

A new disposal strategy in the Schelde-estuary: The concept and the preliminary monitoring results

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The scope

To guarantee optimal port accessibility, one of the projects within the scope of the LongTermVision for the Scheldt estuary to be executed, is the deepening of the navigation channel. In 2001 the Port of Antwerp Expert Team proposed a new disposal strategy, using dredged material to reshape eroded sandbar. A pilot study near the Walsoorden sandbar resulted in the positive evaluation of the feasibility of this new idea.

Within the project of deepening of the navigation channel, this new idea was formulated in one of the alternatives. The environmental impact assessment and an appropriate assessment concluded that a new disposal strategy should be applied: the dredged material had to be disposed near sandbars at 4 locations, to create new ecological valuable habitats (Figure 1 – green hatch).

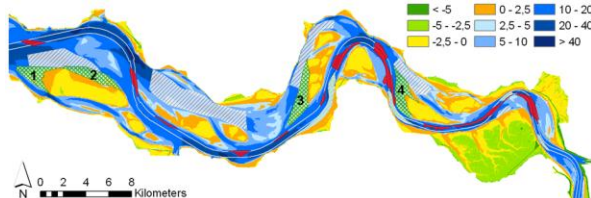


Figure 1: Westerschelde with disposal locations

The idea

The new strategy is based on the concept of morphological management of the estuary: dredged sediments (sand) are used to create benefits for certain estuarine system services/functions. In this case, the dredged sediments are used to reshape sandbars. By doing this, flow patterns are changed and (1) low dynamic (and so ecological valuable) habitats are created, and (2) the flow is concentrated more in the channels in order to preserve the multiple channel system and reduce maintenance dredging quantities.

Since the start of the channel enlargement, sediment has been disposed in order to create the so called “megadune” near the tip of 2 sandbar (location 1 and

4), while a “sandspit” along the edge of 2 sandbars (location 2 and 3).

The monitoring programme

To evaluate the success of this new disposal strategy an extensive monitoring programme was set up and several criteria were defined. Frequent (2-weekly, monthly) topo-bathymetric surveys using multibeam echo sounding are performed in combination with seasonal sedimentation-erosion measurements using both RTK (intertidal) and singlebeam (subtidal).

Also flow velocities on 10 transects, each consisting of 4 measurements points, in the shallow subtidal and the intertidal zone near the disposal locations are monitored.

Preliminary results

Before the start of the deepening, the reference situation was monitored, both for the flow velocities, as the topo-bathymetry. Since the start of the works, new measuring campaigns at all locations have been executed to evaluate the effect of the disposal activities.

Preliminary results show different effects near different sandbars: from the multibeam echo-soundings the stability of the relocated sediment is evaluated. For 3 of the 4 locations the stability has been better than the value from the criterium. From the flow measurements one location shows an important reduction in flow velocities, while on the other locations almost no effect was found. During the next years this monitoring will continue, allowing the evaluation of the new disposal strategy on the longer term.

Parallel with the monitoring, a validated 2D-numerical hydrodynamic model was used to evaluate the effects of the disposal of sediments. Every three months a simulation is performed using the most recent topo-bathymetry. This allows a more frequent evaluation of the changes in flow velocities and flow patterns near the disposal areas.