

HAYNES COASTAL ENGINEERING LABORATORY

&

DREDGE CARRIAGE

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Initial Proposal 1994, NSF Grant 1995

Design Completed January 2000

Ground Breaking August 2001

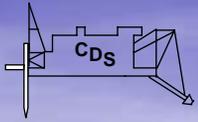
Completed: October 2002

Dedicated: June 4, 2003

Barrett G. Hindes Dredging Engineering Education Fund: 2003

Directional Wave Maker, NSF Grant & Haynes Donation 2003

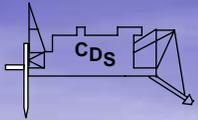




SHALLOW WATER BASIN



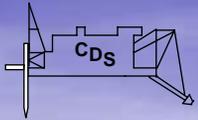
- <http://oceaneng.civil.tamu.edu/>



Waves in Shallow Water Basin

- L=120 ft, W=75 ft, D=4 ft
- Directional Wave Generator
 - Period 0.5-5 s
 - Wave height
 - 0.4 m (1.3 ft) @ 1.5 s
 - 0.6 m (2.0 ft) @ 2.4 s
 - 0.4 m (1.3 ft) @ 5 s
- 35,000 GPM flow rate through wave basin from under wave paddles
- Weirs control water level
- View windows

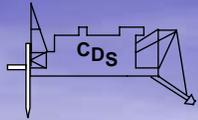




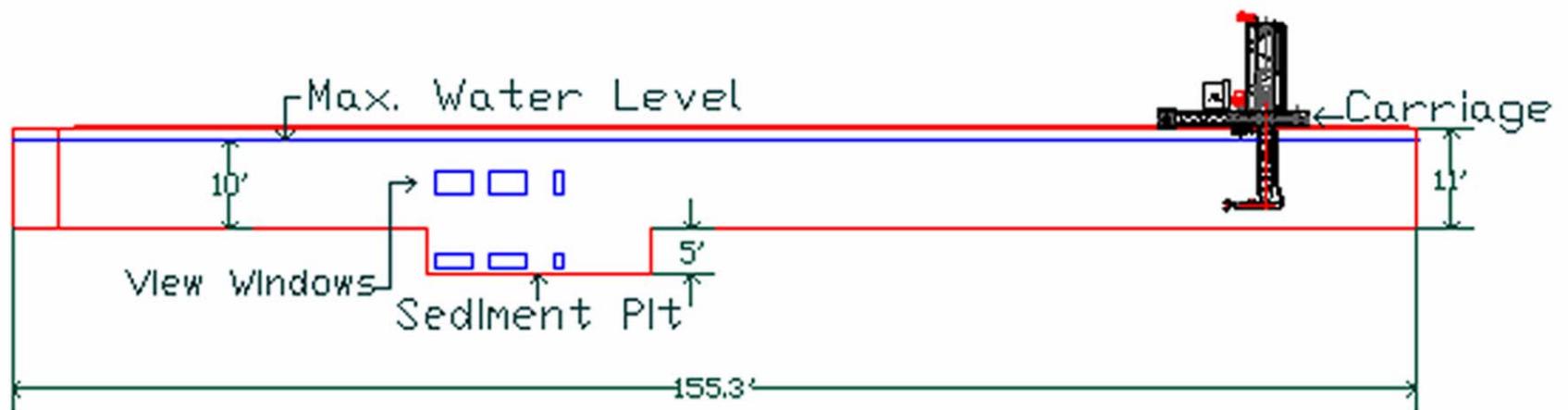
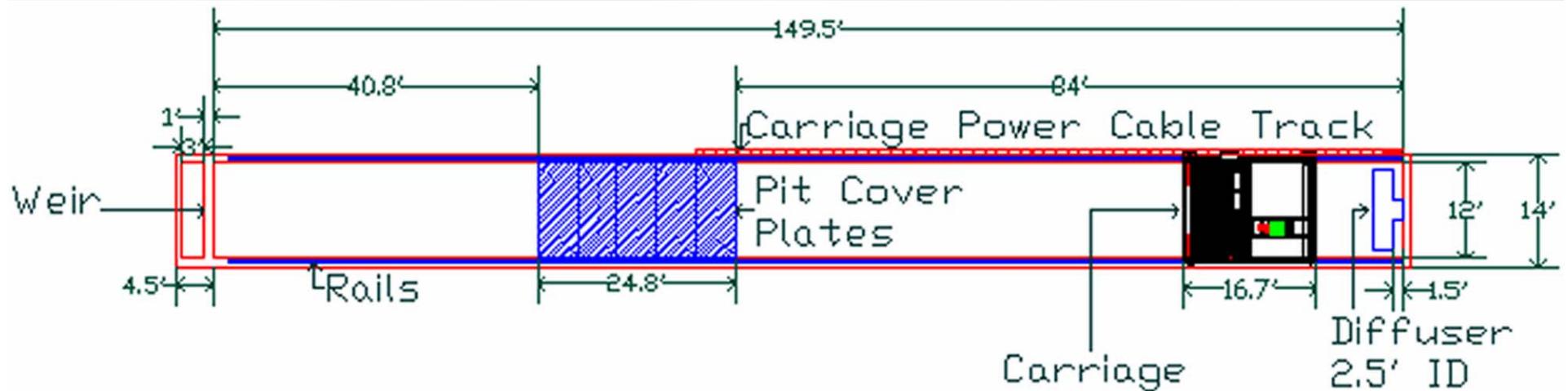
TOW/DREDGE TANK

