Sediment Management in Port Areas, illusion or fact?
Realistic and sustainable sediment management in Belgian Seaports
CEDA – RSHU – SPbSPU International Seminar on Dredging and the Environment, Saint-Petersburg 13-14 October 2009
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DEC NV (DEME Environmental Contractors), www.decnv.com
Seaports: pillars of economic power since Middle Ages

Bruges: clothmaker’s hall

Bruges: office of the Hanseatic League
Hanza Town
Seaports: pillars of economic power since Middle Ages

Zwin silted up: 1520 move office to Antwerp
Flourish and decline in trade determined by quality of waterway connection to North Sea
Seaports: pillars of economic power since Middle Ages
Seaports: pillars of economic power since Middle Ages

- Assurance of marine accessibility
- Concern of harbour policy
- Maintenance of the sea and waterway approach to the seaports and port areas requires major dredging works

- Zeebrugge + access channels North Sea 7,000,000 m³/y
- River Scheldt 11,000,000 m³/y
- Port of Antwerp 1,500,000 m³/y
- Ghent 150,000 m³/y
Reasons for dredging

- Harbour Aquatic Sediments
  - Nautical
  - Hydraulical
  - Environmental
    - Risk Analysis
    - Necessity? Urgency?
      - BATNEEC
        - Dredging
          - Dredged Material
  - Soil Decree

DDEM: creating land for the future
Environmental dredging

• Equipment meeting stringent needs
  • Turbidity
  • Accuracy
  • Spillage
  • Mixing
  • Dilution
  • safety
Environmental dredging
Management options dredged materials

(Polluted) Dredged Materials

- Displacement
- Sea Dumping
- On-shore Treatment
  - Beneficial Use
  - Confined Disposal
DM → Displacement
DM → Displacement

- Western Scheldt:
  - Permit delivered by Dutch Authorities

- Lower Sea Scheldt:
  - Permit delivered by Flemish Authorities
  - Target and limit values based on ecotoxicological data
  - Under water displacement
  - Under water cells
DM → Sea Dumping

- Access channels & Port of Zeebrugge
- Law on protection Marine Environment
- According to the OSPAR Convention “Guidelines for the Management of Dredged Material”
- Permit delivered by Federal Authority
- Dredged Material should meet SQC
### Sediment quality criteria (SQC)

<table>
<thead>
<tr>
<th>Substance</th>
<th>Target value</th>
<th>Limit value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hg</td>
<td>0.3 ppm</td>
<td>1.5 ppm</td>
</tr>
<tr>
<td>Cd</td>
<td>2.5 ppm</td>
<td>7 ppm</td>
</tr>
<tr>
<td>Pb</td>
<td>70 ppm</td>
<td>350 ppm</td>
</tr>
<tr>
<td>Zn</td>
<td>160 ppm</td>
<td>500 ppm</td>
</tr>
<tr>
<td>Ni</td>
<td>70 ppm</td>
<td>280 ppm</td>
</tr>
<tr>
<td>As</td>
<td>20 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>Cr</td>
<td>60 ppm</td>
<td>220 ppm</td>
</tr>
<tr>
<td>Cu</td>
<td>20 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>TBT</td>
<td>3 ppb</td>
<td>7 ppb</td>
</tr>
<tr>
<td>Mineral oil</td>
<td>14 mg/g&lt;sub&gt;oc&lt;/sub&gt;</td>
<td>36 mg/g&lt;sub&gt;oc&lt;/sub&gt;</td>
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<tr>
<td>PAH</td>
<td>70 µg/g&lt;sub&gt;oc&lt;/sub&gt;</td>
<td>180 µg/g&lt;sub&gt;oc&lt;/sub&gt;</td>
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<tr>
<td>PCB</td>
<td>2 µg/g&lt;sub&gt;oc&lt;/sub&gt;</td>
<td>2 µg/g&lt;sub&gt;oc&lt;/sub&gt;</td>
</tr>
</tbody>
</table>
DM → On-Shore Treatment

- Ports of Ghent – Antwerp – Brussel
- Dredged materials are mostly (slightly) contaminated
- DM considered as waste
- Permit delivered by regional authorities
- Treatment and beneficial use mandatory
DM → On-shore Treatment

Treatment Objectives

- Production of geotechnical suitable products
  - Beneficial use (recycling path)
  - Confined disposal (dumping path)
- Reduction of mass and volume
  - Dewatering
  - Separation
- Reduction of contaminated load
- Fixation of pollutants
  - Reduction of environmental risk
DM → On-shore Treatment
AMORAS

1. underwater cell
2. sand separation
3. discharge line
4. consolidation ponds
5. dewatering plant using filter presses
6. water purification plant
7. deposit site

DEME: creating land for the future
• DBOT contract
• 600 000 tonnes DM per year
• DM from Port of Antwerp
DM → Disposal

- Only for non-treatable dredged material
- Application of environmental taxes

Disposal Centre Silvamo, Kortemark, Belgium
DM → Beneficial Use

- Flemish legal concept of “secondary raw material” “end of waste” criteria (environmental)
- Beneficial use
  - As building material
  - As soil
- Use certificate
  - Waste legislation no longer applies, can be treated as products
  - Countries can define “end of waste” criteria
  - Recycling higher ranked than elimination

DEME: creating land for the future
Conclusion

• Huge quantities of different types of sediments under different conditions are managed efficiently and effective

• Through sustainable sediment management plans
  Key elements:
  • Adapted legislation
  • Realistic goals
  • Appropriate methods
  • Promotion of best fitted technology

→ Sediment Management in Port Areas is a FACT.