



Management of dredged material: small-scale dredging

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DHV Consulting and Engineering

- Worldwide presence
- Approx. 5,500 employees
- Annual turnover 2008: ca. € 470 million

Relevant in-house expertise:

- Dredging & Land Reclamation
- Ports & Waterways
- Civil & Maritime Infrastructure
- Waterfront Development & Marinas
- Flood Management & Coastal Protection



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DHV Dredging services and expertise

Provide consultancy from start:

- **Feasibility studies** on dredging projects
- Environmental Impact Assessments (**EIA**)
- Analysis of **equipment** requirements
- **Cost/benefit** analysis of dredging operations
- **Advise** on capital and maintenance dredging
- Preliminary and final **design**
- Preparation of international **tender documents**
- Contract management and **supervision**
- Etc.



To supervision and Technical Assistance

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Management of Dredged Material: small-scale dredging

Definition: an effective and efficient dredging process, usually carried out in confined, difficultly accessible channels and lakes whilst adhering to pre-defined environmental standards, laws and regulations

This can be translated to:

“Small-scale dredging needs tailor-made solutions, each project is unique!”

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Purpose of dredging

1. Water discharge (e.g. floodwaters)
2. Navigation (commercial and recreation)
3. Water quality enhancement ($^{\circ}\text{C}$, O_2)
4. Remediation of pollution (sediment)
5. Recreation and residential (floating houses)
6. Sand-, gravel- or clay-mining and/or disposal
7. Nature creation (deepening lakes, biodiversity), environmentally friendly embankments

Maintenance- and capital dredging




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Critical factors in small-scale dredging

- Accessibility along and in channels and lakes
- Logistics and transport of material in populated areas (traffic)
- Limited space for disposal of sediment and waste
- Sensitive project environment: hinder to surroundings, highly visible, public opinion and interest
- (Old) embankments, low bridges, etc
- Household waste & objects
- Unexploded ordinance




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Recreation



Waste and large objects



Difficult access




Traffic congestion

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Difficult access

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Sensitive Project Environment: Hinder

Urban / industrial hinder:

1. Noise, light and air emissions
2. Transport of dredged material (low bridges, road congestion)
3. Hinder for navigation and recreation / tourism
4. Public opinion and participation


Rural hinder:

5. Natural Protected Areas (fish, protected birds and animals)








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Mitigation measures for Hinder







Urban / industrial:


1. Work during restricted hours and seasons
2. Create nearby temporary disposal sites and transport at night
3. Confer with residents and stakeholders
4. Communication (explain necessity) and create positive project image

Rural

5. Work outside of breeding seasons
6. Building with Nature (e.g. re-use)



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Project phases



Management of dredged material in small-scale projects starts at the beginning of the project:

- Plan work and carry out surveys
- Choice of dredging equipment
- Choice of transport method
- Choice of disposal method

