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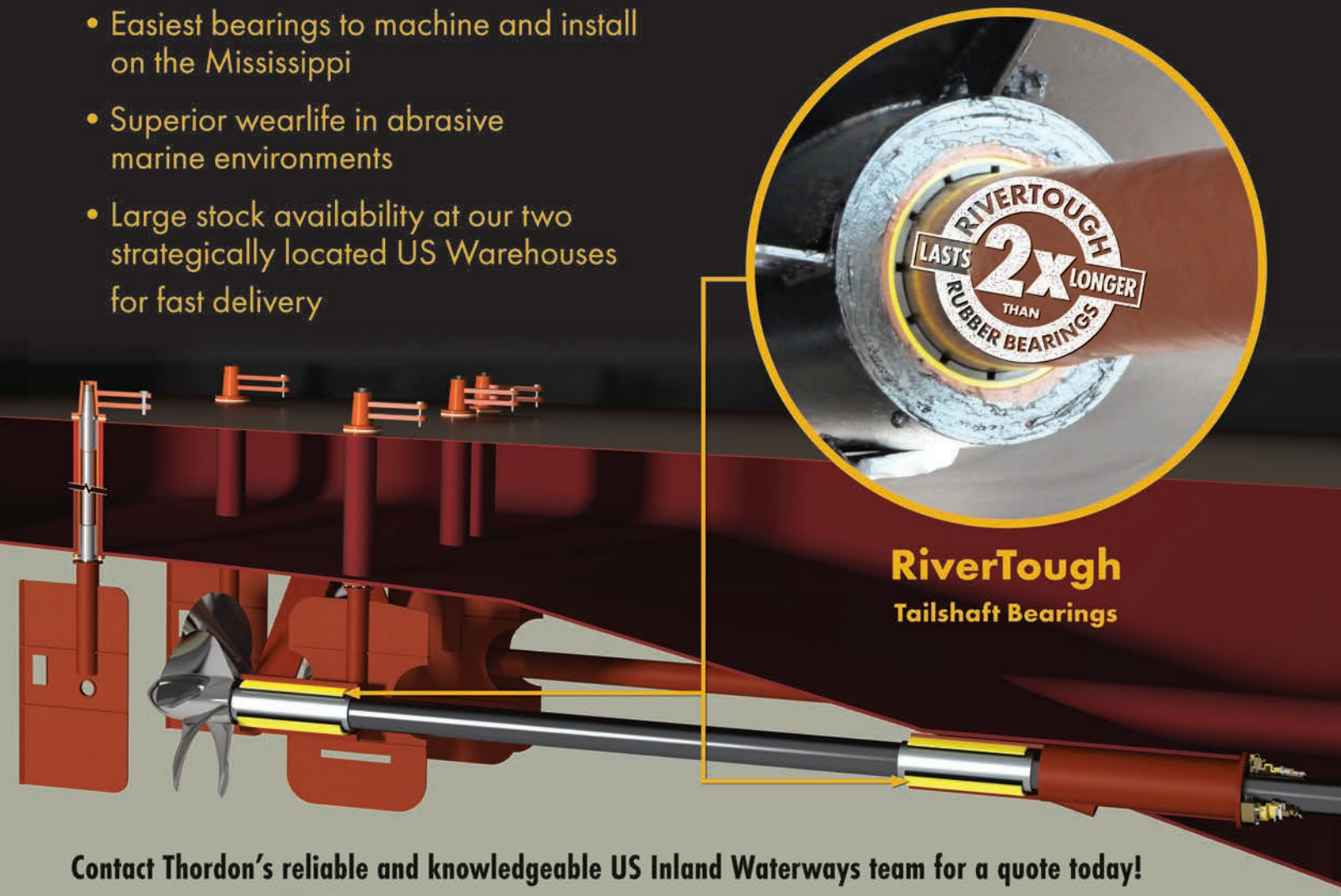

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On the Cover

Workboats such as tugs are primed for a new wave of alternative fuel and hybrid propulsion technologies.

(Photo: © Cliff / Adobe Stock)

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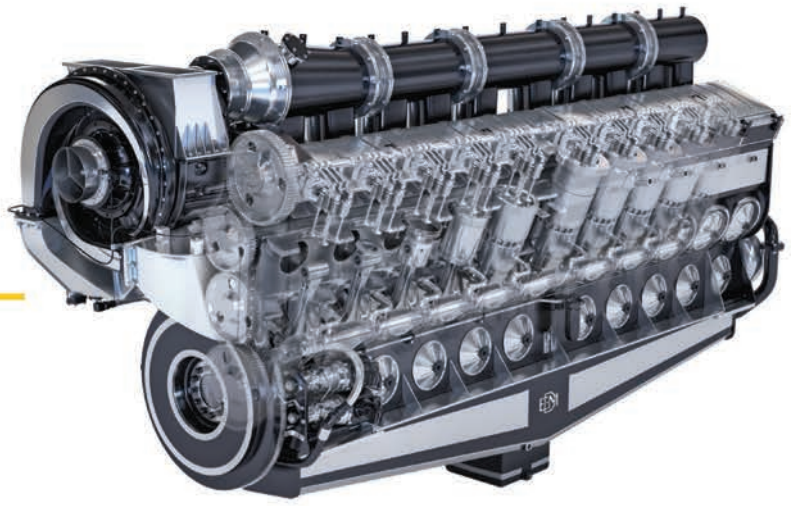

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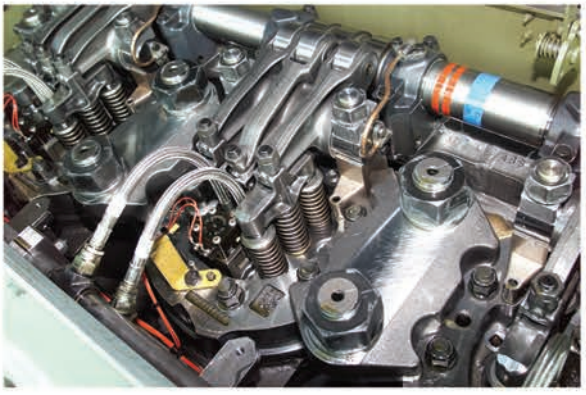

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Editor's Note

Eric Haun, Editor,
haun@marinelink.com

Driven by a desire for greater efficiency, reduced emissions and improved fuel economy, the maritime industry continues to advance propulsion technologies for commercial vessels. Workboats, which often operate on fixed, relatively short and repeated routes, are prime targets for these improvements.

As the required technologies and supply chains develop, new concepts leveraging emerging fuels like methanol, hydrogen and ammonia, as well as hybrid and full electric propulsion systems present operators with more options on their path toward reduced or even zero-emissions operations.

But these new options also pose major challenges in terms of vessel design, energy storage and infrastructure, and in some cases, there are very important capital, safety and operational questions that remain unanswered. The good news is that industry efforts to tackle these issues are gaining strength as the time window to achieve its climate goals shrinks. Serious progress is being made.

Ultimately, these advances are exciting because they will help to make commercial shipping more sustainable and environmentally friendly, and could even help to improve the bottom line. We look forward to covering continued progress in this area in the years to come.

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By the Numbers

US Ferry Funding at Historic Levels

The Biden Administration in July announced historic levels of funding to improve and expand ferry service in communities across the country, as well as accelerate the transition to zero emission transportation. Thanks to the Bipartisan Infrastructure Law, the Department of Transportation's (DOT) Federal Transit Administration (FTA) has made available nearly $300 million through three competitive grant programs that boost access to rural ferry service, bolster existing and new urban service and lower emissions across all services by speeding adoption of zero emission ferry technologies.

The three grant programs, available through a combined Notice of Funding Opportunity (NOFO), include:

1. FTA's Ferry Service for Rural Communities Program, a new program that provides competitive funding to states to ensure basic essential ferry service is provided to rural areas. For Fiscal Year 2022, $209 million is available.
2. FTA's Electric or Low-Emitting Ferry Pilot Program, a new program that provides competitive funding for electric or low-emitting ferries and associated infrastructure that reduce greenhouse gas emissions by using alternative fuels or on-board energy storage systems. For Fiscal Year 2022, $49 million is available.
3. FTA's Passenger Ferry Grant Program, which funds capital projects that support existing passenger ferry service, establish new ferry service, and repair and modernize ferry boats, terminals and related facilities and equipment in urbanized areas. For Fiscal Year 2022, $36.5 million is available and of that, $3.25 million is set aside to support low or zero-emission ferries.

In addition, the DOT's Federal Highway Administration (FHWA) in August announced $172.2 million in Fiscal Year 2022 formula funding under the Bipartisan Infrastructure Law to improve ferry service and provide more travel options in 35 states and three territories.

The Bipartisan Infrastructure Law provides $912 million in formula funding over five years through FHWA's Ferry Boat Program, more than doubling the amount provided under the 2015 FAST Act and expands eligibility that can include ferry maintenance facilities and the purchase of transit vehicles such as buses and shuttles used exclusively to transport passengers as an integral part of an intermodal ferry trip. The funding can also be used for capital improvements to existing ferry operations, which could increase the number of riders, relieve congestion or address environmental or significant operational concerns.

The FHWA's Ferry Boat Program supports terminal and vessel projects that provide critical access to areas that lack other means of transportation where high passenger demand already exists. Funding is distributed to State Departments of Transportation based on a formula contained in law, and the funding is then allocated to individual ferry boat operators based on eligibility.

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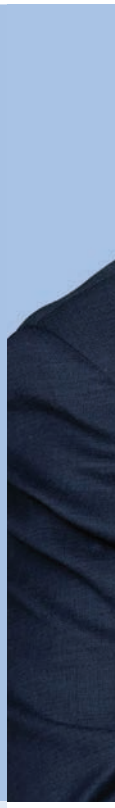
Robert Schluter

Managing Director, e1 Marine



Robert Schluter served as an officer as part of the marine engineering team on board the U.S. Navy guided missile destroyer USS Mahan DDG-42 out of Charleston before transitioning to the business world and "general, corporate type work". Today he serves as managing director at the third startup he's helped build, e1 Marine.

The company, a joint venture between Louisiana-based marine equipment lessor Maritime Partners, Irish tanker owner Ardmore Shipping and Schluter's second startup, Bend, Ore.-based hydrogen generation specialist Element 1 Corp, supplies methanol-to-hydrogen generator technology for vessels as the maritime industry plots its course toward cleaner operations.

With any new technology comes challenges, and many times one of them is proving a novel solution to a market that is not necessarily open to change.

"You need to help people understand what they're getting. All of the parts [in e1 Marine's solution] have already been commercialized in other industries, just not in any great degree in the marine sector yet," Schluter said. "This is technology that's been developed over 30 years, commercialized over 20. We're just moving into the marine space, and we scaled up a little bit to fit the size of the application."

Another key, Schluter said, is finding the right applications and partners to prove the technology. "In any industry, whether it's telecom, trucks or larger stationary power, in the beginning edge, you'll have a few leaders who are willing to do the investment—kind of like Maersk on the

e1 Marine

methanol side—and that just moves things forward. They understand that leading is a little more expensive, but it's strategic in nature. In the inland waterway space, Maritime Partners took that lead [with Hydrogen One, the world's first methanol to hydrogen fuel cell towboat]. So, you get some people who will pioneer that space, and then you just start building behind that."

In late 2022, e1 Marine inked a memorandum of understanding with naval architecture firm NAVTEK to develop hydrogen-powered marine vessels and port applications for the European market, starting with a 120-160-meter car carrier requiring 8-10 megawatts of propulsion power and a hybrid tugboat. "There's a lot of opportunity there," Schluter said.

Asked about broader opportunities across the maritime industry, Schluter said segments most interested in e1 Marine's offering are those that need to achieve a carbon reduction goal of some kind. "We're going to play in vessels that are up to about 6 MW to 8 MW, today. Three years from now, that probably goes up 20%, and then eventually in 15 years we're probably sitting here talking about a large cruise ships. It's an evolution. But right now, anything that's inland waterways and nearshore is good."

