

Anemoi Rotor Sails

SETTING THE  
WORLD IN  
MOTION  
WITH WIND

ANEMOI

A series of thin, light blue wavy lines that flow from the bottom left towards the top right, creating a sense of movement and wind. These lines are layered behind the large 'ANEMOI' text.



It is a crucial turning point for the shipping industry. The backbone of world trade, shipping is responsible for nearly 90% of traded goods and, as a result, the industry is accountable for about 3% of global emissions.

The International Maritime Organisation (IMO) set initial targets to reduce the total annual GHG emissions by at least 50% compared to 2008 levels by 2050. Ongoing discussions are underway regarding more stringent IMO targets. To achieve these targets, new regulations have been introduced, such as Energy Efficiency Design Index (EEDI), Efficiency Existing Ship Index (EEXI) and the Carbon Intensity Indicator (CII). These, coupled with a clear drive to decarbonise from other areas, for example the EU Emissions Trading System (EU ETS), means industry stakeholders are searching for new and proven ways to lower emissions.



# LIMIT HARMFUL EMISSIONS WITH THE UNLIMITED RESOURCE OF WIND

Anemoi Marine Technologies (Anemoi) was born from a shipping professional's desire to minimise the impact ships have on the environment. After many years of research, development and successful pilot installations, our commercial Rotor Sail product was brought to market in 2020 and has garnered the interest of ship owners, managers and charterers looking to address their environmental strategies (ESG) ever since, and subsequently multiple commercial contracts have been secured.

Rotor Sails, also known as Flettner Rotors, are an energy saving technology for the maritime industry. These modern mechanical sails are comprised of tall cylinders which, when driven to spin by a motor, harness the renewable power of the wind to provide auxiliary propulsion to vessels, which significantly reduces fuel consumption and lowers harmful emissions entering our atmosphere by 5-30%.

Our mission is to accelerate the maritime industry's transition to zero emission shipping by delivering market-leading wind technology.

Lowers harmful emissions by

# 5-30%

# TO SET THE WORLD IN MOTION WITH WIND

Anemoi vision:





# EXPERIENCED WIND PROPULSION SPECIALISTS WITH A BULK CARRIER BACKGROUND

2007 – 12

Initially, Anemoi explored various emission reduction technologies and other wind propulsion systems before our research concluded that Rotor Sails had the most potential. From there we concentrated our efforts on testing and developing Rotor Sail technology.

2013 – 14

Anemoi built its land-based test facility in the UK, equipped with a full-scale Folding Rotor Sail. This site is our R&D hub for continual development and optimisation.

2015 – 16

Following successful technology development and prototype testing, Anemoi Marine Technologies Ltd. was incorporated, and preparations began for pilot installations.

2017 – 18

Pilot installations were completed on the m/v Afros, a 64k DWT geared Ultramax and the world's first bulk carrier to be fitted with Rotor Sails, in addition to the m/v Axios, a 'wind ready' Kamsarmax.

2019 – 20

Anemoi underwent a company restructure in advance of commercialising the business and taking its Rotor Sail technology to market. Furthermore, a licence agreement was signed with Wärtsilä Marine for sales and lifecycle services.

2021 – 22

Commercial orders are secured, and production commenced for three major bulk carrier projects. Anemoi continues its growth plans and production scales up to support increasing number of orders.