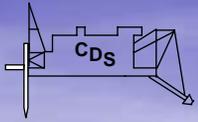


- $L=150$ ft, $W=12$ ft, $D=10$ ft
- Sediment Pit $L=25$ ft, $W=12$ ft, $D=5$ ft
- 35,000 GPM flow rate through tank
- Dredge/Tow Carriage, max speed = 6.6 ft/s (4 knots)
- View Windows

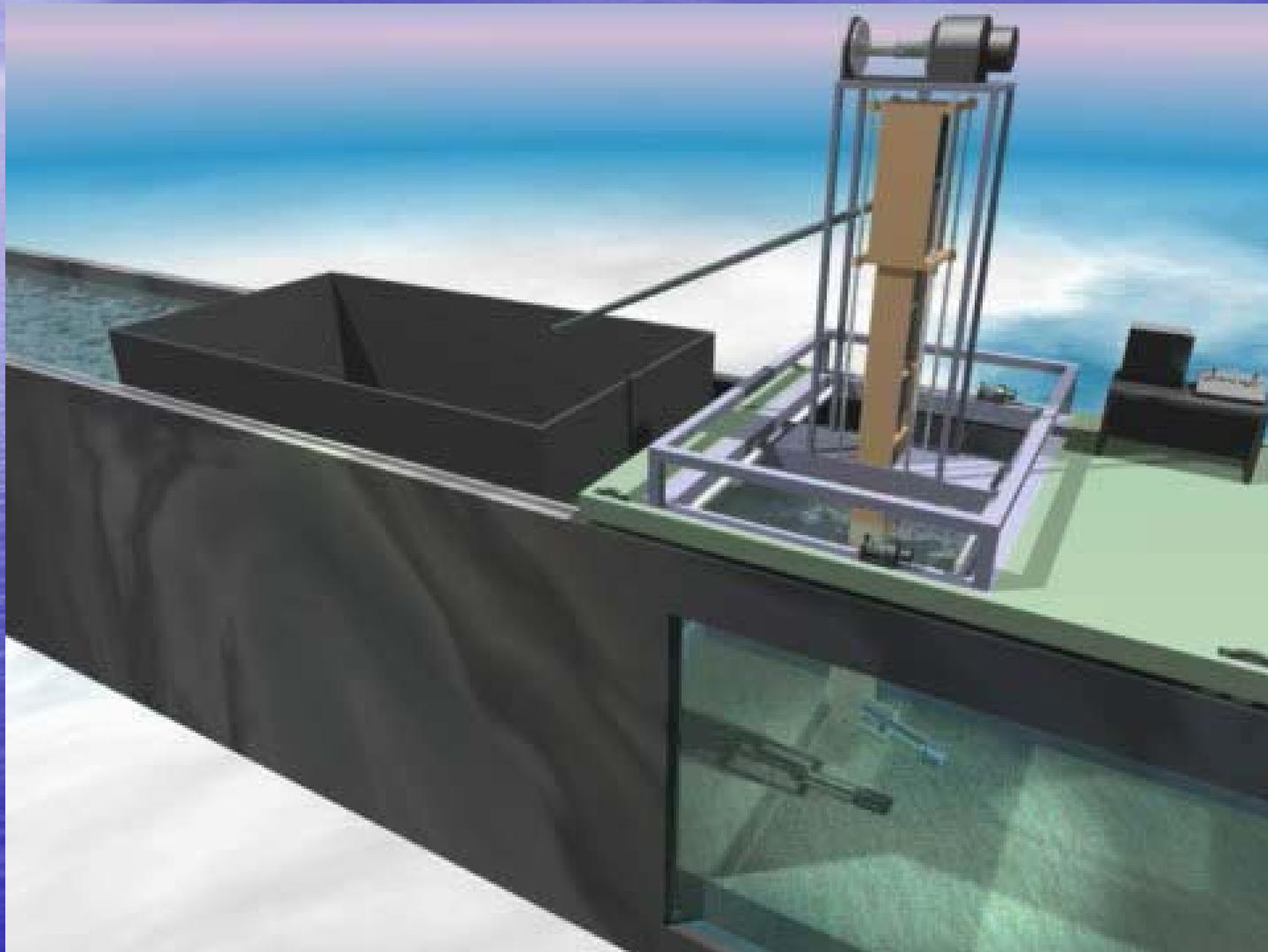


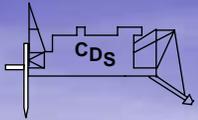
Dredge/Tow Flume





DREDGING OPERATION

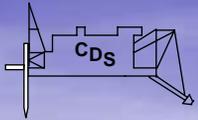




Dredge Carriage

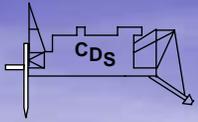
- Approximately 10,000 lb
- Incorporates an upper vertical ladder
- Cradle moves the ladder side-to-side
- Simulates the swinging motion of a cutterhead dredge





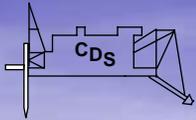
Dredge Pump Working (Aug 2005) & Dewatering System (Aug 2006)





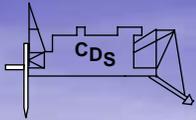
Control and Data Acquisition System (Aug 2005)





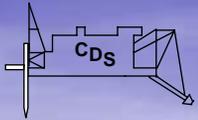
How Can Dredge Carriage Be Used

- Suction inlet & draghead design
- Turbidity & resuspension of sediments during dredging
- Cutter design
- Draghead and cutterhead production measurements
- Dredged material placement
- Development of cutterhead and draghead vision systems
- Draghead and cutterhead modifications to protect marine life
- Capping of contaminated sediments



Completed Projects

- Oil Spill Modeling, Dredge/Tow Tank, Nov 2002
- River Meander and Erosion, Shallow Water Wave Basin, Aug 2003-Aug 2004
- Installation of Directional Random Wave Maker, Shallow Water Wave Basin, Dec 2004 – June 2005
- Tidal Inlet Study, Texas A&M Sea Grant, July 2005
- Installation of Dredge/Tow Carriage, Dredge/Tow Tank, Apr 2005 – Oct 2005.
- Strake Loading Tests, Dredge/Tow Tank, April-May 2006
- Bridge Support Structure Scour Studies, Dredge/Tow Tank, Aug 2005 – Present



Summary

- Designed to model dredges from full to 1:10 scale
- Vertical ladder has load cells to measure loads
- Instruments measure cutter torque, pump suction and discharge pressure, pump rpm & torque, flow rate, density, carriage and ladder position
- Power for all dredge carriage systems is electrical
- Modern data acquisition and control system
- Max carriage speed ~ 2 m/s (4 knots)



THANKS FOR LISTENING



GIG'EM AGGIES