

October 2025

MARITIME REPORTER AND ENGINEERING NEWS

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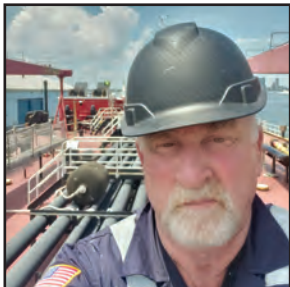
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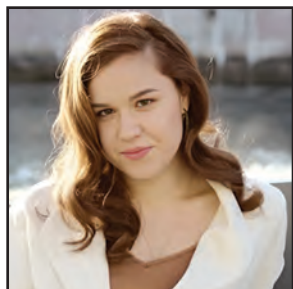
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Harshvardhan

Capt. Harsh has over 43 years of experience in the maritime industry and began his career as a deck cadet, serving onboard merchant vessels in various ascending capacities, obtaining his command in 1997. He spent 28 years at sea, 11 of them as a Master on bulk carriers with ma-

jor global shipping lines where he faced numerous challenging situations.

Kunkel

Robert Kunkel, president of Alternative Marine Technologies and First Harvest Navigation, served as the Federal Chairman of the Short Sea Shipping Cooperative Program under the DOT's MARAD from 2003 until 2008.

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This being the Port and Logistic focus edition, we take a deeper dive into some of the technologies, the policies and the teams driving the market. This edition was particularly well-timed, returning this week from BreakBulk America's in Houston, and on the heels of our recent acquisition of the Port of the Future conference and exhibition.

Port of the Future 2026 – scheduled for March 23-25, 2026 in Houston – will be the 7th Annual return of the event, started by **Kevin Clement** at the University of Houston in 2020. I'm particularly happy to report that Clement has, upon his retirement from U of H over the summer, joined us as out Port of the Future event director.

First and foremost, the event attracts ports from around the country and around the world, its slogan being **"2 Days, 50 Ports"**. With that it brings in a broad swath of port and maritime stakeholders, from government agencies to ship and boat owners, ship and boat builders, and of course a broad selection of technology providers that help keep ports running safely, efficiently and cost effectively. Ports, arguably more than ever, are becoming hubs for innovation and advances, with issues like energy transition, hull cleaning robotics and dredging technology – to name but a few – taking center stage. For more information on Port of the Future visit: <https://portofthefutureconference.com/>.

In fact, in this edition, starting on page 28, long-time MR contributor and Martin & Otaway CEO **Rik van Hemmen** writes in his article – *Sustainable Fuel Chicken and Egg Redux. Maybe Some Ports Can Fix It.* – that perhaps ports could and should take the lead on helping to determine the maritime industry's fuel of the future.

As most reading surely attest, the conundrum in building tonnage premised on an

uncertain fuel future is harrowing at best, essentially coming down to the basic principles of supply and demand:

Shipowners will not buy ships that use a fuel for which no viable supply chain exists, and fuel suppliers will not develop supply chains for which no buyers exist.

Ultimately, ports sit at the hub for both, and there will be much more coming regarding plans for Port of the Future in 2026 and beyond.

On the shipbuilding front, icebreakers have been and will remain topical for years to come, as the Coast Guard this year received a record level of funding – \$25 billion courtesy of "the one big beautiful bill" – including nearly \$9 billion targeted to icebreakers. The November edition of *Maritime Reporter & Engineering News* will offer an expansive section dedicated to icebreakers, particularly the trio of U.S., Canada and Finland and the quest to build next-generation icebreakers now.

But in this edition I'm pleased to welcome Alisa Reiner back to our pages with a thorough analysis of the Russia-China relationship dynamics and its impact on the race to build icebreakers for presence and capability in one of the world's harshest marine environments.



Gregory R. Trauthwein
Publisher & Editor
trauthwein@marinelink.com

Photo Justin Zurre

2026 Editorial Calendar

January 2026

Ad close: January 7, 2026

MARITIME POWER

e-Magazine Edition

From diesel to hybrids, alternative fuels to electric/battery, changes in the maritime powertrain impact everything from design to construction to lifecycle maintenance.

Tech In Focus:

Fuels & Lubes

February 2026

Ad close: January 22, 2026

PORTS & LOGISTICS

- Passenger Ferries
- Icebreaker Design, Construction & Equipment
- Offshore Renewable Energy
- Coatings & Corrosion Control

BONUS DISTRIBUTION

- Port of the Future – Houston, TX
- CMA Shipping – Stamford, CT
- IPF 2026 – New York, NY
- Sea Japan – Tokyo
- Asia Pacific Maritime (APM) 2026 – Singapore
- PVA Maritrends – Covington, KY
- Breakbulk Europe 2026 – Rotterdam

March 2026

Ad close: February 28, 2026

DIGITALIZATION

e-Magazine Edition

From Weather Routing to Cargo Loading to Voyage Tracking to Condition-Based Monitoring, the digital revolution continues to revolutionize the waterfront.

Tech In Focus:

Robotic Hull Grooming Solutions

April 2026

Ad close: March 22, 2026

CRUISE SHIPPING

- Offshore Energy
- Floating Power Production
- Towboat, Tugboat, Barges
- Deck Machinery & Cranes

BONUS DISTRIBUTION

- Seatrade Cruise Global – Miami
- Posidonia – Athens, Greece
- Sea-Air-Space – National Harbor, MD
- Offshore Technology Conference – Houston, TX
- Wind Europe 2026 – Madrid
- Mari-Tech 2026 – Victoria, BC
- Inland Marine Expo 2026 – Nashville

May 2026

Ad close: April 30, 2026

GREEN MARINE

e-Magazine Edition

From Hull Design to Machinery Optimization to Alternative Fuels, the maritime 'green' push is premised on fuel economy too.

Special Feature:

Thought Leadership: Classification Roundtable

June 2026

Ad close: May 22, 2026

DREDGING

- Marine Salvage
- Ship Repair & Conversion Projects
- Maritime Safety Equipment
- Waterjets, Thrusters & Propellers

BONUS DISTRIBUTION

- WEDA Dredging Congress & Exhibition
- Green Marine – Quebec City Convention Centre
- Cruise Ship Interior Expo – Miami, FL
- Marine Money Week 2026 – New York
- MACC 2026

July 2026

Ad close: June 30, 2026

U.S. NAVY, COAST GUARD & GOVERNMENT SHIPS

e-Magazine Edition

In Focus:

Fast Attack & Patrol Craft Builders

August 2026

Ad close: July 22, 2026

SHIPBUILDING

- Hybrid Propulsion Solutions
- The Modern Marine Bridge
- Ballast Water Management
- Shipyard Tools: Cutting & Welding Equipment

BONUS DISTRIBUTION

- SMM – Hamburg, Germany
- Electric & Hybrid Marine World Expo North America
- SNAME

September 2026

Ad close: August 30, 2026

MARINE DESIGN ANNUAL

e-Magazine Edition

From Alternative Fuels to Autonomy/Automation to Digitalization, transcendent technologies that continue to change vessel design, construction and outfitting.

In Focus:

Artificial Intelligence & Maritime

October 2026

Ad close: September 22, 2026

MARITIME TRAINING & EDUCATION

- Thought Leadership: U.S. Maritime Academy Leadership
- Cyber Security
- Cruise Port & Terminal Innovation
- Ferry Boat Review

BONUS DISTRIBUTION

- Interferry 2026

November 2026

Ad close: October 22, 2026

WORKBOAT EDITION

- Marine Engines
- Emission Reduction Technology
- Deck Equipment, Winches, Cranes
- Marine Gears & Transmissions

BONUS DISTRIBUTION

- Intl. Workboat Show 2026 – New Orleans, LA

December 2026

Ad close: November 30, 2026

GREAT SHIPS of 2026

e-Magazine Edition

Review and report on the most significant ships delivered in 2026.

In Focus:

Energy Efficiency Devices:
From Sail to Batteries to Bubbles

EXHIBITIONS

- Surface Navy Association 2027 — Washington, DC

Vessel Diversions in Ocean Shipping: Overview and Implications

By J. Philip Nester



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In recent years, vessel diversions have become a frequent and disruptive reality in ocean shipping, driven by port congestion, labor disputes, regulatory inspections, and geopolitical events that delay or cause cargoes to reroute across multiple ports and continents. Diversions present both legal and commercial challenges for shippers, beneficial cargo owners (“BCOs”), and carriers alike. Familiarity with the governing legal and regulatory framework is essential to ensure compliance, protect financial interests, preserve the ability to recover direct costs in connection with diverted cargoes, limit potential liability, and clarify obligations. This framework can include the Carriage of Goods by Sea Act (“COGSA”), the Hague-Visby Rules (“Hague-Visby”), bills of lading, service contracts, Federal Maritime Commission (“FMC”) regulations, and the Jones Act. Understanding the application and interplay of these rules can help shippers manage carrier rights, statutory restrictions, allocation of charges, and claim preservation strategies.

Carriers’ Authority to Divert

Ocean carriers generally have broad discretion to divert vessels from advertised lanes, port pairs, or schedules. Standard bills of lading and service contracts typically allow carriers to substitute ports, transship cargoes, or discharge cargoes at alternate destinations. Courts generally uphold these contractual clauses, provided carriers demonstrate commercially reasonable discretion under the circumstances. Service contracts filed with the FMC may clarify or limit carrier discretion, but absent express restrictions, carriers enjoy broad operational latitude. In practice, shippers’ primary concern about how diversion-related costs are determined by the carrier under the bill of lading or service contract, which typically favor the carrier.

Jones Act Constraints

The Jones Act (46 U.S.C. § 55102) prohibits foreign-flagged vessels from transporting cargo between U.S. ports. Cargo transportation between U.S. points must be performed by U.S.-built, U.S.-owned, U.S.-flagged, and predominantly U.S.-crewed vessels. This restriction applies even when cargo is ultimately destined for export, and U.S. Customs and Border Protection strictly enforces it. When a diversion involves a U.S. port, shippers have only three lawful options, which must comply with the limited statutory options available: (1) maintain the cargo on the original vessel until discharged abroad; (2) transship the cargo through a foreign hub; or (3) return the cargo to the original U.S. load port for re-export.

Recoverable Damages and Contractual Limitations

Shippers often seek to recover losses resulting from diversions, but legal and contractual frameworks significantly limit recoverable claims. COGSA governs carrier liability in the foreign oceanborne trade of the U.S. for physical loss or damage to cargo while in the carrier’s custody but does not cover purely economic losses such as delay, lost sales, missed deadlines, or reputational harm. Similarly, the Hague-Visby rules restrict recovery to tangible cargo loss or damage when incorporated by contract for international movements. Diversion-related delays are generally not compensable, and carrier are rarely liable for such costs unless they are grossly negligent or the diversion causes physical deterioration or damage, such as spoilage of perishable goods or handling damage. Service contracts that waive consequential damages for economic loss further narrow recoverable claims. Typically, only direct expenses such as storage, re-handling, inland transportation, detention, demurrage, or re-booking fees are recoverable. These claims

remain subject to carrier defenses, including governmental action, force majeure, or inspection delays, highlighting the importance of documentation and proactive risk management.

Statutory and Regulatory Oversight

Shippers operate within a framework of statutory oversight, contractual obligations, and commercial risk allocation. Under the Shipping Act at 46 U.S.C. § 41102(c), carriers must maintain just and reasonable practices. Shippers can file complaints with or notify the FMC if a diversion is discriminatory or commercially unreasonable, but the FMC generally allows carriers to operate with broad discretion.

Risk Allocation and Recovery Strategies

Marine cargo insurance is often the most reliable mechanism to mitigate diversion-related losses, but contractual limitations and exclusions often leave shippers responsible for significant charges. First-party cargo policies typically will cover direct rerouting expenses, while underwriters retain subrogation rights against carriers in cases of proven negligence. Ocean transportation agreements may require intermediaries to indemnify shippers for third-party carrier failures, though claims for consequential damages and delay are usually excluded. Proactive coordination with insurers, meticulous documentation of charges and carrier actions, and understanding bill of lading and service contract terms are critical to preserve recovery potential. Responsibility for additional costs such as demurrage, detention, storage, re-handling, and inland transport is typically borne by the shipper under bills of lading and service contracts.

Managing Claims and Preserving Rights

Vessel diversions create complex operational, regulatory, and commercial risks, requiring shippers to act promptly and deliberately. When losses are primarily economic such as additional handling, rerouting costs, or schedule-related impacts, shippers should issue a formal notice of claim, preserve all shipment information and documents, and coordinate with insurers to maintain coverage and subrogation rights. Ongoing communications with carriers to track cargo status and ensure lawful delivery are essential. Shippers may mitigate some risk through insurance coverage, but carriers' discretion and contractual protections significantly limit shippers' direct remedies against its service providers in practice.