PRESENT

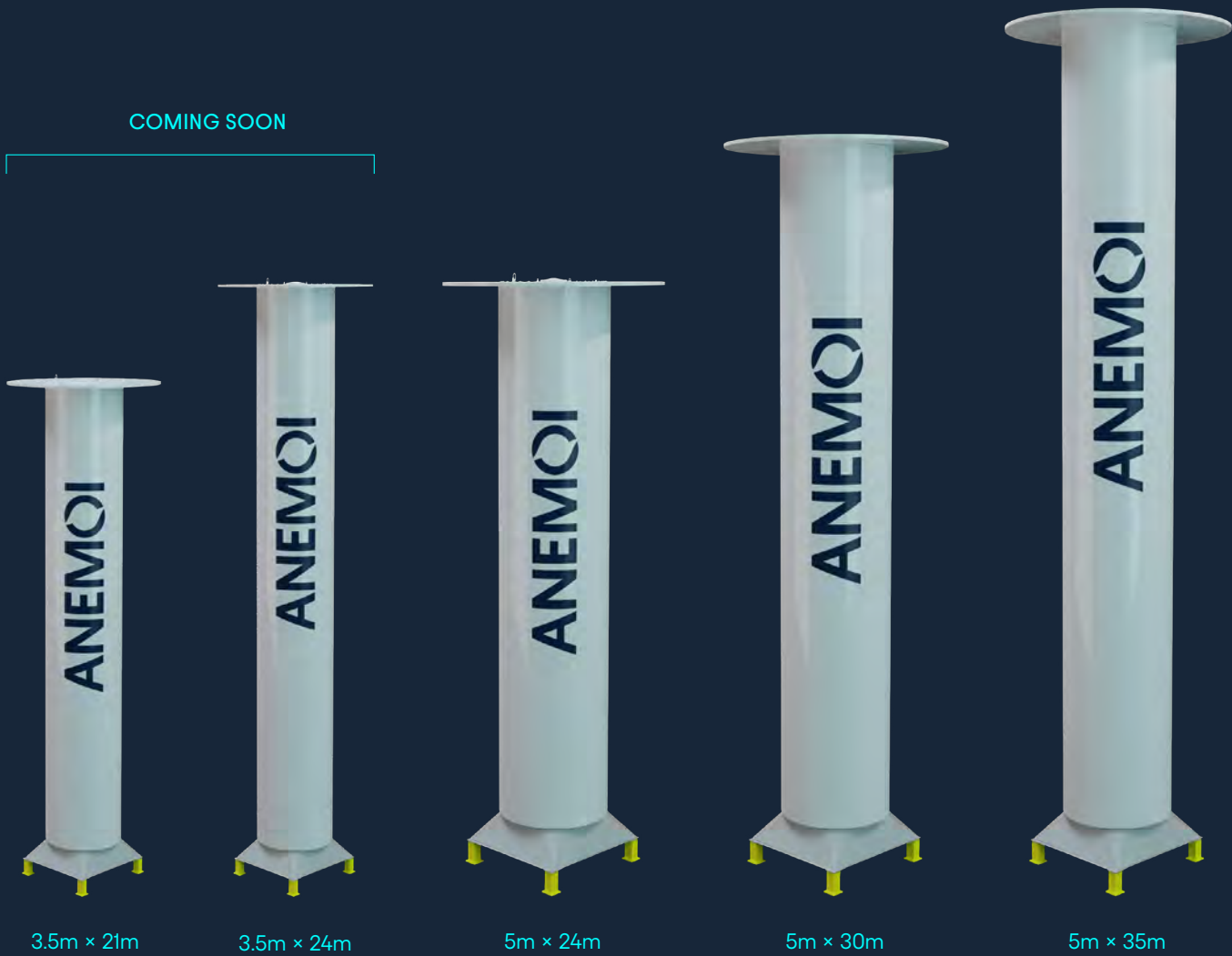
Having established its production with leading partners in China, Anemoi is delivering existing projects and taking orders for new projects.



# EMISSION REDUCTION WITH MINIMAL IMPACT ON VESSEL OPERATIONS

## ROTOR SAIL SIZES

Anemoi offers a range of Rotor Sail sizes to suit most vessel types and sizes. Rotor Sails can be retrofitted to existing ships or delivered with newbuild ships. Our Rotor Sails are movable assets with a 25-year design life so they can be redeployed between vessels.



## DEPLOYMENT SYSTEMS

As standard, Anemoi Rotor Sails are permanently fixed to the deck. However, we also offer a unique range of 'Deployment Systems' which allow the Rotor Sails to be repositioned in a matter of minutes to significantly reduce impact on vessel business and port operations.



### FOLDING DEPLOYMENT SYSTEM

Rotor Sails can be lowered from the vertical to horizontal position.



### TRANSVERSE RAIL DEPLOYMENT OPTION

Rotor Sails are transported across the deck by an independent rail system.



