PorII

Rhine Research Project II - POR II

Towards cleaner dredged material

Port of Rotterdam

Gemeentelijk Havenbedrijf Rotterdam

Introduction

Rotterdam Municipal Authority wishes to further improve the quality of dredged material in the port through a new impetus to the Rhine Research Project, known as POR II.

Key concepts in this new action plan are:

- from dredged material management to integrated sediment management (about 50% of the Rhine sediment flows directly with the river into the sea)
- harmonisation of the policies for the Rhine basin and for the North Sea
- emission control, with a shift from (industrial) point to diffuse sources
- attention will be paid to bioassays, Tributyltin and 'new substances'.

This brochure provides a brief explanation of the POR II approach, activities up until 2004 and an overview of past activities.

Rotterdam, a sustainable clean port

The port of Rotterdam owes its leading position in Europe and the world to a major extent to its geographical location: on the North Sea and the Rhine and Meuse estuaries. However, its location on the North Sea also means that tidal movement carries many millions of cubic metres of sand and silt (sediment) annually from the sea into the port. The Rhine and Meuse add a further substantial quantity of sediment from the hinterland to this. Since the flow velocity greatly decreases in the river estuary, a large proportion of this sediment settles on the riverbed and in the port basins. Without dredging, the port would soon silt up.

Rotterdam Municipal Port Management (RMPM), initiator of POR II, also shares responsibility for the quality of the environment and nautical safety in the port area. A sustainable clean and safe port is a basic condition for a healthy future for the port and surrounding region.
Commissioned by the managers of the port area and river (RMPM and the Ministry of Transport, Public Works and Water Management), dredging is continually carried out in order to guarantee access to the port for shipping traffic. A depth of 10 to 25 metres is required for the harbours and river. This maintenance dredging produces around 20 million cubic metres of dredged material annually. Most of this material is returned to where it came from: the sea. Despite all the measures taken, part of the dredged material (currently still several million cubic metres a year) from the Rhine and Meuse is contaminated by discharges in the Rhine States. It would consequently be irresponsible to relocate contaminated dredged material to the North Sea. In the mid-eighties it was decided to store this dredged material in a special depot known as the “Slufter”.

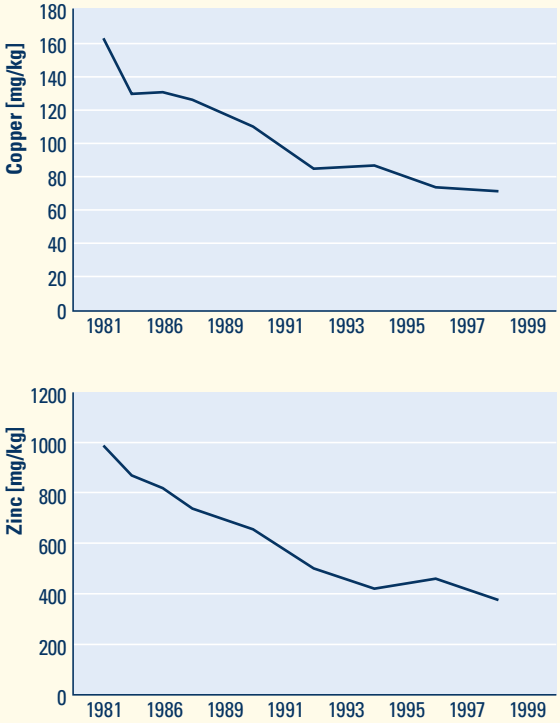


Figure 1
Decrease in average heavy metal contents of dredged material in the eastern parts of the port of Rotterdam

The Slufter: a solution from the past

The Slufter, a large permanent depot for dredged material, went into operation on the Maasvlakte in 1987. This site is used for the storage of contaminated dredged material from the port of Rotterdam (including heavy metals such as zinc and copper and organic micro-pollutants such as PHAs, PCBs, pesticides and mineral oil). Storage of dredged material has to come to an end. The basic principle of Rotterdam's policy is that it should be possible within the foreseeable future to relocate all dredged material from the port (back) into the water system, or alternatively, to use part of it on land without causing (hazardous) impacts.

Rhine Research project (POR)

From 1984-1994, Rotterdam tackled the problem of contaminated dredged material by way of the Rhine Research Project. This programme was specifically aimed at so-called 'point dischargers': clearly identifiable companies along the Rhine and in the port itself. This approach led to a significant reduction of these direct discharges. For many years, POR symbolised Rotterdam's endeavours to improve the port environment. Agreements were successfully made with virtually all the major dischargers

for significant reductions in their discharges. This represented an important impulse for the quality of the Rhine water and consequently the quality of the dredged material in the port of Rotterdam (figure 1).

Although the quality of both the Rhine water and sediment has considerably improved, the ultimate goal - a sustainable situation - has not yet been achieved. In 1999, the Rhine Research Project required a follow-up: POR II.