The Author

Nester

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In Memoriam

Captain Charles Robert MacVean, USN, (Ret.), PhD

March 22, 1937 – September 10, 2025

By Kevin Hardy



courtesy of John Freeman

Capt. Charlie MacVean with some of his USS SEAWOLF (SSN575) divers.

The book, *Blind Man's Bluff*, describes the secret USN submarine operations known as "The Projects." It begins with the opening line, "There was something about Commander Charles R. MacVean that had a way of inspiring legend." Authors Sontag and Drew narrowed that "something" down to "his sense of humor and humanity." Even in the toughest of situations, MacVean radiated calm assurance and situational command. His sailors and divers would knowingly follow him past the Gates of Hell, and did more than once. They called him "Captain," "Skipper," "Mac," or simply "Charlie."

Captain "Charlie" MacVean passed away in the company of family in San Diego, CA, on September 10, 2025, at the age of 88. MacVean joins other stellar American submariners enshrined in history: Bushnell, Holland, Lake, Nimitz, Morton, O'Kane, Butler, and others.

Charles Robert MacVean was born in Paterson, New Jersey. Following graduation from high school in Ridgewood, New Jersey, he attended Dartmouth College as an NROTC student. He earned a Bachelor of Arts Degree, Summa Cum Laude and Phi Beta Kappa, majoring in Engineering Physics, and was commissioned in 1959. Ensign MacVean served as Communicator on board the USS FORREST SHERMAN (DD931) prior to attending Cornell University where he received a PhD in Nuclear Science and Engineering. Lieutenant MacVean then entered the Nuclear Power and Submarine Curriculum, completing courses in Bainbridge, MD, Windsor Locks, CT, and New London, CT.

Lieutenant Commander MacVean was assigned to USS TINOSA (SSN606) in 1965 where he served as the Main Propulsion Assistant and Navigator. The USS TINOSA keel was laid at Portsmouth Naval Yard 24 Nov 1959, the second in a series of fast attack submarines following USS THRESHER (SSN593) from PNY. Charlie recalled some parts of the propulsion system for the THRESHER were not available for its first voyages, so parts from TINOSA were

substituted. After THRESHER's loss at sea with all hands on 10 April 1963, the now available THRESHER parts were built into TINOSA, with the serial numbers beginning with "593-". MacVean silently kept the memory of those seamen as he worked every day.

Thresher's loss was traced in part to its inability to blow its ballast tanks due to excessive moisture in the submarine's high-pressure air flasks. The moist air inside the flasks cools as it expands and flows through the valves. The cooling is localized at the point of expansion. The water vapor froze and plugged the flow paths. This was later confirmed in dockside tests on TINOSA where the flow of air lasted only a few seconds.

Following qualification as a Nuclear Propulsion Engineer, MacVean attended the SSBN Navigator course and completed four POLARIS Strategic Deterrent Patrols as Navigator of the USS GEORGE WASHINGTON (SSBN598 (Blue)), 1968-1972.

From 1972 until 1975, Commander MacVean served as the Commissioning Executive Officer of the USS PARCHE (SSN683). PARCHE became the most highly decorated ship in U.S. Navy history, mainly for missions that remain classified to this day.

He reported for duty as the Commanding Officer of USS SEAWOLF (SSN575) in 1975. During his three years in command, USS SEAWOLF conducted extensive classified operations in the Pacific.

MacVean had a close intellectual and personal relationship with **Adm. Hyman G. Rickover**, Father of the Nuclear Navy, which he recounted on occasion with stories, including a presentation for the Naval Submarine League, "Admiral Rickover-Up Close and Personal." Once, while commanding a classified mission on SEAWOLF, a rack of electronics in a power panel failed spectacularly. To repair it, the submarine surfaced in a fog bank, spare parts were substituted and tested, the reactor restarted, and the ship submerged. USN protocol



*The [SEAWOLF] mission was completed, and they returned to port. On the return trip, he sent the message **“Mission Completed.”** And a second, **“btw, we had a fire in the reactor compartment.”** The Navy was not amused. On the brink of court martial, Rickover intervened, writing, “Leave SEAWOLF alone. They did exactly what we trained them to do.” MacVean reflected, **“Rickover saved my career.”***

Captain MacVean and wife, Ellen, February 2020.

required SEAWOLF to return to port. MacVean, however, assembled his officers in the mess, discussed the matter, expressed his confidence in the repair and testing, and suggested they complete the mission. The officers unanimously agreed. The mission was completed, and they returned to port. On the return trip, he sent the message “Mission Completed.” And a second, “*btw, we had a fire in the reactor compartment.*” The Navy was not amused. On the brink of court martial, Rickover intervened, writing, “Leave SEAWOLF alone. They did exactly what we trained them to do.” MacVean reflected, “Rickover saved my career.” In 1978, Captain MacVean assumed command of Submarine Development Group ONE. This Group contained 17 ships and units and was the sole Navy activity responsible for deep ocean search, location and recovery. Captain MacVean retired from active Naval Service in October, 1981.

Captain MacVean’s awards include two Distinguished Service Medals, the highest award for non-combat service, requiring Presidential review and approval. He also received the Legion of Merit, the Joint Service Commendation Medal, and the Navy Commendation Medal.

MacVean always spoke of his wife, Ellen, with tremendous affection and admiration. They met as juniors in high school, and were married after his graduation from Dartmouth. When Charlie’s submarine, SEAWOLF, set a submerged record of 89-days, it was Ellen who looked after the wives and families at home, a U.S. Navy extended family, helping solve daily problems, occasionally handling far worse. One new mother lost her child just a day or two after giving birth. Ellen stepped in to help with arrangements and grief. She recalls, “I went to the naval hospital in Oakland to be with her. She was amazingly strong. She waited for her husband to come home to have a burial. It was one of the hardest days I had as the CO’s wife.” The word was passed to Charlie at sea, who broke the news to the young father under his command. Ellen added, “Because of how

terribly the CO of the George Washington had handled telling Charlie his brother was killed in Viet Nam, he was very compassionate with informing a crew member of a tragedy at home.” His crew knew their captain’s personal interest in each of them, and he saw an inspiring example of dedication in them.

Following his Naval service, Dr. MacVean held numerous positions in industry, including Honeywell/Hydro Products, eventually becoming Vice President and General Manager. In 1989, Dr. MacVean became the Vice President for Business Development at Horizons Technology, a San Diego company developing and providing mission planning software for the U.S. Navy, U.S. Marine Corps, and overseas allies.

MacVean authored an engaging autobiography, “*Down Deep*,” with the help of friends John Freeman and Gresham Bayne, available on Amazon. One SEAWOLF crewman wrote, “Great book. Felt like I was alongside the CO again. Nice feeling. I was a nuke, so there were long hours, and very tough times. Not always fun. But as was stated throughout the book, you always busted your ass. Not because you feared Mac, but because you never wanted to let the Old Man down. That’s a quality that a fine leader has. Mac had it in spades.” MacVean is survived by his wife and two children, Amy Perez of La Habra Heights in Los Angeles County, CA and David MacVean of Southport, NC. A third child, Lynne MacVean, passed away in February 2025 in Newport Beach, CA.

A Memorial is planned for November 1, 2025, in Point Loma, CA. Ellen picked the date. “Charlie took command of SEAWOLF on November 1, 1975 so his memorial will be on the exact 50th anniversary.” A Memorial page for Charlie may be found at <https://sites.google.com/view/charlesmacvean/home>. Your memories and photos of Charlie are welcome. In lieu of flowers, the family has provided links to two non-profits Charlie felt strongly about.

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ENERGY STORAGE AND NEW FUELS WORK TOGETHER AS ONE

Image courtesy Grimaldi



There's an obvious fuel saving advantage, but partnering energy storage systems with new fuels brings other advantages too.

By Wendy Laursen

There's a new generation of vessels emerging which is exemplified by **Grimaldi's PCTC Grande Shanghai**, claimed to reduce fuel consumption by 50% compared to previous-generation car carriers, and the **NCL Vestland**, a container feeder vessel similarly claimed to reduce energy consumption per TEU per nautical mile by 63%.

What these vessels have in common is a propulsion system that combines energy storage systems and new fuels.

As **Henrik Helgesen, Senior Environmental Consultant at DNV**, points out, the price of maritime batteries is dropping, and including them allows power systems using new fuel engines to respond to load changes better. Batteries help the engines to run more efficiently, reducing the cost of burning new fuels such as methanol and ammonia.

It's a benefit that is not restricted to cargo vessels.

In March, **SAAM Towage** and **Caterpillar Marine** signed a MoU to implement alternative power solutions including electrification and alternative fuels in the tug fleet.

Will Watson, Caterpillar Marine's Product Manager, says engine and battery technologies can be mutually supportive. Flexible options that include batteries and lower-carbon intensity fuels are a way to modernize assets while avoiding heavy capex investments that are tied to the uncertainty around the economics and availability of particular fuels. A modest capex investment at the time of vessel construction for a hybrid powertrain brings greater flexibility enabling operators to make choices based on the options available at that time.

Caterpillar Marine aims to have a marine lithium iron phosphate battery on the water by early 2026 which will be liquid cooled, have a 1C discharge rate and a voltage of up to

Image above: The PCTC Grande Shanghai was commissioned by the Grimaldi Group from China Merchants Heavy Industries. The vessel integrates numerous green technologies: mega lithium batteries with a total power of 5 MWh, 2,500 square meters of solar panels, and cold ironing with shoreside supply of electricity where available.

1420VDC. Additionally, a hybrid propulsion system is currently in development that will consist of a propulsion engine, clutch, electric motor, variable frequency drive, battery system, auxiliary genset and controls.

“What we’ve learned in collaborating with vessel operators, naval architects, and shipbuilders is that there truly is not a single solution that fits all applications. What is appropriate for a passenger vessel won’t meet the needs of a tug, for example. Flexibility is key,” says Watson.

“This is why we’re focused on fuel flexibility and multiple power options that can be customized for a vessel’s unique needs. Holistic marine power solutions that allow optimal transit speeds, improved fuel efficiency, and lower operating costs are a top priority. Lower-carbon intensity fuels are crucial for this reason and complement battery power to create reliable hybrid solutions that reduce diesel fuel consumption.”

Oskar Levander, VP Strategy and Business Development, Kongsberg Maritime, says: “The market trends we’re seeing toward larger energy storage systems and alternative fuels aren’t theoretical — they’re already appearing in advanced vessel projects.” A stand-out example is Kongsberg Maritime’s new UT7623 SEV (Sustainable Energy Vessel) design for Olympic. The vessel owner has ordered two multipurpose subsea vessels which combine methanol-ready dual-fuel engines with a hybrid battery system.

The UT7623 SEV can operate in battery-only mode for zero-emissions in port, use the batteries as spinning reserve to allow fewer engines online at optimal load, and smooth load fluctuations to enhance engine performance and extend maintenance intervals. For offshore operations, the energy storage system can deliver extra power for high-demand moments — such as ROV deployment or maneuvering in heavy seas — without oversizing the main engines.

Levander says Olympic’s choice of a

fully integrated package from Kongsberg Maritime — including rim-drive propulsion, retractable azimuth bow thrusters, hybrid-ready power distribution, and advanced automation — demonstrates that the most efficient solution comes from treating energy storage and

new fuels as part of a single, unified system architecture.

Energy storage systems enable the installation of larger power take off (PTO) systems. The size of a PTO is usually limited to a certain maximum percentage of the engine power to ensure the engine

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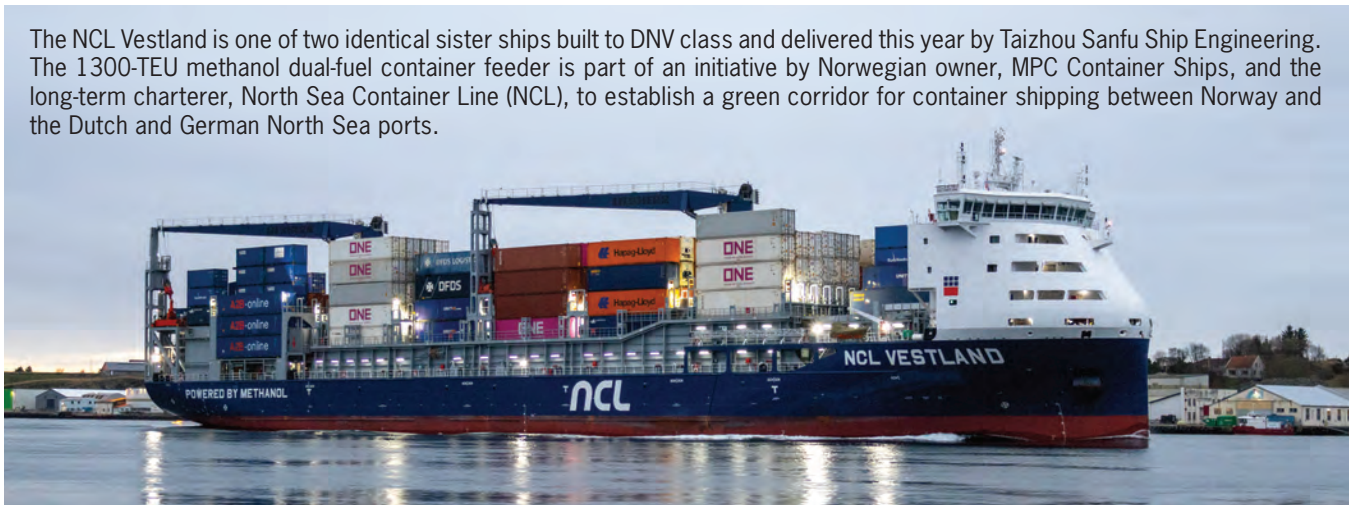
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Kongsberg Maritime's new UT7623 SEV (Sustainable Energy Vessel) design for Olympic.