### LONGITUDINAL RAIL DEPLOYMENT OPTION

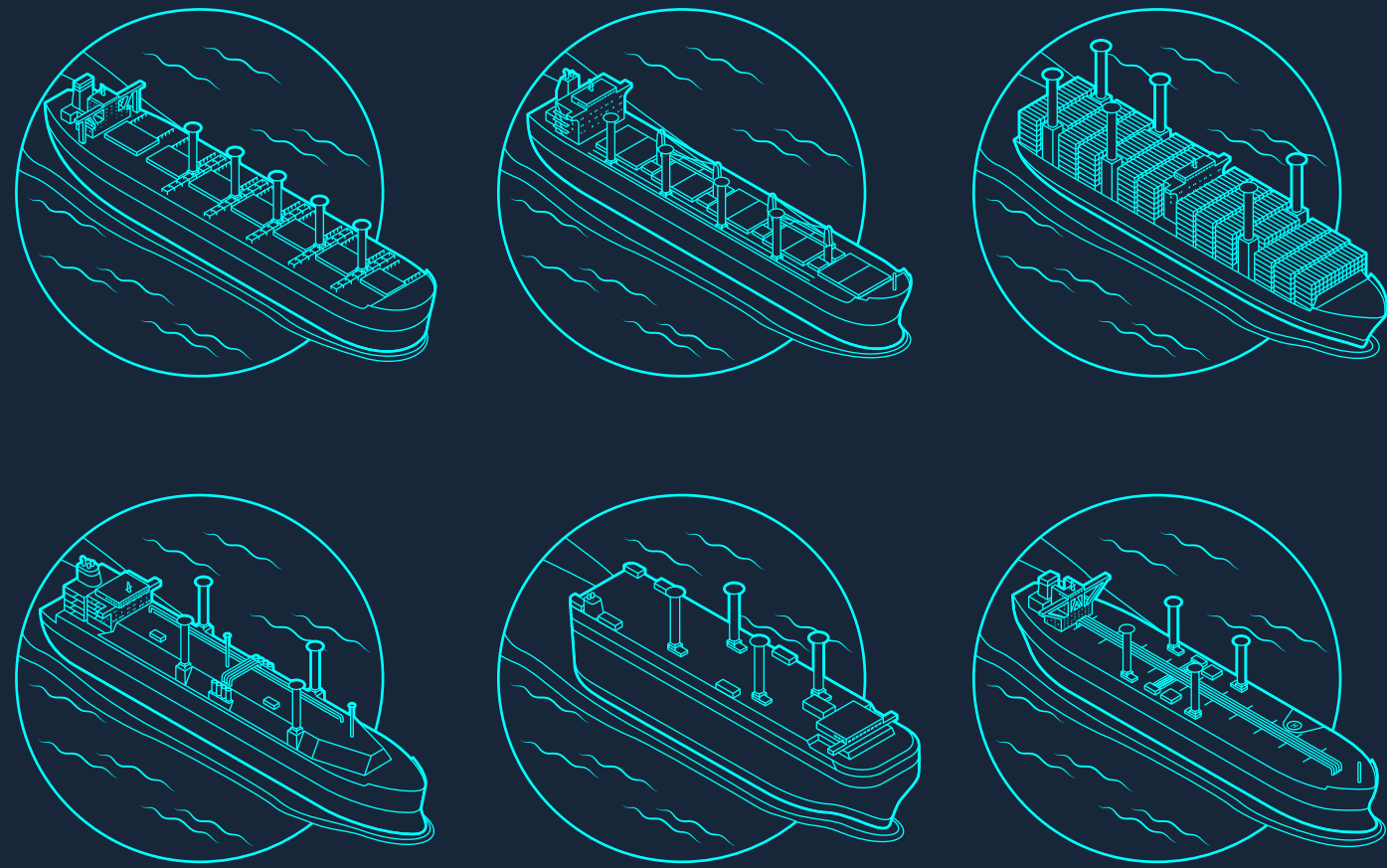
Rotor Sails are transported along the deck by an independent rail system.