For e1 Marine, tug and towboat applications are "real time", Schluter said. "It's currently about a two- to three-year process to go from, 'Let's do this,' to when it's on the water. You have all the engineering, you've got to get your system integrators that manage all the control elements because how I ramp up and down for producing hydrogen is slightly different than how a fuel cell ramps up and down. What are the battery sizing and its requirements? And if you're in the pilot house driving, it needs to be totally seamless, so that controls element is where the investment is right now."

A key takeaway from the ongoing Hydrogen One project, Schluter said, is the importance of getting the load profile right. "When somebody says they want to do a vessel, the first question I ask is, 'Do you know how much power you need?' Because you need to think of it different than if you say, 'Okay, I've got a towboat, it needs 2,000 horsepower. I usually buy two Cat or two Cummins engines, and that's what I want to emulate.' Back up. Because how much power do you actually need?"

"With Hydrogen One, we initially thought we needed a lot more power," Schluter said. The project partners measured eight vessels and found the average load was about 24% of their original estimate. "That totally changed the dynamics between how much battery versus how much fuel cell hydrogen generator. It all starts with the load profile. Once that's dialed in, it drives how big each of the parts will be. So that's where we start. Monitor your load, put trackers on your engines, understand what your load profile is for your evolutions, and that'll drive your solution because you'll save a ton of money when you're ready."

Another area of opportunity for e1 Marine is shoreside. The company is developing a containerized solution that it will demonstrate this year for applications such as reefer power, cold ironing and e-vessel charging, Schluter said, noting demand for this type of product is coming from places like Northern Europe, the U.S. and Singapore.

"As more battery vessels [enter service], and their mission can be effectively accomplished through batteries, they'll need to be charged, and there's not enough grid infrastructure to support that. It's hard to bring additional capabilities to the port; you almost have to build a new power plant at the port, Schluter said. "We offer distrib-

uted power generation that can either fill a gap or it can be a permanent solution."

"In Norway, for example, they may not have power for the fjords—it may never go down there. And yet they'll have e-vessels that are servicing the fjords. How are you going to do that? They need to have some kind of distributor power scenario in the fjords itself."

Referencing another possible use case, Schluter said he recently spoke with a port in Norway that gets their main power from wind and solar, leaving gaps to fill. "Both provide good power, but can be unreliable. It gets dark, the wind's not always there. So they need a stopgap, and we're talking to them about that as well."

For cold ironing, again, there's often a lack of adequate power at ports, Schluter said. "How do you support that? We're doing that with a containerized solution and eventually power barges, megawatt scale, floating power stations."

"I believe many a times we're going to be a very good solution. We're not always going to be the solution, but we can be a part of the mix."

"In simplified terms, we turn methanol to hydrogen as needed," Schluter said. "As the fuel cell, which is the engine in this case, needs hydrogen, we just operate the fuel delivery system to provide the hydrogen as it's needed."

e1 Marine

American Commercial Barge Line (ACBL) is expected to operate Hydrogen One, a first-of-its-kind towboat that will run on emissions-reducing methanol-to-hydrogen generator technology—without diesel propulsion. The vessel is being developed by Maritime Partners and will be built by Intracoastal Iron Works in Bourg, La. Hydrogen One's propulsion system, which relies on e1 Marine's reformer technology to essentially convert bunkered methanol into pure hydrogen on demand, will emit no nitrogen oxide (NOx), sulfur oxide (SOx) or particulate matter (PM) pollution. The hydrogen will run through fuel cells, creating electricity for the vessel's motors, which drive dual L-drive azimuth thrusters.

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Column

Training

Training Gen Z in the Marine Industry

By Pat Folan, Tug & Barge Solutions

Gen Z is looking for a place to fit in the workplace. They are looking for a way to enhance their story while they are making a difference in the world. And you are looking for someone to fill a position. How does your need dovetail with their needs?

Before we get into the training aspect, it is worth understanding who you are going to be training. What are your company's core values? Are the people that you are hiring in line with them?

What are core values? They are the beliefs and principles that drive your business. They are what make your company unique, and they are the line that you won't cross – no matter what.

At Tug & Barge Solutions (TBS), we only hire people that live our core values.

We didn't always do that, and it consistently let us down. We will hire someone who meets and lives all our core values but lacks certain skills because you can always train people.

But you can't train a core value. Two of our core values are: (1) create fun! and (2) embrace and drive change. If they don't like change, or can't have fun, we can't make them do a 180, and therefor they are not a fit for us.

Get your core values figured out, repeatedly talk about them with your staff and customers, and don't compromise on them.

When you hire to your core values, the training part will be easier because you have a foundation in your new hire that aligns with the company.

Training tips

1. Engage them through cross training. Gen Z training must do more than match the job description. It must extend their capabilities. Gen Z is not going to have the knowledge that other generations had. But they are rapid learners. And part of what they want to learn is about all the opportunities at your company.

The company wants a deckhand, but the Gen Z employee envisions being the captain or in a position in the office. Your training must consider their desire to be more than what you currently need. This is not what we have ever done in the industry, but the upside is a more flexible, adaptable, and better positioned workforce for your future.

2. Use videos for storytelling. On average they watch

Pat Folan

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68 videos a day, so the training must be visual to succeed. Not all videos are created equal. This is the generation of TikTok and short videos which get to the point quickly. Videos must be relevant and devoid of fluff and filler. Videos must leverage strong imagery, animation where possible and even a humorous touch. Keep it real too.

Our Safety Management Systems (SMS) are being converted to video formats. The problem we face is not with the learning system and Gen Zers but with the older auditors and regulatory agencies. They have come to expect one format and are very reluctant to change.

3. Think outside the box. Use QR codes in places where training may be needed. A QR code in the engine room at the generator so they can see how an oil change is done correctly is one way, or at the fire station so a vessel-specific fire drill video can be referenced for training.

4. Create immersive learning experiences. Use simulations, 360-degree videos and game-based learning. Gen Z is not a passive learner generation, so training can't be passive either. They're independent and adept at getting the answers for themselves, and they want hands-on training they can fully immerse themselves in.

Gen Z has grown up with full access to the internet, available at their fingertips at all times. This has created a culture of immediacy when it comes to searching for information and consuming content: they expect learning materials to be available to them the moment they need them. Are your materials instantly available or do they have to search through a giant, printed manual?

5. Leverage bite-sized learning. We are developing learning in quick, tightly focused bites that can be consumed in minutes rather than hours.

That's right, minutes. The average length of a video watched by Gen Z online is 2.7 minutes This type of training feeds both the Gen Z need for instant information and their short 8.2-second attention span.

It also is the way that all the other generations in the workforce are now beginning to learn. If you don't know how to do something or you haven't done it in so long that you need a refresher, there's a YouTube video to learn from. Shouldn't that be how your training program is structured? Training that is available anytime and anywhere on various media types and it can be consumed on the go.

6. Make it mobile. Gen Z might use multiple devices and switch screens often, but their smartphones are where they really live. 98% of Gen Z owns a smart phone. We must bring the training to where they live.

We'll lose them if the mobile training is slow to load or requires endless scrolling. To accomplish this, we are:

- Pairing down the content (the days of the 1,000-page SMS are over—can I get an Amen!),
- Incorporating social media interaction,
- Keeping the navigation simple, and
- Designing it for clarity and conciseness.

7. Self-paced learning. Gen Z craves knowledge but thrives when they have the independence to direct their training and create their own learning paths. They are the Google generation. They know where to look when they need to know something.

We will provide them with the place to find what they need immediately and what they need to move up. Training doesn't have to be as structured as it has been.

Instead of every May 1 we are going to learn about back safety, now it can be a year's worth of learning in front of them and they can pick what they want to learn and follow their curiosity. With set goals of completing all the required training in a quarter or a year, they will advance through the training agenda.

8. Personalize the learning experience. Use adaptive learning. Adaptive learning is a technique that uses AI technology to pivot learning to quickly address the needs of the end-user. For Gen Z this means less time wasted on training they don't need and more opportunities for targeted training. Algorithms detect and adjust learning to ignore what the user already knows and focus instead on what they still need to master. Test out options accompany all training modules These algorithms can also see when a learner needs remedial help and then seamlessly deliver it.

9. Add a human touch. Gen Zers still crave human connection. 72% prefer face-to-face communication in the work environment. Gen Z craves social, face-to-face interaction.

It breaks through the multi-tasking noise.

It's not atypical on any given evening for a Gen Zer to send a direct message (DM) to a friend on Instagram while simultaneously listening to music on their Air Pods, watching a newly released YouTube video, browsing on their laptop with 20+ open tabs, responding to work emails, and interacting on a subreddit. To older generations these are

serious distractions—and yet to them, it is normal.

When their manager sends a text or email, it's just adding to the noise.

To truly reach Gen Z, they need to be sought after, in person, with intentional time devoted to the conversation. The time a manager gives to take them out to coffee or get to know them through a Zoom meeting is more meaningful because of the chaos they are accustomed to.

There are several downsides in not only communication but also the quality of work they can produce because of multitasking. Gen Z struggles to naturally focus on deep work. But in reality, we all do. The human brain can do two things at once by dedicating half our gray matter to each task, but when you add a third task, efficiency and productivity go downhill fast. As their manager, you'll need to encourage them to find dedicated time to minimize distractions and produce the work they are fully capable of. Networking is also a big favorite among this generation, as is the need for mentorship and exchange of ideas with more experienced workers.

10. And finally, listen. Listen attentively. Listen quietly. Listen for what is not said. Listen with intent.

Gen Z workers have a carefully tuned radar for being sold to and a limited amount of time and energy to spend assessing whether something's worth their time. Getting past these filters, and winning Gen Z's attention, will mean providing them with engaging and immediately beneficial experiences.

One-way messaging alone will likely get drowned out in the noise. So, listen. It's all that you wanted when you were in their position.

Column

Ferries

Rising to the challenge

By Mike Corrigan, CEO, Interferry

Interferry CEO Mike Corrigan explains the driving forces behind the global trade association's imperative to keep its foot on the gas.

Interferry and its members

scaled some demanding peaks in 2022 but, to state the obvious, our work is never done. Facing an equally busy schedule of challenges and opportunities in the year ahead, we need to keep climbing – a truism that has been memorably expressed as 'the top of one mountain is always the bottom of another'.

Our 46th annual conference in Seattle last October was definitely one of the peaks, not least due to an event-record attendance of more than 500 participants. It spoke volumes for our evolution from US origins in 1976 as a modest networking initiative. These days we rank as the voice of the global ferry industry, which includes consultative status at regulatory linchpin the International Maritime Organization (IMO) and worldwide input to governmental authorities.

Next stop for the conference is Australia in November, but I'll return to this subject after outlining the pressing issues that currently demand Interferry's equal attention.

Right now we are digesting outcomes from the IMO's latest Marine Environment Protection Committee meeting, which took place in December. In a key part of the agenda, discussion was renewed on regulations for dras-

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tic reductions in greenhouse gas (GHG) emissions, which aim for 'net zero' by 2050. Questions were raised about the feasibility of previously-proposed interim targets set for 2030 and 2040, but further consideration was deferred to MEPC meetings later this year.

Meanwhile two compliance instruments have already come into force from January 1. The Energy Efficiency Existing Ship Index (EEXI) requires certification to a technical efficiency standard, while the Carbon Intensity Indicator (CII) means ships must conform to a continuous improvement plan for operational efficiency. Interferry spent several years lobbying that the original proposals required sector-specific amendments compatible with the diverse design and operational profile of ferries. Having won that argument, we will now keep close watch on the implementation pending a review of the systems due in early 2026.