Image courtesy NCL



The NCL Vestland is one of two identical sister ships built to DNV class and delivered this year by Taizhou Sanfu Ship Engineering. The 1300-TEU methanol dual-fuel container feeder is part of an initiative by Norwegian owner, MPC Container Ships, and the long-term charterer, North Sea Container Line (NCL), to establish a green corridor for container shipping between Norway and the Dutch and German North Sea ports.

can cope in all situations, but with a battery system, a larger PTO can be installed while still enabling smooth operation of the engine by taking up sudden load peaks and fluctuations.

Under FuelEU Maritime rules, battery operation with shore power counts as zero emissions, generating a compliance surplus that can be pooled or sold. For vessels like the UT7623 SEV, this means the batteries are not only an environmental asset but also a financial one, offsetting the higher cost of alternative fuels.

The Olympic case reinforces the importance of planning for charging infrastructure. While these vessels are designed to be methanol-ready and globally capable, their full low-carbon potential will depend on the availability of shore power in the ports they serve — a challenge the entire industry must address, says Levander.

Electrical installations are becoming increasingly complex as new types of power sources and loads are added to systems, in contrast to traditional installations where the load and machinery configuration are well understood, says Jin Wang, Director – Energy Transition, Technology Americas, ABS. New power system architecture, such as medium-voltage direct current (MVDC), also requires new understanding of protection and safety management by designers and operators.

In August, ABS issued a new technology qualification cer-

tificate to HD Korea Shipbuilding & Offshore Engineering and HD Hyundai Heavy Industries for their MVDC power system for ships. MVDC technology is generally operated at 8kV DC to 11kV DC and is particularly suitable for large vessels that require tens of megawatts of power.

“The MVDC power systems provide a promising solution for performance improvement in hybrid and all electric power systems, especially for large vessels,” says Wang. The absence of frequency constraints in DC systems allows for smaller and lighter generators, transformers, and switchgear, contributing to overall ship weight reduction. Energy efficiency is improved by reducing power losses from generation to propulsion, and it enables seamless integration of diverse power sources such as diesel engines, fuel cells, renewable power sources, and li-ion batteries.

New designs continue to emerge, and the trend for electrification, batteries, and new fuels is extending beyond smaller and short-sea vessels. As well as providing classification for the Grande Shanghai, RINA recently granted approval in principle for a wind-assisted, battery-assisted, dual fuel LNG/hydrogen-powered ultramax bulker design developed by Almi Marine Management and SDARI.

The new concept redefines propulsion in merchant shipping, says RINA.



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COMING TO AMERICA: C-JOB HOUSTON GROWS

When **Heidi Landen Greene**, President, C-Job Houston, left ABS to take the top spot at C-Job Houston a year ago, the mission was clear: help grow the office from a sales outpost for the Dutch-headquartered naval architecture and marine engineering firm and offer more engineering support, services and design. With **Maritime Reporter TV** she discusses the mission, the markets, success to date and opportunities ahead.

By Greg Trauthwein

When Heidi Landen Greene first stumbled across Webb Institute in a college directory, she had no idea that the decision to apply would chart the course of a career in naval architecture and maritime engineering. Today, as President of C-Job Houston, she is leading the U.S. growth story of a Dutch-headquartered naval architecture and marine engineering firm that is increasingly active across the U.S. Gulf Coast and beyond.

From Webb to Houston

Like many in the field, Greene's career began with a knack for math and science, but it was the uniqueness of Webb Institute: small class sizes, full scholarships, annual internships, and a waterfront campus, that made her take the leap. "It was one of the best decisions I've ever made," Greene says, noting the way Webb combined rigorous academics with hands-on industry experience.

After building a strong foundation at Webb, Greene went on to a long career at the American Bureau of Shipping (ABS), where she honed her expertise in classification and safety. But like many professionals during the pandemic, she reevaluated her trajectory and pursued an MBA at Rice University. That new skill set, paired with her engineering background, led her to C-Job, where she saw the chance to blend business leadership with technical impact. "C-Job is an incredibly entrepreneurial place," she explains. "It was the perfect combination of running a business while applying my technical roots."

C-Job by the Numbers

Founded in The Netherlands, C-Job has built a reputation for forward-thinking vessel design and environmental innovation. The company today employs about 200 people across eight offices in six countries, delivering 182 projects last year alone, with a cumulative 80,000 engineering hours dedicated

to decarbonization and emissions reduction.

Known globally for its expertise in dredging vessels, C-Job also provides a wide spectrum of design and engineering services for ferries, offshore energy support vessels, cruise ships, and specialized government projects. Its portfolio includes contributions to some of the world's most advanced offshore wind installation vessels, such as DEME's Orion and Green Jade.

Rebooting C-Job's U.S. Office

C-Job established its Houston office in 2019 to better connect with U.S. clients. Originally envisioned as a sales and coordination hub, the office is now pivoting under Greene's leadership to provide direct engineering services stateside.

"Our goal is to meet clients where they are," Greene says. "Shipyards and owners along the Gulf Coast consistently tell us they're short on engineering capacity. That's where we step in, helping with smaller backlog projects, providing quick-turn-around support, and being a local partner they can count on."

This shift underscores C-Job's recognition of the unique challenges and opportunities in the U.S. market, where demand is growing but skilled engineering and labor resources are stretched thin.

U.S. Shipbuilding in Flux

C-Job's U.S. expansion comes at a pivotal time. With renewed attention on shipbuilding from policymakers and new investments flowing into yards, the outlook is promising, but not without hurdles.

"There's a lot of excitement and talk right now," Greene notes. "But to make it real, we need to solve the workforce challenge. We can design all the vessels in the world, but without skilled tradespeople to build and operate them, they're just drawings on paper."

Greene points to workforce training as one of the most critical national conversations. "This industry offers incredible opportunities for families and communities. If we can align training with the demand we know is coming, the U.S. maritime sector has a very bright future."

Opportunities Ahead

Dredging remains a core strength for C-Job. In the U.S., the market is both robust and complex, shaped heavily by U.S. Army Corps of Engineers funding cycles and unique vessel requirements. "The U.S. dredging market is strong, but building new dredges is expensive," Greene explains. "Challenges with financing, bonding, and contracting remain, and tariffs and interest rates make it tougher."

Newbuild activity is only one part of the equation, as retrofits present near-term opportunities. "We're seeing solid demand for upgrading existing hulls with more efficient systems, electrical modernization, and emissions-reduction technologies," Greene says. C-Job is currently engaged in such



Image courtesy DEME

retrofit work, helping operators extend the life of assets while improving efficiency.

C-Job's ambitions in the U.S. extend well beyond dredging. Greene highlights opportunities in government contracts—notably with NOAA and the Army Corps—as well as in ferry and cruise vessel design, where the firm's European experience with battery-powered and low-emissions ferries could translate well to U.S. needs.

She also sees a role for C-Job in the Gulf of Mexico's growing offshore decommissioning market, where nimble engineering support for sea fastening, structural modifications, and project-specific solutions is in demand.

For Greene, the past year has underscored the tangible impact of C-Job's designs. She recalls the pride of watching DEME's Orion sail out of Virginia to begin monopile installations at Dominion Energy's offshore wind farm. "There's nothing like seeing your company's work in action on such a visible, high-impact project," she says.

Closer to home, C-Job has been a design partner on Great Lakes Dredge & Dock's (GLDD) new trailing suction hopper dredges, Galveston Island and Amelia Island—the most advanced of their type in the U.S. fleet. Galveston Island is already in operation, while Amelia Island is nearing delivery. "These vessels are state-of-the-art, and being part of their journey has been a proud milestone for our team," Greene says.



CARSTEN LUND STEPS UP: SunStone Maritime Group's Next Generation

*From a career in aviation to a career in maritime, **Carsten Lund** took over recently as the head of Sunstone Maritime Group, a ubiquitous brand in the expedition cruise sector that was created and built for more than 35 years by his father **Niels-Erik Lund**. The gradual transition of leadership has been three years in the making for Sunstone, and today Carsten and his brother **Christian Lund**, COO, sit at the helm. He shares with **Maritime Reporter TV** his vision for the future of the company, including a status on the new series of Boundless class ships, with the aim of signing a shipbuilding contract by year's end.*

By Greg Trauthwein

When Carsten Lund was appointed CEO of SunStone Maritime Group in July, the promotion was more of a formality than a turning point. For more than a year, Lund and his brother had already been steering the family-owned business founded by their father, maritime veteran Niels-Erik Lund. Yet the transition still marked the end of an era and the start of a new chapter for a company that, over the past 35 years, has grown into the world's largest tonnage provider to the expedition cruise industry.

For Carsten, the path to the helm was far from straightforward. Unlike his brother, who joined the company in 2008, he charted a different course before entering maritime—one that began in the skies.

"I spent 20 years in aviation, working in air traffic control in Copenhagen," Carsten explains. "In my early days, I never

thought I would have a career in the maritime industry."

His vantage point, however, allowed him to watch SunStone grow from a fledgling ship management venture into a specialized powerhouse under his father's leadership. In 2021, Niels-Erik called a family meeting to discuss the company's future. With retirement approaching, the options were clear: sell the company, bring in an outside CEO, or transition leadership to the next generation.

Carsten and his brother did not take the decision lightly.

"We were both of the opinion that either we go all in, both of us, or we don't do it at all," he said. After weeks of deliberation, they committed to carrying forward the family legacy. Carsten left his aviation career, joined SunStone full time in 2022, and began a gradual transition of responsibilities.

That measured approach has paid off. "By the time I was

appointed CEO, nothing much changed from Monday to Tuesday,” Carsten says. “The leadership had already been in our hands for some time. It was a natural step.”

SunStone at 35: From Cruise Management to Expedition Specialists

SunStone’s story begins in Miami in 1990, when Niels-Erik Lund founded the company with a vision to charter out cruise ships. By the late 1990s, SunStone was managing 22 ships, making it the largest independent passenger ship manager in the market.

But in 2003, the company pivoted strategically toward expedition cruising—a decision that would define its identity for decades to come. Its first two expedition ships were acquired in 2004, and by 2015 the fleet had grown to a dozen vessels, all secondhand acquisitions.

In 2012, another key decision reshaped the company’s focus: SunStone stepped away from third-party management to concentrate solely on its owned fleet. Five years later, the company launched its first-ever newbuild program, the Infinity-class vessels, which today form the backbone of its fleet.

Headquartered in Denmark but with enduring roots in Miami, SunStone remains true to its model as a tonnage provider — owning, crewing, and maintaining expedition cruise ships while chartering them out long-term to operators. “We’re not a cruise line,” Carsten emphasizes. “We don’t sell tickets. We provide the ships and the crew, so our clients can focus on the passenger experience.”

Renewing the Fleet

Fleet renewal has been central to the company’s strategy in recent years. Today, SunStone operates nine ships, five Infinity-class newbuilds and four older vessels retained from earlier acquisitions. “We’ve worked hard to lower the average age of the fleet from 30 years to 17,” Carsten says. “That’s a significant improvement, and we’ll continue to renew with more newbuilds while retiring older tonnage.”

The company sold two aging ships over the past 18 months for recycling, and further retirements are expected. Still, Carsten notes that select older vessels remain competitive thanks to upgrades such as modern engines and efficient designs. “It’s about striking a balance—keeping vessels that are relevant in today’s market while positioning ourselves for the future.”

Infinity-Class: A Milestone Program

The crown jewel of SunStone’s fleet renewal has been the Infinity-class program, a seven-ship newbuild series launched in 2017. The first vessel delivered in 2019, followed by two in 2021, two more in 2022, and another in 2023. The final ship of the series, Douglas Mawson, was delivered in September 2025.

“These vessels have been a tremendous success,” Carsten says. “They’ve allowed us to cut the fleet’s average age in half and bring state-of-the-art expedition ships into service with



Image credit Fiona Wardle Aurora Expeditions

our clients.”

