

Aging of composite materials in immersed conditions and fatigue

VICOMTE project



This project aims to understanding and assuring the operation of immersed composite structures by developing specific numerical tools and mechanical characterization tests with statics and fatigue loadings. The project will also develop a methodology to accelerate the effects of composite aging and fatigue in immersed environment.

Technical and economic impacts

- ▶ Lightening of MRE structures by using composite materials
- ▶ Better evaluation of the lifetime of MRE in a severe environment
- ▶ Faster qualification of composites for use in MRE structures

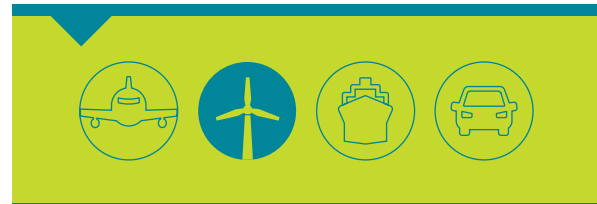
Keywords

Composite aging // Multi-scale simulation
Scale effect // Specimen testing/Structures
Accelerated testing and aging



INDUSTRIAL CONTEXT

The lightening of MRE structures will make possible to improve technical, economic and environmental performances of these structures. Composite materials present a strong potential, furthermore they have different mechanical behavior from metallic materials and their resistance to constraining environments is yet to be fully demonstrated. The rate of degradation of composite materials depends on the thermal and mechanical stresses but also on the environment in which they are immersed.



INNOVATIVE FEATURES

- ▶ Modeling the coupled behavior between mechanical loading and aging, with the realization of accelerated tests using an innovative method to understand the behavior of the material over the long term.
- ▶ Realization of structural tests to validate numerical tools developed from the laws of behavior of composite materials determined at the scale of the test piece.



INDUSTRIAL APPLICATIONS

The results of the project will produce tools to evaluate the good behavior of the composite materials used in the MRE structures. Working on the durability and damage of the composite material will provide insight into the use of composite parts in other industrial sectors. The method of acceleration of damage and aging will be used by the project members involved in the development of this project.

Partners

- ▶ IRT JULES VERNE
- ▶ BUREAU VERITAS
- ▶ GE RENEWABLE ENERGY
- ▶ MECA
- ▶ GeM (UMR CNRS, CENTRALE NANTES, UNIVERSITE DE NANTES)

Budget

▶ 977 k€

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