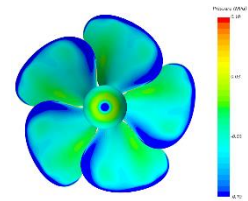


# The CoPropel project in a nutshell

**Ship propellers made from composite materials: a solution to decarbonize the maritime industry. CoPropel's partners have demonstrated the benefits of composite materials for ship propellers, offering a lightweight, corrosion-resistant solution with low electrical signature and reduced fuel consumption.**

## INDUSTRIAL DESIGN AND MANUFACTURING:

- Industrial design of composite propellers in accordance with certification rules and user expectations.
- A propeller that can deform under the load of water in order to vary blade pitch.
- Development of an industrial manufacturing process for composite propellers. (Closed mould RTM process)



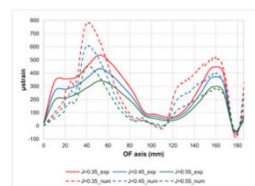
## INTEGRATION OF A STRUCTURAL HEALTH MONITORING SYSTEM INTO THE COMPOSITE PROPELLER:

- Reduced propeller maintenance costs.
- Sensors integrated into the composite material of the blades during manufacture.
- Development and demonstration of two systems with different sensors:
  - A wired system with fibre optics.
  - A wireless system with strain gauges



## A TECHNICAL SOLUTION TESTED AND VALIDATED UNDER VARIOUS CONDITIONS:

- Three demonstrators designed and manufactured: a small-scale propeller, a full-scale propeller and a prototype.
- Propeller testing in a controlled environment in a tank (BSHC) and in real conditions at sea (Ship 30m long / Propeller diameter 1.1m).
- Validation of properties through static and vibration testing.



## IN ACCORDANCE WITH THE BUREAU VERITAS CERTIFICATION PROCESS:

- Compliance with BV guidance note NI663 on the certification of composite propellers.
- Update of guidance note NI663 based on CoPropel results.

## PROMISING RESULTS FOR THE MARITIME INDUSTRY - COMPARISON BETWEEN COMPOSITE AND METAL PROPELLERS:

- Composite propeller up to 50-70% lighter.
- 19% reduced power on the shaft line for equivalent boat speed. Significant fuel savings associated with engine adaptation. (Up to 15%)
- Additional research is needed on cavitation, manoeuvrability and the acoustic signature of the propeller.