The ferry sector is leading the drive towards decarbonization with its pioneering transition to fully electric or hybrid power systems, but we can't do it alone. In particular, our shipboard initiatives must be matched by massive expansion of the shoreside electricity grid. Most existing capacity is limited to 'cold ironing' consumption at berth, so does not ensure sufficient recharging of batteries for propulsion.

As a result, last May we launched a campaign urging governments and port bodies to invest in Onshore Power Supply (OPS) infrastructure. In the first step, an agreement was signed with the European Sea Ports Organization to jointly promote the provision and use of OPS. Since then we've reached verbal understandings with similar partners. Talks with the Cruise Lines International Association are the furthest advanced, and two more heavy hitters are in the pipeline – the International Association of Ports and Harbors; and container line body the World Shipping Council.

Another major aspect of our involvement in environmental issues concerns the Emissions Trading Scheme (ETS) recently agreed by the European Union (EU). The scheme will include maritime emissions and will apply to vessels calling at EU ports regardless of flag. Most large vessels will be included from the start, with a gradual obligation for shipping companies to surrender allowances - 40% for verified emissions from 2024, 70% in 2025 and 100% by 2026.

Interferry's outstanding concern is whether any of the ETS revenues will flow back to the industry to help us meet GHG reduction targets – a key point in tripartite meetings we have held with representatives from the EU's governing body, executive and parliament. In pursuit of such issues, we have also signed a working agreement with the European Community Shipowners' Associations – leveraging their resources to advance our position on regulatory files and obtain timely updates on EU developments.

So far as the 2023 outlook for our members is concerned, the signs are certainly promising. Deliveries of new ferries are flowing, while passenger and freight volumes look set to maintain the return to something like pre-Covid normality experienced last year – when many operators reported volumes close to and even exceeding the levels reached in 2019 before the pandemic struck. Rising costs will undoubtedly impact the bottom line, notably due to the surge in fuel prices exacerbated by Putin's invasion of Ukraine, but this red flag will surely not defeat the ferry sector's legendary resilience.

In this positive frame of mind, I am truly excited that Interferry's 47th annual conference is taking place this year in Hobart, Tasmania. It will be the third time our showcase event has been staged in Australia - following Sydney in 1995 and Gold Coast in 2002 – where we have long since enjoyed a strong and tremendously supportive base of members.

Our conferences play a crucial role in attracting newcomers to the Interferry family. With 25 new members last year alone, we now number more than 270 operators and suppliers in 40 countries. Hobart represents another opportunity to spread far beyond our core US and Europe membership bases and promote the value of our networking, lobbying and best practices mission in the Asia-Pacific region. And in similar vein, next year we'll be in Morocco for the event's debut in Africa.

Meanwhile our 2023 conference diary also includes appearances at February's Passenger Vessel Association event in Long Beach, the Shippax Barcelona gathering in April and the Canadian Ferry Association convention set for September in Vancouver.

I guess you could say this is yet another way in which Interferry aims high through its paramount message…we are Stronger Together!

Column

Safety Equipment

Personal Locator Beacons Improve the Chance of Rescue at Sea

By Morgan Turrell, Director, NTSB Office of Marine Safety

New Year's Eve is a time of celebration and remembrance. Three years ago, on December 31, 2019, as the new year was being rung in across the lower 48 states, a tragedy was playing out in icy Alaskan waters. The fishing vessel Scandies Rose, with seven crew members aboard, encountered severe icing conditions and high winds and waves as it transited from Kodiak to fishing grounds in the Bering Sea. The crabber tried to make it to Sutwik Island to shelter from the storm; however, because of the weight of the topside ice that had accumulated on the vessel and the force of the winds and waves, the Scandies Rose capsized and sank before reaching safety.

Two crewmembers managed to climb out of the capsized ship and swim to a life raft, where they were tossed about for 4 hours in 50-mph freezing winds and 30-foot seas. Search-and-rescue (SAR) operations, hampered by the poor weather conditions and unsure of the survivors' location, struggled to find them. Eventually, a Coast Guard helicopter rescued the two crewmembers, but the remaining five were never found.

Ocean Signal

Our investigation into this accident found that the Scandies Rose's emergency position indicating radio beacon (EPIRB) failed to provide a position after crewmembers were forced to abandon the vessel. The crew was left without a means of communicating with SAR personnel, who, going off the EPIRB information, were searching in the wrong area. As a result of this situation, we reiterated a 2017 recommendation (M-17-45) to require mariners to have personal locator beacons (PLBs). This recommendation asks the Coast Guard to require that all personnel employed on vessels in coastal, Great Lakes, and ocean service be provided with a PLB. Unfortunately, this recommendation is still open.

A PLB is a personal electronic device that transmits a survivor's location on or in the water to the Search and Rescue Satellite-Aided Tracking system during an emergency. It's designed to be carried in a person's life vest (or elsewhere on their body) and manually activated when the wearer is in distress. PLBs continuously update a survivor's location.

The Scandies Rose is one of several notable marine casualties the NTSB has investigated in the last 5 years involving mariners lost at sea in which PLBs could have made a difference. These casualties highlight the critical safety need for PLBs to aid in SAR operations at sea. We've been recommending that all mariners use PLBs since our investigation of the October 2015 sinking of the cargo ship El Faro, which sank in the Atlantic Ocean about 40 nautical miles northeast of Acklins and Crooked Island, Bahamas, after sailing directly into the path of Hurricane Joaquin. The entire crew of 33 aboard perished.

Three days after the El Faro's sinking, searchers spotted the remains of one El Faro crewmember in an immersion suit. It's unclear when the crewmember perished or if any other crewmembers were able to abandon ship; however, had that crewmember, or any others who were able to evacuate, been equipped with a PLB, searchers would have had the essential information to focus rescue efforts. We concluded then that equipping all people onboard a vessel with a PLB would enhance their chances of survival, and, in 2017, we issued safety recommendation M-17-45.

Since the sinking of the El Faro and the Scandies Rose, we have investigated two other marine tragedies that continue to highlight the need for PLBs.

- On November 23, 2020, the Coast Guard received a distress signal about 27 miles from Provincetown, Massachusetts, from the EPIRB registered to the Emmy Rose, an 82-foot-long commercial fishing vessel with four crewmembers aboard. The Coast Guard recovered the EPIRB, but none of the crewmembers were located and are presumed dead. The investigation showed that if any crewmembers had been able to evacuate the vessel, they would have been able to survive up to 22.5 hours in the water with an immersion suit. It's unlikely that the crew had PLBs; however, had they been able to activate a PLB after abandoning the vessel, SAR crews may have been able to find them.
- On April 13, 2021, the liftboat SEACOR Power capsized off the coast of Port Fourchon, Louisiana, in a severe thunderstorm. Six crewmembers were rescued by the Coast Guard and Good Samaritan vessels, and the bodies of six other fatally injured crewmembers were recovered. Seven crewmembers were never found and are presumed dead. None of the survivors rescued had PLBs or similar satellite emergency notification devices (SENDs), which use commercial satellite systems, nor did they know of anyone else on board who did.

Other marine investigations we've conducted have shown how PLBs and SENDs, when voluntarily incorporated into marine operations, likely saved lives. For example, our investigation of the November 10, 2021, fire aboard the fishing vessel Blue Dragon found that SAR controllers were able to correlate location data from multiple emergency beacons. Similarly, our investigation of the July 23, 2016, sinking of the commercial fishing vessel Ambition found that use of the vessel's SEND prompted an immediate response from the commercial response center when the Coast Guard did not receive the captain's mayday call.

PLBs are now widely available, relatively inexpensive, and remarkably accurate. Models typically cost $300–$400, and most offer GPS location functionality that can provide SAR operations with a continuously updated location of each person to within 300 feet. PLBs can be equipped with an integrated automatic identification system (AIS) "Man Overboard" alert that, in addition to satellite GPS location, transmits AIS signals for local assistance from nearby vessels.

The NTSB has been advocating for PLBs for many years now. The Coast Guard should require them, but the marine industry doesn't have to—and shouldn't—wait for a Coast Guard requirement to make PLBs a common piece of safety equipment on commercial vessels.

This New Year, as we reflect on the third anniversary of the tragic Scandies Rose sinking, we ask mariners and marine operations to make it their new year's resolution to invest in their crews' safety by providing PLBs. Without a doubt, a PLB can avoid turning an unfortunate accident or incident into a tragedy on the seas.

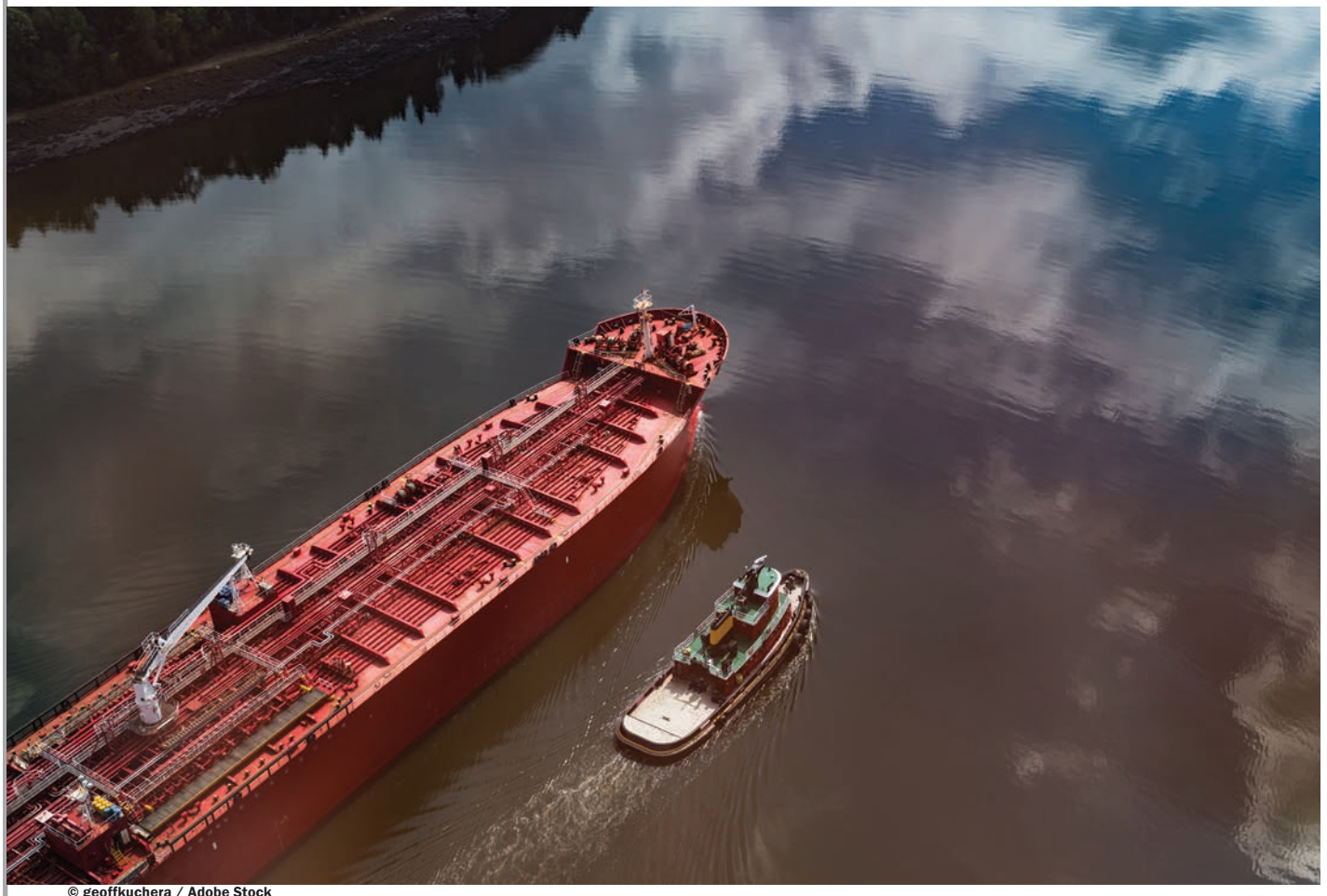
Column

Propulsion

Propulsion Decisions or Smoke on the Water?

