likely just before impact. "Contributing to the pilot's fatigue," the report continued, "was the extended length of duty through the night and early morning hours and his use of an over-the-counter antihistamine."

The pilot took the medication cetirizine, commonly known as Zyrtec, for allergy symptoms. The NTSB said the medication warns that drowsiness may occur, although the pilot said it did not make him tired.

Kirby Corp.'s Inland Marine Unit operated both *Dixie Vandal* and *Trinity*. A company spokesman did not respond to an inquiry about the NTSB findings. The report noted *Dixie Vandal*'s crew switched from a 12-on, 12-off watch rotation to two six-on, six-off watches each day following the incident.

Dixie Vandal's pilot began his 12-hour watch at 1800 on March 14. The 1,200-hp vessel pushed the 297-foot tank barge *Kirby 29751*, which loaded refined petroleum products at 0100 on March 15 at Morgan's Point. From there, the tow headed up the Houston Ship Channel toward City Docks in Houston.

Trinity, meanwhile, arrived at Kinder Morgan's terminal at mile 44 late on March 13. The 1,400-hp towboat pushed the 297-foot tank barges *Kirby 29051* and *EBL 2997*, arranged one in front of the other. The tow moored port side to the terminal.

Dixie Vandal and its barge approached *Trinity* and its barges at about 0400 on March 15, with the pilot planning to pass

NTSB photo

Aerial view of the Kinder Morgan Pasadena Liquids Terminal, with a towboat and two barges moored in a similar arrangement to *Trinity*, *Kirby 29051* and *EBL 2997* on the day of the accident.

the moored vessels port to port. *Dixie Vandal*'s electronic charting system showed the vessel suddenly turned to port.

"At 04:07:47, the rate of turn indicator on the electronic charting system reached its maximum display of 30 degrees to port," the NTSB said in its report. "At 04:08:31, at a speed of about 6.5 mph, the forward port corner of (barge) *Kirby 29751* contacted the starboard side of *Trinity* and then struck the forward port corner of barge *Kirby 29051*."

The impact severed 12 mooring lines holding the tow in place and two cargo hoses, causing more than $500,000 in damage to the Kinder Morgan facility and about $100,000 to the barges. The half-gallon of residual jet fuel inside the hoses reached the waterway, according to the NTSB.

Dixie Vandal, like most towboats in the Kirby fleet, is equipped with a bridge navigational watch alarm system with motion sensors. The system sounds a wheelhouse alarm if there is no movement for more than 40 seconds. Another minute with no movement rings the general alarm. The pilot did not hear the wheelhouse alarm, and the general alarm did not sound, suggesting to investigators that the pilot dozed shortly before the impact.

The pilot at *Dixie Vandal*'s controls was on the 10th day of a 20-day work rotation with daily 1800-to-0600 watches. He told investigators he generally kept normal hours when not working on the towboat, and typically slept from 0800 to 1600 while off watch on the vessel. *Dixie Vandal*'s captain reported that the pilot appeared "more than fine" on the evening of March 14 and ready to complete his watch.

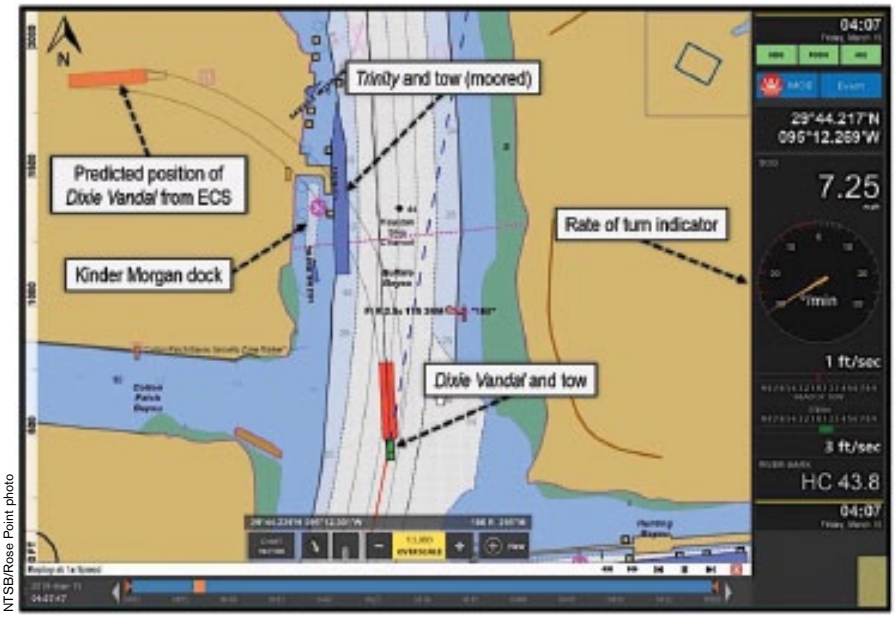
This evaluation occurred before the pilot began his watch under Kirby's "watch readiness" policy. It entails crewmembers monitoring their peers to ensure they can perform their jobs safely. Kirby allows captains to temporarily tie up vessels or request relief if a crewmember feels too tired to complete their duties, the report said.

The report did not say how often these requests are made within Kirby's vast fleet of inland vessels. However, a Kirby manager interviewed by the NTSB said such a request has been made, and granted, on Kirby vessels in the past. These practices aside, the NTSB warned of the challenges of staying awake and focused during the overnight hours.

