Coastal and Ocean Basin at Ostend

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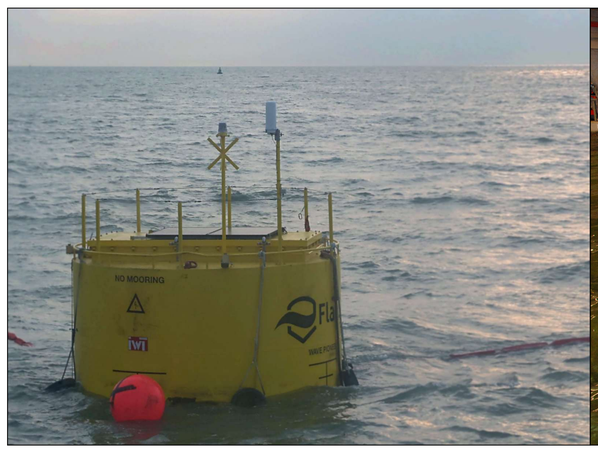
Background

3D testing facilities like the COB are required to further reduce design uncertainties in many coastal and offshore structures. They are able to receive models scaled between 1/100 up to 1/40 subjected to a combination of waves, currents and wind loading in shallow water conditions.

Most institutes in Europe cover specific aspects of these requirements, with only CCOB Cantabria (44m x 30m x 5m depth) and the University of Edinburgh (30m diameter and 5m depth) complying with all requirements, leaving an opportunity for a large scale shallow water coastal and ocean basin in Belgium.



The Wave Pioneer is a wave energy converter prototype (at scale 1:2) installed along the Belgian coast (2007-2010).

The WECwakes renewable energy project (led by UGent) modelled (in scale) an array of 25 wave energy converters to study the full 3D interactions of the devices with the wave field.

The Coastal and Ocean Basin (COB)

The COB at the GreenBridge Science Park in Ostend (Belgium) is under design. The laboratory will provide a versatile facility that will make a wide range of testing possible, including the ability to generate waves in combination with currents and wind at model scales. The COB is funded by the Hercules foundation, IWT, MOW, UGent and KU Leuven. This research infrastructure will offer the opportunity to companies and government agencies to develop innovative designs in coastal engineering and offshore renewable energy, also supporting developments in the blue energy field. The operational management of the infrastructure will be done by the partnership UGent, KU Leuven and Flanders Hydraulics Research.

Architect 3D CAD model of the future COB wave basin in Ostend (Belgium).

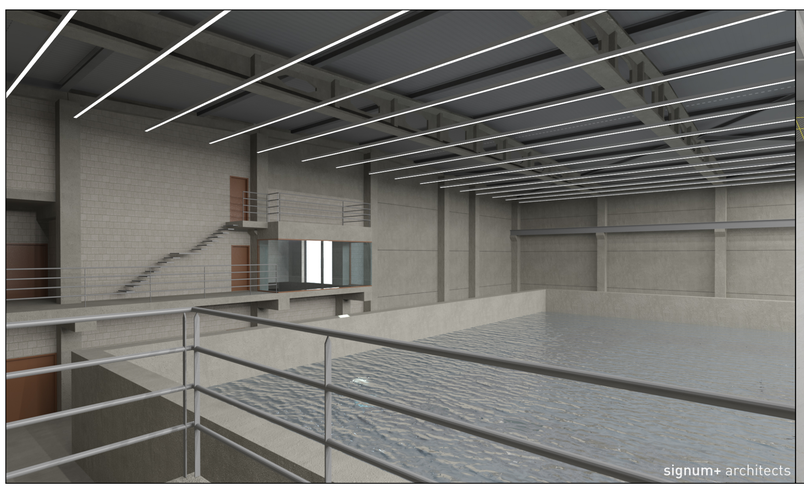
The offices at the COB will contain facilities for lecturing, hosting seminars and meeting rooms for the permanent staff and visiting researchers.

Research at UGent

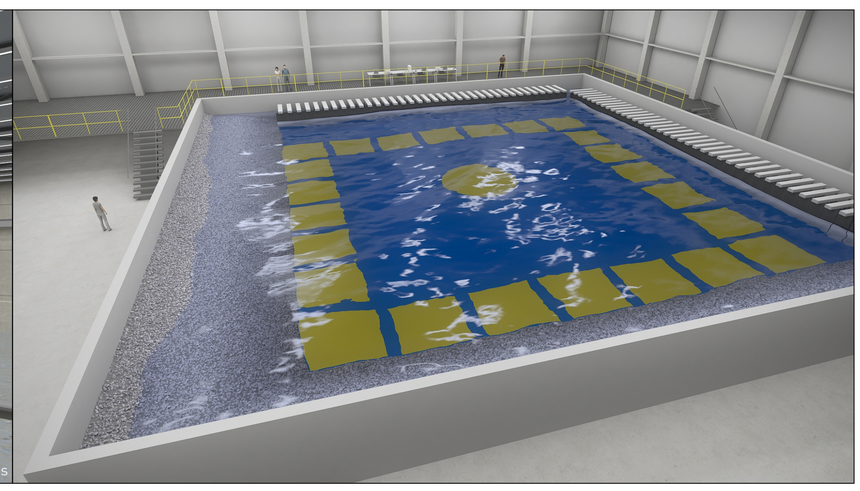
The basin will be equipped with a unique combination of wave and current characteristics, in order to realize the challenging research roadmap sketched by UGent and KU Leuven.

The academic research will cover topics as:

- Wave generation & analysis studies
- Wave-induced loadings of offshore & coastal structures
- Wave-structure interactions
- Mooring forces of offshore constructions
- Scour protections
- WEC farms
- Vegetation & coastal hydrodynamics



The COB will be 30 m long, 30 m wide and have variable water depth of up to 1.4 m allowing for test conditions from coastal to near offshore. A pit located in the middle of the basin will allow experiments with mooring at a depth in excess of 4 m. Bidirectional propellers will drive the recirculation current at velocities of up to 0.4 m/s at 1.0 m water depth.



Artist impression of the COB shows the L-shaped wavemaker and opening for the current generation. The COB wavemaker will be equipped with narrow paddles to achieve high quality short-crested waves and will cover two sides of the basin forming a corner to generate a wide range of oblique wave angles. In combination with the bidirectional current any relative angle between current and waves can be achieved.

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