## VESSEL TYPES

Anemoi Rotor Sails are suitable for most vessel segments including:

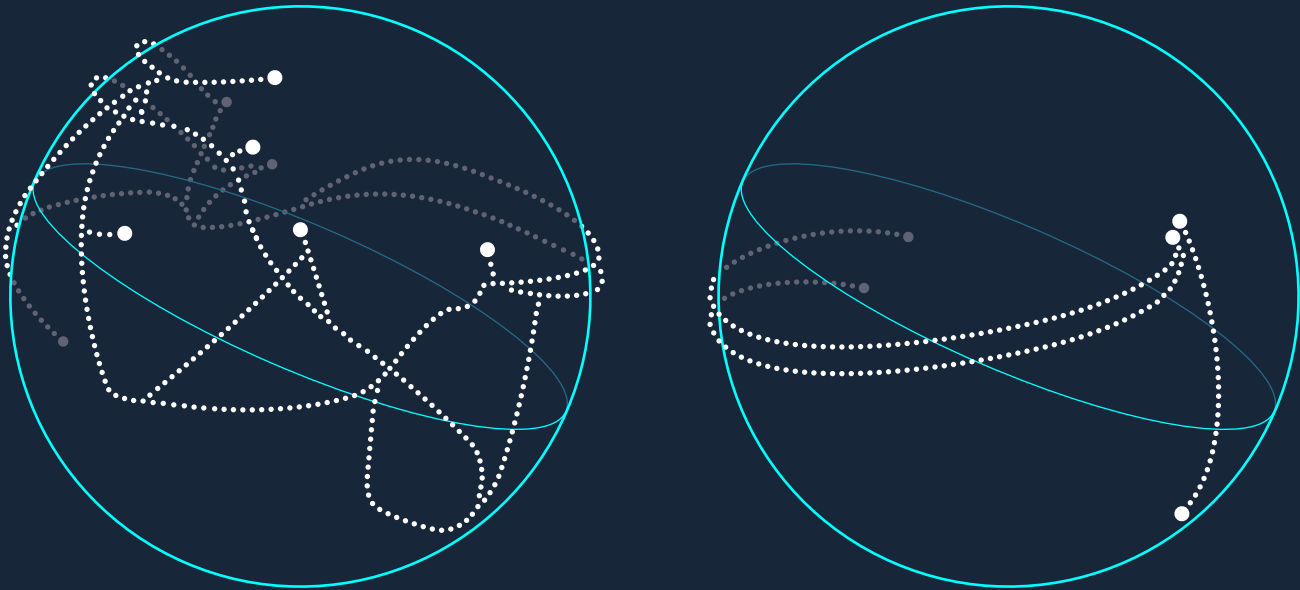
- Tankers
- Bulk Carriers (geared)
- Bulk Carriers (gearless)
- RoRos & Ferries
- LNG/LPG carriers





# 5-30% REDUCTION IN FUEL AND EMISSIONS

Rotor Sails can reduce fuel consumption and emissions by 5-30% and make a significant impact towards regulatory requirements. Anemoi has developed a proprietary "Fuel Saving Assessment Model" (FSAM) to make reliable performance predictions for client installations. Our EEDI calculation method has also been validated by Lloyds Register. Email [sales@anemoimarine.com](mailto:sales@anemoimarine.com) for a bespoke assessment of your ship.



NEWBUILD 210K DWT NEWCASTLEMAX  
BULK CARRIER WITH 4 ROTOR SAILS\*

## IMO GLOBAL TRADE ROUTE

- FUEL AND EMISSION SAVINGS:  
**14.3%**
- ANNUAL FUEL REDUCTION:  
**1,379t**
- ANNUAL CO2 REDUCTION:  
**4,345t**
- EEDI SCORE IMPROVEMENT FROM:  
**1.92 to 1.47**

