

This is the 24th [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 an item on the update of our mathematical model accounting for bank effects. In a second item, we discuss how full scale motion measurements in the Port of Delfzijl were used to gain further insight into the influence of muddy bottoms on the manoeuvring behaviour of ships.

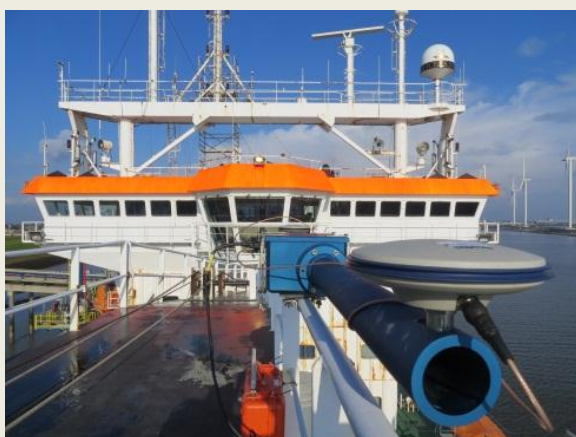


[Bank effects](#) are among the most significant hydrodynamic forces acting on the vessel when a ship sails in a canal. Additionally, when a vessel passes a dock along the same canal, then these [bank effects](#) can no longer be assumed to be stationary. Instead, the effects will result in a transient phenomenon induced by the sudden change in ship to bank distance. It is important that these transient effects are modelled correctly.

The mathematical model for bank effects which the Knowledge Centre uses, can cope with these transient phenomena. In the past, [towing tank experiments](#) were carried out with a ship sailing along a vertical bank with a sinusoidal waterline and along a vertical bank with a step function as waterline. The mathematical model for the [bank effects](#) (squat, horizontal forces and moments) in the [ship manoeuvring simulators](#) of Flanders Hydraulics Research includes the results of these tests and sudden changes in the bathymetry.



The mathematical model was validated by studying the transit of a 230 m long and 37.5 m wide bulk carrier on the Canal Ghent-Terneuzen with both Dutch and Flemish pilots. In 2016 a new experimental program will be carried out in the towing tank to study additional transient bank effects.

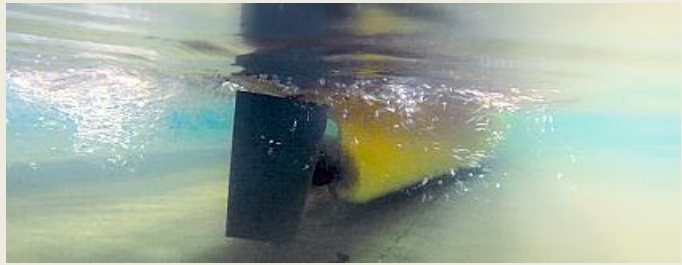


In order to assess the influence of a [nautical bottom](#) in the port of Delfzijl, the Knowledge Centre carried out four [full scale trials](#) to measure the motions at full scale of the hopper dredger Geopotes 15 (Van Oord Nederland bv). During these trials a wide range of tidal levels and bottom conditions were experienced, corresponding to under keel clearances with respect to the top of the mud layer varying between +17% and -5%.

The manoeuvring behaviour of the vessel was assessed based on the relation between ship motions in 6 degrees of freedom and the application of rudder and propeller settings. The evolution of the manoeuvring behaviour during the trials was then compared with the bottom conditions that were actually experienced in order to determine the normative bottom parameters.

The results of the full scale trials provided further insight into the influence of muddy bottoms on the manoeuvring behaviour of the vessel and revealed critical values for both under keel clearance and mud layer thickness for the mud rheology present in Delfzijl.

Based on the more than 40 abstracts that have been accepted for the [4th MASHCON conference](#), which will be held in Hamburg, Germany, on 23 – 25 May 2016, the conference is set for a wide ranging and interesting program. The main theme of the conference, which is ship bottom



interaction, will be covered from various points of view. The validations of numerical computations will be presented by researchers who made use of the open access experimental benchmark data for validating numerical codes. Other researchers will present experimental data and full scale measurements and nautical experts will present their experience with manoeuvring in shallow water. In addition, other topics relating to ship manoeuvring in shallow and confined water will be presented as well.

The registration fees can be consulted on the [conference website](#), which links to a secure online registration system.



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