By Robert Kunkel, President, Alternative Marine Technologies

In no uncertain terms, the goal of "future capable" ship's propulsion is confusing. We have been pressed into a regulatory environment that asks us to reduce emissions, and in the same breath deliver power sufficient to meet commercial schedules and allow the vessel to weather a storm and be safe at sea. To reach that end, owners are presented with a basket of new alternative fuels to achieve the latest January 1, 2023 Carbon Intensity Indicator (CII) regulations. Add that most operators have no previous historical experience or data with these alternative fuels, nor has industry developed the infrastructure necessary to make the fuels available at most, if not all, of the ports we trade in.



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This is not a new issue. The discussions concerning reducing energy use, engine "derating" and reducing ship speed reaches back to the "ECO" ship debates decades ago. The "emissions" discussions and speed reduction were the avenue to reduce CO2. Those who took part in the ECO debate argued that the reduction of power to reach the IMO proposals placed the vessels in jeopardy at sea. Others looked at the commercial benefit with regard to the supply and demand imbalance. Operators knew that the main engines were not designed to operate for long periods at lower output levels.

Most of the current operating tonnage delivered with an Energy Efficiency Design Index (EEDI) calculation are looking at how their Energy Efficiency Existing Ship Index (EEXI) calculation and their CII rating will fare in 2023. A MARPOL Annex VI requirement, the CII basically measures/calculates the efficiency of a ship in transporting cargo or passengers in terms of its CO2 emissions per nautical mile and carrying capacity.

CII determines the annual reduction needed to ensure continuous improvement of a ship's operation within a specific rating level. Understand the factor of "per nautical mile" or the actual voyage itinerary severely impacts that calculation along with your rating and how you compare to your competition. Start advising your chartering department to plan LONG voyages.

Recent survey reports indicate older tonnage will require the installation of an "energy savings device", their main engines derated and operating speeds reduced to meet the new emission reduction goals. The CII currently addresses actual tonnage on the water. What is important is the IMO 2030 requirement to reduce emissions by 40% is now only seven years away—a period that can be associated with recent declines in Far East shipbuilding. CII may reach beyond existing tonnage and into your building plans.

Overall, industry analysts reported that South Korean orders were down 28% during the second quarter of 2022. The Korean Export-Import Bank has projected a further decline of 42% for 2023. We can place blame on the global pandemic or the geopolitical environment affecting all freight markets. Take also into account the price of steel affecting construction costs and a supply chain debacle creating havoc with delivery of machinery and equipment—all solid reasons forcing a downturn to occur. That said, the upcoming seven-year period may see a further decline in one of the major shipbuilding countries in the world.

If you are making a decision to build in 2024, the decision process and specification review, coupled with a construction period of 10 to 12 months to delivery, results in your vessel delivery around 2026 or 2027. Five years later, during your first special survey, you will be required to meet a 40% reduction in greenhouse gas emissions as compared to 2008 levels. Your choice of engine, energy savings device and alternative fuel type must be made now, and these decisions are not easy. In fact, the downturn may be amplified by these difficulties. And as a result, many of the larger Korean yards and design houses are looking at carbon capture rather than alternative fuels, a means to continue with large two stroke engines burning existing fuel sources until such alternative fuel infrastructure can be developed.

CII is based directly on fuel consumption and is related to the ship's technical efficiency and fuel. Operational parameters such as vessel speed, cargo transported, weather conditions and the general condition or maintenance of the vessel including hull fouling are also reviewed.

After nearly 45 years as a builder, owner and ship manager, it is our experience that the operational parameters listed above have always been the items analyzed by crew

Column
Propulsion

and technical shore staff on a nearly daily basis in order to confirm a safe, efficient and profitable ship operation. The same decision process is completed in ship construction. We have been through more than six "ECO" generations in the tanker market.

Hull designs and capacity have been improved. Engines have been further improved. Coating manufacturers have continued to develop hull applications to reduce fouling and in turn fuel consumption. We have even installed LED lighting not only to reduce energy but also save costs of constantly replacing incandescent bulbs. Many in the industry have reacted and addressed "emissions" without the need of a CII, and all of those actions have been within environmental compliance. Simply put, actions to maintain industry sustainability have been in place with the International Safety Management (ISM) Code.

ISM was adopted in 1994 as part of the SOLAS Convention to provide a means to confirm operators were meeting standards similar to CII. A controversial piece of legislation established to abolish substandard ships and operators with the inspections, surveys documents and ISM systems have been in place for nearly 30 years. With all of that survey and documentation, do we now need a CII to "rate" an operation? Has ISM failed us, or do EEXI and CII ratings lead to a financial model base rather than a safety and environmental one?

The term environment, sustainability and governance (ESG) has made its way into shipping from the investment community. It is a subjective rating system that evaluates a shipping company's policies and operations based on conforming to a mix of parameters. In addition to the actual regulatory requirements in place, the mix is not consistent from one jurisdiction or evaluator to another. As with many other industries, reputations and competitiveness can be impacted by ratings defined as "leaders", "average" and "laggard".

In shipping, the number of companies obtaining ESG ratings is on the rise. In addition to the risks of making long-term capital commitments, the added costs and operational limitations that arise from ESG-driven requirements (all of which are rarely discussed by proponents) have resulted in further escalated risks, often negatively impacting investments. The reality is that ESG analysis or rating as an investment evaluation tool has not been very successful. Simply stated, hull design, propulsion technologies and fuel-choices that can actually be the basis for a very long-term investment such as a ship are not in clear view. Suffice to say your business success reaches far beyond environmental compliance with sustainability capability well beyond climate change emissions.

We have been working with a fund that has followed a different investment analysis: economic, sustainable and deployable (ESD). The environmental factor is analyzed in the sustainability goal, and the actual project or investment must be both economically justifiable and the technology

deployable in a practical sense, leading to real long-term sustainability.

We will provide one simple ESG example on how the environmental requirements can affect the commercial viability. A recent shipping company that delivered liquefied natural gas (LNG) powered vessels to achieve better emissions performance returned to the shipyard to modify the engines back to dual fuel and marine diesel oil (MDO). The current price of LNG was prohibitive, and as a result, the operation was not sustainable or deployable based on the preferred environmental fuel choice.

The shipping industry represents only a 1.7% of global greenhouse gas emissions. There have been smart decisions and regulations. The development of the Emission Control Areas (ECA) directing sulfur and nitrous oxide reduction within population areas addressed all vessel types trading in the designated areas – foreign and domestic – large and small. The regulations not only provided sustainable technical directions but also led to forward thinking ship owners and engine manufacturers to look at hybrid, LNG and alternatives fuels in smaller engines and vessels. The regulation created a pilot platform that could be used to develop technical adjustment for the larger engines. The larger ships complied within the ECA and returned to lower sulfur heavy fuels outside the population area and as a result remained economically sustainable.

So why not continue chipping away at emissions sustainability within the same process to ensure commercial sustainability: smart regulations building on our current reporting requirements and standards?

Atlantic Wind Transfers

Build a New Industry

By Tom Ewing

When Atlantic offshore wind (OSW) projects move into high gear, they will kickstart a series of impacts affecting almost the entire East Coast economy, from logistics to transportation to utility projects and, of course, just about every aspect of port and maritime activities.

The related topics of workforce development and employment are among the fundamental issues being pushed and pulled by OSW. How workforce development and education and training proceed – and succeed – will be critical for the U.S. to achieve its huge national goal of 30GW of OSW by 2030, just seven years from now.

This huge energy buildout presents challenges across the maritime sector. Workforce experts use the phrase "adjacent industries" when they discuss worker availability. It means that wind energy companies are likely to recruit employees from more traditional maritime operations since constructing an offshore turbine is completely dependent on maritime skills and expertise. Maritime employers already face a tight labor market; recruitment is a constant

effort now. OSW adds new competitive pressures.

Of course, adjacent hiring can work both ways. Now that workforce programs are gearing up to train thousands of individuals in skills directly applicable to many port and vessel operations the entire maritime workforce could see substantial increases. After all, a person trained to work on a vessel may not care if an employer is a towing company or an energy company. New OSW workforce and training programs could help broader maritime industry challenges.

Another factor within OSW development is that employment itself is a major social and policy goal. Federal and state announcements about OSW projects almost always reference new, high-quality, well-paying (frequently union) jobs that pay at a scale that will support a family, not just an individual. Plus, decisions about automation at ports may not always proceed in a straightforward manner since automation can have a big impact on jobs. Port automation has been a high profile and controversial topic within recent federal legislation.

Employment: Seeking focus

On December 1, the New York State Energy Research and Development Authority – NYSERDA – announced a new website "that will empower New Yorkers to become a part of the renewable energy workforce." NYSERDA writes that New York's green energy goals – which seeks to develop 9000MW of OSW by 2035 – will "foster at least 10,000 family-sustaining jobs for New Yorkers."

In New Jersey, the Council on the Green Economy predicts that OSW will result in a net gain of 95,317 jobs from 2021 to 2031.

Employment projections always include some uncertainty, of course. The Department of Energy's National Renewable Energy Laboratory (NREL) published a report in September 2022 titled "US Offshore Wind Workforce Assessment." The report breaks out employment across five sectors –

- Development
- Manufacturing and supply chain
- Ports and staging
- Maritime construction, and,
- Operations and maintenance.

In a closer look at Ports and Staging NREL writes that terminal crews may not expand much because of OSW. The report cites 2018 data when U.S. ports generated 652,078 direct jobs. In 2024 new OSW jobs could number between 300 and 1,100, then maybe increase to 500 and 2,000 in 2030. For ports and staging, NREL writes that OSW will likely add a small fraction to total employment.

NREL developed a model to estimate onboard employment. In 2024 the model estimates 1,500 new jobs. In 2030, around 2,800 if the workforce is 100% domestic. If the workforce is 25% domestic, the 2024 number is below 500 and 2030 is just a bit above 500. The U.S. Bureau of Labor Statistics estimates there were 75,400 Water Transportation Workers in the U.S. in 2021. BLS doesn't expect much change in the next 10 years, about 1%.

Training starting – but at what scale?

To meet green energy deadlines for power and employment education and training programs need to start quickly and scale up.

Last September, NYSERDA released a report: "New York State Offshore Wind Workforce Gap Analysis, 2022." The report includes all occupations associated with OSW, not just direct maritime employment. By 2040, New York projects its OSW employment will grow by 18,000 to 23,000 jobs. Most jobs will be in manufacturing, construction and "induced industries," i.e., work resulting from employees' spending their paychecks. New York predicts "severe gaps" in four occupations: plant and system operators, hoist and winch operators, continuous mining machine operators and wind turbine service technicians (Titles are SOC titles – "standard occupational classification").

In the maritime sector, moderate gaps are projected for marine engineers and naval architects, sailors and marine oilers, and captains, mates, and pilots of water vessels (again, SOC job titles).

New York's analysis identified 24 wind energy-specific training programs across the State. These are not all specific to OSW, but the training is considered transferable. Most are bachelor's degree engineering programs. A new OSW program is starting at Suffolk County Community College, but details were not available for New York's Gap report.

Six programs are in development at various New York

Seafarers International Union

Seafarers International Union

institutions. In 2019 and 2020 the report tells that there were wind energy programs available at Clinton Community College and Sullivan County Community College. But only two students completed the program at Clinton. State officials are working on program expansion. The College of Staten Island, for example, recently received $566,000 to help students access OSW training. The announcement doesn't say, however, how many students are enrolled in programs that likely lead to actually working in the OSW industry.

