

Newsletter Shallow Water

Knowledge Centre Manoeuvring in
Shallow and Confined Water



November 2022

This is the 52nd 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 give a summary of the sounding board meeting which was held at Flanders Maritime Laboratory and we give an update on the carriage of the Towing Tank for Manoeuvres in Shallow Water.

Sounding board meeting

Stakeholders from both public and private companies were invited to a sounding board meeting to discuss how access to research facilities and the study of ship manoeuvring behaviour can be improved. The meeting was held on 23 September 2022 at [Flanders Maritime Laboratory](#).



The meeting started with a presentation on the status of the Towing Tank for Manoeuvres in Shallow Water. An overview was then given of the facilities that are used within the Knowledge Centre and the participants were asked which types of these facilities they use and why.

Towing tanks are still used for classical resistance tests, but less frequently than in the past. For relatively simple hull shapes, Computational Fluid Dynamics would now be the first choice. When testing special hull shapes or when studying specific aspects, such as seakeeping and manoeuvring characteristics, a towing tank would be the preferred choice.

A basin, such as the [Coastal & Ocean Basin](#), is a valuable option to take account of interaction with fixed structures, particularly in wind and wave conditions. [Free running tests](#) in ship manoeuvring basins are also used extensively, for example to test Dynamic Positioning Systems or to study the manoeuvring characteristics of ships. Based on these tests, mathematical models can be developed which are then used in simulators.

Training simulators play an essential role in education and formation. However, [ship manoeuvring simulators](#), which use more sophisticated mathematical models, are very useful for research, particularly when a lot of scenarios need to be tested.

Three topics were then discussed in detail. The first topic was [autonomous navigation](#) with focus on ships. It was immediately pointed out that [autonomous navigation](#) is an enormous change from manned navigation. Small changes can also be very rewarding – whenever a sub-process can be rendered autonomous successfully, the rewards are immediate. With respect to ship design, several aspects need to be considered at the beginning of the design process for fully autonomous zero-emission [autonomous navigation](#). Dynamic Positioning is deemed very important for successful autonomous navigation. With respect to controllers, it was emphasized that the mathematical models in simulators in the near future can be replaced by controllers developed by third companies, for example to try out the steering algorithms for autonomous navigation. Both [free sailing](#) experiments in a towing tank and simulations

can therefore serve as a test bed. Several researchers associated with the Knowledge Centre have also been working on this for their doctoral research. Legal aspects such as liability were also discussed, and mention was made of the FLOWS thesis of the year [Legal challenges regarding autonomous shipping in inland waters](#) by An-Sofie Obrie. The differences were highlighted between seagoing vessels and autonomous navigation in inland waters, where the environment is confined and where the vessel is less exposed to hydro-meteorological parameters such as wind and waves. It was also emphasized that it is important to pay attention to regulation, for example to safeguard the advantageous opportunities offered to [autonomous navigation](#) in the Flemish waterway network.

The second topic was [autonomous navigation](#) with focus on infrastructure and operational challenges. The advantages of route planning were discussed, but it was pointed out that it may just lead to a shift within the transportation process, i.e. leading to a bottleneck in the un/loading process. It is clear that [autonomous navigation](#) could be advantageous, but not in every case. Ultimately, a cost-benefit analysis has to be made.



A third topic that was discussed was the transition to clean power in shallow water within the European framework [Fit for 55](#). The participants were well aware of the measures that can be taken. Operational measures, reduction measures and a fuel shift all have a role to play. These measures are often proposed for a ship sailing in deep open water. A ship spends a lot of time in shallow water as well, with a propulsion unit that may not be operating in efficient conditions, so it merits further investigation.



The meeting was concluded with a brief discussion of funding possibilities for research. Several funding mechanisms exist and they are used by research institutes and companies alike. Interest groups are useful to keep up to date of what is playing and also to steer future calls. Overhead is cumbersome. The highlight of the meeting was the inauguration of the free running system by Filip Boelaert, Secretary General of the Department of Mobility and Public Works.

Home sweet home

At the end of August 2022, the towing carriage [arrived at Flanders Maritime Laboratory](#), after traveling from the main contractor, [Consmema](#), via inland vessel to a mooring location in close proximity to [Flanders Maritime Laboratory](#). After a successful transport and lifting procedure, the carriage was installed on the rail section at the harbour side of the [Towing Tank for Manoeuvres in Shallow Water](#).



At the moment, appendages of the carriage, such as brakes and a yaw table, are being put in place. As the carriage needs sufficient power to accelerate its mass of 70 tons to 3.0 m/s, the integration in the electricity network requires careful attention. The next step will be data network integration to ensure that 24/7 unmanned operability can be relied upon. Upon completion of all the integration steps, which is expected by the end of 2022,

the towing carriage as mechanical test apparatus will undergo Site Acceptance Tests so that captive model tests can be carried out in 2023.

Researchers associated with the Knowledge centre recently published:

Delefortrie, G.; Villagomez, J.; Verwilligen, J. (2022). Maneuvring Behavior of Push Convoys in Different Barge Configurations. J. Sh. Res.: 1–19. doi:10.5957/JOSR.1220005

Herdayanditya, I.; Rauwoens, P.; Verao Fernandez, G.; Martínez-Estévez, I.; Lataire, E. (2022). Monopile run-up study using Eulerian and Lagrangian numerical models. Trends Renew. Energies Offshore. ISBN 9781003360773: 491–499. doi:10.1201/9781003360773-56

Pribadi, A.B.K.; Donatini, L.; Lataire, E.; Fernandez, G.V.; Martínez-Estévez, I. (2022). Validation of a computationally efficient time-domain numerical tool against DeepCwind experimental data. Trends Renew. Energies Offshore. ISBN 9781003360773: 597–608. doi:10.1201/9781003360773-68

Marc Mansuy from UGent receives the first prize YP award at SMART RIVERS 2022



Marc Mansuy attended the PIANC conference [Smart Rivers 2022](#) which took place in Nanjing, China and online from 18 – 21 October 2022. He presented the paper [Simulation study to assess the maximum dimensions of inland ships on the river Seine in Paris](#), for which he received the YP Award. In addition, he was co-author of [Benchmark of turning basin options for the ECMT Class V network of Nord-Pas-de-Calais \(France\)](#).

An-Sofie Obrie won the Flows Thesis of the Year Award

An-Sofie Obrie won the Flows Thesis of the Year Award for her thesis [Legal challenges regarding autonomous shipping in inland waters](#), which was supervised by the [Maritime Technology Division](#) at Ghent University.

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