Dredging and environment : MARCOM contributions

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Dredging and environment: MARCOM contributions

1- Former MARCOM reports dealing with dredging

2- Ongoing MARCOM reports

3- Recent presentations from PIANC in Liverpool

4- MARCOM networking about port dredging

5- Concluding remarks
1- Former MARCOM reports

WG 3-A Navigation in muddy areas

WG 6 Classification of soils and rocks to be dredged (to be updated by WG 144)

WG 10 Disposal of dredged materials into sea

WG 14 Economical channel maintenance

WG 19 Beneficial use of dredged materials

WG 23 Site investigations for dredging works
WG 3A Navigation in muddy areas: introduction of nautical depth

Fig. 1 - Comparison of density profile and tanker cross-section to illustrate the concept of nautical depth.
WG 6 Classification of soils and rocks to be dredged
(1984 supp Bullet 46 to be updated by WG 144)

First introduced in 1968 as International Study Commission
together with IADC and ISSMFE, completed in 1972 and revisited
and published in 1982

Attempt to classify soils and rocks
And to recall tests and sampling techniques
WG 10 Disposal of dredged materials into sea (1986 supp Bullet 52)

Introduced by US section in Monaco 1982 in order to consider sea disposal as alternative solutions based on scientific evidence

Three basic solutions
A fourth case with artificial island

And cases where the dredged material is capped due to contaminants within* sediments

Appendix 1: effects of disposal scientific data

Appendix 2: Convention on the Prevention of maritime Pollution (MARPOL) by dumping of wastes and other matter
WG 14 Economical channel maintenance ‘1989 supp Bullet 67)

Mainly derived by dredging managers working in dredging companies or port authorities with practical solutions for contracts
WG 14 Economical channel maintenance ‘1989 supp Bullet 67)

Describing also land disposal facilities
WG 19 Beneficial use of dredged materials (PIANC 1992) : a practical guide
Many examples :

Football soccer field in Rouen

Golf course in the Netherlands
WG 19 Beneficial use of dredged materials (PIANC 1992) : a practical guide
Other examples :

Beach nourishment in Belgium

Dredged material containment
Area used for aquaculture(USA)
WG 23 Site investigations requirements for dredging works – 2000 Supp Bullet 103

The report summarizes different in situ and laboratory investigations and considers also the contract for those tests through FIDIC (IFCE) standards.

<table>
<thead>
<tr>
<th>TEST</th>
<th>MATERIAL TYPE</th>
<th>MEASURED PROPERTIES OR CHARACTERISTICS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field shear vane</td>
<td>Soft to firm clay, clayey silts</td>
<td>Undrained shear strength, remoulded shear strength</td>
<td>Carried out in boreholes</td>
</tr>
<tr>
<td>Quasi-static cone penetration test</td>
<td>Most soils except coarse gravels, cobbles and boulders</td>
<td>Relative density of granular soils, shear strength of cohesive soils</td>
<td>Carried out in boreholes</td>
</tr>
<tr>
<td>Standard penetration test</td>
<td>Most soils except cobbles and boulders, weak rocks</td>
<td>Relative density of granular soils, indicative shear strength of cohesive soils, indicative strength of weak rock</td>
<td>Carried out in boreholes</td>
</tr>
<tr>
<td>Dynamic cone penetration test</td>
<td>Sands and gravels</td>
<td>Qualitative evaluation of compactness/relative density, qualitative evaluation of sub-soil stratification</td>
<td>Carried out in boreholes</td>
</tr>
<tr>
<td>Permeability test</td>
<td>Granular soils</td>
<td>Mass permeability</td>
<td>Carried out in boreholes</td>
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<tr>
<td>Trial dredging</td>
<td>Soils and rocks</td>
<td>Dredgeability</td>
<td>Carried out in boreholes</td>
</tr>
</tbody>
</table>
2- ongoing or recent MARCOM

MARCOM 43 Minimizing harbour siltation

MARCOM 51 Water injection dredging

MARCOM 144 Classification of soils and rocks for the maritime dredging process (updating of WG 6)
WG 43 Minimising harbour siltation (2008)

Describes three alternative techniques to cope with sedimentation:

KSO: keep sediment out of the port

KSM: keep sediment moving (raising flow velocities in quiescent areas)

KSN: keep sediment navigable (passive or active and introduced by the nautical depth concept)
WG 43 Minimising harbour siltation (2008)

KSO: keep sediment out of the port by means of a current deflecting wall ; example Köhlfle Port of Hamburg
WG 43 Minimising harbour siltation (2008)

KSO: keep sediment out of the port by means of training walls
Kumamoto - Japan
WG 43 Minimising harbour siltation (2008)

KSM: keep sediment moving through mechanical devices by means of scour jets or vortex foils
WG 43 Minimising harbour siltation (2008)

KSN: keep sediment navigable through active nautical depth
Example: Emden – Germany
MARCOM 51 Water injection dredging

Objective of the study:

Give guidance when Water Injection Dredging is feasible.
Give guidance on payment conditions for contracts between the contractor and the client.
Give guidance on environmental effects of Water Injection Dredging

Report presented at the next MARCOM meeting (Ostende September 2010)
3- Recent presentations from PIANC in Liverpool

76 Min Gao-Qijn Fan : New progress on the research of navigation channel in Yangtse estuary

168 J.van’t Hoff and al : Hydraulic fills manual

246 P.M.Vercrujsse : Steps towards development of green dredging technologies
4- MARCOM networking about port dredging

4-1 MARCOM 2005 Le Havre – PORT 2000 and the river Seine estuary sedimentation pit case

4-2 MARCOM 2007 Helsinki -Vuosaari port works : dealing with TBT during works

4-3 MARCOM 2010 Ostende
4-1 MARCOM 2005 Le Havre- PORT 2000 at the mouth of the river Seine estuary: sedimentation pit created

15 Juin 2004

 Dragages d’accompagnement :
 ZONE 1 = 1.5 Mm3
 ZONE 2 = 1.7 Mm3
4-2 MARCOM 2007  Vuosaari port works (port of Helsinki-Finland): dealing with TBT during works
Removing of spoilt soil material from the sea floor
Expert group on sedimentation topics
PIANC 125th Anniversary Celebration in ASIA, Nagoya JAPAN
12-14 September 2010
MARCOM 2010 Ostende-Zeebrugge
Vlaamse baaien 2100
5- Concluding remarks