In New Jersey, university officials are establishing OSW training programs that will range from entry-level certification to associate degrees to master's degree programs. Susan Nardelli is with Rowan College of South Jersey, one school that is out front on OSW training. Nardelli said programs are still being finalized and adjusted. The school recently purchased and installed training equip-

ment; Maersk Training assisted with this. Rowan's associate degree program will start in 2024; certificate programs start this year.

It's difficult to get answers about how many students these emerging programs will accommodate and whether the programs are being sized to enroll 25 to 30 students at a time or 250 to 300.

Maritime unions are important training providers. One well-known program is offered by the Seafarers International Union (SIU) in partnership with the Lundeberg Maryland School of Seamanship in Piney Point, Md. This joint program provides free tuition. Courses range from deckhand skills to engine room work to stewards' duties. There are specific programs aimed at veterans moving from military to civilian work. Graduates work across the industry, from deep-sea containerships to New York ferries.

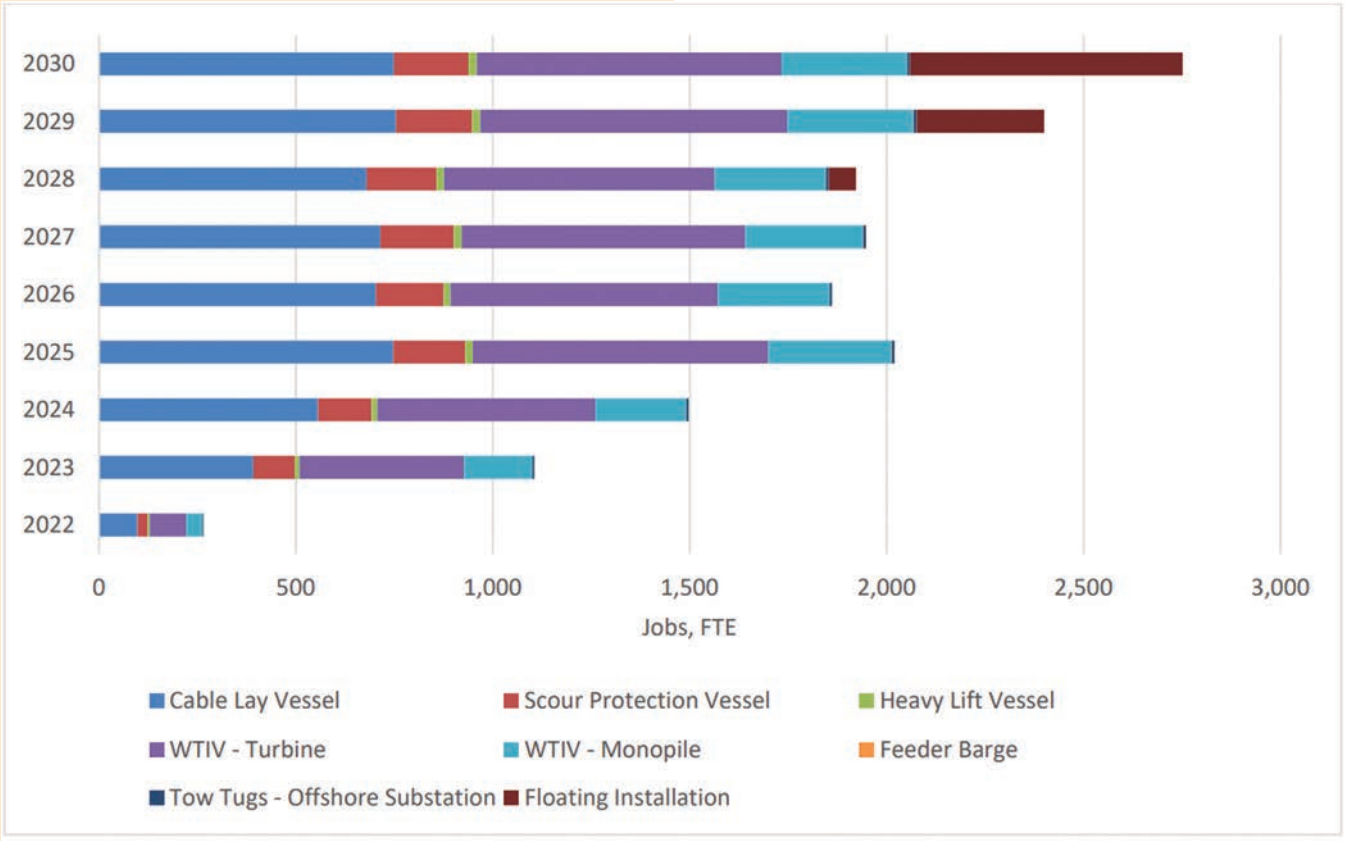
Bart Rogers was an SIU assistant vice president at Lundeberg (he retired November 30). Rogers was asked whether traditional mariner training meets the needs of OSW employers. "When it comes to the future of the maritime industry," Rogers commented, "and the clean energy jobs that come with it our school is more than adequate to keep training the next generation of merchant mariners."

Rogers said crew transfer vessels (CTV) or service operation vessels (SOV) for OSW are similar to vessels such as ferries and tugs. He said the school regularly updates its curriculum to stay current with Coast Guard and industry standards. Rogers added that, "a CTV is very similar to a ferry boat and a SOV is going to be like an articulated barge or tugboat. SIU has been training these mariners for generations."

Rogers said that new students can be trained in about three weeks to be ready for basic safety skills, lifeboat skills and designated security duties. He said the school has changed its recruiting efforts somewhat so that it can identify potential students living in prospective OSW coastal areas. A parallel focus is on trade schools and community colleges in those areas. Rogers emphasized, though, that SIU's recruitment is for the whole maritime industry, not just OSW. "We try to over qualify our members," Rogers said, "so they have more choices where they'd like to work."

Rogers was asked about expansion and scale-up. He said the SIU program "is always able to increase its capacity to meet industry needs and provide whatever training is required."

NREL



Job contribution of each vessel type based on the installation hours each person on board works

Teamwork, please

Safety training is an issue that exemplifies the mix of forces and issues still at play as OFW moves to the starting gate.

NREL writes that standardized safety training for workers who perform installation and operation activities at sea "has been identified as one of the highest priority areas to address to ensure that an adequately trained workforce is available to build projects."

Not surprisingly, the U.S. Occupational Health and Safety Administration (OSHA) requires the OSW industry to provide training on occupational hazards and risks and mitigate those risks. However, OSHA does not specify training requirements, according to NREL.

Many organizations are seeking safety certifications from the Global Wind Organization (GWO), a nonprofit group of manufacturers and offshore wind energy project owners focused on occupational safety. GWO standards are the most widely adopted in the OSW industry.

GWO estimates that more than 25,000 workers will need to receive basic safety training to meet the installation pipeline through 2025. GWO guidelines are incorporated into training curricula for GWO certified training providers. GWO certification is an important metric and NREL writes that almost 100 community colleges and training organizations are seeking certification. But this process, NREL reports, has proved troublesome. "Many organizations," NREL observes, "have reported that the process for obtaining (GWO) certification can be long and difficult

Seafarers International Union

and have expressed concerns that it could prove to be a bottleneck for training the workforce." NREL suggests that "efforts should be made to ensure programs can be developed and certified in a timely manner to meet demand without compromising quality."

NREL's gap analysis concludes with five recommendations to help expand the OSW workforce.

- **Recommendation 1:** Build consensus around the roles and requirements needed for an offshore wind energy workforce, and clearly communicate those roles and requirements to all stakeholders.
- **Recommendation 2:** Continue to conduct detailed assessments of existing programs, trainings, and workers to identify gaps in training, skills, education, or experience. While many land and sea tasks may be similar "working offshore may not be for everyone."
- **Recommendation 3:** Prioritize the most immediate workforce needs for training alignment, expansion, and development.
- **Recommendation 4:** Document existing program offerings and coordinate the development and expansion of programs to ensure these efforts are implemented for the most needed programs and in the most relevant locations.
- **Recommendation 5:** Encourage collaboration between offshore wind workforce stakeholders to create a diverse, equitable pipeline for future workforce needs.

American Cruise Lines

SHIPBUILDING REPORT:

American Cruise Lines is in the midst of a significant fleet expansion.

U.S. Passenger Vessels

By Barry Parker

With travel and tourism nearing pre-2020 levels, and transit systems benefiting from a return to work, passenger vessels have seen renewed activity. In its year-end review, John Groundwater, Executive Director of the Passenger Vessel Association (PVA), which advocates for the sector in Washington, D.C. wrote: "As we are nearing the end of the calendar year, we are delighted to report that our industry, and our members, are reporting far and wide that they have experienced very positive business conditions during 2022." The broader industry-wide trend toward cleaner fuels has impacted design of new vessels, as has the increased movement towards digitalization and more automated operations.

Along the East Coast, Casco Bay Line (serving islands in coastal Maine, out of Portland) selected the Senesco yard (North Kingstown, Rhode Island) for construction of a double ended hybrid electric ferry to replace an existing diesel boat. According to naval architects Elliott Bay Design Group (EBDG), the boat- with delivery anticipated in late 2024, "features ABB Marine & Ports' hybrid propulsion system supporting diesel-electric and zero-emissions battery-powered modes, as well as a combination of both." The specifications also call for a FerryCHARGER shore charging system, from A Stemmann Technik, to be provided by ABB that will enable rapid charging during turnarounds in Portland. The new boat, which will operate between Portland and nearby Peaks Island, will be able to transport up to 599 passengers, and 15 vehicles.

In New York harbor, the Staten Island Ferry (operated by the city's Department of Transportation) saw the commissioning of its third newbuild, Dorothy Day, in late 2022, joining SSG Michael H. Ollis, and Sandy Ground, which joined the fleet earlier in the year. The vessels, each with 4,500 passenger capacity, were constructed at Eastern Shipbuilding's yards in Allanton and Port St. Joe, in the Florida Panhandle. According to a New York City release, "The new ferries are larger, more modern, and safer in extreme weather than earlier fleets. They feature popular design elements of past Staten Island Ferries, including phone-charging outlets and more comfortable seating, as well as an oval upper-deck promenade that serves, for the first time, as an outdoor 'walking track' for riders." Their design, also dual ended, is from EBDG; propulsion is provided by ABS Electro-Motive Diesel (EMD) Tier 4 engines powering Voith Schneider propellers, at each end of the vessel. In January, 2023, steel was cut at the Allanton yard for a new 302-foot passenger/vehicle ferry for Bridgeport & Port Jefferson Steamboat Company, designed by Gilbert Associated and fashioned along the lines of the existing vessels P.T. Barnum and Grand Republic.

New York Waterway, which runs passenger craft around the harbor, has also taken delivery of four boats, each with 509 passenger capacity (with one more under construction following the 2022 delivery of Arthur Imperatore, named for the company's founder), from Yank Marine, which has yards in southern New Jersey. The aluminum catamaran style ferries are powered by twin Cummins 2300 hp engines and ZF transmissions. Nearby operator Seastreak, linking midtown and downtown New York with the Jersey Shore (and New England destinations during the summer months), began operating its high speed 750 passenger newbuild Seastreak Courageous (an Incat Crowther aluminum catamaran design, built by Midship in Harvey, La. at a cost around $18 million) in early 2022. Also slated to come online is NYC is a new zero-emissions electric high-speed ferry scheduled for launch in 2024, featuring BAE Systems driveline, Echandia power management, Toshiba batteries and HamiltonJet waterjets. The Carbon-fiber, foil-assisted Teknicraft design vessel is the result of a partnership between local operator New York Cruise Lines and Stockholm-based Green City Ferries AB (GCF) and will be operated by New York Cruise Lines subsidiary New York Water Taxi on the Hudson River between Brooklyn and Manhattan. A builder has yet to be announced.

Arthur Imperatore was delivered to NY Waterway from Yank Marine in 2022.