Built with advanced safety, fuel efficiency, and green technologies, the Infinity-class vessels embody SunStone’s philosophy of long-term planning and client-focused customization.

Boundless-Class: The Next Chapter

Even before Douglas Mawson joins the fleet, SunStone is preparing its next series: the Boundless-class.

“The Boundless is built on the success of the Infinity, but in a slightly larger package,” Carsten explains. At 125 meters in length compared to the Infinity’s 104, the new class will accommodate 200–300 passengers in standard layouts, or fewer in more luxurious configurations.

Key features will include safe-return-to-port systems, zero-speed stabilizers, virtual anchoring, and a suite of fuel efficiency and sustainability measures. Flexibility will be a hallmark: while the ships will share identical technical platforms below the waterline, their superstructures and interiors will be tailored in collaboration with clients.

“Everything below the waterline will be the same, but above, they could look very different,” Carsten notes. “That allows us to offer clients real flexibility while maintaining efficiencies of series construction.”

Discussions with shipyards are in the final stages, with a contract expected by year-end. The first Boundless-class vessel

INTERVIEW



L to R: Carsten Lund, Niels-Erik Lund. & Christian Lund



Watch the full interview
with Carsten Lund, CEO,
Sunstone Maritime Group,
on Maritime Reporter TV:



Specification	Infinity Class	Boundless Class
Length Overall	104 m	125 m
Beam (approx.)	~18 m	Wider (approx. 20 m)
Passenger Capacity	130–200 (depending on configuration)	200–300 (standard); ~100–150 in luxury layouts
Year Introduced	2019 (first delivery)	2028 (planned first delivery)
Number of Vessels	7 (Douglas Mawson delivering 2025 completes series)	Planned series (multiple ships, delivery every 6 months post-2028)
Polar Class	PC6 (Polar Class 6, Ice-strengthened)	PC6 (same standard, suitable for polar regions)
Stabilizers	Zero-speed stabilizers	Zero-speed stabilizers (enhanced)
Key Technology Features	Safe-return-to-port; virtual anchoring; high fuel efficiency	Same core features + expanded outdoor deck space, larger superstructure flexibility
Design Flexibility	Interior layouts tailored with clients	Interior and exterior customization; identical below waterline, varied above
Operational Focus	Expedition cruising in polar and remote regions	Expedition + warm-water cruising; designed for global deployment



Image courtesy Sunstone

could deliver by fall 2028, followed by additional units at six-month intervals.

Expanding Horizons: Beyond Polar Expeditions

SunStone's fleet is designed for global deployment, from the icy extremes of Antarctica to the sun-drenched ports of the Mediterranean. While expedition cruising has traditionally been centered in polar regions, Carsten sees new opportunities.

"We've seen an increase in interest from warm-water operators," he says. "There's strong demand for small ships that can access ports the large cruise liners cannot."

Hotel operators are also eyeing the sector, seeking to create intimate, up-scale cruise products in Europe and other regions. The adaptability of SunStone's designs — expedition-capable but equally suitable for warm-water destinations — positions the company to tap into these emerging markets.

If there is one theme that defines SunStone's leadership transition, it is continuity. Carsten is quick to credit his father's guiding principles, which remain central to the company's identity: long-term thinking, relationship-building, and steady growth.

"Our father always taught us to play the long game," Carsten says. "This isn't about making a quick profit. It's about building relationships that last decades and ships that will sail for 40 years or more."

While generational shifts inevitably bring new ideas and approaches, Carsten emphasizes that the company's direction

remains unchanged. "We're proud of what has been built and want to honor that legacy. The tools may evolve, the markets may expand, but the core values stay the same."

Looking Ahead

With the Infinity-class nearly complete and the Boundless-class on the horizon, SunStone Maritime Group is entering a new growth phase under its next-generation leadership. The strategy is clear: maintain focus on expedition cruise ships, expand into new markets,

and keep building vessels that can operate "anywhere in the world."

As Carsten reflects on the journey so far, the excitement is palpable. "It's been an honor to take on this responsibility," he says. "We're building for the long term—ships that will sail for decades, and relationships that will last just as long."

For SunStone, the voyage continues—anchored by family heritage, steered by a new generation, and propelled by a fleet purpose-built for the future of expedition cruising.

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Crushing Ice

Russia-China Dynamics & the Icebreakers Market

By Alisa Reiner

The Arctic is no longer a remote expanse beyond the edges of global commerce — it is now a contested arena where strategic competition, energy development, and maritime innovation converge. As climate change accelerates sea ice retreat, previously impassable waters are opening to navigation for longer periods each year. This change unlocks shorter trade routes, exposes massive untapped hydrocarbon and minerals reserves, and creates demand for ships able to operate in some of the harshest conditions on Earth.

In this evolving environment, icebreakers are more than just engineering feats — they are geopolitical tools. Nations that control them can escort commercial shipping, supply remote installations, and assert sovereignty over Arctic waters. What is now emerging, however, is a geopolitical contest between

the seven Arctic NATO member states and Russia, alongside China — which, though not an Arctic state, is increasingly asserting its interests in the high north.

For shipbuilders, equipment manufacturers, and maritime service providers, these developments signal one thing: demand for ice-class vessels — particularly heavy icebreakers — is set to increase.

Geopolitical Context: Russia and China in the Arctic

For Russia and China, both aiming for dominant position in global trade and energy, cooperation in the Arctic offers economic and strategic benefits. Russia and China describe their relationship as a “comprehensive strategic partnership,” one that extends to the Arctic. But behind the diplomatic language



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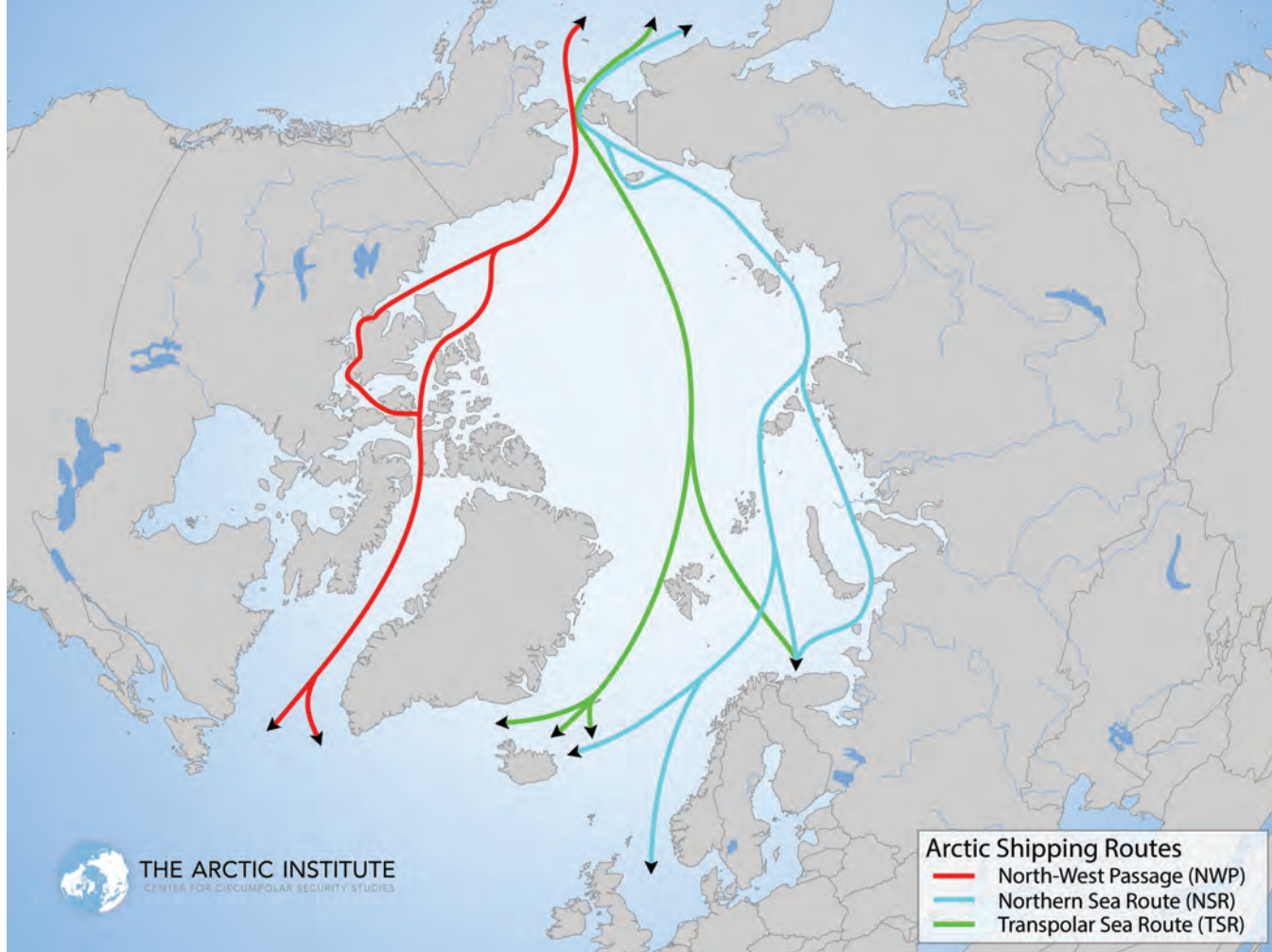
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and on-the-ground engagement lie significant differences in priorities, strategies, and trust levels.

China's Arctic ambitions began to take shape in the early 2010s, motivated by its reliance on maritime shipping and energy imports. In 2013, after agreeing to respect Arctic sovereignty and navigation rules, Beijing secured observer status on the Arctic Council. Its 2018 Arctic white paper formally declared China a "near-Arctic state" and integrated the region into the Belt and Road Initiative as the "Polar Silk Road." Officially, China emphasizes scientific research, environmental protection, and commercial activities — with no public mention of military ambitions. Russia, by contrast, treats the Arctic as a sovereign domain. Its priorities center on resource exploitation, military presence, and the Northern Sea Route (NSR) as a domestic shipping lane.

This divergence has historically limited cooperation outside of energy projects. Yet mutual needs have kept certain partnerships alive. After sanctions lim-

ited Western investment in 2014 and cut it off in 2022, Chinese financing became more vital for Russia's Arctic oil and gas projects. In July 2023, the two countries launched a regular shipping corridor through Arctic waters, completing 80 voyages in its first year.

The Arctic LNG 2 project demonstrates the fragility — and resilience — of such cooperation. The \$20+ billion venture was sanctioned by the United States in late 2023. China's Wison New

Energies announced its withdrawal in June 2024 under Western pressure, but by August, Chinese ships were covertly delivering massive power-generation modules to the Russian site, even changing vessel names mid-route to avoid detection.

The 13th China–Russia Arctic Workshop in October 2024 further revealed underlying differences. Russian participants emphasized military cooperation and resource development, while Chi-

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nese delegates prioritized energy and shipping routes alongside technological innovation. Both sides agreed that technology — from AI-based monitoring to submarine cable systems — will drive future cooperation, but Russia focused on carbon emission management, resource extraction, and economic development, whereas China stressed using technology to deepen its international Arctic engagement.

These differences matter for icebreaker collaboration — Russia sees them as tools for sovereignty and economic control; China views them as enablers of trade access and technological prestige.

The Northern Sea Route and Infrastructure Push

The NSR runs the length of Russia's Arctic coast — 24,140 kilometers (almost 15,000 miles) — linking the Barents Sea to the Bering Strait. In optimal conditions, it can cut travel time between Asia and Europe by up to 40% compared to southern routes.

Hence, for Russia the NSR offers market diversification and logistical opportunities, while also unlocking greater access to offshore Arctic resources and reinforcing its security, geopolitical influence, and economic development. For China, whose southern trade routes pass through U.S.-influenced chokepoints like the Strait of Malacca and Suez Canal, the NSR offers both strategic independence and economic efficiency. Access to Arctic hydrocarbons — estimated at 30% of undiscovered natural gas and 13% of undiscovered oil — is an added incentive.

But infrastructure alone cannot make the NSR viable year-round. Ice conditions still restrict navigation for much of the year. Russia has invested in ports, logistics hubs, and advanced navigation systems, but without sufficient icebreaker escorts, traffic volumes will remain seasonal. The NSR's future as a commercial artery will ultimately depend on the pace of icebreaker construction.

Shipbuilding and Icebreaker Demand

Russia's icebreaker fleet — the largest in the world — includes nuclear-powered Project 22220 vessels (Arktika, Sibir, Ural) designed to penetrate ice up to three meters thick at a speed of 22 knots in clear water, diesel-electric models, and aging Soviet-era ships. The next generation, expected to come online around 2030, will center on the massive icebreakers, designed to break through ice up to 4.3 meters thick and clear a channel up to 50 meters wide for extended navigation seasons.