## NEWCASTLE – TIANJIN

- FUEL AND EMISSION SAVINGS:  
**12.9%**
- ANNUAL FUEL REDUCTION:  
**1,242t**
- ANNUAL CO2 REDUCTION:  
**3,915t**

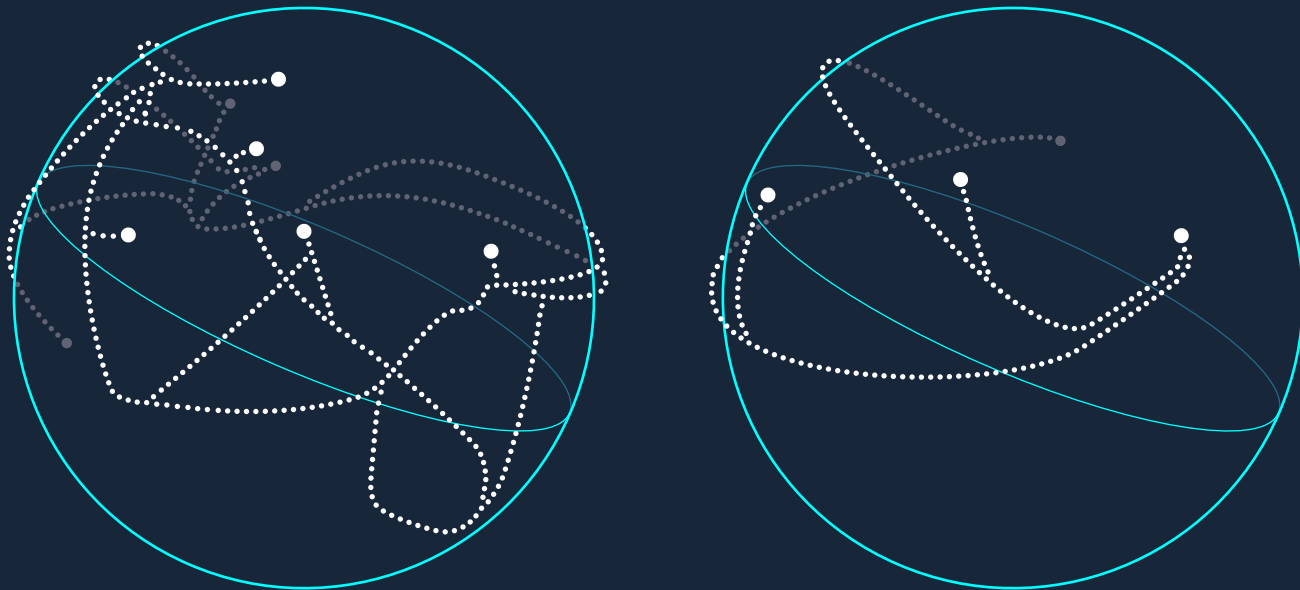
EXISTING VLCC TANKER WITH 5 ROTOR SAILS\*\*

## IMO GLOBAL TRADE ROUTE

- FUEL AND EMISSION SAVINGS:  
**16.3%**
- ANNUAL FUEL REDUCTION:  
**1,988t**
- ANNUAL CO2 REDUCTION:  
**6,190t**
- EEDI SCORE IMPROVEMENT FROM:  
**2.11 to 1.68**

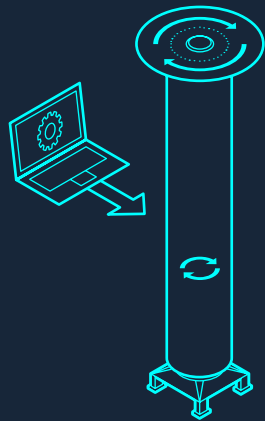
## LOOP (LOUISIANA OFFSHORE OIL PORT) – NINGBO VIA CAPE OF GOOD HOPE

- FUEL AND EMISSION SAVINGS:  
**14.9%**
- ANNUAL FUEL REDUCTION:  
**1,793t**
- ANNUAL CO2 REDUCTION:  
**5,584t**



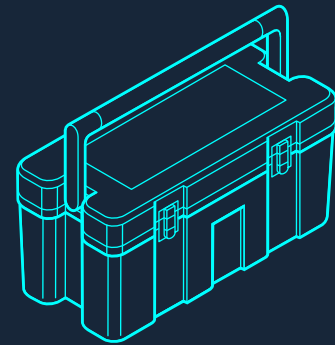
\* Results are estimates based on vessel sailing 270 days per year. Fuel type VLSFO. Results are return journeys covering both laden and ballast conditions.  
\*\* Results are estimates based on vessel sailing 300 days per year. Fuel type HFO. Results are return journeys covering both laden and ballast conditions.