"Self-reported (subjective) alertness, such as the pilot stating that he felt alert and awake for his shift, is often deceptive," the report said.

The NTSB, which investigates a small fraction of maritime casualties, identified 14 incidents between 2014 and 2019 where fatigue was a leading factor. Ten occurred between 0100 and 0600 when the human body's circadian rhythms are low. During these times, people often struggle to stay awake even if they are not overly fatigued.

Casey Conley



NTSB/Rose Point photo

A screenshot captured at 04:07:47 from the playback of *Dixie Vandal*'s electronic chart system shows the towing vessel as it approached the Kinder Morgan facility.

High-water barge strike knocks Tombigbee bridge out of alignment

Rivers Wilson was pushing six barges up the rushing Tombigbee River when its port-side aft barge hit the Norfolk Southern railroad bridge near Jackson, Ala. The tow spun to port after impact and became pinned against a support pillar.

The collision, at about 0100 on March 10, 2019, pushed the bridge at mile marker 88.2 out of alignment. Railroad officials closed the span to train traffic for more than a day. Permanent repairs cost more than $4.8 million. One crewmember fell and suffered a minor injury in the minutes after the bridge strike.

National Transportation Safety Board (NTSB) investigators acknowledged the Tombigbee was in flood stage, and they also recognized that the bridge opening — located along a bend — is poorly aligned with the river current. That said, the agency cited the pilot's decision to continue the voyage through the bridge, given his unfamiliarity with *Rivers Wilson*, as a leading factor in the allision.

"(The pilot's) incomplete understanding of the current, in combination with the misalignment of the bridge with the thalweg and *Rivers Wilson*'s lower horsepower (than his usual) vessel ... resulted in his belief that the tow had enough speed to overcome the effect of the current," the NTSB said in its accident report.

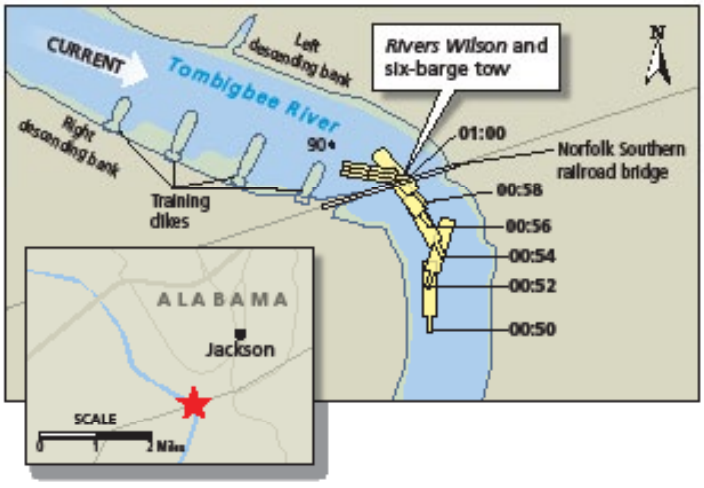
After the bridge strike, investigators identified numerous deficiencies with the 2,800-hp towboat built in 1958, including watertight and structural integrity issues. The vessel did not have a certificate of inspection or meet Subchapter M standards.

The Coast Guard detained *Rivers Wilson* for some time afterward, and the NTSB said it had not returned to service by spring 2020 when it published the accident report.

Graestone Logistics of Mobile, Ala., owned and managed *Rivers Wilson*, but personnel from Parker Towing of Tuscaloosa, Ala., crewed the vessel at the time of the bridge strike. Neither company responded to inquiries about the NTSB findings.

Rivers Wilson departed a fleeting area near Mobile at 2040 on March 8 with six barges, each carrying about 1,600 tons of direct reduced iron. The destination was Nucor Steel in Tuscaloosa. The original plan called for eight barges in the tow, but the captain opted for six because it was his first trip with *Rivers Wilson*, the NTSB reported. The captain and the pilot had worked together for several years on a 3,800-hp towboat in Parker's fleet.

NTSB photo/Pat Rossi illustration



***Rivers Wilson,* moored in Mobile, Ala., after the accident, was pushing six barges up the Tombigbee River when the tow hit the Norfolk Southern railroad bridge near Jackson. The map shows positions of the tow before the impact.**

River conditions likely influenced his decision. Opinions among the crew varied, although the pilot said the Tombigbee was the highest he could recall during 11 years with Parker Towing. A gauge located about a mile from the Norfolk Southern bridge in Jackson registered 29.4 feet, or 5.4 feet above flood stage.

The voyage upriver had occasional hiccups along the way. Twice the towboat "bogged down" in the current and dropped from about 3.5 mph to 1.5 mph. Crew also had to stop and fix an oil leak on the starboard main engine on March 9. The pilot estimated the current at about 8 mph for much of the voyage.

The pilot, with 28 years of industry experience, came on watch at 2300 that night. He prepared to abort the tow, if needed, downriver from the Norfolk Southern bridge if *Rivers Wilson* struggled to maintain speed upriver. But as the tow approached the abort point at about 2400, the vessels continued upriver at around 3 mph. The tow approached the rail bridge at about 0050 the next morning.

> The span crosses near the center of a bend that has become sharper over the years. Four training dikes installed just upriver from the bridge to stabilize the channel contribute to the challenging current.

