

This is the seventeenth [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 discuss a study that has been carried out with respect to access policy to ports. We are also pleased to announce that the 4th International Conference on Ship Manoeuvring in Shallow and Confined Water will be held in Hamburg in 2016.



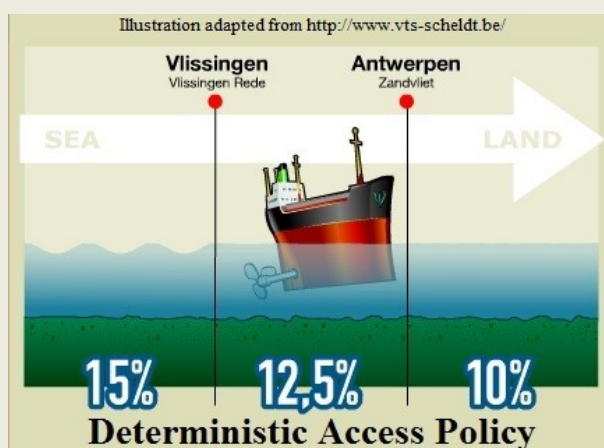
Courtesy Maritime Access Division, Flemish Government

The shipping traffic to the Belgian and Dutch ports located at the Western Scheldt estuary and the river Scheldt follows an access channel of which the depth is restricted. As a result, deep-drafted vessels (e.g. more than 13.1 m for traffic to Antwerp) cannot always sail 24 hours a day on the River Scheldt. The period in which these vessels may proceed inward or outward bound is called the tidal window, depending on the ship's draft and the height of the tide. The [Common Nautical Authority](#) calculates these

tidal windows and gives permission for the vessels to proceed in- or outbound. A so-called deterministic access policy is based on calculations that use tide, current (if applicable), draft and water depth values to check whether a certain minimum gross under keel clearance is assured during the voyage and contact with the bottom is avoided at all times.

A probabilistic access policy, on the other hand, is based on an acceptable probability of bottom touch during the transit of any (deep-drafted) vessel and could therefore result into a more optimal use of the access channel.

The draft of a ship that is underway is not static. Depending of the speed, the ship will squat, which is a combination of sinkage and trim. In addition, a ship will respond to waves and wind so that the rolling, pitching and heaving motions will also affect the draft and hence the probability of touching the bottom (BTP).



Over the last couple of years, the Knowledge Centre has studied how the tidal windows are affected by adopting a probabilistic rather than deterministic access policy. A dedicated software package called ProToel was used in these studies. ProToel allows a user to select a ship with a specific loading condition, a route to be followed with a specified speed profile along the trajectory, and a specific starting time (or a series of starting times) for the voyage. In each point of the trajectory, the program calculates the gross under keel clearance based on bottom depth and water level data.



A probability of bottom touch criterion needs to be accompanied by an additional criterion to guarantee the manoeuvrability and controllability of the vessel, as these properties are significantly affected with decreasing under keel clearance. Such a criterion can be formulated in terms of a minimum manoeuvring margin (MM).

The study – on behalf of the Common Nautical Authority – was carried out for 683 tidal cycles of the year 2011 and it was found that a probabilistic access policy results in a clear increase of the accessibility of the ports of Flushing, Terneuzen and Antwerp for deep-drafted container ships and bulk carriers, both in terms of length of tidal window and maximum allowable draft. Only in less than 5% of the tidal cycles the tidal windows will be smaller than when calculated with a deterministic access policy. The detailed findings of this study will be presented at the upcoming [PIANC World Congress](#).

For more information on the concept of a tidal window, please consult the animation on the website of the [Common Nautical Authority](#). More information on our research can be found [here](#).

We are proud to announce that the 4th International Conference on Ship Manoeuvring in Shallow and Confined Water will take place 23 – 25 May 2016 in Hamburg and will be hosted by the [Federal Waterways Engineering and Research Institute \(BAW\)](#). Up until now, the International Conferences on Ship Manoeuvring in Shallow and Confined Water were held every two years, but as the upcoming [MARSIM](#) conference will be held in September 2015, it was considered more interesting to have our conference in 2016. Book the date in your agendas!



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