MONAMOOR

Monitoring of polyamide mooring lines

DURATION: 42 months | **LAUNCH:** 2020 | **Total budget:** €1,834K

CONTEXT

Offshore wind is established in Europe with a global potential to reach more than 100 GW by 2030. Of this, floating wind is estimated to constitute 10% of the market, in exploiting offshore sites where the available wind energy potential is up to four times higher than for fixed turbines. An anchoring system is easier to install and more flexible to geological natures than the foundation of fixed wind turbines.

So, floating offshore wind may rapidly become a competitive alternative, for which the mooring system is a critical component. Actual floating wind sites are exposed to harsh environment in moderate to shallow water depth where standard catenary mooring layout is not a suitable solution. More efficient restoring forces and dynamics damping are insured by a semi-taut mooring layout composed of synthetic ropes. In reducing up to two times the seabed footprint, polyamide rope is a highly promising solution.

OBJECTIVE

To develop in parallel both modelling tools for the mechanical behaviour of nylon fiber rope, and the appropriated long-term monitoring instruments based on a deep understanding of material degradation mechanisms.

EXPECTED RESULTS

- Analytical model based on an appropriate rheological law for standard engineering tools based on beam element.
- Recommendation for bedding-in procedure.
- A deeper understanding of internal material degradation mechanisms in different fatigue regions.
- Dedicated methodology for high cycle fatigue prediction.
- Innovative solution for long-distance interrogation of synthetic rope's monitoring.
- Development and evaluation of an integrated transducer to monitor the evolution of sub-ropes interaction and a global strain sensor to evaluate rope performance in service-life.
- Validation of developing tools and models against representative sea trials.

TECHNOLOGIES

STAGES OF THE VALUE CHAIN

Design | Installation Construction | Operations Maintenance

SCIENTIFIC CONTENTS

- Dedicated model based on the rheological hypothesis of a visco-elasto-plastic material.
- Sensors development enable to provide information on both global strain and sub-ropes interactions.
- Develpment fo an approach integrating long-term sensors and a technic for prediction of high fatigue cycles.
- Sensors and models validation against sea-trials tests.

PARTNERS

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This project benefits from French State financing of €643K managed by the National Research Agency under the Investments for the Future programme.