"The bridge tender noticed the (towboat) was slowing as the tow passed under the bridge and asked the pilot if he was about to 'stall out,'" the report said, noting that the tow was moving to port at 1.5 mph with no forward movement at all.

"The bridge tender radioed that the pilot would have to 'make it smoke black to get up through there,' to which the pilot replied, 'Looks like I may be fixing to touch up on you, too,'" the report continued.

He was right. *TOUAX 956 B*, the aft port barge in a two-wide, three-deep configuration, hit pier 3 on the railroad bridge at 0058. The tow pivoted to port and the current pushed against its beam, pinning the vessels against the bridge. The forward port barge, *PTC 851*, also hit the bridge. Two good Samaritan vessels helped free the tow.

Rivers Wilson attempted to complete the voyage to Nucor with two loaded barges and two empties. The empty barges were not explained in the report. There is no indication any of the

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barges spilled their loads or broke away. Regardless, the tow never made it; its port engine suffered a block failure a dozen or so miles upriver from the bridge. The tug limped back to Mobile on a single engine.

The Norfolk Southern railroad bridge is something of a trouble spot on the Tombigbee. Tows hit the 71-year-old lift bridge at least four times between January and March 2019 during high water. The rail company asked the Coast Guard twice in March to close the waterway due to difficult conditions.

The span crosses near the center of a bend that has become sharper over the years. Four training dikes installed just upriver from the bridge two years earlier to stabilize the channel contribute to the challenging current.

That change hasn't gone over well. The bridge tender told investigators he has heard complaints about the dikes' effect on the current, and *Rivers Wilson*'s pilot reported similar issues to the NTSB. The dikes, he said, "forced the current across the river into a sandbar that previously had to be dredged annually. The current then deflected back into the channel at the bridge. The current had always set vessels toward the right descending bank, but the dikes made the situation worse."

The U.S. Army Corps of Engineers released a study in 2015 recognizing challenges passing through the railroad bridge. Issues include the location of the bridge relative to the bend, the presence of a growing upriver sandbar, and bridge piers that are poorly aligned with the upstream current. Maneuvering through the area was often difficult, the Army Corps report said, and in high water "the difficulty increases substantially."

Casey Conley

Procedural breakdown leads to rupture aboard tanker in Texas

The 479-foot *Fairchem Filly* berthed at the Vopak Terminal on the Houston Ship Channel to offload hexene, a process that required pumping nitrogen into the vessel's cargo tanks to maintain the chemical's purity.

Two forward cargo tanks overpressurized early in the offloading process and one tank ruptured, releasing hexene into an adjacent ballast water tank, the National Transportation Safety Board (NTSB) said in a report on the May 30, 2019, incident. No one working at the shoreside terminal or on the ship was injured. No pollution was reported.

The ship, registered in the Marshall Islands, required $750,000 in repairs to the No. 3 port cargo tank and the steel deck on top of the tank that was also damaged. Roughly $100,000 worth of hexene became contaminated.

The NTSB said *Fairchem Filly*'s crew and Vopak personnel deviated from established practices for cargo discharge, particularly the process of adding nitrogen to "blanket" the hexene. Communication also broke down between ship and shore crews at a pivotal point in the process. As a result, too much nitrogen entered the ship's No. 3 port and starboard cargo compartments at a rate that exceeded the pressure relief valve's ability to expel it.

"Since the nitrogen hose connection was improperly configured, the flow rate of nitrogen had to be controlled by the ship or terminal personnel by manually adjusting the dock or ship valve," the NTSB report said. "Therefore, communication between the ship and terminal personnel was critical."

Fairchem Filly arrived at the terminal in Deer Park, Texas, at 0400 carrying 65,171 gallons of liquid methyl isobutyl ketone in its 1S (No. 1 starboard) tank. The ship carried 914,563 gallons of hexene in its 2S (No. 2 starboard), 3P (No. 3 port) and 3S (No. 3 starboard) tanks. Hexene must be stored under a "blanket" of inert gas to prevent oxygen absorption. Both chemicals are used in numerous industrial and consumer products.

Not long after arriving, the ship's crew met with Vopak's dock supervisor to make plans for the cargo discharge. They completed a safety checklist and coordinated communication over hand-held radios. The NTSB said the crew never completed a separate nitro-

Bill Ward photo

***Fairchem Filly*, left, passes the crude oil tanker *Delta Harmony* in the Houston Ship Channel at Morgan's Point, Texas, in February 2019. A cargo tank on *Fairchem Filly* ruptured while hexene was being unloaded from the ship three months later at a terminal in Deer Park, Texas.**

gen-handling checklist that among other things specified using a 1-inch hose, or using an orifice, to limit nitrogen flows. The terminal's own safety protocols required hoses no larger than 2 inches in diameter.

Crews used a 4-inch hose, without an orifice, to dispense nitrogen to blanket the hexene during the cargo discharge, which began at about 0700 from the 3S and 3P tanks on *Fairchem Filly*.

The ship's cargo tanks had a supply of nitrogen to blanket the hexene during transit, so nitrogen was not needed during the initial cargo discharge. The ship's nitrogen supply valve was closed, but the shoreside supply valve was about a quarter open.

Low tank pressure alarms sounded 33 minutes after the hexene discharge began. The ship's crew tried repeatedly to reach the shoreside dockman, who replaced the terminal's initial contact after his shift ended at about 0600. Surveillance footage later showed the dockman at the break shack when the alarms sounded.

