

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 Dredger for the burrowing of industrial sand.

Consideration:

Sand and gravel for industrial purposes becomes a rare and expensive item nowadays, due to environmental requirements.

The authorities give licences for new gravel and sand pits, when such pits can be used in a save way for recreation purposes after extraction of the minerals. Therefore special attention should be given to the slopes of the pit.

A sand supply contractor considers opening a mining pit in a shallow polder in Holland

The soil conditions is as follows:

- 3 m overburden of peat and soft clay
- 10 m fine sand not suitable for industrial purposes
- 35 m coarse sand suitable for the industrial purposes with a total volume of 15 million m³.

The existing water level is 0.5 m below ground level. Accessibility to the area is by road only.

From market studies it appeared that:

- The yearly capacity of industrial sand is required of 500000 ton
- The fine sand has a d50 of 200 micron and the coarse sand of 500 micron and a d90 of 2 mm.
- The dredged material has to be pumped to a separation plant to a level of 10m above ground level, which requires a input volumetric concentration of between 20 and 25% (density 1200 to 1250 kg/m³ }

From you is requested a conceptual design of a 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 dredger to design
- B.2. Design the required dredging installation. (excavation installation if required, side winches, 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 anchoring system
- 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. 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