Industry plans call for as many as 15–17 nuclear icebreakers to meet projected cargo volumes of 100–150 million tonnes, driven largely by LNG, crude oil, and metals exports from the Arctic. This will require sustained investment in new construction, maintenance, and repair capacity — areas where sanctions have already created bottlenecks.

Sanctions have slowed these ambitions — historically reliant on Finnish yards for high-end builds, Russia is now pushing domestic production, but delays linked to restricted access to Western propulsion systems, high-grade steel, and marine electronics

have slowed progress. China has the industrial capacity to step in, but Moscow's longstanding caution in transferring its nuclear propulsion know-how remains a point of friction. Cooperation has therefore focused on ice-class LNG carriers and conventional ice-capable cargo ships, areas where Chinese shipyards have proven capabilities and may expand into auxiliary systems, modular construction, and non-nuclear propulsion integration.

Outside the Russia–China axis, the West is also scaling up. In November 2024, the United States, Canada, and Finland signed the Icebreaker Collaboration Effort (ICE) Pact, pooling resources for Arctic and polar icebreaker development. At a March 2025 meeting in Helsinki, the partners outlined cooperation on design innovation, workforce training, and research and development.

Strategic Outlook

The Arctic icebreaker market is at the center of a broader strategic competition. Russia seeks sovereign control and resource dominance; China looks for diversified trade routes and a technological foothold; the West aims to counter both through alliances like the ICE Pact.

For the maritime industry, this “push–pull” dynamic presents both risks and opportunities. On one side is a Russia–China bloc developing icebreakers outside Western supply chains. Russia's need to modernize and expand its icebreaker fleet ensures long-term demand for hulls, coatings, propulsion units, navigation systems, and cold-weather operational gear. China's own ambitions under the “Polar Silk Road” will likely drive parallel demand for commercial and research icebreakers, supported by provincial-level shipbuilding initiatives.

On the other, Western-led initiatives such as the ICE Pact will compete for technological leadership, setting new design and performance benchmarks. This bifurcation of the market means suppliers in propulsion systems, ice-resistant materials, autonomous navigation, climate-adapted radar, and nuclear marine engineering could find demand on both sides — if they navigate export control regimes carefully.

In short, while the Russia–China Arctic relationship is not seamless, its very frictions may expand the overall icebreaker market by driving both states to invest heavily in parallel capabilities. For builders, component manufacturers, and service providers, the Arctic icebreaker sector over the next decade will be one of the few maritime domains where geopolitics, climate change, and industrial strategy align to sustain high-value demand.

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Sustainable Fuel Chicken and Egg Redux. Maybe Some Ports Can Fix It.

By Rik van Hemmen

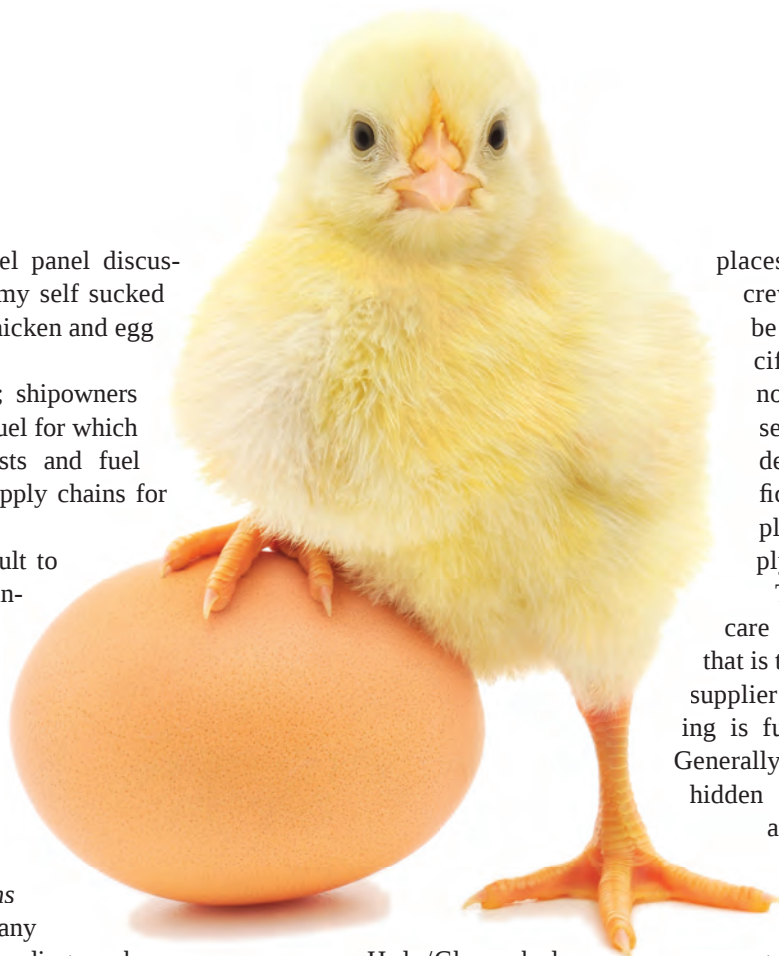
In a recent sustainable fuel panel discussion, I once again found my self sucked into the sustainable fuel chicken and egg conundrum.

I have discussed it before; shipowners will not buy ships that use a fuel for which no viable supply chain exists and fuel suppliers will not develop supply chains for which no buyers exist.

In general, it is very difficult to break a chicken and egg conundrum, except through a direct directive or through, often, very large, subsidies.

Direct directives often leave the problem solution to the market. As such, when IMO tells shipowners ‘*thou shalt achieve such and such maximum CO2 emissions by such time*,’ there may be many solution approaches and depending on how the ships fall (pun intended) there could be one or more dominant solutions. However, there is no guarantee that these solutions are optimal.

One of those solutions may be a very dangerous fuel that happens to be most economical to a specific ship owner, but



places unfair burdens on crews. Another fuel may be useful in one specific segment, but does not interact with other segments and thereby develops inherent inefficiencies with the suppliers who need to supply multiple fuels.

The public may not care and simply say, well that is the shipowner and fuel supplier’s problem, but nothing is further from the truth. Generally, that truth remains hidden for a period of time and then a major disaster occurs and we are off to the Exxon Valdez/Ozone Hole/Chernobyl races again.

The public should have a say in the solution, but the public as a whole is very bad at coming up with solutions. So is government. Is there anything out there with sufficient power to at least drive the solutions into a rational and equitable direction?



Image above © Anatolii/AdobeStock

While shipowners are discussing sustainable fuel options, so far, I have not noticed any such discussions by the ports. Interestingly ports may be able to break the chicken and egg conundrum. Sustainable fuels are not just ship concerns, they are also very much shore-based concerns where the fuel need to be manufactured, stored and distributed and not just for ships. Ideally such fuels should also support shore based stored fuel needs.

This may suggest that a major port may be the chicken and egg breaker by simply stating: "We have looked at all the aspects of sustainable fuel and we think it should be Fuel X and will only support that fuel."

Interestingly there is a relatively recent and very powerful example where one player made a statement like this, and changed the world very much for the better. It occurred in the US OPA90 decision to only allow double hull tankers into its ports. The USCG let the market argue for a little, suggested that they would only allow double hulls and even told the market that they would accept solutions that were superior to double hulls. When no one came up with a better solution the USCG simply told ship owners operating in US ports that double hulls would be required.

Nobody knows if double hulls actually were the best solution (actually, ironically, the best solution is getting rid of fossil fuels), but this one powerful player quickly made the rest of the world follow suit. And the world became a much better place.

In this case one power player is not enough, that would be like somebody inventing email but not having anybody to email with. Email worked because a small group of smart people started to use it and then set the example for the rest of the world.

As such, from a game theory point of view we should find a small group of influential players who get together, do the hard work, and come up with an approach that serves all best.

Such players need to be big but do not have to rule the world. It would appear to me if, say, New York and Rotterdam agree on the optimal fuel, and then make a commitment to only support that fuel, that the adoption of that fuel would spread. If LA/Long Beach, Singapore and Shanghai support the same fuel it will almost certainly lock in on a worldwide basis.

This may not be easy, but let me paint the alternative. Ship-owners are running helter skelter between different fuels, and every port makes a minor investment in all of those fuels and sure enough we will have the same fuel mess we have lived with in the last 50 years and which has only gotten worse with IMO directives (Low sulfur, biodiesel, LNG).

We can do better, if we agree on one sustainable fuel and go from there, we can gain great efficiencies and save untold billions. Undoubtedly the pinheads (engineers like me) will argue one fuel is theoretically more efficient than another in certain circumstances. However, specific efficiency is not the same as full system efficiency. Even if one fuel is somewhat less efficient or somewhat more expensive, once considered on an overall system level it almost undoubtedly will be more efficient if it is the single sustainable fuel.

Interestingly, Ports are the multiplayer interactive location that can best identify the best overall efficiency solution. Let's deconfuse the ship owners, and let the Ports provide a clear course on sustainable fuels. At the very least, let's hear from the Ports what would make them happy. Happy ports; Happy ships; Happy public.

For each column I write, **MREN** has agreed to make a small donation to an organization of my choice. For this column I choose the Maritime Association of the Port of New York and New Jersey, <https://www.nymaritime.org/> Their alternative fuels panel is making a first pass at this issue.



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Propane's Economic Edge for Ports During Trade Uncertainty

Lower, more predictable costs help ports manage expenses amid economic stress

By Jim Bunsey, Propane Education & Research Council

Trade has been a rollercoaster recently. Between the unpredictability of tariffs and uncertain economic outlooks, ports have faced big swings in trade volume as well as pressure to do more with less. Operational efficiency and cost control are critical, which is why propane continues to emerge as a cost-effective, dependable energy solution that offers significant economic advantages for port terminal operators looking to stay ahead during uncertain times.

Lower and More Predictable Fuel Costs

One of the largest variable costs in port operations is fuel. Diesel and gasoline prices can be heavily impacted by the global oil market, which can be affected by several factors like international conflicts, policy changes, tariffs, and more. Propane, on the other hand, is predominantly produced domestically here in the United States, so it benefits from a more stable supply chain and fewer price fluctuations. Compared to diesel and gasoline, propane helps protect ports from sharp



Image courtesy PERC

price spikes that can quickly consume their annual fuel budget for the year. Propane suppliers can also offer port operators mutually beneficial long-term fuel contracts, improving budget predictability and planning. And on a per-gallon basis, propane usually beats the price of diesel, sometimes by as much as 50 percent.

West Basin Container Terminal

(WBCT) at the Port of Los Angeles has been running propane terminal tractors for over 20 years, and after switching from diesel to propane, the terminal went from \$1,519,217 in annual diesel costs to \$1,150,922 in annual propane costs. That's around a 25 percent savings that the port could reinvest in its operations.

The upfront investment cost in pro-



pane equipment also tends to be lower than new electric equipment. Based on a 2021 assessment of the San Pedro Bay terminals at the Ports of Los Angeles and Long Beach, the purchase price for near-zero emission propane terminal tractors is significantly lower than electric tractors at approximately \$150,000 in comparison with electric's \$320,000 per unit.

Reduced Infrastructure and Maintenance Costs

Propane refueling infrastructure also tends to cost much less than electric, which may require recharging stations and grid upgrades. Propane infrastructure is cost effective, scalable, and quick to deploy. Not only can large operations store over 100,000 gallons of propane on-site, but refueling stations can be installed with a relatively low upfront investment and scaled to meet port-specific needs. Propane also doesn't degrade over time like gasoline and diesel, so large reserves can be stored for long periods.

Propane engines also generally require less maintenance than diesel engines. For example, there's no need for expensive aftertreatment systems such as diesel exhaust fluid or diesel particulate filters. This further reduces long-term maintenance costs on parts and labor, as well as less vehicle maintenance downtime.

Improved Equipment Uptime and Productivity

With a volatile trade environment, there have been periods of record volume flowing through ports. For example, July 2025 was the busiest month on record at the Port of Los Angeles. Getting ships unloaded quickly and efficiently is critical, and equipment downtime is a hidden cost that can disrupt schedules and erode profit margins.

Propane-powered equipment can perform all day, carrying heavy loads without loss of power or speed. Today's propane terminal tractors are currently the only near-zero emission fuel technology platform capable of meeting marine terminal operators' endurance needs — traveling consistent speeds and distances no matter the cargo weight.

Meanwhile, a single propane cylinder can power a forklift for an entire eight-hour shift without losing power or speed. Cylinders can also be swapped out in a matter of minutes. On the contrary, most electric batteries cannot last

for a whole shift, requiring operators to stop and recharge or swap out a battery. This higher uptime and faster turnaround for propane material handling equipment means more efficient operations, better use of labor resources, and increased output.

