Knowledge Centre Manoeuvring in Shallow and Confined Water

Flanders Hydraulics | Flanders State of the Art | GHENT UNIVERSITY

December 2023

This is the 56th newsletter of the Knowledge Centre Manoeuvring in Shallow and Confined Water, which aims to consolidate, extend and disseminate knowledge on the behaviour of ships in shallow and confined water. In this newsletter, we present a study of the wave climate near a monopile, which is of importance for the operation of crew transfer vessels near offshore wind turbines.

PhairywinD

The Belgian Part of the North Sea is one of the densest areas of installed offshore wind turbines in the world. Most of the windfarms are currently operating on the border between Belgium and the Netherlands and produce 8 TWh of green energy annually. The electricity production corresponds to the annual consumption of 2.2 million families, which is almost half of the Belgian households, or

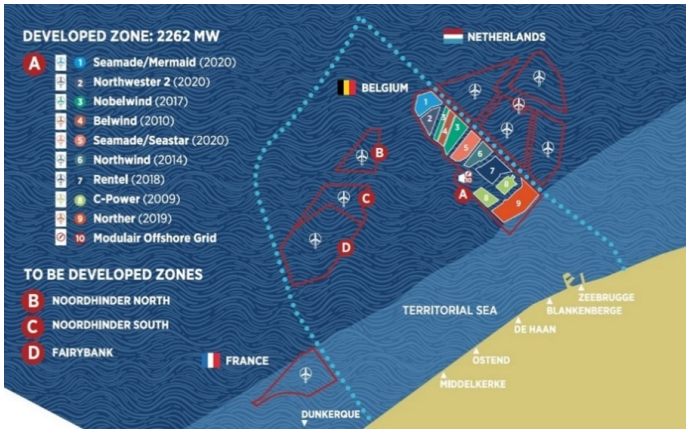


Figure 1. Belgian Offshore Wind Farms. Source: Belgian Offshore Platform

10% of the total energy demand in Belgium. The development has not stopped yet, as a new concession zone has been opened on the border with France (Figure 1). Due to the growing offshore wind industry in Belgium, a research group consortium has been initiated. Funded by ETF Economy, PhairywinD was established so that the Belgian Offshore Wind Industry will excel in several aspects. It covers various topics of the offshore wind farm and includes the safety of marine operations. Marine operations can vary from the installation of wind turbines to crew transfer operations and the decommissioning of the wind turbines.

A joint PhD research project between KU Leuven and UGent is currently ongoing to assess the wave field around a large monopile typical for an offshore wind farm so that safe marine operations nearby the monopile can be assured. Until now, studies of the marine operations near a monopile generally exclude the monopile in the hydrodynamic analysis. However, as the monopile diameter has been growing significantly in the last few years, the inclusion of the monopile in the analysis has become inevitable. The effect of the monopile on the wave field and its impact on marine operations is therefore studied in this PhD research project. An experimental campaign has been carried out in the Coastal & Ocean Basin to understand the wave field around the monopile. The experiments investigate the wave field around

the monopile for three different types of waves: regular, bichromatic, and irregular waves. Figure 2 shows the experimental set up where the monopile model is shown and several probes were placed around to record the water elevations. The initial analysis in regular waves suggests that linear theory appears to miss the actual crests, but still decently captures the main harmonic component of the wave field around the monopile. Footage of the experiment can be seen on our youtube channel.