NY Waterway

Feature
Passenger Vessels

Renewed government funding for infrastructure, which includes the realm of terminals and access projects, will greatly benefit the ferry sector. The U.S. Department of Transportation's Federal Highway Authority (FHA) announced more than $172 million in funding- for 115 projects, in Fiscal 2022, under its multi-year Ferry Boat Program. The largest awards went to Washington State Ferries ($38.3 million), and Alaska Marine Highway System ($35.6 million), the Texas Department of Transportation ($12.4 million) and New York City's DOT-garnering $10.5 million. In other large awards, New Jersey's Statue Cruises saw a $5.8 million award, while New York Waterway gained a $2.9 million award. The Texas DOT will be taking delivery in 2023 of the The Shearer Group-designed Esperanza "Hope" Andrade, a double ended vessel with a capacity of 495 passengers, and 70 vehicles. The boat, being built at the Gulf Island Fabricators facility in Louisiana, with batteries (a Siemens MWhr energy storage system) to supplement its diesel electric powerplant, will operate between Galveston and Bolivar Island, Texas.

Other 2022 recipients of FHA largesse included Woods Hole Martha's Vineyard and Nantucket Steamship Authority ($3.5 million), the Virginia Department of Transportation ($3.3 million), North Carolina Department of Transportation's Ferry Division ($3.1 million), the Grand Portage-Isle Royale Transportation Line, Inc. ($3.1 million), which serves Minnesota's Lake Superior region, and the Louisiana Department of Transportation ($3 million). The Gulf Island yard, in Houma, La. is also completing a pair of 300 passenger, 40-vehicle ferries, Salvo and Avon for the North Carolina DOT, based on an EBDG design, which will operate between Hatteras and Ocracoke. They are powered by Caterpillar engines tied to Schottel Z-drives. Also in the Carolinas, the U.S. Watercraft Yard, on the North Carolina coast, delivered the 129-passenger catamaran style Ocracoke Express, to the state's DOT, during 2022.

Louisiana is set to launch a new ferry service with the help of nearly $41 million in low-interest loans from the DOT. Two new EBDG-designed 190-foot ferries will be built by Houma, La. based Thoma-Sea Marine Constructors for estimated completion in mid-2025, replacing the Cameron II, which was built in 1964. The two

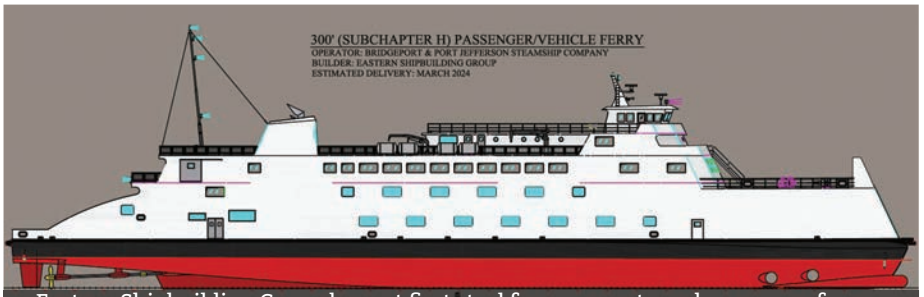
Casco Bay Line selected the Senesco to build a double ended hybrid electric ferry to replace an existing diesel boat.

EBDG

new vessels will use battery-powered electric thrusters. The batteries will be charged by diesel generators on board but can be upgraded to fully electric in the future.

Looking ahead at other vessels currently under construction, Maine State Ferries has a 104-foot passenger/vehicle ferry that will serve a route between Rockland and Matinicus Island., designed by Gilbert Associates, under construction at the Steiner Shipyard in Alabama. The same route will also be served by a larger passenger/vehicle boat to be built at Senesco, which will include hybrid electric power with kit from BAE Systems (to supplement propulsion with Caterpillar diesel engines). A sister (250 passengers and 23 motor vehicles, without the hybrid capability) Capt. Richard G. Spear, was delivered from the Maine-shipyard Washburn & Doughty in early 2022. It serves a route between Rockland and another island, Vinalhaven.

Beyond ferries and similar craft, the overnight sector, with river and coastal cruise vessels, has benefited greatly as travelers are stay on North American shores. American Cruise Lines continues to expand; its latest newbuild American Symphony began Mississippi River excursions in late 2022. A sister vessel (American Serenade, which will be the fifth in a series of 175 passenger ships built at Chesapeake Shipbuilding, in Maryland) is set to begin cruises on the Lower Mississippi in Spring, 2023. In late 2022, the company began construction on American Liberty, the third new Coastal Cat in the company's "Project Blue" series, at the same yard. With delivery



Eastern Shipbuilding Group has cut first steel for a new auto and passenger ferry for the Bridgeport & Port Jefferson Steamboat Company.

Eastern Shipbuilding Group

North Carolina DOT

set for 2024, its delivery will follow two ships in the series, American Eagle and American Glory- both scheduled for inaugural voyages along the U.S. East Coast in 2023. The catamaran vessels, designed for 110 passengers (with the company targeting to build a dozen) are described as "a fleet of go-anywhere ships for the U.S. market", with versatility that will enable them to "run almost anywhere." Viking Cruise Lines' 386 passenger Viking Mississippi, delivered in 2022 from Edison Chouest's LaShip shipyard in Houma, La., is now active on its namesake river, "[breaking] away from the tradition of Mississippi paddlewheelers by featuring the line's trademark Scandinavian design elements," in Viking's words.

The burgeoning offshore wind activities, initially in the New England and mid-Atlantic states, is creating demand for crew transfer vessels (CTV), a cousin, of sorts, to passenger craft. Gladding Hearn Shipbuilding, in Somerset, Mass, a yard with a lengthy history of building ferries, was contracted to build an aluminum CTV, based on an Incat Crowther catamaran design, for Patriot Offshore Maritime Services LLC – a new entrant to the wind sector. Vineyard Wind, which the boat will serve, has also signed a contract with a different operator- American Offshore Services, for another CTV that will be built by Blount Boats, with a yard in Warren, R.I.- no stranger to the passenger sector. A CTV operator with ties to passenger ferry companies serving Rhode Island and Massachusetts, Atlantic Wind Transfer, has contracted to build a series of aluminum catamarans (using a design from Chartwell utilized in European operations) at St. John Shipyard, in Palatka, Fla. – now under ownership of entities linked to Greece's Logothetis family. The boats will deploy Tier 4 compliant engines, from MAN. Three more Incat Crowther-designed CTVs are being built for WINDEA CTV—a joint venture between MidOcean Win, Hornblower Group and Ems Maritime Offshore—including two at St Johns Ship Building and another at Gulf Craft in Louisiana.

The path toward the future, where the passenger sector will be looking closely at fueling options, is far from straightforward. Consider Cape May Lewes Ferry, operating passenger/car ferries across Delaware Bay. One of its boats, New Jersey, saw its 1970s era Fairbanks Morse engines replaced with Tier 3 compliant power from EMD, in 2020, with work performed at Caddell Dry Dock in Staten Island, N.Y. Ultimately, the three-vessel fleet will need to be replaced. The ferry operator has engaged EBDG to develop a master plan that will look at issues including vessel economics, alternative fuels availability, and physical re-

CTVs, like this one being built for Blount Boats for American Offshore Services, are a cousin, of sorts, to passenger craft.

AOS

quirements at terminals, funded partially with a $600,000 grant awarded in 2022 under the U.S. Maritime Administration's America's Marine Highway program.

Across the country, Washington State Ferries (WSF), with a fleet of 21 auto/passenger ferries, has also been studying the transition to an electric future. A request for proposals for five new hybrid electric Olympic Class (HEOC) ferries to be built in Washington state (though this requirement could be amended depending on pricing in initial RFP responses), with an average cost of $220 million each, is now in the works after an initial deal with builder Vigor fell through over price and contract terms. The newbuilds (possibly with azimuth thrusters rather than fixed shaft line, but still under discussion) will be complemented by conversions of existing vessels to hybrid-electric mode (with funding in hand, so far, for four vessels). Also under consideration is the electrification at more than a dozen terminals, starting with those in Central Puget Sound. WSF said in October 2022 that its intent was to specify ferryCHARGER systems from Stemmann-Technik, but said this could be subject to review.

Down the coast, the San Francisco Bay Area Water Emergency Transportation Authority (WETA) was recently awarded a $14.9 million grant from the California State Transportation Agency (CalSTA) to develop a high-frequency network of battery-electric ferries. WETA is currently completing a two-pronged study investigating both clean marine propulsion technology and shoreside infrastructure needs. Dorado, delivered from Mavrik Marine in 2022, and its three sister vessels under construction are expected to be WETA's final new ferries equipped with diesel propulsion, as the agency expects to order only zero-emission passenger ferries going forward. WETA has said that it may also convert some current ferries to zero-emission propulsion systems over the next decade.

Notably, alternative fuels typically will come with increased costs. An early update on the Cape May Lewes Master Plan notes that shoreside infrastructure for battery charging (should a hybrid power option be pursued), at both ends, would cost around $20 million. The Washington State DOT, in its Strategic Plan, is pegging overall funding needs for its transition, at around $4 billion (with $1.33 billion already funded). In summary, it's going to be a tortuous voyage, and also a very expensive one.

FerryCHARGER charging system

Wabtec

Glosten

Glosten's SA-100 Methanol-hybrid Tug Design

By Eric Haun

The commercial maritime industry is seeking solutions to improve efficiency and reduce emissions, and a wide range of new solutions are coming to market to answer the call. Among these is a new design for a methanol-hybrid tug from naval architecture and marine engineering firm Glosten. The SA-100, developed in collaboration with systems integrator ABB, is a high-powered tug with 90-ton bollard pull that's "intended to give operators a means to improve environmental performance, but in every other respect, continue to operate as they do normally," said Peter Soles, marine operations and business development, Glosten.

Methanol, which is commercially available globally, is attractive because it is cleaner burning and offers lower carbon pathways for companies to meet their decarbonization goals, Soles said. Compared to marine diesel or marine gasoil, CO2 reductions of 2-15% may be achievable for gray methanol produced from natural gas, or as much a 70-90% for green methanol produced from renewable resources, he explained, adding that SOx, NOx, and particulate matter (PM) emissions reductions can exceed 99%, 60% and 95%, respectively.

And that's not all. "Methanol has a long list of advantages, not just over some of the other alternative fuels, but over diesel as well," Soles said. "It remains a liquid fuel at ambient temps; it can be injected into medium and high-speed diesel cycle engines with relatively few modifications; and, it can be stored in hull-integrated tanks.

"Methanol is also a proven marine fuel that has been in use for over a decade and has a long history of safe handling. We are well past the technical feasibility stage. Methanol is now 'commercially advanced'. The engine technology is available and steadily progressing, the rate of adoption among vessel operators is increasing rapidly, and a regulatory framework for methanol-fueled vessels is already in place."

While an engine running on methanol can be expected to perform similarly to one using diesel, with comparable power output and response times, Soles said a primary drawback is less range or endurance because methanol has roughly half the energy density of diesel. "This doesn't mean that the tug is less powerful. It just means that more fuel has to be injected, and at higher pressures, than when using diesel. [A dedicated harbor assist tug] will likely need to be refueled more frequently in comparison to present day operations."

From a design standpoint, Soles said the greatest challenges for developing this particular tug are related to onboard space limitations. "In addition to batteries, a series-hybrid tug like this requires a lot of electrical switchgear,"

he explained. "Normally, that wouldn't be too big of a deal on a tug of this size; but when you combine that with having to develop a workable methanol tank arrangement, including cofferdams and required access points, and all the while trying to minimize gross register tonnage (GRT), it becomes a fairly tricky balancing act."