"In an effort to increase nitrogen flow and pressure, the chief officer instructed the pumpman to open the ship's nitrogen valve, which had been closed," the report said. "Since the chief officer did not see a change in tank pressure, he instructed the pumpman to fully open the ship's nitrogen valve, thus making the ship entirely dependent on the terminal's valve to regulate the flow of nitrogen."

Ten minutes later another alarm blared, signaling too much pressure in the 3S and 3P tanks. Pressure relief valves for both tanks opened before the crew reported a "surge" on the ship when the 3P tank ruptured. Hexene from that tank overflowed into the adjacent No. 3 port ballast tank, and ballast water overflowed onto the deck through a vent.

The NTSB identified a series of failures that preceded the overpressurization event. These included the use of an oversized hose to dispense nitrogen into the ship, the communication breakdown that created uncertainty about the condition of the shoreside nitrogen valve, and the chief officer's order to fully open the ship's nitrogen valve rather than ceasing the operation until the dockman could be reached.

"Since the (onboard and shoreside) valves were opened too far, the nitrogen supply rate exceeded the tank relief capacity design limit," the NTSB determined.

The agency added that "both the terminal and operator of the vessel had procedures and control measures in place that clearly outlined a nitrogen blanketing operation, (but) the procedures were not followed on the day of the accident."

Fleet Management Ltd. of Hong Kong managed *Fairchem Filly*, built in 2007 in Japan. The company did not respond to an inquiry about the NTSB findings. Vopak, a Dutch chemical giant, did not respond to an email seeking comment.

Casey Conley

Bulker loses engine power, grounds for week outside Green Bay

A bulk carrier inbound on Lake Michigan for Green Bay, Wis., grounded within sight of the city's downtown and remained stuck for more than a week.

The 740-foot *Algoma Conveyor* grounded on the morning of March 19 due to an "unexpected loss of engine power," according to Peter Winkley, chief financial officer of vessel operator Algoma Central Corp. of St. Catharines, Ontario.

Crew aboard the Canada-flagged ship dropped anchor before the bow drifted out of the navigation channel and went aground in the soft bottom. The ship's stern partially blocked the channel into Green Bay.

The U.S. Coast Guard is reviewing the incident but has not yet released the cause of the engine failure, said Lt. Phillip Gurtler, spokesman for Sector Lake Michigan. "Currently, we are not sure why that happened, but it is being investigated," he said.

There was no pollution or hull breaches due to the grounding, and the 18 crew reported no injuries. Pilots are not required on board for entry into the Port of Green Bay.

Algoma Conveyor approached Green Bay carrying road salt after making other port calls on the Great Lakes. The ship became stuck about 5 nautical miles from the Fox River, which bisects the city and flows into Green Bay. The river also is home to the port and several large industrial businesses.

The Coast Guard established a unified command that included Algoma Central Corp., the Wisconsin Department of Natural Resources and the Port of Green Bay. The group organized a salvage plan to remove the ship without causing pollution or hull damage.

Gus Schauer photo

Algoma Conveyor **passes the Grassy Point swing bridge in Duluth, Minn., in early December while heading up the St. Louis River to unload salt at the C. Reiss Terminal.**

Hudson Marine of Pelham, N.Y., oversaw the salvage, which began March 23. Over four days, more than 3,000 metric tons of salt was removed from the holds of the self-unloading bulker and placed in a waiting barge.

The 2,000-hp tugboats *Barbara Andrie*, *Nickelena* and *Erika Kobasic* refloated the ship on March 26 and pulled it back into the channel. From there, the freighter sailed into the Port of Green Bay under its own power.

Winkley described the salvage as "fairly routine." However, he said it "was certainly complicated by various procedures put in place by all parties involved as a result of the COVID-19 pandemic response."

Although salvage crews encountered "minor difficulties" along the way, Gurtler said the operation was completed without incident "thanks to the close partnership between all of the participating agencies." Winkley expressed gratitude to the Coast Guard and Hudson Marine.

Algoma Conveyor, built in China, joined Algoma's fleet last year. The vessel trades within the Great Lakes and typically carries aggregate, salt, grain or iron ore, depending on the season, according to Algoma Central's website. It can discharge up to 5,400 metric tons of cargo per hour.

AIS data suggests the ship did not stay long in Green Bay. By midafternoon on March 29, *Algoma Conveyor* was underway in the St. Clair River heading south to Lorain, Ohio, after making a stop in Sarnia, Ontario. •

Casey Conley

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Courtesy Gladding-Hearn Shipbuilding

Need for tighter port security driving new demand for patrol boats

by Alan R. Earls

Security vessels for civilian operators have been getting a lot more attention in recent years, and that has been driving a wave of purchases. What's causing the growth is a combination of factors, starting with recognizing the need for stronger security assets. That, in turn, highlighted the inadequacy of many older vessels, a need to support longer missions, pressure to move to cleaner power plants, and the opportunity to employ more sophisticated security, navigation and communication technology.

"U.S. ports have been expanding at the greatest rate in the country's history due to economic success. As a result, the value of the patrol boat resource is greater than ever before," said Richard Scher, director of communications at the Maryland Port Administration.

