A NEW APPROACH FOR MANAGING THE WESTERN SCHELDT’S MORPHOLOGY AND ECOLOGY

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1. BINATIONAL MANAGEMENT OF THE WESTERN SCHELDT ESTUARY

The Scheldt estuary is the maritime access to several ports in Flanders and the Netherlands, the largest being the Port of Antwerp. The Flemish Ministry of Infrastructure finances and executes the dredging works in the multi-channeled Western Scheldt. Before 1970, only limited dredging was required on the sills. In the beginning of the 70’s, the navigation route was deepened for the first time, a second time in 1998. The Flemish and the Dutch government decided setting up a common "Long Term Vision" for the management of the estuary. One of the main objectives of the LTV is the preservation of the dynamic and complex flood and ebb channel system in the Western Scheldt, the middle reach of the estuary located in The Netherlands. For years, dredging was seen by many as a major cause for the negative morphological and ecological changes; this issue would be addressed in LTV studies.

2. PORT OF ANTWERP EXPERT TEAM

The Port of Antwerp has no authority on the maritime access to its harbour and appointed an independent international expert team to investigate the feasibility of a further deepening of the navigation channel in the estuary. These experts concluded that dredging was not a major threat and that the present morphological evolutions are the consequence of longer-term effects of natural changes and of the human interferences on these, e.g. poldering. They proposed an holistic approach of the morphological management in which dredging would be embedded as a management tool. Besides dredging and disposal, this approach would include modifications to the existing hard bordering and construction of new river structures to modify the erosion-transport-deposition process. Dredging should not be considered only for enlarging the navigation route, also as a means to steer the estuarine morphology.

3. THE WALS OOORDEN PILOT PROJECT

The Port of Antwerp Expert Team proposed in 2001 a pilot project to demonstrate that disposal of dredged material can be used to influence positively the morphology at the shoal of Walsroorden, where negative changes in the multi-channel system had been observed. Changing the shape of the sandbar would help maintaining the multiple channels, making the area ecologically and morphologically healthier and, on the long-term, improving the self-dredging capacity of the flow on the nearby crossings. In this way the quantity of material to be dredged on sills could possibly be reduced. To investigate the feasibility of the proposal, a research program was conducted in 2002 and 2003 at Flanders Hydraulics Research, including desk studies, field measurements, scale model tests and numerical modelling. Based on the results, the expert team could conclude that nothing opposed the feasibility of the new disposal strategy, although final judgement required an in situ disposal test. At the end of 2004, 500.000 m³ of sand was disposed with a diffuser in relatively shallow water along the Walsoorden sandbar. The experiment is thoroughly monitored with multi-beam and LIDAR topo-bathymetric surveys, sediment tracing, in-situ sediment transport measurements and an ecological monitoring.

4. OUTCOME

From morphological viewpoint, the experiment is definitely a success, as almost all the material remains in the disposal area, after one year. From ecological viewpoint, no negative effects could yet be observed. Continuation of the experiment is planned with 500.000 m³ to be disposed at the beginning of 2006. The new disposal strategy could now possibly be included in the routine dredging operations, with potential benefits for the economy (improving port accessibility) and the ecology (management of habitats). Further research is needed for embedding a morphological dredging and disposal strategy in the ongoing dredging policy and, more generally, in an holistic approach to the morphological management, together with other measures such as an adaptation of the hard bordering.

5. REFERENCES

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