But the specific challenges of methanol fuel are manageable, Soles said. "There are some special requirements with respect to the fuel delivery system, as well as hazardous zones that you have to think carefully about. What's more difficult, though, is the tank arrangement. Going into any methanol tug concept, you're already facing the issue of incorporating a fuel that requires roughly twice as much space as diesel on a unit of energy basis. Then, on top of that, you've got the requirement for 600mm cofferdams for tank areas above the waterline and wherever tanks are adjacent to any occupied spaces. In comparison to what we all know and are familiar with—i.e. diesel powered tugs—it does feel a bit like having two new factors working against you. It's not impossible to work out; but it can be pretty limiting on a relatively small vessel like a harbor tug."

Another challenge for the SA-100—and really for all hybrid alternative fueled tugs—is greater upfront costs, which Soles sees as a key factor restricting more widespread adoption across the U.S. "But, for operators that are committed to making the transition to alternative propulsion, a methanol-hybrid vessel like SA-100 can be constructed for significantly less than a gas-powered tug that runs on liquefied natural gas (LNG), hydrogen or ammonia – and that's mainly because methanol fuel remains in a liquid state at ambient temperatures and can be stored in hull-integrated tanks. It also runs well in diesel-cycle engines with relatively minor modifications and requires fewer ancillary systems than gas-powered tugs."

The story can be entirely different on the operational side of the ledger, where hybrid and alternative fueled tugs aren't necessarily more expensive, and sometimes even less expensive when smartly designed. Soles said having batteries on board the SA-100 goes a long way to help drive down operational costs. "Using batteries for 'boost' power allows the operator to select smaller main engine-gensets that are much better suited for the actual operational demands of routine assist jobs. Sizing engines for full bollard doesn't just mean buying larger, more expensive engines. It means the engines will consume more fuel than necessary; and because they're running very lightly loaded most of the time, it means they're not operating at their design efficiency point, resulting in more frequent maintenance," Soles said. "The use of batteries in SA-100 also enables the tug to run in fully electric mode when not actively working, which means the engines aren't running at all. This keeps engine hours to a minimum and increases the amount of time one can go between in-frame overhauls."

Another way the designer worked to keep operational costs to a minimum on SA-100 was by developing the structural arrangement for low U.S. GRT. "Given that operators can expect higher capital costs with hybrid and alternative fuel tugs, they will be looking for other ways to control total cost of ownerships (TCO) and, ultimately, keep their rates competitive," Soles said. "The best way to do that is to manage labor costs - and USCG manning requirements are directly linked with GRT."

While the future remains unwritten, a number of shifting factors could help the business case for cleaner burning vessels down the line. The marine industry is "going through a time of profound change and uncertainty", Soles pointed out. "With rapidly evolving federal and state regulations, changing market forces and changing perceptions around corporate environmental responsibility, what assurances do operators have that investing in a newbuilt diesel-mechanical tug won't ultimately cost them more in the long run?"

Overall, the market reaction to the SA-100 has been "overwhelmingly positive", Soles said. "Most operators have already done a fair amount of independent research into alternative fuels and understand many of the factors that make methanol so appealing as a diesel replacement."

Figuring out the supply chain is another issue altogether. "Operators have questions about methanol availability, where they can source it, and whether or not the infrastructure is in place for bunkering or refueling by tank truck. These are all fair questions, and I believe it's the biggest hurdle to get over before we see methanol adopted by more than just a few forward-thinking operators," Soles said. "Fortunately, SA-100, as designed, can be operated on diesel indefinitely and easily retrofitted for methanol whenever operators feel assured it's a direction they want to go in."

The SA-100 is Glosten's first methanol fueled vessel concept, but the firm is already working on other projects that incorporate methanol fuel, Soles said. "There will certainly be more methanol fueled vessel concepts and projects to come."

American Offshore Services

A number of CTVs being constructed in the U.S., including those being builf by Blount Boats for American Offshore Services, have been described as "hybrid-ready".

Hybrid [Ready]

By Eric Haun

There are vessels on order today—including crew transfer vessels (CTV) being built in the U.S. (American Offshore Services at Blount Boats and for WINDEA CTV at St. Johns Ship Building and Gulf Craft, for example)—that are described as "hybrid-ready". Of course, a vessel is either hybrid or it isn't. So what does hybrid-ready mean?

When asked about the hybrid-ready CTVs that Blount Boats is building, the shipyard's president Marcia Blount told *Marine News* that the vessels' Volvo Penta IPS propulsion system "is readily upgradeable to hybrid at any time in the future. The vessel has been designed and planned with the space reserved for all the required components, which will simplify the work and time needed to accomplish this future upgrade."

Vessel owners, designers, builders and propulsion suppliers are planning ahead. Those who may want to go hybrid in the future can take certain steps to make the transition easier—and less costly—down the line.

According to Carl-Henrik Hård, a sales and application

engineer at Volvo Penta, hybrid-ready is all about being best positioned for tomorrow's technologies and operations. "For us, it means preparing the market and our customers for what's coming in the near future," Hård said. "The vessels that are on the drawing board for today may last for quite a long time in some cases. . . [Hybrid] technology maturity is not right for all the type of operations yet."

Volvo Penta is among a number of propulsion companies working to advance its technologies to meet the needs of a growing customer base looking at hybrid as a means to improve their operational efficiency and environmental footprint. "We see opportunities among all our customers, from CTVs, which in our world is quite big, and other marine commercial vessels, but all the way down to smaller leisure boats," Hård said.

The company possesses in-house knowledge and expertise in areas such as vessel design, efficiency and general layout, specifically around the propulsion system, to help vessel owners achieve their hybrid goals, Hård said. "There are many bits and pieces where we can work with customers to make the vessel as suitable as possible for hybridization," he explained.

Examples of this could be designing a vessel's layout and general arrangement with space to accommodate batteries later on, or optimizing the vessel for the specific use cases, which Hård said is especially important when onboard energy is limited.

Another company preparing for the growing hybrid market is ZF Marine, which has a line of gearboxes that it describes as hybrid-ready. "By that, we mean that it already comes equipped with the necessary mechanical pieces to allow inputs from an alternative source, be it electric motor, a smaller engine or something else," said David Friedenberg, engineering manager at ZF Marine LLC, USA.

For ZF, the concept is not new. "ZF has worked with something like this from the '80s, but it wasn't electric hybrid power, but a smaller diesel engine." Friedenberg said. "When hybrid came along, it was really not much for us to say, 'All right, how do we do that?' Essentially, a traditional gearbox having three shafts, input shaft, output shaft, intermediate shaft, two pinions that are able to affect the left- and righthand output shaft rotation. We just added a fourth shaft; the same gear teeth pattern and connection to the output shaft, big bull main gear, and then used a clutch back to engage or disengage the alternative driver. If it's an electric motor, then the electric motor can be clutched, the other clutches can be released, the engine can be stopped, the diesel engine can be stopped. The electric motor now applies its clutch back and drives the standard existing output shaft gear to propel the vessel down the waterway."

Friedenberg said ZF sees hybrid opportunity across the commercial marine sector. For now, vessels like ferries that operate on short routes, or crew boats, pilot boats, whale watching boats, dinner cruise vessels with a fixed operational circuit.

"In terms of retrofitting an existing gearbox or a design that's already functioning in a boat, that's not so easy. I would say, from a financial perspective, it can be impractical to do that. What we have done, though, is we've changed the case design, to a certain extent, to allow us to use one casting that can be machined so that it could be used through the model."

nForcer FM 175D Engine

Fairbanks Morse Defense launches its first high-speed engine

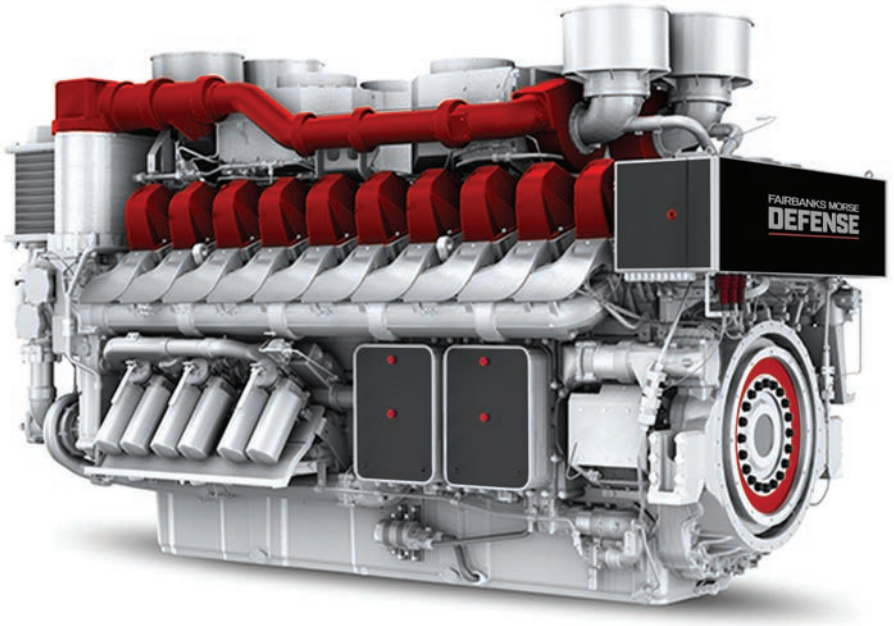
Beloit, Wis. based Fairbanks Morse Defense (FMD) recently announced the expansion of its engine lineup with the new nForcer FM 175D, the company's first engine designed for high-speed applications, as it gears up to support the power and propulsion needs of the U.S. Navy's unmanned programs.

"The Navy's future fleet will be electric, and the power requirements for each vessel to support advanced weapons and detection systems alongside standard operations will be greater than anything else we've seen over the past 20-30 years," said George Whittier CEO at FMD, a portfolio company of Arcline Investment Management.

Enter the nForcer FM 175D, one of the most powerful high-speed engines in the maritime defense marketplace. The engine will be available with 12, 16 or 20 cylinders and includes a 175-millimeter bore for mechanical or electric propulsion for onboard power generation, the manufacturer said. It operates at 1,800 – 2,000 RPMs and has a power output rating of 1,740 – 4,400 kW.

"The engine delivers maximum power output at the lowest weight due to its compact design," a FMD spokesperson told *Marine News*. "The nForcer FM 175D features FMD's common rail technology, which enhances fuel efficiency and reduces carbon emissions. This results in increased operational availability, a longer lifecycle and lower operating costs."

A longtime supplier to the U.S. Navy, FMD said it is currently bidding on multiple projects and that it expects the new engine will be ready to integrate with naval fleets within the next two years. "We are in the process of working closely with the U.S. Navy to ensure the nForcer FM 175D high-speed engine meets their unique requirements for surface combatants and to get the engine qualified for unmanned vessel applications," the spokesperson said.



Fairbanks Morse Defense

Vessels

CREST Wind SOV

Crowley

U.S. maritime services company Crowley and Danish offshore service company ESVAGT will jointly build and operate a service operations vessel (SOV) for long-term charter with Siemens Gamesa Renewable Energy. Under the new contract, Crowley will manage and crew the SOV to support Siemens Gamesa's service operations on the Dominion Energy Coastal Virginia Offshore Wind (CVOW) project. ESVAGT will support Crowley with design, construction, crew training and operation services as part of the two companies' joint venture, CREST Wind.

The HAV 832 SOV will be built by Fincantieri Bay Shipbuilding in Sturgeon Bay, Wis., and is scheduled to enter service in 2026. According to Crowley, the 289-foot vessel will feature state-of-the-art technologies to augment safety, workability, and comfort to support the O&M activities of the wind farm project. It will have modern accommodations for 80 crew and technicians.

Neebish Island III

Manitowoc, Wis. shipbuilder Burger Boat Company has delivered a new car/passenger ferry vessel to the Eastern Upper Peninsula Transportation Authority (EUPTA), located in Sault Ste. Marie, Mich.

