



Newsletter Shallow Water

Knowledge Centre Manoeuvring in
Shallow and Confined Water



July 2024

This is the 58th 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 have an item on the experimental wind tunnel experiments for the Everblue project, the new release of Capytaine and we launch a 2nd call for abstracts for the 7th MASHCON conference.

Everblue

The size and capacity of ships in general, and of container ships particularly, has increased dramatically over the last decades. This has led to higher air drafts, so that ships experience more impact of wind and wind loads. These wind effects on ships are traditionally assessed using very simplified semi-empirical methods, which can presently fall short due to both the increase in the ship's dimensions and the augmented probability of harsh meteorological events. Wind tunnel experiments are now underway at the [von Karman Institute](#) to assess the effect of wind on scale models of various configurations of stacked containers on an Ultra Large Container Ship (ULCS). More than 200 different wind tunnel tests are planned in order to acquire accurate and reliable experimental data that can be used as a benchmark for the following phases and for future projects. Three compositions of the surroundings will also be tested; a bare terminal, a terminal with container stacks and a terminal with storage tanks (Figure 1). For each case, five different wind speeds and a wide range of wind directions will be tested. For a selection of setups, PIV-measurements (Particle Image Velocimetry) will be carried out showing the velocity details in a 2D plane.



In addition, experiments are carried out in an open sea environment and the measurements will be compared with data from literature.

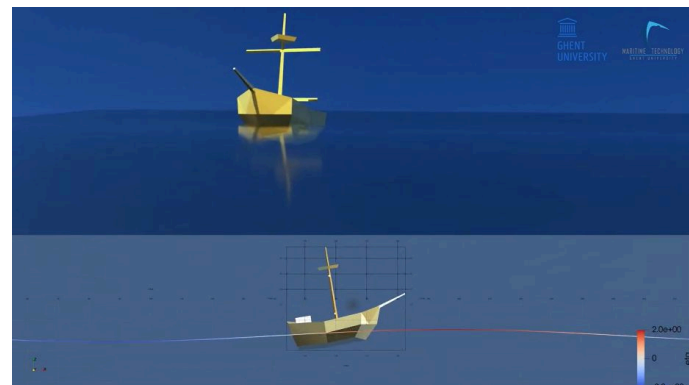
The goal of the [Everblue](#) project is to investigate in detail the effects of wind on modern container ships moored in realistic, densely built harbour environments. In addition to the wind tunnel experiments, the problem will be tackled by means of CFD simulations and dynamic mooring

analysis. The goal of the project is to have a better understanding of the impact of the wind in a harbour environment, to develop high-fidelity models for the wind field and to improve techniques to calculate the wind-induced forces on moored ships and on mooring equipment. Everblue is a joint project funded by VLAIO between the Maritime Technology Division at Ghent University and the von Karman Institute for Fluid Dynamics.



Capytaine

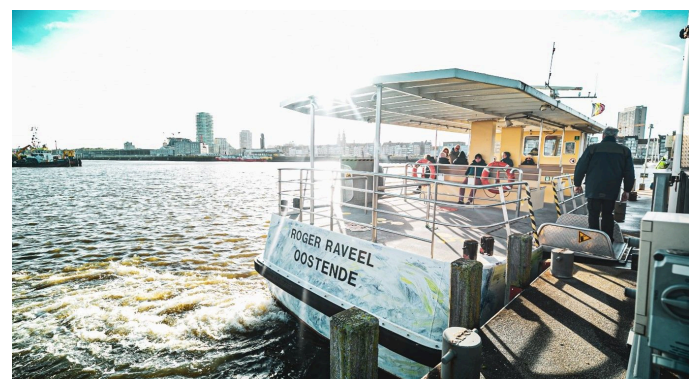
Capytaine is a Python package for the simulation of the interaction between water waves and floating bodies in the frequency domain. It is built around a full rewrite of the open source Boundary Element Method (BEM) solver Nemoh for the linear potential flow wave theory.