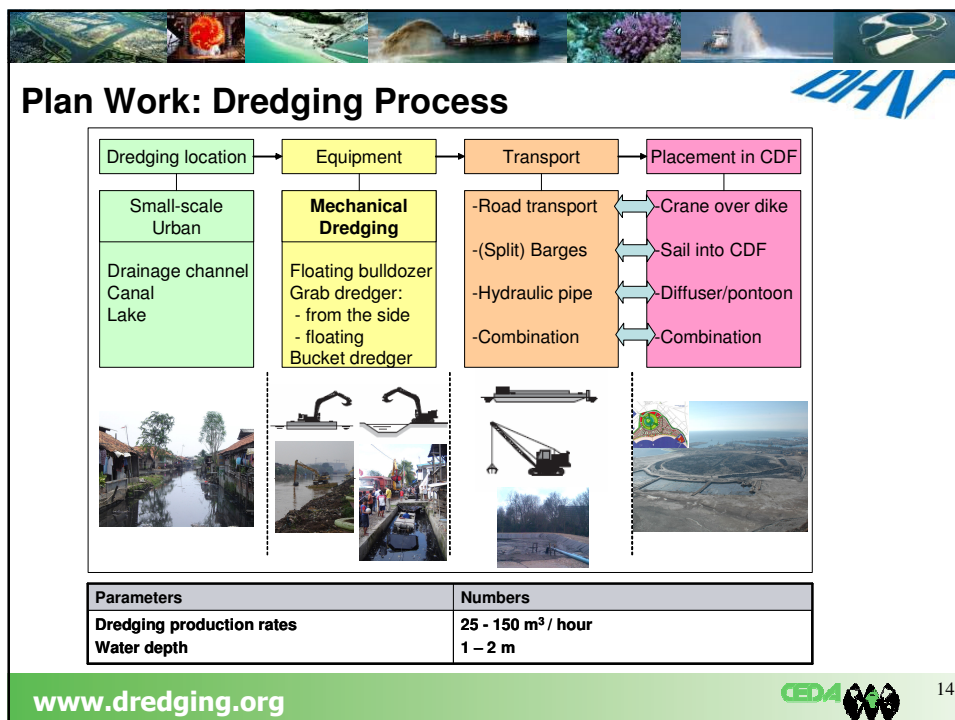
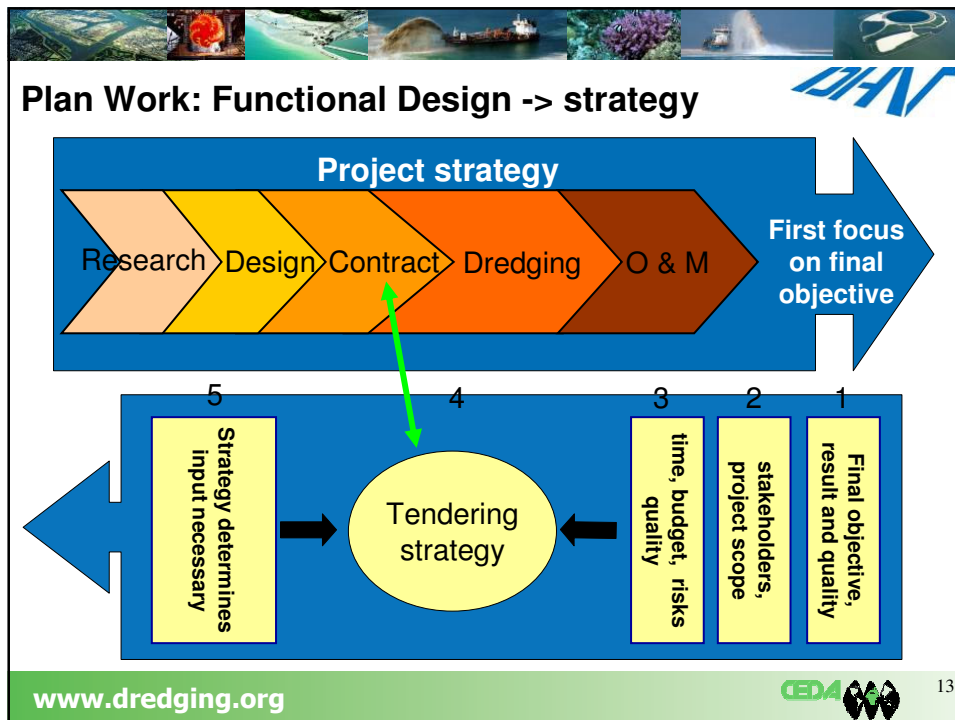
Start dredging, but be prepared for the unexpected!!