Port patrol boat units are rapidly developing and expanding throughout the U.S., mirroring in some ways what happened after World War II, Scher said. At that time, port security entities began deploying patrol vessels, often U.S. Navy-surplus motor torpedo boats (better known as PT boats). Those vessels were valued for their small size, maneuverability and low cost to acquire. Little more than a year before 9/11, which dramatically reinforced the need for greater

The attacks of 9/11 have resulted in nearly two decades of security upgrades in ports around the United States. In 2015, Gladding-Hearn delivered a pair of 70-foot tactical response vessels, above, to the New York Police Department's Harbor Patrol Unit. The superstructures feature ballistic-resistant windows and panels, and an advanced air filtration system on each boat safeguards the crew spaces.

domestic security, Scher said it was an act of terrorism against the Navy that raised awareness of the value of waterside patrols to counter the threat of vessel-laden weaponry.

"On Oct. 12, 2000, such a weapon struck *USS Cole* in Yemen's Aden Harbor, killing 17 personnel and wounding 39 more," he said. From that point on, port security directors were given the responsibility to implement a waterside means to identify, address and deter similar threats that might emerge against cargo vessels and cruise ships.

As a result, today's patrol boats are designed for speed and maneuverability, are capable of mounting special weapons, and are equipped with radar and sonar. And, analogous to the boon provided by Navy surplus in the 1940s and 1950s, procurement now often comes with financial assistance from the Federal Emergency Management Agency's Port Security Grant Program.

"The baseline for port security is the Maritime Transportation Security Act of 2002, SAFE Port Act of 2006, and 33 Code of Federal Regulations," Scher said. The development and deployment of a patrol boat unit is greatly influenced by the intent of these federal regulations, he added.

> Duclos said operators have wanted — and have gotten — ballistic protection for the crew (e.g., windows and bulkheads), and nuclear, biological and chemical filtration systems for the cabins.

In Canada, the story is generally similar, but with less specific direction or support from federal authorities, said Danielle Jang, senior communications adviser at the Vancouver Fraser Port Authority. For example, she noted, regulations are not driving the market for newbuilds. Instead, factors driving growth include the overall age of port fleets and advances in technology and materials.

While port security trends in Canada are not as easily traced to events like 9/11 or the attack on *USS Cole*, there have been parallel developments. "For us here, the most significant change has been the requirements for ship escorts and terminal security," Jang said. "These activities require longer loiter times on vessels, increasing the needs for crew facilities. We also benefit from the increased power and lower fuel consumption of newer engines."

Canada's biggest port security concerns are similar to those in

Courtesy Metal Shark

Rising demand for law enforcement vessels has bolstered the order book at Louisiana-based Metal Shark. The shipyard's list of patrol customers includes the Florida Fish and Wildlife Conservation Commission, which has placed multiple orders for center console boats.

the United States, although they might be weighted differently. They include navigational safety, protection of critical infrastructure, and waterside terminal and ship security. To tackle those challenges, Jang said the Vancouver Fraser Port Authority looks for vessels with capabilities that include improved communication and navigation suites, longer mission duration and range, and better crew amenities.

Courtesy All American Marine

The Texas Parks and Wildlife Department tapped All American Marine to build *Captain Murchison*, an 80-foot, hydrofoil-assisted patrol catamaran. Features include a rapid-launch RHIB, an onboard drone for enhanced surveillance, and thermal-imaging video. "The vessel is definitely a game-changer for the Texas game wardens," says Cody Jones, assistant commander of the department.

In addition to security concerns about port infrastructure and commercial vessels, steady growth in recreational boating has increased the amount of overall marine traffic, putting more pressure on law enforcement agencies and their officers, said John Hotz, senior account manager and law enforcement specialist at Jeanerette, La.-based Metal Shark. Powerboating, paddle sports, fishing and wakeboarding have changed the surface dynamics and increased the potential for boater conflict, particularly on inland waterways.

"More than ever, patrol boats must be efficient, fast and durable," Hotz said. "In order to safely operate on crowded waterways, they must be highly maneuverable and allow for greater situational awareness."

And that's exactly what boatbuilders like Metal Shark say they've been working hard to deliver. "We place significant emphasis on developing crew-friendly, purpose-built law enforcement vessels that offer improved officer comfort and safety," Hotz said.

For example, he said Metal Shark's center console vessels feature large tops with increased coverage, full-height glass windshields for weather protection, wide walkways to allow for easy crew movement even while wearing bulky gear, and integrated coaming pads and toe rails to make it easier to work alongside another boat. Similarly, the company's pilothouse vessels feature a pillarless-glass design for improved visibility.

"Every facet of these vessels is designed with law enforcement and security missions in mind," Hotz said.

Other shipyards are in lockstep with that approach. All American Marine of Bellingham, Wash., recently built a vessel for the Texas Parks and Wildlife Department that is "about as advanced as you can get," said AAM marketing manager Bronson Lamb.

The aluminum catamaran, *Captain Murchison*, will patrol state and federal waters for the law enforcement division of Texas Parks and Wildlife. The 80-by-27-foot vessel features twin Caterpillar C18 ACERT D engines paired with HamiltonJet HM521 waterjets. One particularly innovative feature, according to Lamb, is Teknicraft's Rapid RHIB launching system integrated into the stern of the vessel, which allows deployment of a rigid-hull inflatable boat in under one minute while traveling at up to 15 knots. The RHIB has a 170-hp Volvo diesel engine and HamiltonJet propulsion.

The latest technology on the boat also extends to surveillance. *Captain Murchison* has a drone linked to radar and navigation sys-

tems so the crew can get a closer look at a suspicious craft without getting too close.

