

Sediment Management in the Port of Hamburg

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For centuries regular maintenance dredging has been necessary to maintain safe water depths for navigation in the Port of Hamburg. The port is situated at the upper end of the 100 km long Elbe estuary. On the one hand side this means that environmentally friendly transport by ship reaches comparatively deep into the inland. On the other hand side the port has to face the challenges of both quantity and quality sediment management resulting from its geographical position.

Naturally an estuary like the one of the Elbe receives sediments both from the sea with tidal pumping and with freshwater from upstream. Those sediments mix in the port area. Past developments like flood protection (dikes), land-reclamation in the port, fairway channel adjustments etc. influenced the processes of sedimentation in the fairway, the side branches and harbour basins.

The Elbe estuary is maintained both by the German Federal Waterways Administration WSV and the Hamburg Port Authority HPA. Together roughly 20 Million m³ have to be dredged annually. This is comparable to other big estuaries in Europe. According to specific guidelines the sediments dredged by the WSV are being relocated in the aquatic system.

Roughly ¼ of the total amount has to be dredged by HPA. In former times dredged material was used for land reclamation in the port area and because of its nutrients also for agricultural purposes. Some 30 years ago this had to be stopped because of the contamination of Elbe sediments. At that time there was no chance of source control in the catchment area at all. Contamination coming from ¾ of the Elbe length was well documented at the former German-German border, but little was known about its provenance.

Hamburg had to develop its very special Dredged Material Management Concept in the 1980's. A solution had to be found in the limited city area. It was derived from a comprehensive research programme.

Taking into account that contamination sticks to fine grained particles the first step of treatment is separation of these fine grains from the coarser sand. The still very wet silt is then dewatered with highly sophisticated machinery. Since 1993 the large scale METHA treatment plant works with a throughput of 1 Million m³ dredged sediments per year.

The dewatered silt is safely stored in 2 specially constructed silt mounds, following the strict requirements of German waste disposal requirements. All efforts to beneficially use these treated sediments had no lasting effect.

Since the political change 20 years ago things have changed. The first international treaty to be signed by the reunified Germany was the one to set up the International Commission for the Protection of the Elbe IKSE. The water quality improved significantly because of construction of wastewater treatment facilities and closing down whole out-dated industries. Also sediment quality improved substantially. Therefore in the 1990's open water disposal (relocation) started in Hamburg, like common in most other ports.

Today still some 1.2 Million m³ are disposed off on land, the bigger part of 3-4 Million m³ is brought back to the aquatic system. Today's challenges are quite different compared to those 30 years ago.

The implementation of EU nature protection legislation requires the development of an integrated management plan (see KLOCKE). In this context a holistic view will become necessary.

This also fits to the requirements of the EC Water Framework Directive, which can help to solve remaining sediment contamination problems in the entire Elbe region. In this respect a new Sediment Management Working Group of the IKSE becomes very important to deal with the quality aspect of sediment management. Also the quantity aspect has to be tackled; for this see GLINDEMANN and HEYER.

All this is combined in a recent River Engineering and Sediment Management Plan for the Elbe estuary by both the WSV and HPA, which is supported by the 3 neighbouring federal states.

For more information:

www.Hamburg-Port-Authority.de

www.Tideelbe.de

<http://www.dredging-in-germany.de/Hamburg/>