Energy Security and Operational Resilience

Another major factor with the potential to disrupt operations is electrical grid instability. And increased power demand, aging infrastructure, and severe weather are making power outages more common by the day. The risk of electric grid failures is particularly concerning for ports located in large population centers where electricity demand is high and in regions with higher risk of natural disasters. According to a recent report from the Department of Energy, blackouts in the U.S. could increase by 100 times by 2030 if nationwide electrical infrastructure isn't expanded and upgraded. For ports, grid outages can disrupt communications, IT systems, and other essential services, in addition to preventing electric terminal tractors and forklifts from recharging.

Propane provides ports with an off-grid solution that reduces dependency on the grid. With onsite propane storage and backup propane-powered generators, microgrids, and shore power, ports can keep critical electric systems running even when the grid goes down. Likewise, while propane-powered equipment is completely protected from grid disruptions, even electric forklift and terminal tractor fleets can benefit from propane-powered EV charging capabilities.

Weathering the Waves of Global Trade

As economic uncertainties and tariff whiplash continue to affect the volume of goods coming into U.S. ports, controlling costs and maximizing efficiency are critical for maintaining port operations. Propane power is one way in which ports can achieve lower and more predictable fuel costs, affordable infrastructure, minimal maintenance downtime, and resilience during power disruptions.

Whether ports have been utilizing propane equipment for decades or are looking to upgrade their operation, propane is a strategic asset that can help ports weather whatever global trade has in store.



Navy Cargo Handling Battalion Sailors are Expeditionary Cargo Experts

Moving combat cargo — swiftly and safely — is a critical link in Navy's long and complex supply chain to support warfighters on the front lines. The job is accomplished by specialized Navy Cargo Handling Battalions that help to transfer cargo at critical links in the chain.

By Edward Lundquist

Navy Cargo Handling Battalion ONE (NCHB-1), based at the Camp Peary annex of Naval Weapon Station Yorktown, is one seven cargo handling battalions in the Navy that are tasked with loading and off-loading military cargo at remote locations and under austere conditions.

According to Commanding Officer Capt. James McPeake, NCHB-1 is “currently the sole active-duty NCHB in the U.S. Navy unit under Navy Expeditionary Logistics Support Group (NAVELSG), which is part of Navy Expeditionary Combat Command (NECC). We’re organized, trained and equipped to load and off-load Navy and Marine Corps

cargo carried in military controlled aircraft, maritime pre-positioning ships and merchant or container ships in all environments, and operate associated temporary expeditionary air and ocean cargo terminals.”

McPeake is a Supply Corps Officer. While they serve everywhere in the Navy, Supply Corps assignments are usually in a logistics support role. However, McPeake said his job is “heavy on the operational.”

Navy cargo handlers must know how to operate a variety of loading equipment, the proper techniques for lifting and stowing cargo, and the correct handling of hazardous materials. According to a news release from Navy Fleet Forces



NCHB 1 Sailors help with cargo offload operations as Military Sealift Command chartered ship MV Ocean Giant delivers supplies in support of Operation Deep Freeze 2025.

Photo by Marie Morrow, Military Sealift Command Pacific



Command, “these Sailors must be physically strong and able to follow orders under stressful, often dangerous conditions. In wartime, these combat ‘stevedores’ load and unload vital cargo, often under the threat of enemy fire.”

“Expeditionary logistics allow the Navy to quickly return to maintaining maritime dominance. Our Sailors are trained to operate globally and thrive in littoral environments to rearm, refuel, resupply, repair and revive naval forces to stay in the fight,” said Rear Adm. Brad Andros, commander, NECC.

Surface cargo is one of our biggest missions,” said Senior Chief Boatswain’s Mate Radcliffe Brown, NCHB-1’s training chief. “We equate ourselves to longshoremen or the port stevedores that you would find at any major harbor. But we carry out that function just about anywhere in the world, including done in expeditionary, small-harbor environments.”

The battalion works with the Military Sealift Command (MSC) and Maritime Administration to load or offload ships from the Maritime Prepositioning Force (MPF), Maritime Administration Ready Reserve Force (RRF), or other MSC ships and chartered vessels.

For example, NCHB-1 supports the annual Operation Deep Freeze resupply mission in Antarctica.

“We’ve been doing that since late 1950s when the mission started. Military Sealift Command (MSC) charters a vessel every year. It’s an ice hardened cargo container ship, and they fly our cargo handlers down to McMurdo Sound,” Brown said. “We offload all the supplies that are needed to support all the National Science Foundation sites in Antarctica. Typically, it’s somewhere around 1,000 containers that come off the ship. And then we backload all the trash, science experiments, and everything that’s coming out back onto the vessel. It’s a pretty big mission, obviously, everybody’s always excited to go on that.”

Brown said the battalion supports the Marine Corps preposition program, which are ships loaded with the weapons, vehicles and supplies that a Marine Expeditionary Brigade would need to sustain themselves for 30 days. “We are the cargo enablers for offloading any cargo containers or lighterage craft, which are the ship-to-shore connectors that are operated by the Amphibious Construction Battalions. Naval Beach Group is the lead naval support element for that.”

The battalion of 345 officers and Sailors assigned has steady work that keeps their skills sharp. NCHB-1 has a training complex with various types of cargo and handling vehicles



Equipment Operator 2nd Class Joseph Birl, assigned to Navy Cargo Handling Battalion ONE (NCHB-1), guides Engineering Aide 2nd Class Miya Roman, assigned to Navy Cargo Handling Battalion ONE (NCHB-1), transporting ISO containers with a Kalmar 53K, August 10.

and equipment to provide hands-on training and experience. In turn, the battalion provides training to the other NCHBs.

“When MSC ships go into maintenance their maintenance availability, they’ll pull into the Blount Island facility in Jacksonville, Florida. We’ll send a Surface Cargo Company to help offload the cargo. Our teams work with the master of the ship and the port superintendent to move containers and breakbulk cargo. Often times we’re needed to transfer the INLS (Improved Navy Lighterage System) off the ship. We’ll also help train our reserve battalions during these evolutions,” McPeake said.

Pass the Fuel and Ammunition

NCHB-1 can establish fuel service supply points (FSSP) to rearm, refuel, and resupply in support of air operations. “Our FSSPs are mobile, McPeake said. “That’s the point of being expeditionary. We’re very agile. We can pack everything up pretty quickly and move on to the next location.”

The battalion can establish and operate forward fueling points in remote and austere locations to provide fuel to aircraft, helicopters, watercraft or vehicles.

McPeake said the battalion has been busy supporting ordnance reloads in the Commander U.S. Naval Forces Central Command/Commander 5th Fleet operating area in the Middle East. This has been especially important to ensure the Navy’s surface combatants can reload their vertical launch system (VLS) missile cells after an engagement.

“When you go Winchester—the Navy term for running out of ammunition—combatants must reload, and do it quickly,” said McPeake. “Our combatant ships don’t want to be off station any longer than they have to, therefore they don’t want to sail too far to replenish their ordnance. Our Sailors are trained and experienced in loading/offloading ordnance from our surface



combatants in an expeditionary environment in a safe and efficient manner.”

Ultimately, the Navy would like to replenish missiles while ships are at sea. In fact, a great deal of research, development and testing has gone into doing just that.

In a key demonstration, the Ticonderoga-class guided missile cruiser USS Chosin (CG 65) used the hydraulically-powered Transferrable Reload At-sea Method (TRAM) device to load an empty missile canister into the ship’s MK 41 vertical launching system (VLS) while conducting a replenishment at sea with the USNS Washington Chambers (T-AKE 11), a Military Sealift Command dry cargo and ammunition ship, last October. Engineers at Naval Surface Warfare Center, Port Hueneme Division (NSWC PHD) in California developed TRAM, and helped conduct the test.

Prior to the at-sea demonstration, the method was tested ashore using a crane from an auxiliary ship as part of Large Scale Exercise (LSE) 2023. Sailors assigned to Navy Cargo Handling Battalion’s expeditionary reload team worked with the crews of the Arleigh Burke-class guided missile destroyer USS Porter (DDG 78) and Military Sealift Command’s (MSC) dry cargo ammunition ship USNS William McLean (T-AKE 12) in performing a MK 41 Vertical Launch System (VLS) re-arm using simulated ordnance while pier-side at Naval Station Norfolk.]]

The Navy wants TRAM to be available in the fleet in two to three years. Until then, the NCHB 1 ERC stays busy, and is directly supporting the warfighter. The ERC can handle the weapons where they arrive at an airport of debarkation (APOD) and transfer it to the sea port of debarkation (SPOD) where they load the ships. The ERC works closely with the ship’s personnel to load the weapons—which can include SM-2s, SM-3s, SM-6s- Tomahawk Land Attack Missiles and Evolved Seasprow missiles—the way the ship wants them.

“It’s a big customer service role for us,” Brown said. We’re not just dropping off material, because it’s a little more customized sometimes to how they need it. We work with the ship and develop the best plan to reload them, so they have their capabilities at the maximum efficiency. We offload expended canisters as part of our retrograde management. And we also help them with their seal assemblies, which are the compo-



nents down within the VLS to seal the canisters.”

Under ideal conditions, ships can tie up at a secure facility with cranes, power and plenty of room to maneuver the vehicles, which can allow the teams to simultaneously conduct onloads on both the forward and after VLS tubes. However, it’s not uncommon that the team have the equipment to reload the forward VLS tubes and then move back to reload the aft launcher.

“It takes longer to load than offload a VLS cell, Brown said, because VLS cells have a specialized gas management system to handle the exhaust from a missile being fired from inside the cell, which is inside the ship,” said Brown.

“When loading, it can be very laborious to set up the gas management system, but offload is really quick,” Brown said. “A 10-hour onload is pretty standard. If the ships need a pretty robust onload, it could be about a two -day evolution.”

HADR

NCBH-1 is heavily involved in humanitarian assistance and disaster relief efforts following natural disasters, conflict or other calamities, especially where established port facilities have been marginalized or destroyed.

“We responded to the disaster relief efforts after Hurricane Maria devastated Puerto Rico back in 2017. We were brought in to set up an emergency port operation. We served as the stevedores because all the local longshoremen who normally would be handling cargo at the ports were affected by the hurricane and, and they, themselves, needed the aid,” Brown said.

The battalion was also involved in the effort to deliver relief supplies from the sea to Gaza, handling the offload of relief supplies from MV Roy P. Benavidez, USNS 2nd Lt. John P. Bobo, and USNS 1st Lt. Baldomero Lopez, in support of the Army-led mission off the coast of Gaza to deliver critical humanitarian assistance.

Brown said the battalion can tailor the right team and scale up its footprint as needed. We have our own tents, air conditioning, mobile kitchens. We can stay for days, weeks or even months.”

“Conducting these missions on a regular basis has helped us keep our experience and training levels at a high-state,” McPeake said.



NCHBs are Navy's Expeditionary Logistics Experts

Combat Stevedores train to move cargo ashore and afloat

By Edward Lundquist

Training for the Navy Cargo Handling Battalions (NCHBs) is conducted at a specialize training facility at Cheatham Annex in Williamsburg, Virginia.

According to the Navy Expeditionary Logistics Support Group's (NAVELSG) Command Master Chief Petty Officer Chad Elliott, NCHB Sailors can practice loading or unloading ships at the Williamsburg training facility, with a simulated cargo hold and real shipping containers, as well as Vertical Launch System tubes so the NCHB Expeditionary Reload Companies (ERCs) can practice onloading and offloading missiles.

"This is where our REARM-REFUEL-RESUPPLY capabilities training pipeline starts with hands-on the reps-and-sets our Cargo Handlers need to become proficient," Elliott said.

NAVELSG is the parent command for the Navy's three Expeditionary Logistics Regiments and seven NCHBs. Elliott said these units the Navy's expeditionary logistics experts.

Two regiments based at Cheatham Annex and Point Magu in California.

A new unit, NCBH-3 is coming online now and will be an active battalion.

The Cargo Handling Battalions are the current iteration of what began as "Combat Stevedores" who served with the 41 "Special" Naval Construction Battalions, created during WWII.

"We are a qualifications-based organization, we're not a rate-based. We do have a lot of people who have prior service, but it isn't necessary. You don't need to come from a rating that involves cargo handling. But you do need to be certified to operate the equipment," said Elliott. I just need them to be willing to train."

Elliott said the training facility gets plenty of use. "There's never a dull moment."

"We're the Navy's expeditionary cargo handling experts. It sounds trite, but being able to properly perform logistics is the difference between success and failure in a high-end conflict," said Elliott. "We believe that, and that's why people care about what we think around here."

Navy Expeditionary Logistics Support Group (NAVELSG), Williamsburg, Va.

