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A TRUE PIONEER
Richard Fain reflects on Royal Caribbean Cruises Ltd.'s innovative spirit as the company prepares to turn 50

STAYING SAFE AT SEA
How key industry players are helping operators to protect people and ships

SUSTAINABILITY FIRST
A look at key ferry newbuilds

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Cruise line CEOs discuss the growing appeal of expedition cruises

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Mike Corrigan explains why Interferry is forming partnerships

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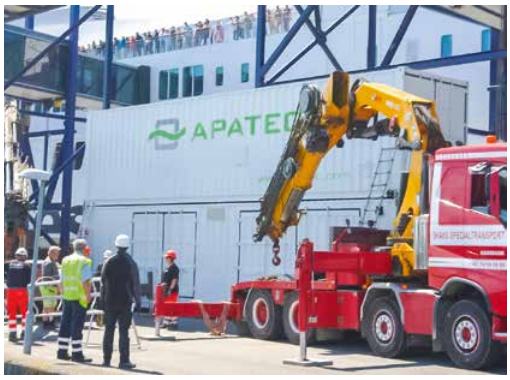
Top interior firm AD Associates creates the cover for *Cruise & Ferry Interiors*

Scrubbing the scrub water

APATEQ has developed the MarinePaq system to enable shipowners to purify their vessels' scrub water using ultrafiltration membranes and discharge it into the sea



MarinePaq has a modular design, which makes it easy to expand as capacity requirements change

Named a technology pioneer by the World Economic Forum in 2016, Luxembourg-based company APATEQ designs and manufactures high-efficiency water and wastewater treatment systems for the marine, oil and gas industries.

Typically, wastewater emitted by ships' exhaust gas cleaning systems (scrubbers) is highly contaminated with heavy metals, hydrocarbons and soot, all of which are produced during the combustion of the heavy bunker oil fuel. Common treatment technologies that are currently available on the market, such as hydro-cyclones and centrifuges, are often overstrained when it comes to eliminating the tiny lightweight soot particles that act as carriers for hydrocarbons from ships' scrub water.

APATEQ has developed MarinePaq, a compact environmentally friendly and cost-efficient solution that enables shipowners to treat their vessels' scrub water via a centralised onshore treatment plant.

Designed for reliable 24/7 operation with a high degree of automation, MarinePaq combines field-proven ultrafiltration membrane technology with innovative process technologies. This enables MarinePaq to remove the smallest particles to provide an effluent that complies with strict international regulations so it can be discharged directly into the sea in harbours or coastal areas. Any sludge arising from the treatment will be compacted by an integrated chamber filter press so that it can be safely disposed of.

MarinePaq's membranes can be used for more than five years before they need to be thoroughly cleansed or exchanged. The continuous automatic backwash feature makes the system easy to maintain, with long intervals in between maintenance periods.

> "MarinePaq removes the smallest particles to provide an effluent that can be discharged directly into the sea"

In addition, MarinePaq has a modular design, which means it can easily be expanded to increase capacity. It meets all current industry regulations and can be adapted to meet stricter legislation in future.

By operating the MarinePaq system from the shore, shipowners are able to save the expensive water disposal costs associated with hauling the scrub water to the nearest industrial wastewater treatment facility. Plus, they are no longer dependent on the availability of external water disposal providers, which will save time and make operations more flexible. Passenger ship operators can benefit from a return on their investment in typically a few months.

Danish ferry operator Scandlines has installed the MarinePaq system as a centralised facility at the port of Gedser in Denmark. Built into two 40-foot containers stacked on top of one another, the containerised MarinePaq system enables Scandlines to clean water emitted from the closed-loop scrubbers on its two new hybrid ferries – Berlin and Copenhagen – which operate between Gedser and Rostock, Germany. The effluent produced by MarinePaq is discharged into Gedser's harbour in compliance with strict environmental legislation. Meanwhile, the compact container gives MarinePaq a small footprint, ensuring easy installation in the harbour. **C&F**