

## DEPARTMENT OF MARITIME AND TRANSPORT TECHNOLOGY

Type of assignment: Designing Dredging Equipment  
Assignment number: 99.3.GV.????  
Confidential: No  
Date: 13 August 2007  
Name student:  
Course of study

### **Title**

**The design of a heavy duty Cutter Suction Dredger (CSD).**

### **Consideration:**

In the seventies and eighties of the last century a numerous harbours were dredged, as well as reclamation jobs executed in the Middle East. Although hardly any large works were executed after those years, it is expected that the coming years a new boost in dredging jobs can be expected.

Therefore an international operating Dredging Contractor considers to renew his rock cutter dredger fleet.

From market studies it appeared that:

- The yearly production capacity of the new Cutter Dredger should be at least  $7.5 \text{ Mm}^3$
- The unconfined compressive strength of the limestone rock varies uniformly between 0 and 20 Mpa. Ratio compressive over tensile strength is less than 8
- Pumping distances are normal distributed with an average of 3500 m with a standard deviation of 2500 m.
- The existing water depth varies between 0 and 18 m
- Required dredging depth varies between 3 and 18 m
- 60% of the work is unprotected; the wave climate is for the gulf area

From you is requested a conceptual design of a trailer Cutter Suction Dredger suitable for executing the above mention dredging jobs.

### **A. Starting points**

A.1. Lecture notes "Designing Dredging Equipment", WB3408

A.2. Ports & Dredging (IHC)

A.3. Dredgers of the World

A.4. Global Waves Statistics.

A.5. Other relevant literature

### **B. Assignments**

- B.1. Determine the required hourly output of the CSD to design
- B.2. Design the required dredging installation. (Cutter installation, sidewinches, ladder, pipe diameters, pump capacities and manometric pressures of the dredge pumps, specific speed of the pumps, pump powers, maximum and minimum dredging depth, etc)
- B.3. Draw up a power balance for the different parts of the dredging cycle
- B.4. Determine the main dimensions of the pontoon (L,B,H,T)
- B.5. Design the required spud systems.
- B.6. Give a main layout of the dredger.
- B.7. Report in English the sub assignments B.1. t/m B.6

C. Supervision

This assignment should be independent executed by the students mention above. For questions, remarks and assistance contact Prof. Vlasblom via E-mail address: [W.J.Vlasblom@wbmt.tudelft.nl](mailto:W.J.Vlasblom@wbmt.tudelft.nl). For making appointments with Prof. Vlasblom please contact Mrs. Bokop van der Stap, telephone 015 2786529.

D. Time

This assignment starts at.....and have to be finished in a maximum of 4x80 effective hours, including the reporting. Besides the enclosures the size of the report shall not exceed the 50 printed pages and starts with a signed assignment and a summary of maximum 2 pages.

E. Confidential agreement

Not applicable.

Agreed by:  
The student

The Chair of Dredging Engineering

Prof.Ir. W.J. Vlasblom