The 92-foot U.S.-made steel ferry, Neebish Island III, will operate year-round on the St. Mary's River in Michigan's Upper Peninsula between Barbeau, Mich., and Neebish Island. The vesselwas designed by Seacraft Design, LLC of Sturgeon Bay, Wis. to operate in the harsh winter environment and through the solid ice conditions it will encounter on its route.

The ferry was delivered to EUPTA on October 30, 2022, and entered into service on November 9, 2022.

EUPTA operates three local vehicle and passenger ferries to the nearby islands of Sugar, Neebish and Drummond.

Vessels

Hayden Grace

Robert Allan Ltd.

Coden, Ala. shipbuilder Master Boat Builders has delivered the new tug Hayden Grace to Bay Houston Towing Co. for operations in Galveston, Texas.

The new 85-foot-long vessel is the first in a series of three RApport 2600 tug designed by Canadian firm Robert Allan Ltd. ordered by Bay Houston. The design team and the client worked to address operational challenges the vessel would face. Main features of this latest RApport design include compact size and shallow draft allowing it to operate in more confined waterways than previous Z-Tech vessels, as well as a special styled deckhouse. The customized general layout of the tug features a Master and Chief Engineer's cabin, along with the galley and mess, located on the main deck, while two cabins for four crew members are located on the lower deck.

The main propulsion for the tug comprises a pair of Caterpillar 3512E, EPA Tier 4 certified diesel engines, each rated 2,213 bHP at 1,600 rpm, and driving a Schottel SRP 430FP Z-drive unit with Ø2200 propeller. The electrical plant consists of two identical John Deere 4045AFM85 diesel gensets, each with a power output of 99 ekW 480V, 3-Phase, 60 Hz.

Texas City

Gladding-Hearn Shipbuilding

The Galveston-Texas City Pilots has taken delivery of Texas City, its fourth pilot boat from Gladding-Hearn Shipbuilding, Duclos Corporation. The new launch is equipped with a Seakeeper 30HD stabilizing gyro, which, according to shipyard officials, will reduce up to 80% the vessel's roll.

With a length overall of 73.2', beam of 23.3' and draft of 5.9', the all-aluminum, high-speed pilot boat features the Ray Hunt Design deep-V hull. It is powered by three Volvo Penta D13, EPA Tier 3 marine diesel engines, each delivering 800 Bhp at 2,300 rpm, and integral to the engines' triple IPS-Pod 1050 system. Top speed is over 33 knots and runs 30 knots at 80% power. The vessel will burn 30% less fuel than the pilots' existing 70-foot pilot boats at the same speed, explained Peter Duclos, the shipyard's co-president.

Humphree interceptors, with Active Ride Control and Coordinated Turn and Automatic Trim Optimization, are installed at the transom to automatically optimize the vessels running trim, and actively reduce pitch and roll at speed above 15 knots.

People & Companies


Klein


Stewart


Dutra


Nunan

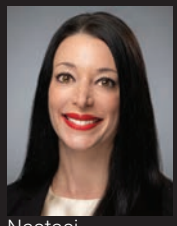

Heward


Lennerstedt


Farrell


Farrell


Beerbohm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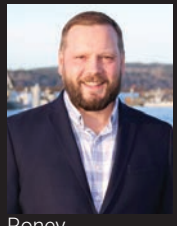

Roney

Klein Named BOEM Director

The U.S. Interior Department named Elizabeth Klein, a lawyer who worked in the Obama and Clinton administrations, to head the Bureau of Ocean Energy Management, replacing Amanda Lefton, who resigned from the post effective January 19.

Dutra Names Stewart CEO

The Dutra Group named Harry K. Stewart, previously chief operating officer, as its new CEO. Bill T. Dutra, who led the company since its founding, will move into the role of executive chairman.

Rear Adm Nunan First Woman Appointed USMMA Superintendent

The U.S. Department of Transportation and the Maritime Administration announced the appointment of Rear Admiral Joanna M. Nunan (U.S. Coast Guard, Ret.) as the next superintendent of the U.S. Merchant Marine Academy (USMMA). Nunan, who spent more than three decades in the U.S. Coast Guard, has commanded units at every level both afloat and ashore.

Heward Named MITAGS Director

The Maritime Institute of Technology and Graduate Studies (MITAGS) announced that Mark Heward has joined as director.

Lennerstedt Takes the Helm at Humphree

Helena Lennerstedt was appointed CEO of Humphree, succeeding succeeds Hannes Norrgren who has taken up the role of senior vice president for Volvo Penta's industrial business unit.

New Leadership Roles at Resolve Marine

Marine salvage, rescue, emergency response and specialized services company Resolve Marine announced that Deputy CEO Joseph Farrell, III has been appointed Chief Operating Officer. Lana Farrell, currently manager of talent development, will add responsibilities and lead the company's alternative investments division with oversight of Resolve Academy, the company's marine firefighting and training division.

McDonough Promotes Beerbohm

McDonough Marine Service announced it has promoted David Beerbohm to vice president of maintenance.

Nastasi Promoted to VP at Ingalls

HII's Ingalls Shipbuilding division promoted Kimberly Nastasi to vice president of the newly formed integrated communications and stakeholder engagement department.

St. Johns Ship Building Hires Gentle

Palatka, Fla. shipbuilder St. Johns Ship Building has appointed Ken Gentle to the position of vice president of repair.

Roney Joins NBBB, ESR

Peter Roney has been hired to join the executive management team supporting U.S. West Coast shipyards Nichols Brothers Boat Builders and Everett Ship Repair.

Marine News 2023 Editorial Calendar

January 2023

Ad close Jan. 4

E-Magazine Edition:

U.S. Offshore Wind:

Shipbuilding, Ports & Logistics

February 2023

Ad close Jan. 20

Power & Propulsion

- Passenger Vessels
- Mariner Training & Education
- Safety Equipment

Event Distribution

PVA Maritrends: Feb 2-5, Long Beach, CA

CMA: Mar 28-30, Stamford, CT

IPF Wind: March 28-30, Baltimore, MD

Ferry Safety & Technology: April 1, New York, NY

March 2023

Ad close Feb. 28

E-Magazine Edition:

U.S. Inland Waterways Transport: Operations, Infrastructure & Dredging

April 2023

Ad close Mar. 17

Towboats, Tugs & Barges

- 2023 Shipbuilding Report
- Navigation Technology
- U.S. Offshore Wind

Event Distribution:

OTC: May 1-4, Houston, TX

SeaWork: June 13-15, Southampton, UK

Inland Marine Expo: May 31-June 2, Nashville, TN

May 2023

Ad close April 21

E-Magazine Edition:

U.S. Maritime Workforce: From Offshore to Inland Waterways & Shipyards

June 2023

Ad close May 19

Combat & Patrol Craft

- Navy & Coast Guard Shipbuilding
- Autonomous Vessels
- Dredging

Event Distribution:

WEDA Dredging Summit: July 17-20, Las Vegas, NV

Multi-Agency Craft Conference: Dates & Location TBD

July 2023

Ad close June 22

E-Magazine Edition:

The Green Marine Annual: New Products & Innovations

August 2023

Ad close July 21

Boatbuilding & Repair

- Naval Architecture & Marine Engineering
- Shipyard Equipment
- Workboat Communications

Event Distribution:

SNAME Maritime Convention : Dates & Location TBD

September 2023

Ad close Aug. 25

E-Magazine Edition:

Fast Craft: Patrol, Fire, Police, Pilot Boats & Ferries

October 2023

Ad close Sept. 18

Offshore Energy

- Vessel Repair & Conversion
- Electrification & Alternative Fuels
- Deck Machinery & Cranes

Event Distribution:

Clean Gulf: November. Dates TBD,

Electric & Hybrid Marine World Expo: Dates TBD

Houston, Texas

November 2023

Ad close Oct. 20

The Workboat Edition

- Top Vessels of 2023
- Power & Propulsion Technology
- U.S. Shipyards

Event Distribution:

International WorkBoat Show: Dates TBD, New Orleans, LA

December 2023

Ad close Nov. 30

E-Magazine Edition:

Workboat Technology: Best Marine Technology & Service Innovations of 2023

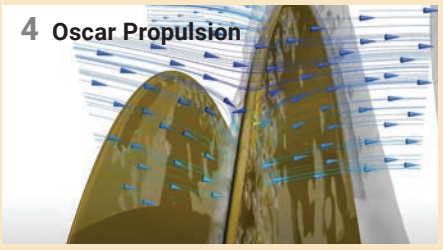
Products

1 VETUS

2 In-Mar Solutions

3 Survitec

4 Oscar Propulsion



5 Kongsberg Maritime

1. VWC Series Windlasses

The VWC Series windlasses are designed for automatic vertical handling of chain-only anchor rodes while offering an independent capstan for the retrieval of a secondary rope and chain rode or to assist with docking procedures. Classification society approval is available.

https://vetus.com/usa/maxwell/

2. In-Mar Solutions: Alu Pilot Chairs & Deck Rails

In-Mar Solutions offers a complete line of Alu Design & Services Marine Pilot Chairs and Deck Rails. There is a standard line in addition to the option for custom designs to suit specific needs. Sleek, modern design and maximum utility and comfort are emphasized.

www.inmarsolutions.com

3. Life Ark

Life Ark, Survitec's new helical slide-based marine evacuation system (MES) for small to medium-sized passenger vessels has received full-type approval from Bureau Veritas. Designed for vessels with a freeboard height of up to 23m and passenger capacities ranging from 300 to 1,500, Life Ark uses a fully enclosed, dry-shod helical (spiral) slide, ensuring a safe, rapid and comfortable descent, Survitec said. There is no restriction on the size of individual users, and crew can ascend the slide to assist passengers if necessary. Fully enclosed single and double helical slide options are available in an asymmetric arrangement. The Life Ark comprises self-righting approved liferafts for 50, 100, 150 persons, with SOLAS A, B and HSC emergency packs.

4. PressurePores

Oscar Propulsion and the University of Strathclyde have found a way to reduce underwater radiated noise from ship propellers. The patented PressurePores system is said to reduce propeller tip vortex cavitation by applying a small number of strategically placed holes in the propeller blades. The addition of these pressure-relieving holes allows ships to operate with a more silent propeller. Following four years of computational fluid dynamics (CFD), modeling and cavitation tunnel tests during the solution's development phase at Strathclyde, the solution was shown to reduce cavitation volume by almost 14% and URN by up to 10dB. Results were further verified in tests on the sub-cavitating propellers on Princess Royal, a 19m research catamaran operated by Newcastle University. And last year, CFD Finite Element (FE) propeller stress tests were completed in accordance with DNV rules.

5. Type ULE PM Thrusters

Kongsberg Maritime has launched a new series of retractable azimuth thrusters. The units, of the ULE PM type, are smaller than competing units but maintain thrust power. Kongsberg Maritime said that because of their compact size, the new thrusters could be used on modern offshore wind, fishing, and naval vessels with limited space on board. "The ULE PM type thruster has an integrated electric prime mover mounted very low between the steering gear. This saves more than a meter in vertical space in an engineering compartment. The ULE PM Type is the smallest retractable unit on the market for any given power requirement," Kongsberg said.

NEW PRODUCTS

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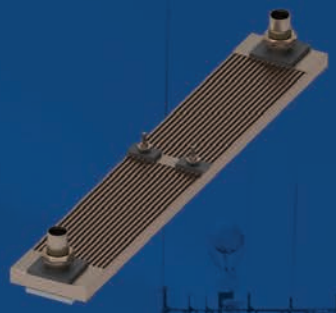

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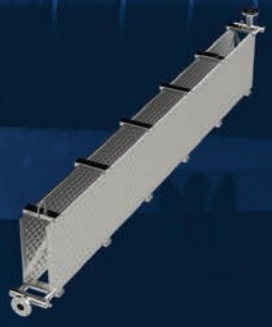

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