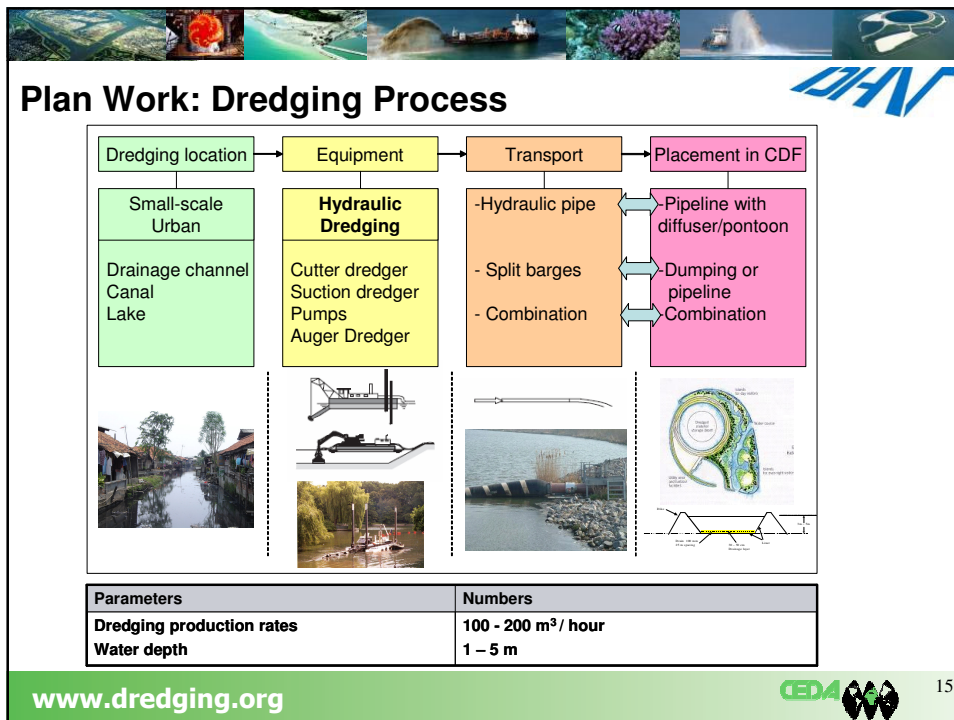


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Start with surveying

Profile and sediment volume


Sediment quality

Search for objects

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Survey status project area






Examine transport route

Examine state of embankments






Lower water level for underwater survey



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Dredging techniques: mechanical



Grab and small low barges






Closed environmental grabs


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Dredging techniques: mechanical






Amphibious dredger


Low-lying specialized bucket dredger



Low-lying silt pusher (floating bulldozer)



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Dredging techniques: rural areas



Placement of dredged material on adjacent land



Simple dredging in rural areas





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Transport techniques: mechanical



Transport with small vehicles





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Transport techniques: hydraulic

Cutter suction dredger




Small cutter suction dredger that can pass under bridges

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Transport techniques: hydraulic

Environmentally friendly cutter dredger






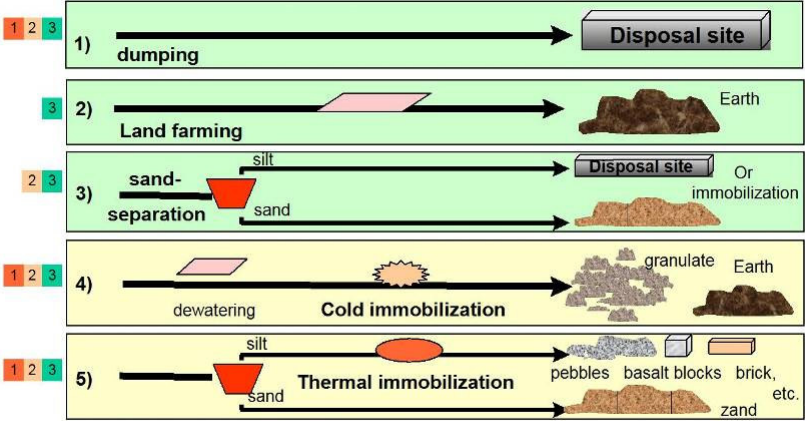
Mechanical dredging, hydraulic transport

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Disposal techniques



Techniques can be used for following material

1 Silt, pollution mix
2 Silty-sand pollution mix
3 Silty-sand, PAK/oils

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Disposal techniques



Temporary basin



Temporary disposal sites




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Disposal techniques





Transfer to disposal site




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Case Study: Jakarta dredging




- Situation:** Drainage channels and retention basins are full of sediment and waste
- Result:** Insufficient drainage capacity. Flooding in residential areas endangering peoples lives and creating economic losses, unhygienic conditions
- Measures:** (Regular) Maintenance dredging, waste management and new channels & retention basins increasing capacity
- Aim:** Reduce flood risk to acceptable level, create safe living and working areas



Case Study: Jakarta dredging






Case Study: Jakarta dredging

Project content:

- Find range of **optimal small-scale dredging techniques** for Jakarta situation
- Go through **entire dredging process** from start (preparation) to finish including logistics
- **Procurement** of dredging equipment
- **Train** local staff for replication and operation and maintenance after project ends (continuation)
- **Boost public image** of dredging through 'visible' project
- Facilitate public information and **community participation**
- **Carry out Pilot: dredging, transport and separation of sediment and waste**

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Case Study: Jakarta dredging



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Case Study: Jakarta dredging

Separation of sediment and waste for re-use



Rotating drum separator




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Case Study: Jakarta dredging





Reuse of dredged material




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Thank you!!

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