POR II

Together with Rotterdam Public Works Department, the RMPM continued their efforts towards clean dredged material in a sustainable environmental situation.
The main reason for POR II is the continued settling of contaminated sediment in the port. Next to that a research carried out by the German GKSS Research Centre (2000-2001) concluded that there are new developments that necessitate a new start of the project via POR II.

GKSS research

The GKSS research, carried out in collaboration with a number of other institutes, consisted of the following four study segments and results:

1 **An up-to-date study into the present and future (2015) quality of the Rhine water and sediment on the basis of combined socio-economic and environmental scenarios related to the changing economic activities in the hinterland and port of Rotterdam.**

The general picture is that the quality of the dredged material has considerably improved and that this is slowly continuing (figures 2 and 3). Where the traditional contaminants are concerned, the situation will improve, but even in the case of the so-called 'green scenario' the target levels for a large number of substances will not be achieved by 2015. Particularly the diffuse sources are proving a problem. This concerns for instance the emission of combustion products of fossil fuels and other emitted substances that enter the Rhine via the atmosphere. Groundwater and paved urban areas are also pathways whereby contamination continues to reach the Rhine unabated. In

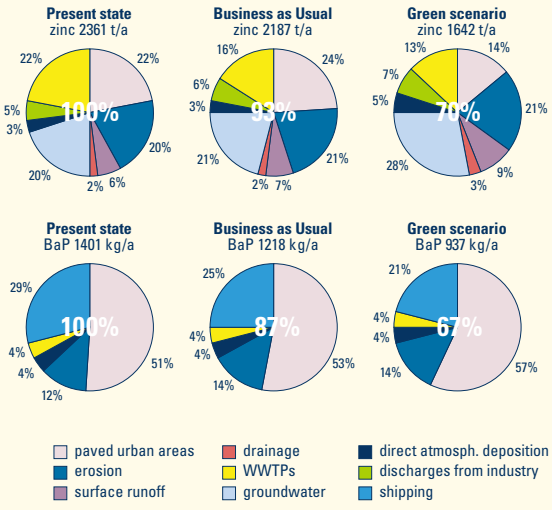


Figure 2
Results of the scenario analysis for zinc and benzo(a)pyrene inputs in the Rhine basin upstream Bimmen/Lobith

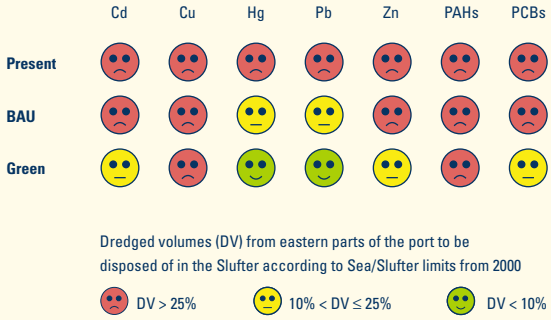


Figure 3
Present and estimated future (2015) quality of dredged material in the eastern parts of the port of Rotterdam according to Dutch criteria from 2000

addition there are also 'historic' contaminated sediments (containing PCB for example) which are gradually being released into the Rhine basin.

2 The relative role of inputs from the Rhine, sediments and dredged material into the North Sea.

About half of the Rhine sediment settles in Rotterdam. The other half flows into the sea directly. At present therefore, direct emissions from the river dominate the input for most contaminants into the North Sea. This underlines the need to view the Rhine catchment and the coastal zone as a continuum/one system with regard to achieving further reductions of contamination. In addition the importance of the role of sediment in relation to the sediment balance is underlined, partly in relation to the northwards flow of sediment and conservation of the valuable Wadden Sea estuary (figure 4).

3 Mapping out and linking policies, legislation and regulations in the Rhine riparian states, 'Brussels'(EU Water Framework Directive) and in Marine organisations.

This analysis shows that attention paid to sediment is fragmented and receives inadequate recognition as a policy priority (figure 5). It is important to translate the contaminated sediment to reduction measures at the source. There is also a strong need for harmonisation of approaches and the integration of stakeholders in the decision-making process. This was one of the factors that led to the joint proposal for a European Sediment Network (SedNet).

4 Development of knowledge concerning bioassays, TBT and 'new' substances that could affect the new assessment of the quality of dredged material for relocation at sea.