Version 2.1 of Capytaine was launched recently and features the approximate forward speed (AFS) based on the work described by Donatini et al. (2022), which was published in the proceedings of the 6th MASHCON conference. Capytaine, developed by Matthieu Ancellin (R&D Engineer at Eurobios Mews Labs), is an open-source linear potential flow solver capable of simulating wave loads on structures in the frequency domain. Examples of applications include seakeeping calculations of floating objects or structures. In the AFS approach, the zero speed results (i.e. diffraction and radiation forces) are corrected to account for the fluid velocities (parallel to the direction of the forward speed) considering the diffracted and radiated waves. The AFS approach assumes that the magnitude of the forward speed is relatively small and assumes that thin ship theory is valid so that the fluid around the body can be approximated by uniform flow. This release is also available on PyPI and Conda-forge repositories. The video on our youtube channel shows a pirate ship moving in waves with forward speed.

2nd call for abstracts for the 7th MASHCON conference

The 7th MASHCON conference, which will be held from 18 to 21 May 2025 in Bruges, Belgium. The MASHCON conferences offer researchers and experts the possibility to discuss the latest developments in research and practice related to ship manoeuvring in shallow and confined water. The 7th edition will pay particular attention to clean power in shallow water, dealing with



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aspects such as the green energy transition in shipping and near-shore emissions, manoeuvring in shallow water with Efficiency Improving Devices and auxiliary propulsion in shallow water, including wind assistance. The conference will not just concentrate on clean power, but also discuss shallow water effects on ship manoeuvring, ship - bank interaction and other confined water effects, ship - ship interaction effects, squat and other vertical motions in shallow water.

Authors are invited to submit an abstract of 350 - 500 words before 30 September 2024. Once accepted, authors will be expected to write and present a full paper, which will be reviewed by the international scientific committee.

The conference organizers also welcome papers dealing with all aspects related to manoeuvring in shallow and confined water. Benchmark data are available for researchers wishing to validate numerical tools against experimental model test results.

The 7th MASHCON conference is organized jointly by the Maritime Technology Division at Ghent University and Flanders Hydraulics.

Presentations

Several researchers associated with the Knowledge Centre attended the 35th PIANC World Congress, which took place in Cape Town, South Africa, from 29 April to 3 May 2024.

Guillaume Delefortrie presented “Ship’s squat when sailing asymmetrically in an approach channel” and “Exact and approximated solutions to the critical flow speeds in canals”.

Marc Mansuy presented “Improving the accessibility of the Walloon waterway network for larger ships using six-degrees-of-freedom ship manoeuvring simulators” and Jeroen Verwilligen presented “Historical evaluation of the Western Scheldt for ultra large container ships”.

Ivandito Herdayanditya presented “Experimental study of the wave field around a monopile due to moderate steepness irregular incident waves” at the Coastlab24 conference, which took place from 13 to 16 May 2024 in Delft, The Netherlands.

Along with other smart shipping projects, DDShip, which was discussed in our previous newsletter, was presented at the Smart Port Week in Antwerp on 11 June. After the presentation of the project, a Q&A was held with the audience so that the main issues and concerns of stakeholders could be identified. The presentation can be downloaded at <https://mass.kbrv.be/mass-sessions/flanders-state-of-the-art-data-driven-smart-shipping-ddship>

Ivandito Herdayanditya presented “Application of Irregular Frequency Removal Feature in Capytaine for Marine Operations in the Offshore Wind Farms ” at the 43rd International Conference on Ocean, Offshore & Arctic Engineering (OMAE®) conference, which took place from 9 to 13 June 2024 in Singapore.

Researchers associated with the Knowledge centre recently published:

Brouwers, B.; van Beeck, J.; Lataire, E. (2024). Optimisation of the depth range of UIV on cohesive sediment (fluid mud) flows. *Discov. Appl. Sci.* 2024 66. ISBN 0123456789 6(6): 1–17.
[doi:10.1007/S42452-024-06016-8](https://doi.org/10.1007/S42452-024-06016-8)

Delefortrie, G., Verwilligen, J., Eloot, K., Lataire, E. (2024) Bank interaction effects on ships in 6 DOF. *Ocean Engineering* Vol. 310, 118614, <https://doi.org/10.1016/j.oceaneng.2024.118614>

Herdayanditya, I.; Streicher, M.; Lataire, E.; Rauwoens, P. (2024) Experimental Study Of The Wave Field Around A Monopile Due To Moderate Steepness Irregular Incident Waves. *Proceedings of the 9th International Conference on Physical Modelling in Coastal Engineering (Coastlab24)*. Delft, The Netherlands, May 13-16, 2024. DOI:10.59490/coastlab.2024.686

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