One of the most prominent players in the patrol boat market is Gladding-Hearn Shipbuilding of Somerset, Mass. Company President Peter Duclos said that since 2009, the shipyard has delivered 12 64-foot patrol boats to the U.S. Navy, two 70-footers and three 60-footers to the New York Police Department, and seven 57-footers for the Colombian navy for missions similar to those handled by the Coast Guard in the United States.

Duclos said operators have wanted — and have gotten — ballistic protection for the crew (e.g., windows and bulkheads) and nuclear, biological and chemical filtration systems for the cabins. There also has been demand for non-lethal weapons such as water cannons and the Long-Range Acoustic Device (LRAD), a hailing and warning system similar to what's been deployed on some Navy ships. And in terms of command, control and communication, there has been considerable interest in forward-looking infrared (FLIR) vision systems, integrated digital two-way radio systems, and satellite TV systems.

Bob Beck, director of sales and marketing at Superior, Wis.-based Lake Assault Boats, said the specifics of each security vessel vary depending on whether it operates in open or protected waters, but sea-keeping and speed are always important. "You want to be able to catch the bad guys, or at least get to a protective position relative to the bad guys," he said.

Today's customers also value comfort for operators, such as shock-mitigating seating and more crew amenities. "Obviously, you may have to stay out for longer patrols, so anything that offers ease of use is big," Beck said. That could be upgraded electronics, or the latest in engines and controls. For example, he said Lake Assault offers joystick controls, connecting the outboards, on many of its multi-engine boats. For efficiency reasons, higher-powered diesel outboards have become a popular option.

Courtesy Lake Assault Boats

Maritime security needs are not limited to large ports, and smaller boats do not have to lack technology. In 2018, Lake Assault Boats delivered a 26-foot patrol boat to the town of Essex, Conn., for law enforcement on the Connecticut River. The enclosed pilothouse features sonar, radar and a thermal-imaging camera.

Beck said demand for patrol boats in the United States has been robust enough that he is seeing competition from Canada and elsewhere. "Internationally, (builders) are always looking for new markets, so we have seen some inroads by foreign manufacturers," he said, adding that "because it is such a large market, they would like to have a piece of the pie that others currently have."

Will growth in the sector continue? Probably, according to Scher, despite the advent of other security technologies. For a time, closed-circuit television (CCTV) was the technology of choice for most port security directors, he said. However, it was quickly determined that CCTV did not provide adequate landside and waterside perimeter security unless terminals were inundated with cameras, or the CCTV system included video analytics. It was that realization of the value of having personnel observing from multiple locations that helped energize interest in enhancing patrol boat capacity, Scher said. And that seems likely to remain as a core need. •

Correspondence

by Capt. Marc Deglinnocenti

Pandemic stalls IMO talks on regulating autonomous ships

The International Maritime Organization (IMO) has suspended its Maritime Safety Committee (MSC) meetings until further notice due to the COVID-19 pandemic. The meetings are at the heart of the IMO process that is taking place to regulate maritime autonomous surface ships (MASS).

Courtesy Rolls-Royce

Rolls-Royce is among the innovators with concepts for autonomous cargo ships, including an LNG-fueled short-sea vessel. The process of advancing global regulations for such vessels is on hold due to the COVID-19 outbreak.

Even though there's a pause in the talks, some progress has been made regarding these advanced ships.

The IMO proudly states that the MSC has a strategic plan for both advancing MASS technologies and regulating the technologies it wants to promote. The regulation process is, of course, the more complicated of the two. The IMO is addressing the regulation process by continuing its ongoing scoping exercise, which is a multifaceted MASS study. We knew of the scoping study early on, but now we have a bit more information about what it entails.

The study currently covers multiple subject areas such as safety, security, liability, property damage compensation, international trade, costs, ports, marine environmental issues and personnel issues. The personnel research will include how pilots will be integrated into MASS, as well as the impact to various maritime-related jobs. The study also includes how personnel will respond to MASS incidents. That's a great deal more information about the scoping study than we had a year ago. The study was due to be concluded by 2020, but that timeline is now in serious doubt.

New guidelines also have been developed by the IMO for trial testing of MASS. The aim of the guidelines is to stress the importance of individual MASS trials first taking into consideration the risks involved. The IMO wants MASS testers to think about safety, security and any possible environmental impacts before conducting such trials. The group wants written plans about the trial risks, as well as incident response plans, set in place ahead of time. Constant monitoring is recommended during the trials themselves — not just an end review or a conclusion report. The IMO also states that certain current regulations for all vessels must be observed by MASS test vessels. Those regulations can be found in the Interim Guidelines for MASS Trials (MSC 1/Circular 1604, Annex, Page 1) on the IMO website (www.imo.org). Even though those guidelines don't mention every current treaty compliance at this time, the IMO has not forgotten about them. It is still a current area of study by the MSC.

We knew before that meshing MASS with current international treaties was going to be a factor in regulating MASS. The main international treaty concern floated around the problem of MASS rendering aid to vessels in distress. As it turns out, that was just the tip of the iceberg regarding global treaties. The MSC is also looking at MASS as it relates to many current international agreements involving navigation rules (COLREGS), Safety of Life at Sea (SOLAS), Standards of Training, Certification and Watchkeeping (STCW), search and rescue (SAR), passenger

ship instruments (SPACE STP) and many other subcategories of these agreements. The subcategories run into the double digits and include such concerns as hazardous-waste transportation, oil cleanup and everything in between.