Figure 4
Transport of sediments in the North Sea

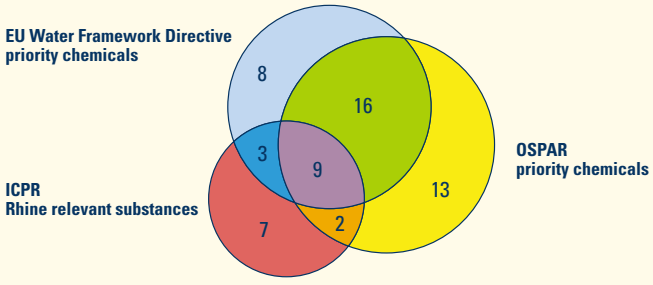
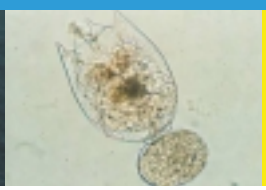


Figure 5
Comparison of lists of priority chemicals from Rhine and North Sea

Together with the ICPR in november 2000 the 4th International Rhine Conference – The River, the Port and the Sea – was organized in Rotterdam



EU Water Framework Directive

At the end of 2000, 'Brussels' adopted the European Water Framework Directive, which aims at harmonising policy on water (and related sediments) for all EU member states. In the coming years, this guideline will be incorporated into national legislation and regulations. The POR II research results should contribute towards discussions within the European Union and member states about the quality of European water systems. Sediment and the relationship between river and coastal systems should be given a place on the European agenda.

Bioassays

The Fourth National Policy Document on Water Management proposes to add bioassays to the current chemical assessment of dredged material quality. Bioassays are tests whereby organisms from a 'receiving water system' (in this case the North Sea ecosystem) are exposed to (contaminated) dredged material. This enables us to gain more insight into the effects of the contamination. POR II specifically wishes that these effects are translated to the sources in order to make it possible to control the sources.

POR II objectives

The main objective of POR II is to ensure that all dredged material is sufficiently clean by 2015, in line with the concept of a sustainable port and region in which port activities take place. In other words, all dredged material should be clean enough either to be relocated in the North Sea or to be beneficially re-used.

The RMPM is not in a position to solve the sediment and dredged material issues on its own. Collaboration with organisations that are involved in water and sediment management for the Rhine and the North Sea such as the International Commission for the Protection of the Rhine (ICPR) and OSPAR is an important implied objective.

Up until 2004, the following objectives will need to be within reach for POR II:

- **Based on the results of the GKSS study, influence on Rhine riparian states (particularly the Netherlands and Germany), at a European level (both government and environment organisations) and especially the new European Water Framework Directive, whereby directives should also particularly be regarding the control and approach to diffuse sources.**

- **Harmonisation of sediment quality criteria and target levels in the Rhine basin and the receiving North Sea coastal system, whereby the sea and river are seen as one continuum system. Achieving the quality objectives for the Rhine should also result in dredged material sufficiently clean enough to relocate into the sea or partially beneficially use. It is important to have a balanced action to increase the level of protection for the Rhine and North Sea, from both ecological and economic points of view.**

- **Sediment management should get on the political agenda: no longer simply focusing attention on dredged material as a waste product. Sediment is a useful and indispensable element of the continuum system. The establishment of the knowledge platform SedNet should contribute towards achieving this.**

International ban on TBT

TBT stands for Tributyltin. It is a substance with a harmful impact on the environment, which is used in marine paint to inhibit the growth of algae on ships' hulls. TBT particles are globally found in water and are also found in dredged material from ports. Paint containing TBT should be banned and has to be replaced by environment-friendly alternatives. This is why the RMPM is lobbying for a worldwide ban on TBT (source control) and is encouraging the use and further development of knowledge of alternative marine paints. The RMPM, for example, is rewarding ships that do not use TBT paint with extra points in the Rotterdam Green Award Certificate system. (Re)painting ships with paint containing TBT is expected to be banned worldwide by the International Maritime Organisation by 1 January, 2003. Five years later it will no longer be permitted on ship's hulls at all. In anticipation of the international ban, TBT will be included in the new assessment for dredged material. The GKSS study shows that TBT concentrations in Rotterdam are not exceptional in comparison with other seaports.

POR II will also continue to focus attention on maintaining and renewing agreements on emission reductions with industry in the hinterland. An example of this is the third (follow-up) covenant with the trade association of the German Chemical Industry (VCI), whereby emissions from this industry will be further reduced (to an average of 90% compared to the levels at 1984).

SedNet

Right at the start of POR II, a proposal was launched for a broad European Sediment Network (SedNet). This is a European platform where organisations involved in sediment management and related dredged material issues can exchange knowledge and expertise. SedNet supports, catalyses, co-ordinates and facilitates these issues. Furthermore, SedNet aims to complement existing EU networks and thematic working groups and wishes to be an advisory board to European, national and regional authorities on sediment issues, and indirectly assist with their policy implementation (for example the European Water Framework Directive). The main objective will be the preparation of a joint document, containing recommendations and guidelines for integrated, sustainable sediment management, from local to river basin level.

General information

POR II
Rotterdam Municipal Port Management
Mr M. Eisma (secretary of POR II)
P.O. Box 6622
3002 AP Rotterdam
+31 (0)10-2521312
E-mail: eismam@port.rotterdam.nl
Internet: http://www.portmanagement.com/uk/

GKSS study results
(GKSS Research Centre Geesthacht, Germany)
Internet: http://w3g.gkss.de/i_a/dredged_material/

European Sediment Network: SedNet
Internet: http://www.mep.tno.nl/sednet/