# KEY BENEFITS



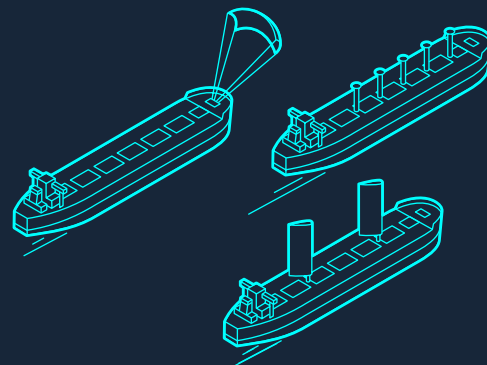
## → FULLY AUTOMATED SYSTEM MINIMISES CREW INPUT AND MAXIMISES BENEFITS

When the wind is favourable, our Rotor Sails will automatically switch on and adjust the rotation speed to ensure maximum savings are achieved. The crew can also monitor the performance of the Rotor Sails via the control unit located in the bridge, which also houses features such as manual override.



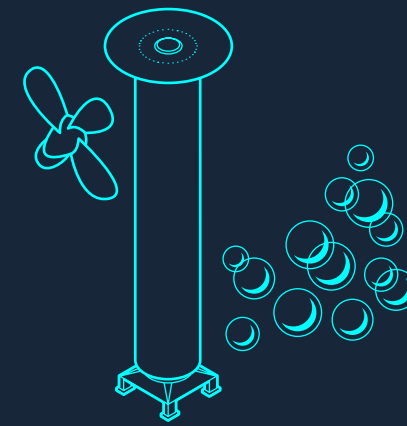
## → LIMITED MAINTENANCE REQUIRED

Anemoi Rotor Sails have been designed to require minimal and infrequent maintenance. If maintenance is necessary, this is communicated to the crew via the bridge control unit.



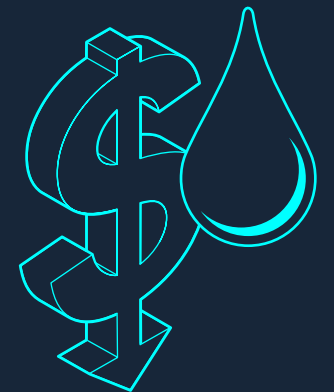
## → MORE THRUST PER SQUARE METRE

Per square metre of projected sail area, Rotor Sails offer a much greater thrust force to propel ships compared to other wind propulsion technologies.



## → CAN BE EASILY COMBINED WITH OTHER ENERGY SAVING TECHNOLOGIES

For further vessel efficiency, our Rotor Sails can be combined and clustered with other energy saving devices, such as those offered by our partners at Wärtsilä Marine.



## → REDUCE COSTS FROM EXPENSIVE ALTERNATIVE FUELS

Alternative fuels, when market ready, are expected to come at a high price. Rotor Sails reduce fuel consumption, irrespective of fuel type. Installing Rotor Sails can future proof vessels against these new operational costs.



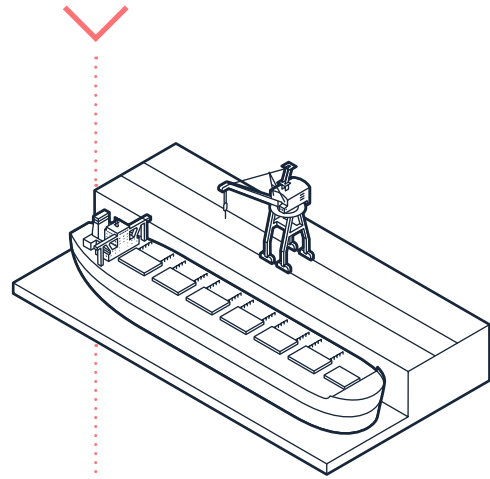
## → APPROVED BY LEADING CLASSIFICATION SOCIETIES

Our Rotor Sail design has been certified by Lloyd's Register. Anemoi works with all classification societies during the installation process to achieve the necessary quality standards.