Despite all of these new areas of study, some things have remained constant. The main defined categories of MASS remain the same:

• **Degree one: Ship with automated processes and decision support.** Seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated and at times be unsupervised, but seafarers are on board ready to take control.

• **Degree two: Remotely controlled ship with seafarers on board.** The ship is controlled and operated from another location. Seafarers are available on board to take control and to operate the shipboard systems and functions.

• **Degree three: Remotely controlled ship without seafarers on board.** The ship is controlled and operated from another location. There are no seafarers on board.

• **Degree four: Fully autonomous ship.** The operating system of the ship is able to make decisions and determine actions by itself.

So, that's a lot of new information to digest and a lot of new factors for the MSC to consider. In the meantime, the MASS technologies themselves continue to advance, and the number of MASS vessels being built continues to increase. The IMO has issued a caveat regarding all of this new information, though: It's all subject to change without notice until it's ratified into law. •

Capt. Marc Deglinnocenti is a maritime technical writer. His sea time dates to 1974 in a wide variety of roles on sailboats, conventional and tractor tugboats, training ships, barges, warships, cargo ships, passenger vessels and research vessels. He can be reached by emailing oldarmada@gmail.com.

Maritime Restoration

Real estate firm advances plan to restore *SS United States*

In a significant step toward preserving "America's flagship," a prominent New York development company has agreed to proceed with renovating the mothballed ocean liner *SS United States*, converting it into a hotel, museum, and entertainment and cultural center — if a city agrees to provide a permanent berth.

RXR Realty announced its intentions in March in conjunction with the SS United States Conservancy, a nonprofit organization that has owned the ship since 2011. It has been docked and deteriorating in Philadelphia since 1996 after being retired in 1969 because of competition from air travel.

In late 2018, RXR began studying the feasibility of renovating and converting the 990-foot ship, which has 600,000 square feet of developable space, into a floating dockside attraction. The company will now proceed on what it estimates will be a $500 million project, with work done over two years at a shipyard plus six months at the ship's new home port. RXR said it is in early talks with several shipyards that it has not identified.

Courtesy RXR Realty/SS United States Conservancy

RXR Realty of New York, in partnership with the SS United States Conservancy, envisions including a world-class museum on the renovated ocean liner that would honor the ship's history. New York, Philadelphia, Boston, Miami, Seattle, San Francisco, Los Angeles and San Diego are on the list of possible home ports.

The company will continue to pay more than $60,000 a month to cover dockage fees and other costs while moving on to the next major step: finding a city interested in having *SS United States* as a permanent attraction.

RXR is reaching out to officials in New York, the ship's home port during its years of trans-Atlantic operation, as well as Philadelphia, Boston, Miami, Seattle, San Francisco, Los Angeles and San Diego.

RXR estimates the project will generate more than 1,000 jobs, becoming a major economic generator for its host city.

"(*SS United States*) is an iconic piece of American engineering and design, and we're committed to finding a permanent home and restoring this one-of-a-kind luxury

Courtesy SS United States Conservancy

***SS United States* at its berth in Philadelphia in 2016. RXR Realty is covering more than $60,000 in dockage fees per month until the renovation project begins.**

ocean liner into a vibrant, mixed-use destination," said RXR Chairman and CEO Scott Rechler.

"*SS United States* has waited a long time for this opportunity," said Susan Gibbs, president of the SS United States Conservancy and granddaughter of the ship's designer, the late William Francis Gibbs. "It is a significant step toward finally realizing our goal of saving America's flagship. RXR's outstanding team understands the historic importance and economic potential of this enduring symbol of national pride and innovation."

RXR has a track record of adapting and updating historic buildings. Renovation projects in New York include the Helmsley Building, 75 Rockefeller Plaza, and Pier 57 on Manhattan's West Side for Google offices.

For the *SS United States* project, RXR has assembled an architectural and engineering team that includes Perkins Eastman, HLW and Gibbs & Cox. Gibbs & Cox is the naval architect that originally designed the ship.

On its maiden voyage in 1952, *SS United States* set the record for the fastest ocean liner to cross the Atlantic. It was the largest liner ever built in America, 100 feet longer than *RMS Titanic*.

In 2016, the SS United States Conservancy and cruise ship operator Crystal Cruises announced that the company would evaluate buying the ship to return it to passenger service. But a $1 million feasibility study determined there were too many problems to overcome.

If RXR's plan succeeds, *SS United States* would join *Queen Mary* in Long Beach, Calif., *Queen Elizabeth 2* in Dubai, and *Rotterdam* in its namesake city in the Netherlands as permanent floating attractions.

Bill Bleyer

SS United States at a glance

To make *SS United States* light and fast, more aluminum was used in its construction than for any previous project in history. On its maiden voyage, the ship shattered the trans-Atlantic speed record for liners in both directions. During trials, the ship traveled at 44 miles per hour (38.2 knots), and in regular service achieved a speed of 41.4 mph (nearly 36 knots).

Four U.S. presidents sailed aboard *SS United States*: Harry Truman, Dwight Eisenhower, John Kennedy and Bill Clinton, fresh out of Georgetown University and on his way to study at Oxford as a Rhodes scholar.