First Navy Expeditionary Logistics Regiment	Williamsburg, Va.
Second Navy Expeditionary Logistics Regiment	Williamsburg, Va.
Fifth Navy Expeditionary Logistics Regiment	Point Magu, CA

U.S. Navy Cargo Handling Battalions

ONE		NCHB-1	Cheatham Annex, Naval Weapons Station Yorktown, Virginia
	Active		
FIVE		NCHB-5	Joint Base Lewis-McChord, Tacoma, Washington
	Reserve		
EIGHT		NCHB-8	Lakehurst Maxfield Field, Lakehurst, New Jersey
	Reserve		
TEN		NCHB-10	Naval Weapons Station Yorktown, Virginia
	Reserve		
ELEVEN		NCHB-11	Blount Island Command, Florida
	Reserve		
THIRTEEN		NCHB-13	CBC Gulfport, Mississippi
	Reserve		
FOURTEEN		NCHB-14	Port Hueneme, California
	Reserve		



The Vagaries of Marine Transit: Why Proper Packing is Paramount

By Capt. Harshvardhan Kumar, Director – Marine Technical Services, Charles Taylor

In July this year, the Ever Feat, operated by Evergreen, ran into severe weather off the coast of southern Brazil. Rough seas caused 30 to 40 containers to be crushed, dislodged, or left teetering off the deck. Some of the damaged units were carrying fertilizer, raising concerns about hazardous material management and potential environmental fallout. According to experts, heavy vessel pitching and rolling could have played a role in causing the container stacks to strain under pressure.

This was not an isolated incident. Rather, it is a stark reminder of how vulnerable cargo can be in rough seas. According to the World Shipping Council, an estimated 576 containers were lost at sea in 2024, with a 10-year average of 1,274 a year. Besides these, numerous containers do arrive safely in ports but with the cargo within damaged due to the forces encountered at sea, leading to contested claims as insurers deny claims based on Institute Cargo Clause 4.3.

Understanding the Forces at Sea

When a container ship encounters inclement weather, the forces at sea can be intense. Even well-secured cargo can shift if it has not been packed properly. Once a single container is compromised, it can set off a domino effect – posing risks to the crew, vessel, and marine environment. To prevent this, it is important to understand the dynamic forces at play during marine transit.

Pitching refers to the up-and-down motion of the vessel's bow and stern (or front and back of the ship) as it moves over

waves from the front or rear. Rolling is the side-to-side movement across the port and starboard (or left and right), usually caused by waves hitting the vessel broadside.

In adverse weather, a container ship can experience rolling of up to 45 degrees. If you multiply that by thousands of roll cycles over a voyage, the cumulative stress on cargo and the securing arrangements can be immense. These repetitive forces test the strength and integrity of lashings, container fittings and packing within each unit.

One of the most dangerous forms of rolling is parametric rolling – when wave patterns align with the ship's natural roll frequency, especially when waves strike from the front or rear. This can occur without warning, can cause violent rolling, even in moderate sea conditions, and is a known contributor to container stack failures. Even if the containers on the vessel survive the rolling, the cargo within is subjected to severe stresses and these can remain unnoticed till the container is opened at the destination.

Case Study: APL England

On 24 May 2020, the APL England was sailing from Ningbo, China to Melbourne, Australia when it lost propulsion in rough seas around 46 nm southeast of Sydney. During this time, the vessel rolled heavily, and container stacks collapsed under heavy stress.

The consequences were severe. Fifty containers were lost overboard, including one carrying hazardous dry powder fire extinguishers. An additional 63 containers were damaged but



remained onboard.

An investigation by the Australian Transport Safety Bureau (ATSB) revealed that intense rolling and pitching – triggered by gale force winds and a temporary loss of propulsion – led to the incident.

The Role of Proper Packing

While rough seas and vessel movement are beyond human control, how cargo is packed and secured can make a critical difference.

Many shippers rely on past experience rather than best practice, assuming that if damage has not happened yet, the method is good enough. However, all it takes is one instance of extreme motion for that assumption to fail, and with catastrophic consequences.

Poor practices include, but not limited to, incorrect weight declarations, especially under-reporting actual container weights; improper load distribution (e.g., heavy cargo on top tiers); inadequate packing inside containers despite secure external lashing; and partial or inadequate securing of upper tiers.

These poor practices may lead to damaged cargo, environmental hazards, financial loss, and denied insurance claims.

The CTU Code and Why it Matters

The Code of Practice for Packing of Cargo Transport Units (CTU Code) is a joint publication by the International Maritime Organization (IMO), the International Labour Organization (ILO), and the United Nations Economic Commission for Europe (UNECE). Although

non-mandatory, it serves as a globally recognised standard for the safe packing of shipping containers and other cargo transport units (CTUs).

The CTU Code is designed to support all stakeholders across the intermodal transport chain. It promotes safety, security, and environmental protection throughout the cargo journey and is widely adopted by industry professionals and referenced in insurance assessments and claims evaluations.

Following the Code reduces the risk of damage, improves safety, and helps prevent disputes. According to a 2023 study by researchers at Italy's Politecnico di Torino, companies that implemented the CTU Code saw costs and penalties reduced from €670,000 to €13,000, and extra costs as a percentage of revenue cut down from 37% to 10%.

Best Practices

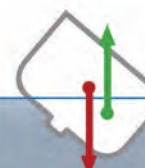
Proper packing is one of the most effective ways to minimise risk during marine transit. The people who pack and secure the cargo in a container would probably be the last ones to look inside the unit till its opening at the destination. This, all the people in the supply chain including road and or rail transport workers, crew members of any inland or ocean transport vessels, terminal operators in ports and others who have a duty to inspect the cargo and finally, those who unpack the unit, rely on the securing carried out at the origin. Clearly, poor or insufficient practices continue to be a leading cause to cargo damage and loss claims.

Compliance with the CTU Code and

ensuring personnel are trained in proper securing techniques and verifying container weight and load distribution are best practices and safeguards against cargo damage and loss.

When something goes wrong, insurers and marine surveyors will carefully examine how the cargo was packed and secured. If investigations reveal that basic standards were not followed, claims may be reduced or denied entirely.

At sea, being prepared makes all the difference. Weather and vessel motion may be unpredictable, but packing and securing cargo is within our control. Proper packing not only prevents damage, but also protects people, cargo, and reputation.

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*Deputy Head of Finance
and Accounting,
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Image courtesy Abeking & Rasmussen

Shipyard Estimating

Abeking & Rasmussen Evolves from Spreadsheets

For more than a century, Abeking & Rasmussen has been all about precision and innovation in shipbuilding. Known for its custom superyachts and specialized vessels, the German yard recently embarked on a further digital transformation journey – streamlining cost estimation. **Kris-Henrik Köster-Eibel**, the shipyard's Deputy Head of Finance and Accounting, led the transition from Excel-based workflows to a shipbuilding-specific estimating platform: CostFact.

What were the challenges in the estimation process before CostFact?

Cost estimation in custom shipbuilding is a demanding and high-risk task. Every vessel is unique, yet stakeholders expect a transparent and as accurate as possible basis for decision-making. The key challenge lies in ensuring consistency, version control, and traceability in increasingly complex projects. Often, customer-specific logics or a wide range of optional requests result in a significant portion of the typically short project timeline being consumed by organizational tasks.

What did the previous situation look like – Excel spreadsheets, right?

Yes. For a long time, we relied heavily on Excel, primarily because of its flexibility and the familiar functions we enjoyed using. However, this flexibility also introduced risks: formula errors, duplicate entries, inconsistent data structures, and no reliable version control. As our projects grew in size and complexity, and we began supporting our refit department with cost calculations, it became increasingly difficult to maintain a single source of truth. We needed a more robust system that would provide clear structure and allow us to focus on the essential aspects.

Why did you choose CostFact?

I first came into contact with CostFact many years ago at the beginning of my career in cost calculation. At the time,

we started a test phase, were still heavily reliant on our Excel-based workflows, and were not yet ready for the change. In 2024, Mr. Fischer from CostFact approached me again and proudly presented how the system had evolved over the years. I was impressed by the progress and saw an opportunity to reassess whether Abeking & Rasmussen might now be ready to move away from the old processes.

We used this opportunity to evaluate several solutions, and CostFact clearly stood out. It is specifically tailored to the shipbuilding industry and truly understands how we calculate, with standardized assemblies, parametric cost drivers, modular building blocks, a structured option management system, and, my personal highlight, a comprehensive quotation database.

This quotation pool gives us access to indexed and structured supplier quotations, even years later.

The system enables us to manage the high complexity of our projects while maintaining a certain degree of standardization. It was also important for us to define interfaces for seamless data exchange with our ERP system. In addition, we were impressed by the CostFact team's responsiveness and their fast, solution-oriented approach.



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How did the implementation process unfold?

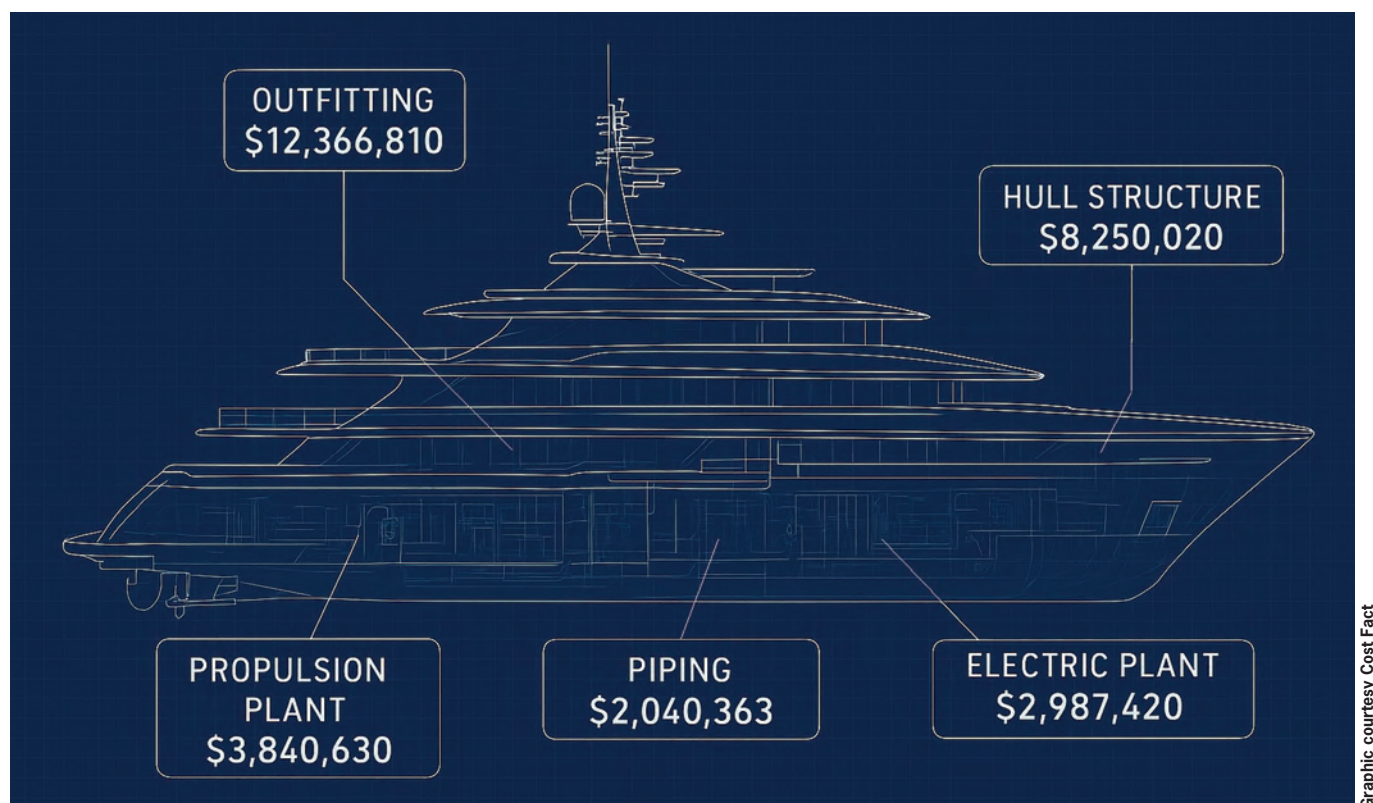
We took a step-by-step approach. First, we adapted CostFact to fit our existing cost structure and workflows, benefiting from the previous test phase, during which we had already gained in-depth experience with the system.

Next, we implemented interfaces with our ERP system to enable automatic synchronization of material costs and work packages. We then used CostFact in several projects alongside Excel to verify consistency in the results. This approach allowed us to train the team in a real-world setting without disrupting ongoing operations.

What results have you achieved since adopting the system?

