

ENCE ENME NAME 4723 and 4723G

Final Examination 2010

Thursday May 6, 2010

Time 8 pm – 10 pm

Regular Class Room

Open Book

Topics

Design of breakwaters:

- Determination of Design Still Water Level (tide, annual fluctuations, storm surge, wind setup, wave setup).
- Selection of Design wave
- Determination of armour unit weight and zone details.
- Determination of Crest ELEVATION (Design SWL , runup, RSLR and settlement).

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- Overtopping flow.

Forces on seawalls:

- Vertical walls:
 - Non –breaking waves
 - Breaking waves (Minkin)
 - Broken waves
- Sloping walls.
- Oblique wave attack on walls.

Forces on piles:

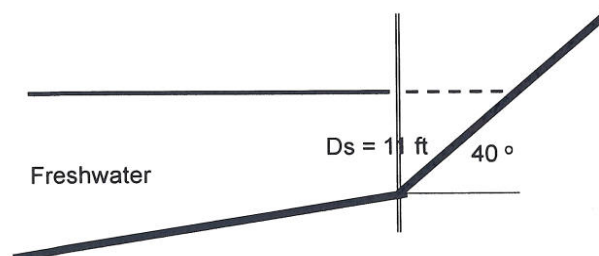
- Slender piles:
 - Inertia
 - Drag
 - Lift
 - Frequency of forces.
- Large diameter piles.

Review for Final Exam

EN 4723

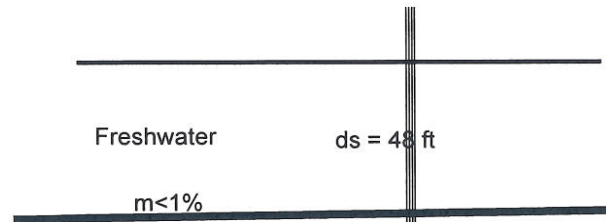
1. Minikin Forces

- Given: $H_i \leq 20$ ft; $T = 7$ sec; $m = 5\%$; $d_s = 11$ ft
- A) Find Minikin Force on a vertical wall
- B) Find Horizontal component of the non-breaking Minikin Force on a 40 degree sloped concrete wall



4. Forces on Piles

- Given: $H_i=16$ ft; $T = 7$ sec; $m \sim 0$; $d_s=48$ ft; $D=6$ ft
- Assume: $CL=0.7$ CD
- Find the wave forces on a rough circular pile.
- i.e F_{im} , F_{Dm} , F_L and the resultants of these
- Find St and f_o .



5. Seawall & Breakwaters

- Design the trunk of a Breakwater:
- Find Armour layer W and Crest Elevation.
- Given:
 - Local Design SWL Elev. 10 ft MSL (including, storm surge, spring tide, seasonal fluctuation & wind setup.
 - Local Bed Elev. -18 ft MSL
 - $H_s = 8$ ft; $T_s = 5.5$ sec
 - Use Tetrapods in two layers
 - Slope 2H:1 V
 - Salinity 34 ppt
 - $S_s = 2.4$
 - $m < 1\%$
- RSLR = 1.5 ft
- Settlement = 1 ft

