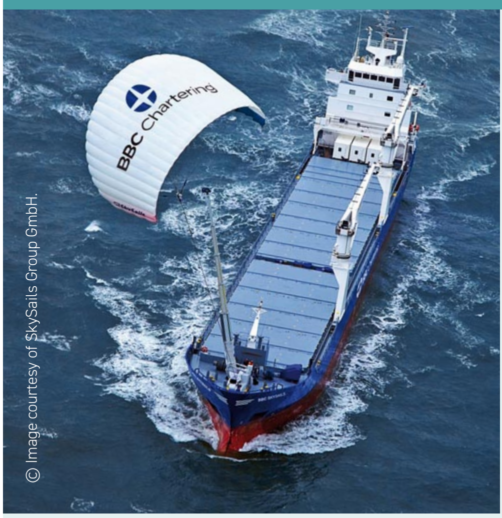
WIND-ASSISTED PROPULSION

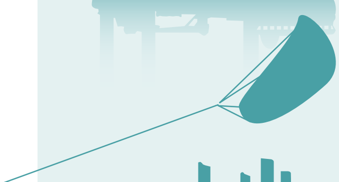
THE MARITIME INDUSTRY IS UNDERGOING A PROFOUND TRANSFORMATION AS IT SEEKS TO REDUCE ITS ENVIRONMENTAL FOOTPRINT AND TRANSITION TOWARDS MORE SUSTAINABLE PRACTICES. ONE INNOVATION THAT HAS RECEIVED ATTENTION IS WIND-ASSISTED CARGO SHIPS. WHILE SHIPS HOLD GREAT POTENTIAL FOR SUSTAINABLE SHIPPING, THEY ALSO COME WITH CERTAIN RISKS THAT NEED TO BE CONSIDERED.



© Image courtesy of SkySails Group GmbH.

Sailing ships have been harnessing the power of the wind for centuries. However, recent advancements in technology and design are breathing new life into this ancient form of transportation. These modern wind-assisted systems are designed to complement traditional propulsion methods, rather than replace them entirely. This hybrid approach helps maximise efficiency while reducing environmental impacts. Several wind-assisted systems are currently being developed and tested. Some of the most notable systems include:

FLETTNER ROTORS – These tall rotating cylinders are mounted on a ship's deck. As the rotor spins, it creates a Magnus effect, generating forward thrust.



KITES – Modern kite-like sails are deployed from the deck of the ship to capture wind energy to generate forward thrust.

RIGID WING SAILS – Rigid wings are mounted on the ship's deck and use the Bernoulli principle to generate forward thrust. These wings can be adjusted to optimise their performance in varying wind conditions.

The adoption of wind-assisted propulsion offers several advantages to shipowners such as:

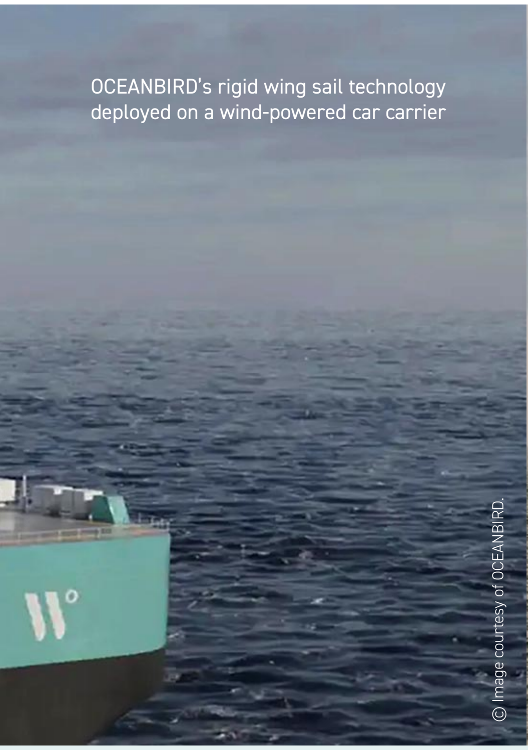
Fuel efficiency and emissions reduction – Wind-assisted cargo ships utilise various technologies, such as sails, rotors, and kites to capture wind energy and assist the ship's propulsion, resulting in reduced fuel consumption and subsequently a reduction in greenhouse gas emissions.

Cost savings – By relying on wind propulsion, shipping companies can reduce their fuel expenses, which constitutes a substantial portion of their operational costs.

Compliance with regulations – As the maritime industry faces increasingly stringent emission regulations, wind-assisted cargo ships offer a means of meeting these requirements without compromising operational efficiency.