The most immediate impact has been a significant gain in efficiency. We've drastically reduced the time required to produce new cost estimates, which allows us to initiate projects more quickly. Thanks to the structured database, we can easily reuse historical data and perform fast "what-if" analyses or scenario comparisons.

Transparency has also improved: project managers and purchasers now have a much clearer view of key cost drivers. Once an order has been secured, we can



Graphic courtesy Cost Fact

now transfer the calculation budgets to our ERP system with a single click, replacing the previous manual data entry process that took hours.

How did your team adapt to the new system?

Of course, my colleagues were also familiar with the advantages of Excel. But as with any change, it was important to involve the team early during the testing phase. The benefit was clear: they quickly saw how CostFact eliminated manual steps and reduced the potential for errors. The advantages became apparent early on.

Thanks to targeted training and a well-structured transition period, the new system was quickly accepted. Today, my colleagues are highly proficient in using the software, which is something I'm genuinely pleased about, as it shows that the change has truly taken root.

How does the system support the flexibility needed for custom shipbuilding?

That was one of our top priorities. CostFact allows us to build templates for common systems and components but also lets us adjust parameters for

each project. So while we maintain structure, we're not boxed in. Every estimate is tailored, yet traceable.

Has CostFact improved collaboration across departments?

Absolutely. Today, design, procurement, and project management all work with the same set of cost data. The procurement team gains early insight into expected costs and quantities, which significantly improves planning. Our project engineers make targeted and efficient use of the offer pool, across all projects and at any time.

This creates a shared language across the entire organization. In parallel, we're developing additional processes to make offer evaluation more sustainable and to digitally support both specification development and the preparation of supplier quotes.

What's next on your digital transformation roadmap?

CostFact offers many additional features that we haven't yet fully explored, but which have the potential to further enhance the quality of our cost estimates. Looking ahead, we plan to deepen the integration with our ERP system, enabling us to work more seamlessly

with up-to-date actuals from ongoing projects within the costing process.

What advice would you give to other shipyards considering a move away from spreadsheets?

Understand what truly matters in cost estimation: fully transparent budgets at all times, built on reliable data from previous projects, refined by experienced professionals into accurate, decision ready calculations for stakeholders.

If you're spending more time managing spreadsheets than analyzing data, it's time for a change. Choose a solution that supports your unique way of calculating and don't underestimate the importance of involving your team early in the process.

A good system doesn't replace your expertise, it amplifies it. And it gives you the freedom to focus on what truly matters.

Abeking & Rasmussen's move to CostFact marks a key milestone in the modernization of shipbuilding estimation. Given the increasing complexity and competitive nature of the world of custom shipbuilding, digital tools such as this are proving indispensable for ensuring the profitability of shipbuilding projects.



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In the Shipyard

From Design to Delivery



Wind Ally

Cadeler took delivery of its first A-class wind turbine installation vessel (WTIV), Wind Ally, designed to transport up to six sets of XXL monopile foundations per round trip.

Wind Ally has become the ninth vessel on the water in Cadeler's growing fleet of WTIVs. After the scheduled mobilization, the vessel will head directly into operations installing foundations at Ørsted's Hornsea 3 offshore wind farm in the North Sea. For the first time, Cadeler will take on the entire transport and installation (T&I) scope for offshore monopile

foundations, a strategic step that positions the company as a full-service provider in the foundations market.

The new vessel has been under construction for two years at the COSCO shipyard in Qidong, China. It has been delivered ahead of schedule, within budget. The design is a result of close cooperation between Cadeler and its key partners, including COSCO, GustoMSC, NOV, Kongsberg, Huisman, and MAN Energy.

With a deck space of 5,600-sq.-m., payload exceeding 18,000 tons, and a main crane capable of lifting above 3,300 tons at 39 meters, Wind Ally can transport and install up to six sets of XXL monopile foundations per load.

The vessel can accommodate up to 130, and the hybrid design of the A-class vessels allows swift conversion between foundation installation and wind turbine generator installation.

Wind Ally is the first of three A-class newbuilds ordered by Cadeler. Her sister vessel, Wind Ace, is scheduled for delivery in the second half of 2026, followed by Wind Apex in 2027.

Cadeler is fully on track with its fleet expansion strategy and, by mid-2027, the company will operate a 12-vessel fleet.

Electric Tugboat



Sanmar

Sanmar launched the third of four fully electric ElectRA Series tugs that it is building for BOTAŞ, Türkiye's state-owned crude oil and natural gas pipeline and trading company. All four of the tugboats are based on the ElectRA 2500SX design from Robert Allan Ltd.

With a battery capacity of 5,085 kWh each of the BOTAŞ tugs can achieve 70 tonnes of bollard pull and a speed of 12 knots. They have accommodation for a crew of up to eight people, and include backup diesel gensets for fire-fighting and extended endurance. The tugs to be named BOTAŞ HİLAL, BOTAŞ BAYRAK, BOTAŞ AY, and BOTAŞ YILDIZ will measure 25.4 x 12.8m with a maximum draft of 5.8m.

MODEC LCO₂ Floating Storage and Injection Unit

MODEC received an Approval in Principle (AiP) from American Bureau of Shipping for a Floating Storage and Injection Unit (LCO₂FSIU) that is capable to receive, temporarily store and ultimately inject carbon dioxide (CO₂).

The FSIU would be able to receive LCO₂ transported in low pressure condition, store, and inject it into subsea wells at high pressure for permanent sequestration, which eliminates a need for onshore LCO₂ receiving plant and pipeline to injection wells. The unit is engineered for a maximum CO₂ injection capacity of 10 million tons per annum (MTPA), with a minimum total tank storage capacity of 100,000 m³.

To support uninterrupted injection operation, the FSIU will feature both tandem loading at the aft and simultaneous side-by-side loading at the midship port side, enabling flexible and efficient LCO₂ transfer from LCO₂ carriers, up to 90,000 m³ capacity (tandem) and up to 50,000 m³ (side-by-side). The FSIU hull was developed in collaboration with Mitsubishi Shipbuilding Co. Ltd. (MSB), while the mooring system incorporates a SOFEC External Turret to allow dual loading operation as well as station keeping in non-directional environment as often found in Southeast Asia. The FSIU will also be equipped with diesel engine generators integrated with a carbon capture system on the topside, minimizing operational CO₂ emissions.

This concept was developed in collaboration with Mitsui OSK Lines Ltd. (MOL), to leverage their experience and market position with LCO₂ carriers and its proven methods of safe storage, transport and offloading.



MODEC

In the Shipyard

From Design to Delivery

Ice-Class Tugboat Victoria

A new chapter in Arctic towage begins as Victoria, a newly delivered ice-class tugboat built by Damen Shipyards, has entered service in the Swedish port of Luleå. This is a milestone not only for the port, but also for Steerprop, a provider of propulsion systems for demanding marine environments, as it represents the first deployment of its Steerprop CRP (Contra-Rotating Propeller) azimuth propulsors in the tugboat segment.

Victoria is the first vessel in Damen's new Azimuth Stern Drive (ASD) Tug 3413 ICE design — a class purpose-built for Arctic operations. Designed to deliver consistent performance in ice-covered waters, the tug is equipped with two Steerprop SP 60 CRP ECO propulsors, each rated at 3,700 kW and certified to 1A Super ice class. These advanced propulsion units combine pushing and pulling propellers within a single system, delivering superior maneuverability, ice performance, and energy efficiency in both harsh ice conditions and open water. Located on the northern Gulf of Bothnia, the Port of Luleå is Sweden's "gateway to the Arctic." With increasing cargo traffic and occasional cruise ship visits, its operational requirements demand reliable, high-performance tugs capable of year-round service. The new Damen tug meets this challenge, designed to maintain 8 knots through 1.1-meter thick floe ice or 3 knots through 1.1 meter first-year level ice.

The ASD Tug 3413 ICE is engineered for versatility and performance, achieving a maximum speed of 14.1 knots and a bollard pull of 72.8 tons ahead and 68.5 tons astern. The 34-meter-long, 13-meter-wide tugs were built at Damen's Song Cam Shipyard in Vietnam.



CSOV Delivered to BSO

© Jacob Stærk / Ulstein Group



Bernhard Schulte Offshore (BSO) took delivery of its newest Commissioning Service Operation Vessel (CSOV), built by Ulstein Verft in Norway. The vessel, named Windea Clausius, was christened on September 4, 2025, and features two sterns and azimuth propellers at both fore and aft, ensuring optimal performance in Dynamic Positioning (DP) operations and enhancing fuel efficiency. Regardless of whether the vessel is facing towards or away from the weather, it maintains excellent operability and flexibility. With the Ulstein's TWIN X-STERN design, the ship can minimize motion — critical for safe gangway operations as well as crew and personnel

well-being. Equipped with a large, height-adjustable, centrally located walk-to-work gangway and elevator tower for personnel and cargo transfers, the vessel also includes a 3D motion-compensated crane for offshore lifts of up to five tons. Onboard logistics are optimized with spacious storage areas and stepless access to offshore installations.

In addition, Windea Clausius features a height-adjustable boat landing system that allows for safe and stepless transfer of personnel and equipment between the CSOV and smaller crew transfer vessels — an important safety aspect especially while operating within offshore wind farms.

Windea Clausius offers up to 90 cabins with windows for charterers' offshore personnel. In total, there are 111 cabins providing comfortable living conditions for up to 132 individuals. With hybrid battery propulsion and methanol fuel readiness, the vessel is designed for low-carbon operations and is ideally suited for both operations and maintenance (O&M) and construction support roles, particularly in harsh offshore environments.

The newbuilding is named after the German physicist Rudolf Clausius whose work on thermodynamics established fundamental principles for understanding energy transformations, including wind energy.

Tech Files

Latest Products & Technologies



Steerprop Tapped for New Polar RV

Steerprop was selected to power the Polarstern, Germany's next-generation polar research icebreaker, supporting the vessel's demanding scientific mission in the demanding polar environments. TKMS will build the new Polarstern for the Alfred Wegener Institute, Helmholtz Center for Polar and Marine Research (AWI) and has selected Steerprop to supply the azimuth propulsion system.

Steerprop's polar track record is impressive, with azimuth propulsors on every third icebreaker in service in the world and without a single major overhaul in more than 15 years, according to the company.

Due to enter service in 2030, Polarstern will operate for up to 310 days a year in the Arctic and Antarctic. Built to Ice Class PC2, the vessel will be powered by two Steerprop SP 160 PULL ARC LM azimuth propulsors, the largest mechanical units of their kind ever built, each delivering 9 MW of power through a 4.8-meter diameter propeller.

The specifications require holding a steady 3 knots through multiyear ice of up to 1.8 meters thick with 20% snow cover. "The new Polarstern represents the next generation of research vessels," said Yngvar Frodell, Project Director of the new Polarstern at TKMS. Given the vessel's limited time in port and expected 30-year service life, predictive maintenance and reliability are central to mission success.



Humanoid Robots in the Shipyard?

ABS and Persona AI inked an MOU to develop inspection technologies for Persona AI's humanoid robot platform deployment in shipyards. Humanoid robots are suited to operate in ship-



yards designed for human workers, offering flexibility and mobility in complex, confined, or ergonomically challenging spaces. Persona AI's humanoid robots, based in part on NASA's robotic hand technology, will be outfitted to conduct a range of shipyard tasks. Under the MOU, ABS and Persona AI will collaborate on a series of joint development projects, collecting data to support classification during ship construction. Ultimately, it will support development of new ABS standards for the types and quality of data required to support digital and remote survey techniques. These standards will not only guide future robot design but also help understand how to collect, evaluate, and apply robotic data for certification and compliance purposes.

Marine Fuel Pump Built for Fuel Flexibility

As shipowners eye a future full of alternative fuel solutions – LNG, ammonia, methanol, and LPG, among others – a technical sticking point traditionally has been the fuel pump, as different fuels pose different technical challenges. DESMI says it has developed a gamechanger. The new DesFuel Deepwell Pump from DESMI is touted by the company as the world's first marine fuel pump designed from the ground up for all alternative fuel compatibility and flexibility. The design was inspired by DESMI's cargo gas pump, which has been proven across the global marine industry since 1996. As a deepwell pump, the DesFuel Deepwell Pump features include:

- Essential components are placed outside the fuel tank for easy access and reducing maintenance costs,
- Maintenance and repair without gas-freeing,
- No need for filters – the motor is air cooled and the main bearing is oil lubricated,
- Optimized for low NPSHr,
- Ready for all vessels and fuels – the pump will be available in five sizes to cover all vessel types.





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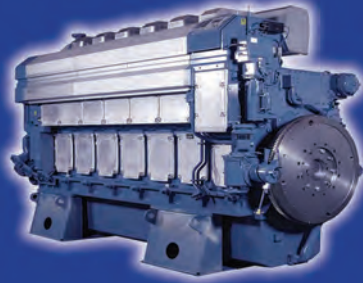


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