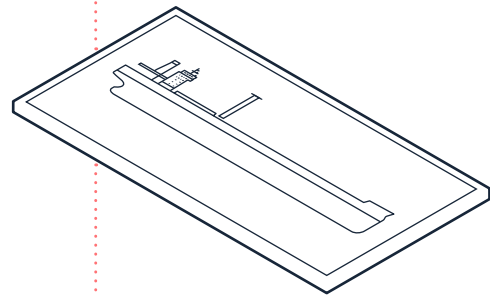


## SIMPLE INSTALLATIONS WITH FLEXIBLE WIND-READY OPTIONS AVAILABLE

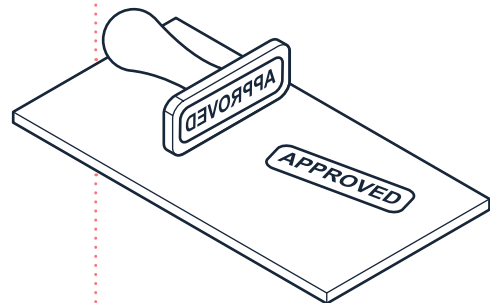
### 1 FEASIBILITY STUDY & PORT ANALYSIS



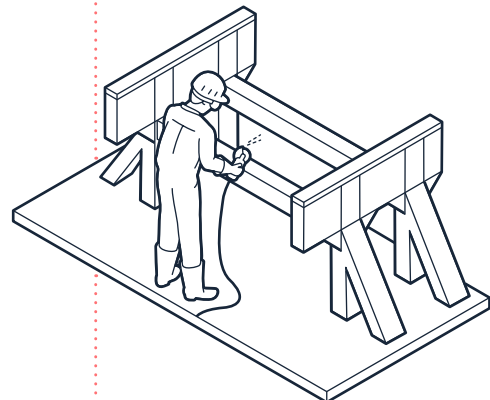
### 2 INTEGRATION DESIGN



### 3 CLASS APPROVAL

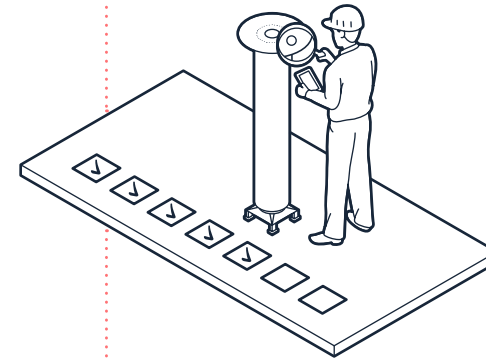


### 4 VESSEL INTEGRATION

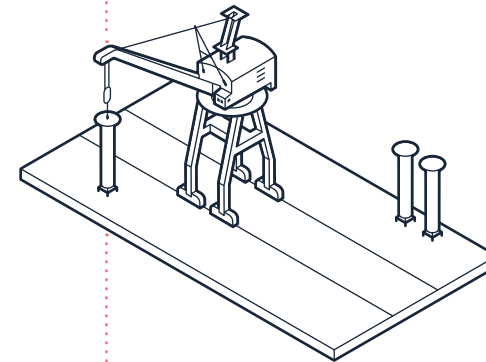


After step 4 [vessel integration], we consider the vessel to be 'wind ready', a term categorised with a class notation. 'Wind ready' means the vessel integration [structural and electrical preparation] has been carried out. Once this has been completed, the Rotor Sails can be added gradually using a 'plug and play' approach. The phased installation of Rotor Sails can be aligned to phased regulations to help maintain compliance.

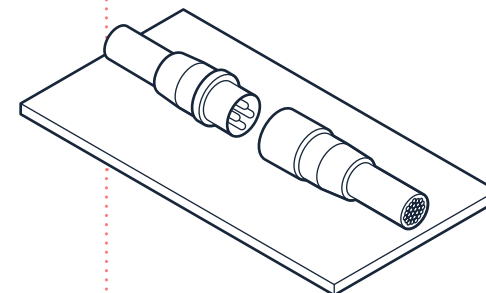
### 5 FAT AND CLIENT INSPECTION OF EQUIPMENT



