Epibenthic community dynamics in relation to structural variability of offshore wind turbine substructures

Introduction

Wind turbine substructures in marine environments provide substrate for organisms with sessile life stages. Epibenthic growth increases cross-sectional areas and surface roughness (Jusoh and Wolfram, 1996; Shi *et al*., 2012).

By changing the surface contours settling organisms have the potential to increase drag coefficients and hydrodynamic loading, which may reduce the operational lifespan of the turbine (Heaf, 1979; Shi *et al*., 2012).

Epibenthic colonisation on structures is highly variable and evidence suggests surface orientation is an important determinant of community composition (Glasby, 2000; Moura *et al*., 2008).

Scope of Project

The purpose of this project is to determine whether epibenthic communities differ with surface orientation (vertical, horizontal or diagonal) as well as between planes (inner, outer, top and bottom).

Settlement frames (figure 1) were designed to replicate surfaces on offshore wind turbine foundations. Frames, constructed from either steel S355 or plastic, in a cube design with cylindrical sections, will be deployed at 3, 6 and 9 metres beneath a floating platform. The frames will be replaced at 3 month intervals, in time with the change of seasons, to capture seasonal variability.

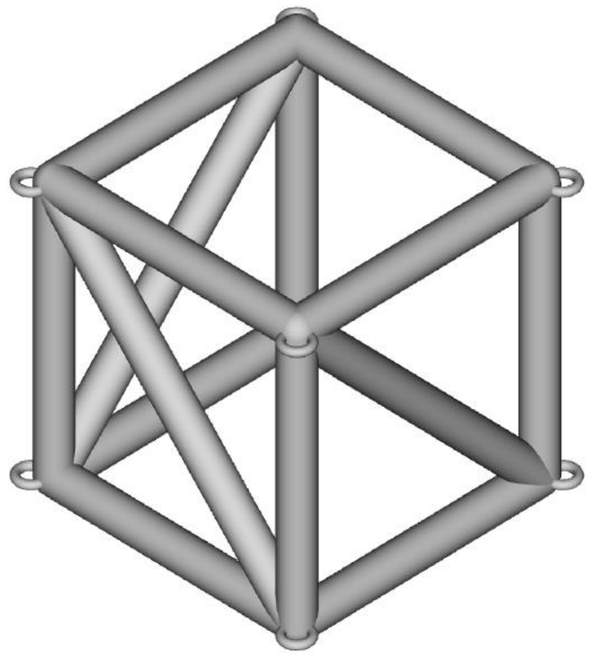

Figure 1: Frame with vertical, horizontal and diagonal sections.

Data collection and Analyses

Epibiota will be identified in a laboratory to the lowest identifiable taxonomic level. Marine growth will be quantified in terms of surface coverage of sections. Each section is defined by it's orientation and plane (e.g. Diagonal Top).

Statistical models shall be used to determine if communities differ between sections and in what way. The results may inform structural and fluid dynamics models to develop more realistic representations of how marine growth effects wind turbines.

References

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