

FIBRE COMPOSITE MANUFACTURING TECHNOLOGIES FOR THE AUTOMATION AND MODULAR CONSTRUCTION IN SHIPYARDS

FIBER4YARDS PROJECT



FIBRE4YARDS' objective is to match end-users' needs with Fibre-Reinforced Plastic (FRP) manufacturing technologies (adaptive molds, ATP/AFP, 3D printing, curved pultrusion profiles, hot stamping, innovative composite connections), in order to improve shipyards' production and maintenance. The introduction of innovative FRP manufacturing technologies will enable the automation of production processes and improve environmental performance.

TECHNICAL AND ECONOMIC IMPACTS

- Increase the use of Composites in Shipyards

BUDGET

7 572K€

KEYWORDS

Fibre-Reinforced Plastic (FRP); manufacturing technologies; Shipyard production; FRP manufacturing

RESEARCH THEMES AND EXPERTISES

Integrated product/process design
Composite processes

EQUIPMENTS

Multi axial test bench
Composite manufacturing workshop

PARTNERS

Coordinator : CIMNE (ES)
Industrials : IOXL (NL), BUREAU VERITAS (FR), COMPASSIS (ES), CW (NL), INNOVATEKNEA (HU), IRURENA (ES), L-UP (FR), NAVAL GROUP (FR), TSI (ES)
Academics : POLITECHNIKA LODZKA (PL)
RTO : INEGI (PT), IRT JULES VERNE (FR)



INDUSTRIAL CONTEXT

Today, Fibre-Reinforced Polymers (FRP) materials are extensively used for building lightweight hull structures of vessels with length up to about 25 m. FRP are also used for even larger lengths (up to 50 m). In fact, most of the leisure craft and sailing yachts, naval ships, patrol and rescue vessels below 25 m length are built in FRP materials. However, the production capacity in numbers of FRP ships does not achieve its full potential due to high total production costs. One of the main reasons for this limitation is the lack of automated procedures, and the current semi-artisanal methods used in FRP shipbuilding.

INNOVATIVE FEATURES

- Introducing smart and secure engineering, manufacturing and data sharing concepts in ship production.
- Embedding advanced and highly automated FRP production technologies in the Shipyard 4.0 while applying these technologies in ship production, maintenance and dismantling.
- Developing and validating new (digitalized) engineering and analysis simulation solutions to support modular ship design and construction in the Shipyard 4.0 concept.
- Facilitating industrial deployment of the FRP Shipyard 4.0 by providing guidelines for design, production, certification, and staff training. Developing business plans and Intellectual Property Rights (IPR) strategies for shipyards.

INDUSTRIAL APPLICATIONS

The project aims to modernise the shipyards bringing composite manufacturing processes already in use in other industries, such as aeronautics, automotive, etc... and deploy them to shipbuilding. The main impacts are: environmental (transport mass reduction and fuel consumption); manufacturing cost effectiveness; increase competitiveness and growth of the European sector; improve environmental performance of shipyards and ship builders; composite structure functionalisation functioning and integrity of structures in real time, which will allow maintenance operations to be adapted.



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