

PhairywinD

Belgian Offshore PhD Expertise

PhairywinD - OWT in Belgium

- The last two wind farms in first zone (Northwester II and SeaMade) = built and commissioned in spring and autumn 2020.
- Now: **8** wind farms operational in the Belgian North Sea:
 - total installed capacity = 2,262 GW.
- 2020: Belgian offshore wind farms generated
 - 6.7 terawatt hours (TWh) of electricity
 - = **8.4%** of total electricity consumption in Belgium (=electricity consumption of 1.9 million families)
- Construction works are expected to remain at a standstill for a few years while awaiting the official tender procedure for new developments in the more western Princess Elisabeth Zone (= doubling wind capacity at sea to 4.5GW)







RESEARCH

Researchers involved in PhairywinD





RESEARCH



PP3: ULiège ESR: Nandar Hlaing Starting date: 15.03.20

Title PhD:

O&M Optimisation of Offshore Wind Turbine Support Structures Using Digital Twins

Current stage

- Reviewing relevant state-of-the-art publications and identifying the most promising research directions
- Risk-based inspection planning
 - A simplified risk-based inspection (RBI) framework through pre-posterior decision analysis has been applied using different deterioration models and failure criteria. The choice of models and failure criteria is demonstrated to affect the optimal decision.
- Uncertainty quantification of monitoring systems

First results

- Optimal inspection interval and optimal annual failure threshold for inspection planning
- Likelihood model (uncertainty) for strain monitoring

Forecast year 2

Promoter:

 Optimal decision-making framework for operational management

Philippe Rigo

Co-promoter: Christof Devriendt (VUB)

- The likelihood of strain monitoring will be implemented in the optimal management framework for offshore wind structural systems to identify optimal monitoring, inspection, and maintenance strategies
- Data-based structural health monitoring
 - A data-based Structural Health Monitoring (SHM) technique will be developed using artificial neural networks (ANN) which relates the SCADA parameters and load information.
 - The objective is to use the trained and validated ANN as virtual sensors which use the SCADA data to provide load information.





行阶

