



# Re-Optimization of 15MW-scale floating wind platform using UHPC-concrete over steel construction.

Maritime DTU  
Department of Maritime Engineering

Type of project: BSc or MSc

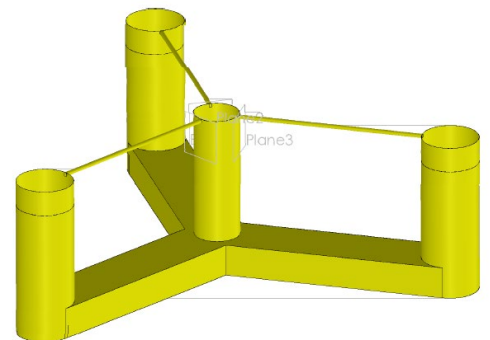
## Project description:

Texas Wind Tower is developing a topologically optimized UHPC-concrete floating wind platform with optimal performance, sustainability and industrialization characteristics. The platform structure will be built in ultra-high performance fibre-reinforced concrete (UHPC), an advanced cementitious composite with ~200 MPa compressive strength and ~15 MPa usable tensile capacity. The structure will be constructed with digital manufacturing techniques such as large-scale 3D printed formworks, cable-net and other novel material placing solutions. The floating structure could include dedicated structure areas to house electrosynthesis processing equipment used for various energy transition needs. Due to sustainability and supply chain conditions, utilization of concrete over steel in wind floaters is becoming a pressing concern.

Investigation of the structural advantages of using concrete over steel for construction and particularly UHPC concrete are needed. A study evaluating the performance capability and design characteristics of a 15MW-scale floater model as redesigned to make use of UHPC concrete would reveal valuable information for the new design effort. A reference turbine and floater for such a review is available on DOE/NREL website and Github: <https://www.nrel.gov/news/program/2020/reference-turbine-gives-offshore-wind-updraft.html> <https://github.com/IEAWindTask37/IEA-15-240-RWT>

Depending on the background and interests of the student, possible projects could include one or more of the following topics:

- Numerical analysis of the reference floater to determine response when UHPC is substituted for steel with a recommendation for possible structural adaptations.
- Re-design of the reference floater to account for unique properties of UHPC and additional innovative structure characteristics.
- Advanced optimization of the floater structure to incorporate game-changing attributes of the new build material and novel placement methods.



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