

ECR Research Fund: Parametric Study for Flapping Foil System for Harnessing Wave Energy  
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Summary:

We have explored the usage of hydrofoil in offshore floating platforms to reduce the wave induced loads on the mooring lines. Inspired by the nature, thrust can be generated in the wake of flapping foil by reversed von Karman streets, which is mostly used in ocean propulsion systems. It presents preliminary experiments with a hydrofoil retrofitted in a semi-sub model structure exposed to regular and irregular waves. Although still at a very early stage, the preliminary results presented here show that retrofitting a hydrofoil in a floating platform can lead in positive gains at, primarily, the surge forces acting (in these cases) at the model structure's centre of mass.



Figure 1: on the left, the model platform in the wave flume. At the top right, photograph of the model equipped with a hydrofoil. Below, on the tested hydrofoils and the, equivalent volume, sphere. At the bottom right, schematic of the mooring line arrangement used for all the tests.

The fund has supported the following output:

1. WindEurope Annual Event, WindEurope 5-7 April 2022 in Bilbao, Spain. Working with nature: retrofitting solutions for reducing mooring line loads.
2. Supergen ORE hub annual assembly 12 January 2022: Reducing mooring line loads from wave energy.
3. 2021 Group projects: Stabilising offshore floating turbine by harnessing wave energy.
4. 2021 MSc thesis: Laboratory-scale modelling of irregular waves and its interaction with submersible floating platform.
5. 2021 MSc thesis: Laboratory-scale physical modelling of floating wind turbine platform and its novel stabilisation technique.