Other famous passengers included Marlon Brando, Coco Chanel, Sean Connery, Gary Cooper, Walter Cronkite, Salvador Dali, Walt Disney, Duke Ellington, Judy Garland, Cary Grant, Charlton Heston, Bob Hope, Marilyn Monroe, Prince Rainier and Grace Kelly, Elizabeth Taylor, John Wayne, and the Duke and Duchess of Windsor.

Designer William Francis Gibbs wanted his ship to be fireproof, so he insisted that no wood be used. The one exception: The ship's grand pianos were made from a rare fire-resistant mahogany. A piano was tested by dousing it with gasoline and lighting a match; the wood didn't burn.

Bill Bleyer

Courtesy SS United States Conservancy

The ship that set the record in 1952 for the fastest trans-Atlantic crossing was taken out of service in 1969. More than five decades later, talks are proceeding with several unnamed shipyards to restore *SS United States* to its former glory.

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plans, buying government bonds, and tax-deferred annuities. My introduction to real estate as a retirement investment came after I got married. My wife told me about the benefits and tax advantages of owning your own home — not the least of which, in my opinion, was a life free of rent hikes and overbearing landlords.

After all my research, I was left with one question that I still had to answer: How much money was enough? Did I need $100,000 for a comfortable retirement? How about $1 million? Or $5 million? The answer, I decided, really depended upon the kind of lifestyle I wanted after I retired. Owning our own home, paid off with no mortgage, was essential for both my wife and I — plus enough monthly income to cover our expenses, and money in savings for emergencies. Following the advice in a couple of books recommended to us, we focused on investments that would help us meet those goals safely and with minimal risk.

The very nature of our profession, with decent pay and long periods of time off, gives merchant mariners many options and great flexibility when it comes to investing for the future. A good friend and old shipmate, Jeff, retired in his 50s thanks to wise investing in rental houses. I worked with an engineer on a fish processor — he was nicknamed Diablo — who bought a 200-acre farm in Indiana. While he was at sea making the money to pay off the mortgage, he let his family live there for free, and in return they operated and maintained his farmstead until he retired. Dan, an old friend and 1,600-ton master, used a combination of his U.S. Navy pension, Social Security and paying off his condo to finance his comfortable retirement. There are many good investment options out there. The key, in my opinion, is to become informed about the opportunities available to you, pick the ones that suit your needs best, and stick with them as much as possible.

The very nature of our profession, with decent pay and long periods of time off, gives merchant mariners many options and great flexibility when it comes to investing for the future.

We can no longer expect pension plans and/or Social Security to cover all of our retirement needs. These days, we must be proactive in building up the value of our other assets. It is never too late to start planning for your financial future so you don't end up working for far longer than you want — or are able to.

Till next time, I wish you all smooth sailin.'

Kelly Sweeney holds a license of master (oceans, any gross tons), and has held a master of towing vessels license (oceans) as well. He sails on a variety of commercial vessels and lives on an island near Seattle. You can contact him at captsweeney@professionalmariner.com.

A Mariner's Notebook

by Capt. Kelly Sweeney

Sure as the tide, retirement is coming – don't be caught short

The phone rang and when I picked it up, I was surprised that an old shipmate I had not spoken with in many years was on the other end. Tom and I sailed together, me as mate and him as cook/deck hand, on a coastwise tug running between Portland, Ore., Vancouver Island, Canada, and Bellingham, Wash. After catching up on personal stuff for a bit, then sounding more serious, he asked, "Do you know of any job openings in the Seattle area, Kelly?" That surprised me, because the scuttlebutt I had heard from a mutual friend was that Tom had retired from the business and was living the good life in some coastal port on his sailboat. Perhaps guessing what I was thinking, he continued, "I retired four years ago, figuring that I had enough. But I don't, and I need to start making money." It was obvious to me that his retirement plans had gone awry.

The day you begin your maritime career, it may be a lifetime before you have to worry about things like retirement, and whether you will have enough money to live comfortably once you stop working. But ask a retired merchant mariner like my old shipmate Tom, and my guess is that he or she will say the time comes up on you far faster than you'll realize. That's why, whether it is a company or union job, before you even set foot on the vessel it's good to be aware if there are any retirement benefits offered. Don't do what I did after getting hired by a large West Coast towing company, my first job in the maritime industry. I didn't even know what my hourly pay was, let alone what my retirement benefits were. It wasn't until I had been working there for several months that Kimo, a friend and engineer on my boat, explained to me the details of the union pension plan — and how many years of work it would take for me to qualify. When I calculated how old I would have to be before I could collect a pension, I was flabbergasted.

I decided then and there that the prudent thing to do was to start my own personal retirement fund, with money from my own investments, in addition to any pension to which I might be entitled. I made an appointment with a financial adviser who had an office not far from my apartment. I told him that I had saved $10,000 in six months of work and wanted to start an investment program geared toward my retirement. With his toothy smile eerily reminiscent of a shark, he smoothly presented various options. One thing they all had in common was that each involved paying him to invest my money — with no guarantee of a return. By the time he finished his spiel, it seemed to me that he was more of a salesman than an adviser, and I decided that handing over my hard-earned money for this "expert" to invest just wasn't the right way for me to go.

After that experience I decided to learn about investing for myself. I knew about Social Security, having helped my grandmother with hers a few years earlier, and I saw how little that actually amounted to. My dad's individual retirement account (IRA) could have worked well for him, but he only put money into it sporadically. I read some books and magazines at the local library and learned about 401(k) retirement

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