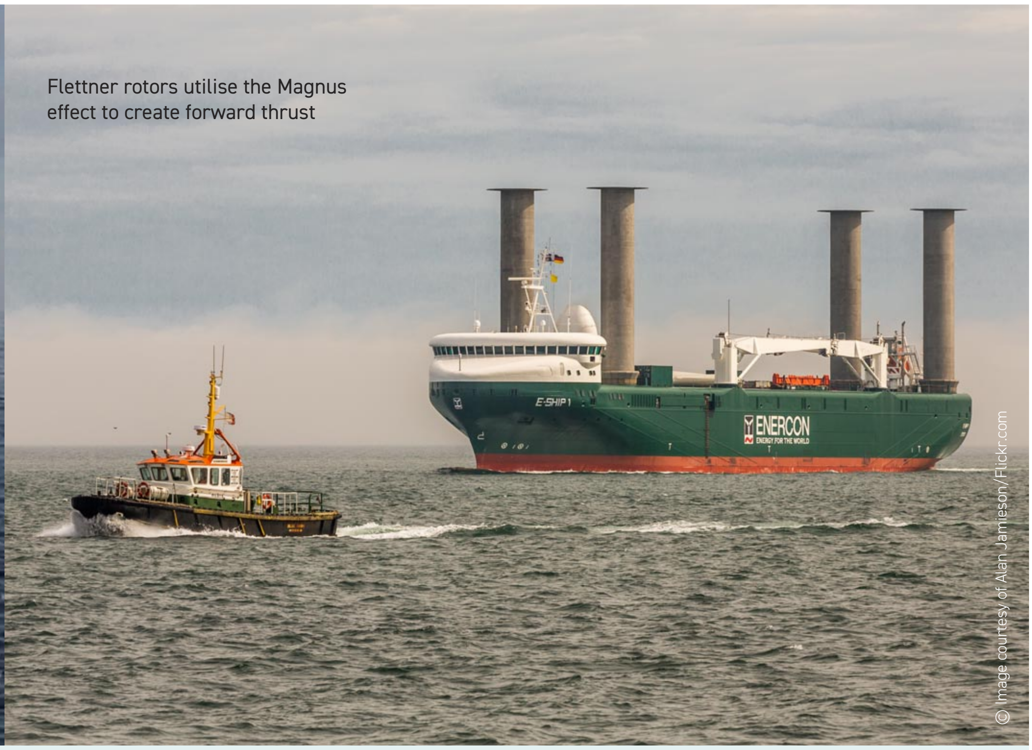
Improved reputation – Operating wind-assisted cargo ships demonstrates a commitment to sustainability and environmental responsibility, which can enhance a shipowners reputation and appeal to the increasing number of eco-conscious customers and consumers.

Jacob Damgaard
Divisional Director, Loss Prevention Singapore
jdamgaard@tindallriley.com



OCEANBIRD's rigid wing sail technology deployed on a wind-powered car carrier

© Image courtesy of OCEANBIRD.



Fletttner rotors utilise the Magnus effect to create forward thrust

© Image courtesy of Alan Jamieson/Flickr.com

However, before installing wind-assisted propulsion there are also certain technical and operational risks that should be considered and be sufficiently mitigated:

Structural integrity – The forces exerted by the wind-assisted propulsion technologies on the ship's hull, particularly at the interface between the rig and the hull, need to be taken into account.

Manoeuvrability – The use of the sails at sea may impact a ship's steering characteristic including rate of turn, stopping range etc and should be duly considered by the officer on watch as part of their decision making when determining a specific manoeuvre.

Technological integration – Implementing wind-assisted technology may require specialised engineering and design expertise, ensuring the seamless integration of wind propulsion systems with traditional engines to prevent unexpected technical issues.

Cargo handling – The use of wind assistance technologies can potentially hinder the process of loading and unloading cargo. This depends on both the mechanisms used for these operations and the structure connected to the technology. Port cranes or other moving objects may also cause damage to the installed wind-assistance.

Stability and heel – The large forces created by the rigs can produce heeling forces which may need to be catered for, both during standard operation and extreme weather conditions.

Visibility – Many of the technologies produce obstructions to lines of sight both in operation and when stored. These issues need to be checked against the International Convention for the Safety of Life at Sea (SOLAS) requirement for bridge visibility as well as shipowners' own procedures and port state rules for safe navigation.

Air draught constraints – Bridges and similar structures can impose air draught limits that must be taken into account, either restricting the height of the installation or necessitating the use of a folding/collapsible rig.

Crew safety – Moving parts associated with wind assistance technologies could present safety hazards to the crew.

Maintenance – The system will require regular maintenance and may experience wear and tear. Ensuring reliable maintenance and repair infrastructure is crucial to prevent downtime and operational disruptions.

Repair costs – Technology associated with wind assisted propulsion is likely to be expensive. Therefore, any damages caused by mishandling or collisions are likely to prove costly.

Crew training – Crew members and shipowners must undergo training to effectively operate wind-assisted ships, enabling them to manage the additional systems and comprehend the limitations of the installed technology,

As with all new technologies and prototypes a higher risk exposure may be expected at the "start-up" phase as the technology is still new and being tested. Therefore, to mitigate the risks, a robust risk management approach is required, as the crew and ship owner become familiar and comfortable with the new technology. As the technology matures and is mastered by the crew, shipowners, and operators, the risk exposure may decrease.

How widespread wind-assisted propulsion technologies will become as part of the maritime industry's green transition is still uncertain. Whilst this technology has several advantages it can only complement and will not likely replace fuelled propulsion. Therefore, shipowners are likely to also seek alternative fuels to meet the decarbonisation demands of the future. However, as the future price for green alternative fuels may be substantial, a high fuel efficiency will be of further importance to shipowners. Wind-assisted systems may play a valuable part in the initial investment towards decarbonisation if the cost of wind-assisted technology can be offset by long-term fuel savings.