Dredging Research in China

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Introduction

• Yearly dredging market in China about 265 Mm$^3$.
• 2/3 is executed by the CCCC Group
• 1/3 by others (mainly dredgers of the Ministry of Water Resources)

• Dredging research is started in the 1990$^{th}$
Dredging Contractors
(Ministry of Transport and Communications)

China Communication Construction Company Ltd.
(former called CHEC;
China Harbour and Construction Company)

Divisions:
• Infrastructure Design
• Infrastructure Construction
• Dredging
• Port Machinery and Manufacturing
• Other
Dredging Contractors
(Ministry of Water Recourses)

• Many small Contractors with small equipment
• Are different organised and have there own meetings in China.
• 100 dredgers project ??
Dredging Laboratories

• CCCC
  - Shanghai Dredging Company (Lab reconstructed)
  - Tianjin Dredging Company (plans to build one)
  - Guangzhou Dredging Company (????)

  - Hohai University of Changzhou (Ministry of Education; formally Ministry of Water Recourses)
Dredging Flume
Dredge Carriage
Irregular wave flume
Hopper Loading Model Test Facility
Sub-surface Dredging Test Facility
Experiments to improve an environmental cutter head
Hydro-cyclone Model Test Facility
Jet Water Nozzle Current Profile Measurement Facility
Study on the improvement of the jet water coherency in draghead
Experimental study on cutting of saturated hard compact soil with draghead teeth
Draghead Model Test
Draghead Design
Study on High Efficiency Medium Pressure Dredge Pump
CSD Supervisory Control and Data Acquisition System
The laboratory of Tianjin Dredging Company

- Is under construction; plans for:
  - A long (1500 m) pipeline and pump facility φ 500 mm
  - A cutting tank
  - A sedimentation tank
Laboratory of the Hohai University
Cutting Tank under Construction
Cutting Tank ready for use
Pump and Pipeline Test Stand
Resistant test of $90^\circ$ bend
Cutter head tests
Draghead Tests
Filling the tank with sand
Tank Operation Screen
The small Glass Model and Triaxial Test Stand
The Simulator
The research (Hohai)

- solid transport
- pump performance
- soil cutting
- mathematical modeling
- dredging simulation

In general applied research for contractors.
Hardly fundamental (basic) research
Cutter Head Design

• Some articles about cutter head design are published
• On Wodcon XVIII and other EADA/CHIDA conferences
Hydraulic transport (1)

![Graph showing hydraulic transport data for gravel 2 with diameter 4.0-8.0 mm and Cvd 10-12%].

- **Water**
- **Measured**
- **Durand**
- **Present model**
Hydraulic transport (2)

Gravel 3, d=8.0-16.0mm, Cvd=10-12%

Mean mixture velocity Vm (m/s)

Hydraulic gradient Im (-)

- Water
- Measured
- Durand
- Present model
Hydraulic transport (3)

![Graph showing hydraulic transport data for gravel with sizes 16.0-32.0 mm and Cvd 9-10%](image)

- Water
- Measured
- Durand
- Present model