

# POLYAMOOR

Flexible and durable polyamide mooring line for marine renewable energy

**DURATION: 46 months (2017–2020)**

## BACKGROUND

The mooring systems used for floating wind turbines differ significantly from those used in the oil industry due to the high dynamics at shallow depths. The challenge is to keep the float stable in extreme environments whilst limiting the forces transmitted by the lines and the maximum displacement of the float to which the power export cable is attached. **One of the solutions being considered involves using nylon lines capable of absorbing these forces, but whose behaviour is highly non-linear and poorly understood over the long term.**



## OBJECTIVE

To characterise in detail the dynamic and long-term behaviour of nylon anchor lines in order to update standards accordingly

## KEY ACHIEVEMENTS

- Identification of a nylon cable configuration compatible with the service life of a floating wind farm (20 to 25 years)
- Identification of a generic visco-elasto-plastic rheological model
- Analytical formulations of the various rheological blocks suitable for nylon, followed by calibration and validation of these formulations through specific test sequences
- Identification of a simple long-term creep law (period > 1 year)
- Proof of concept for an accelerated method of predicting service life based on self-heating

## CONCLUSION

POLYAMOOR has enabled the identification of a behavioural model that very accurately reproduces the instantaneous behaviour of nylon. A behavioural model for long-term creep has been established. Creep at different loading rates and its effect on the behavioural model will be investigated in the MONAMOOR project. The service life objectives are achieved through a dedicated cable design and the use of a specific polymer coating. The long-term performance of this coating remains to be assessed. The results have led to the updating of a recommendation note for the certification of synthetic lines used in offshore environments (BV NI432).

### TECHNOLOGIES



### STAGES OF THE VALUE CHAIN



Design

O&M

## RESOURCES GENERATED

- **Database** of stress and strain **data** at reduced scale for characterising the behaviour of nylon
- Stress-strain **database** from fatigue tests on sub-cords
- Analytical **model** of the visco-elasto-plastic behaviour of nylon and proprietary **module** for this behaviour law in the commercial software DeepLines™
- **Analytical formulation and test protocol** for the accelerated qualification of nylon via self-heating
- **Analytical formulation** of long-term creep in nylon
- **Update to the recommendation note** for the certification of synthetic lines used in offshore environments (BV NI432)

## PARTNERS



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