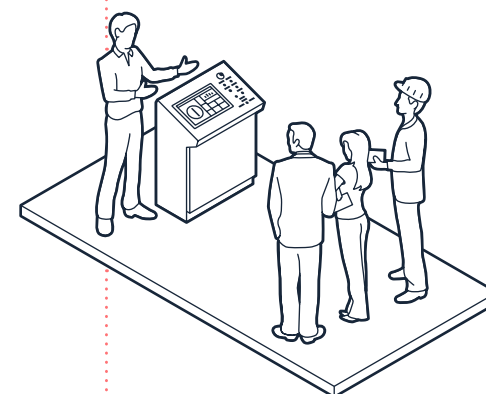
### 6 EQUIPMENT INSTALLATION



### 7 ON-BOARD COMMISSIONING



### 8 TRAINING & SUPPORT



# QUALITY, SAFETY AND THE ENVIRONMENT ARE AT THE TOP OF THE AGENDA FOR ALL OUR PROJECTS



- VLOC**
- **SHIP TYPE:**  
400k DWT VLOC
  - **CLIENT:**  
To be announced
  - **ROTOR SAIL CONFIGURATION:**  
5 Rotor Sails (5m × 35m) on Folding Deployment System
  - **SOLUTION:**  
Coming soon! This vessel typically trades on Oman-Brazil and China-Brazil routes, which are particularly well suited for wind propulsion



- M/V AFROS**
- **SHIP TYPE:**  
64k DWT geared Ultramax Bulk Carrier
  - **CLIENT:**  
Blue Planet Shipping
  - **ROTOR SAIL CONFIGURATION:**  
4 Rotor Sails (2m × 16m) on Longitudinal Rail Deployment System
  - **SOLUTION:**  
Delivered in January 2018, the m/v Afros has visited over 100 ports since with a 100% port acceptance rate



- M/V AXIOS**
- **SHIP TYPE:**  
82k DWT Kamsarmax Bulk Carrier
  - **CLIENT:**  
Blue Planet Shipping
  - **ROTOR SAIL CONFIGURATION:**  
Vessel made 'wind ready' so Rotor Sails can be installed simply in the future
  - **SOLUTION:**  
4 Transverse Rail Deployment Systems were installed along with the electrical and control hardware



- NEWCASTLEMAX**
- **SHIP TYPE:**  
210k DWT Newcastlemax Bulk Carrier
  - **CLIENT:**  
Berge Bulk
  - **ROTOR SAIL CONFIGURATION:**  
4 Rotor Sails (5m × 35m) on Folding Deployment System
  - **SOLUTION:**  
Coming soon! Savings of 1,200–1,500 tonnes of fuel per year are predicted



- BERGE NEBLINA**
- **SHIP TYPE:**  
388k DWT Valemax Ore Carrier
  - **CLIENT:**  
Berge Bulk
  - **ROTOR SAIL CONFIGURATION:**  
4 Rotor Sails (5m × 35m) on Folding Deployment System
  - **SOLUTION:**  
Coming soon! Savings of 1,200–1,500 tonnes of fuel per year are predicted



- TR LADY**
- **SHIP TYPE:**  
82k DWT Kamsarmax Bulk Carrier
  - **CLIENT:**  
Tufton Investments
  - **ROTOR SAIL CONFIGURATION:**  
3 Rotor Sails (5m × 24m) on Transverse Rail Deployment System
  - **SOLUTION:**  
Delivered in June 2023. Initial results indicate savings will exceed 10% annually. Performance validation is ongoing.

"We firmly believe wind propulsion can help achieve our decarbonisation commitments and are therefore pleased to be rolling out Anemoi Rotor Sail technology on our vessels."

Paolo Tonon, Technical Director of Berge Bulk



# OFFICES IN UK AND CHINA

We supply the global shipping industry with our smart, proven Rotor Sail technology.

## TEST FACILITY

Port of Blyth, UK

- Full scale land-based Rotor Sail
- Available for client visits

## HEAD OFFICE

London, UK

- Open-plan space to support growth projections
- Engineering, Sales, Marketing, Finance and Administration base

## BRANCH

Brockenhurst, UK

- Expert teams in Projects and Engineering

## ANEMOI PRODUCTION & QUALITY ASSURANCE TEAM

Jiangsu Province, China

- World class production partners
- 170+ production staff in addition to Anemoi staff

# WHY ANEMOI?

- Over 15 years' experience in wind propulsion
- Shipping background – we understand vessel operations
- Innovative approach to technology development
- Turnkey installations possible through key collaborations with COSCO Shipping Heavy Industries and Chengxi CSSC
- Supported by industry leaders such as Wärtsilä Marine
- Dedicated, passionate team working to protect our environment
- Offer a large scope of services to meet client requirements
- World class supply chain with partners including CRRC Corporation Limited

Wind propulsion is one of the most sustainable ways to lower ship emissions



Get in touch to find out more!

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