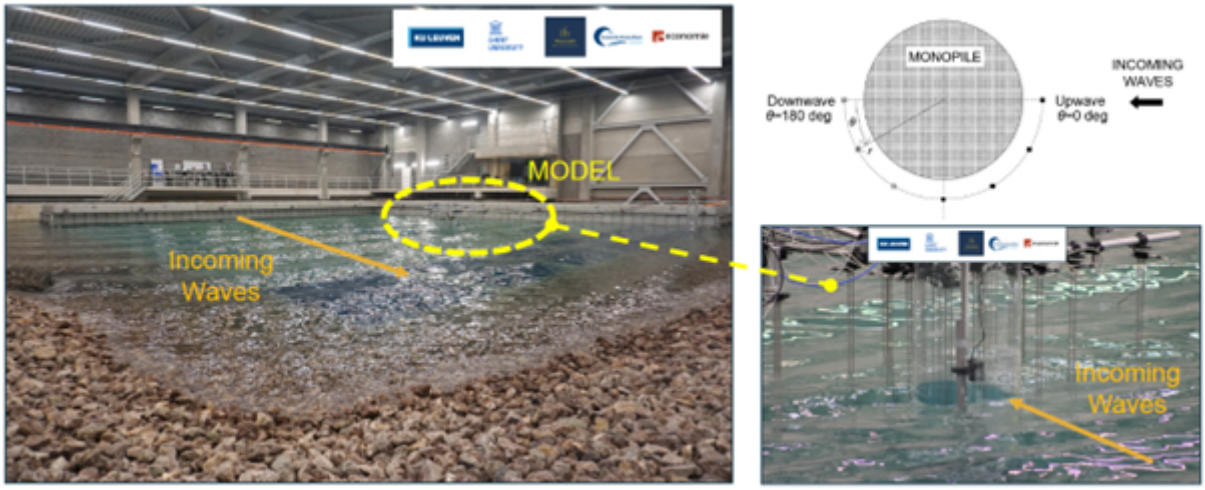
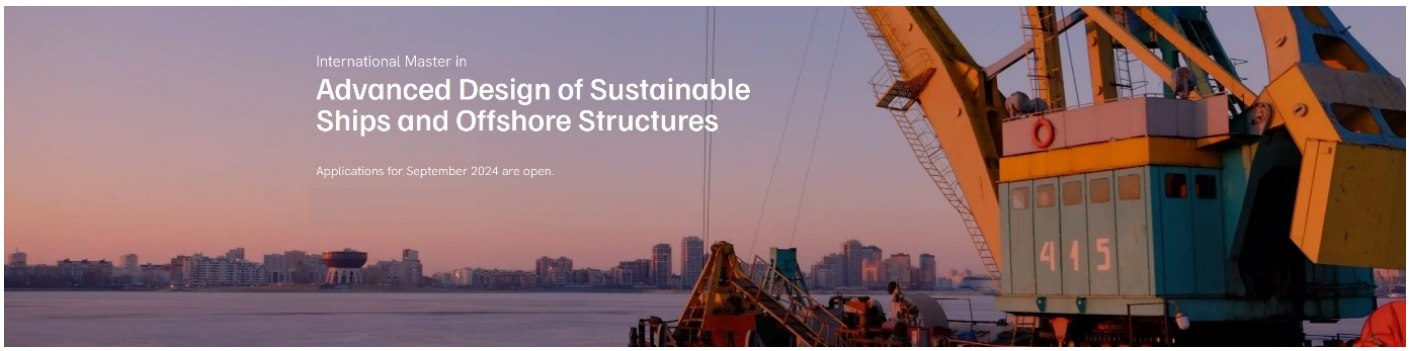


Figure 2. Experimental set up at the Coastal & Ocean Basin.

EMship

Ghent University is now the coordinating institute of the International Erasmus Mundus EMship, an advanced two-year master's level education programme in design and optimisation of ships and offshore structures dedicated to sustainable maritime transport, ships, offshore and renewable energy structures. Thanks to its strong background and complementary expertise, the EMship Consortium tackles rapid technological evolution in the fields of naval architecture, maritime technology and offshore engineering and addresses the growing demand from companies for graduates with up-to-date competences and societal challenges related to global warming (need for energy saving, renewable energy sources, more efficient and less polluting means of transport…).

Applications for September 2024 are now open. Prospective students can also apply for an Erasmus+ scholarship.



Researchers associated with the Knowledge centre recently published:

Brouwers, Bart; Meire, D.; Toorman, E.A.; van Beeck, J.; Lataire, E. (2023). Conditioning procedures to enhance the reproducibility of mud settling and consolidation experiments. *Estuar. Coast. Shelf Sci. 290: 108407*. doi:10.1016/J.ECSS.2023.108407

Delefortrie, G.; Verwilligen, J.; Kochanowski, C.; Pinkster, J.A.; Yuan, Z.M.; Liu, Y.H.; Kastens, M.; Hoydonck, W. Van; Pinkster, H.J.M.; Lataire, E. (2023). Unsteady ship–bank interaction: a comparison between experimental and computational predictions. *Sh. Technol. Res.* doi:10.1080/09377255.2023.2275372

Delefortrie, Guillaume; Eloot, K.; Lataire, E. (2023). The influence width of drifting ships. *Appl. Ocean Res. 141: 103779*. doi:10.1016/J.APOR.2023.103779

He, H.; Van Zwijnsvoorde, T.; Lataire, E.; Delefortrie, G. (2023). Model predictive controller for path following ships validated by experimental model tests. *Ocean Eng. 288(115971).* doi:10.1016/j.oceaneng.2023.115971

Wium, D.; Lataire, E.; Belis, J. (2023). Finite element analysis of a glass structure in a superyacht superstructure. *Glas. Struct. Eng. 2023: 1–18*. doi:10.1007/S40940-023-00240-1

Activities

Hongwei He attended ICMASS 2023: Autonomy for Sustainable & Green Shipping, which was held during Europort 2023 in Rotterdam, The Netherlands from 8 to 9 November 2023. Patrik Peeters from Flanders Hydraulics presented “ASHIP, a safe test environment for innovations in autonomous navigation”.

Knowledge Centre Manoeuvring in Shallow and Confined Water
Berchemlei 115
2140 Antwerp
Belgium
T. +32 3 224 60 35

Flanders Hydraulics | Flanders State of the Art | GHENT UNIVERSITY