

# Ice-induced vibrations of offshore wind turbines



PhD Candidate: ir. Cody C. Owen  
Section: Offshore Engineering  
Supervisor: Dr. ir. H. Hendrikse  
Promotor: Prof. dr. A.V. Metrikine

## Description:

Offshore wind turbines with vertically sided support structures that are installed in subarctic regions must be designed to endure interaction with drifting ice floes that result in ice-induced vibrations. Unlike existing lighthouses and platforms for hydrocarbon extraction, nascent offshore wind turbines are relatively soft structures with low natural frequencies and high susceptibility to structural vibrations. Moreover, the different regimes of ice-induced vibrations may arise in the different bending modes of these structures. Therefore, the structural characteristics of offshore wind turbines and their novelty in subarctic regions pose an interesting challenge in the design to withstand ice-induced vibrations. To address this challenge, an existing dynamic ice-structure interaction model is investigated and improved by comparing with new model-scale experiments. These dedicated experiments are to study the behavior of ice-induced vibrations with respect to change in ice properties and detailed analysis of local contact area variation during interaction.

## Goal:

The goal is to refine the dynamic ice-structure interaction model for the purpose of accurate prediction of the development of ice-induced vibrations of offshore wind turbines for industry design standards.

Sponsors:



## Contact Details:

E-mail: C.C.Owen@tudelft.nl  
Phone: +31 (0)6 476 479 95  
Room: 2.83