

# Ageing of composites in the marine environment

ECOSAM<sup>2</sup> project



ECOSAM<sup>2</sup> project aims at studying and at characterising the mechanisms of ageing of composite materials in marine and sub-sea environment in order to better estimate their lifetimes and performances for Shipbuilding and Marine Renewable Energy applications.

## Technical and economic impacts

- ▶ Gain potential in sustainability on a tidal turbine blade
- ▶ High potential gain on the weight of the superstructure of a ship
- ▶ Reduced maintenance interventions

## Keywords

Composites // Hygro-mechanical coupling  
Ageing in sub-sea environment  
Hydrophobic coatings

Numerical modeling of the diffusion phenomenon  
january 2013

Launch of experimental testing campaigns  
june 2014

End of project  
november 2015

november 2012  
Project launch

décember 2013  
Selection of composite materials to be characterised

october 2015  
Results of testing campaigns and analysis

## INDUSTRIAL CONTEXT

Historically the metallic materials are predominantly used in the industry of the shipbuilding and power generation. Step by step composite materials were more highlighted because they allow to reduce the weight of structures with comparable performances. Nevertheless these materials have mechanical behaviours different from metallic materials and their resistance in severe environments such as marine / sub-sea remains to be demonstrated.



## INNOVATIVE FEATURES

- ▶ Numerically simulate aging mechanism by modeling the phenomenon of diffusion and hygro-mechanical behavior
- ▶ Perform on materials characterization tests aged seawater and correlation with the simulations
- ▶ Perform characterization tests of the hydrophobicity of coatings.
- ▶ Required to perform fire tests

## Partners

- ▶ IRT JULES VERNE
- ▶ GE RENEWABLE POWER
- ▶ DCNS
- ▶ CETIM
- ▶ STX FRANCE
- ▶ GEM (UMR CNRS, ECN, UNIVERSITE NANTES)

## Budget

▶ 1 550 k€

## INDUSTRIAL APPLICATIONS

Results will allow to feed databases necessary for the industrials to estimate the performances of the studied composite materials. These estimates will then allow use of some of them for shipbuilding of Marine Energy Renewable applications.

### Sales contact

Philippe Piard  
philippe.piard@irt-jules-verne.fr

### Press contact

Sophie Péan  
communication@irt-jules-verne.fr

www.irt-jules-verne.fr

