Floodwall and Levee Performance Analysis, Physical Modeling

Physical Modeling Team

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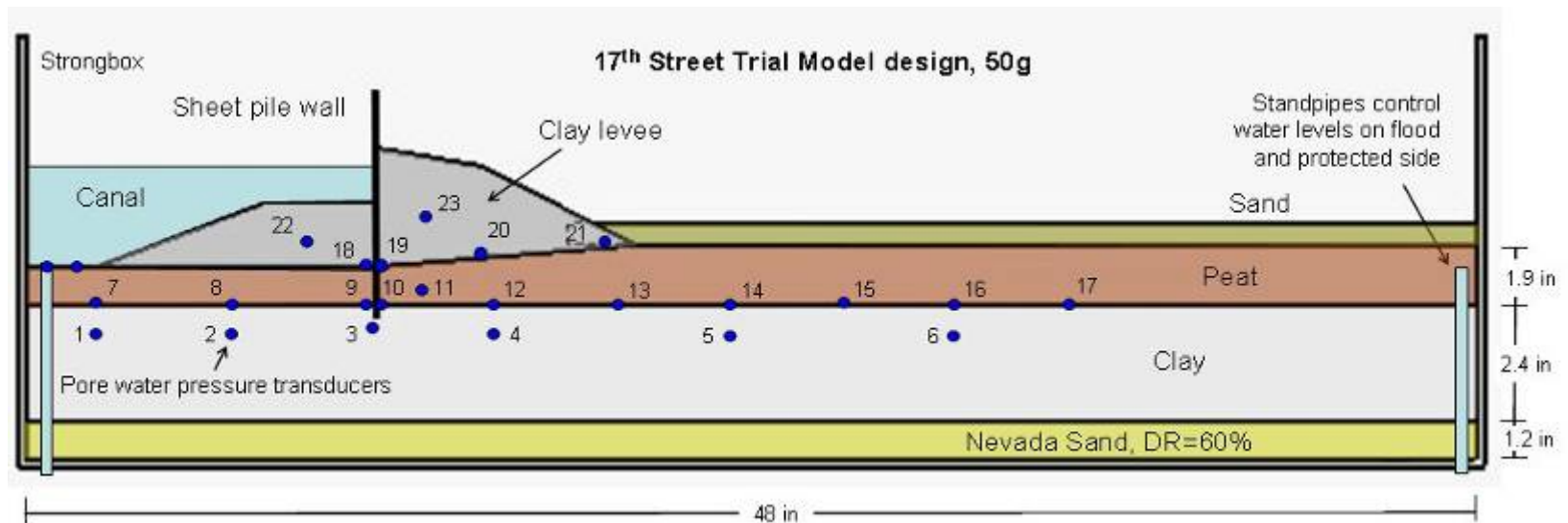Prof Dr Ir Frans Barends
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Physical Modeling Progress

- Completed 2 models of London North (ERDC & RPI)

- Completed 1 model of 17th Street

- Currently building models of London South (ERDC & RPI)

- Future is 2nd model of 17th Street and model of Orleans Canal

17th Street Model

- One trial model tested at RPI, second model to be tested at ERDC
- Levee: Synthetic clay (match field conditions based on lab test, CPT, etc)
- Swamp/Marsh: Actual field material
- Lacustrine: Synthetic clay (match field conditions)
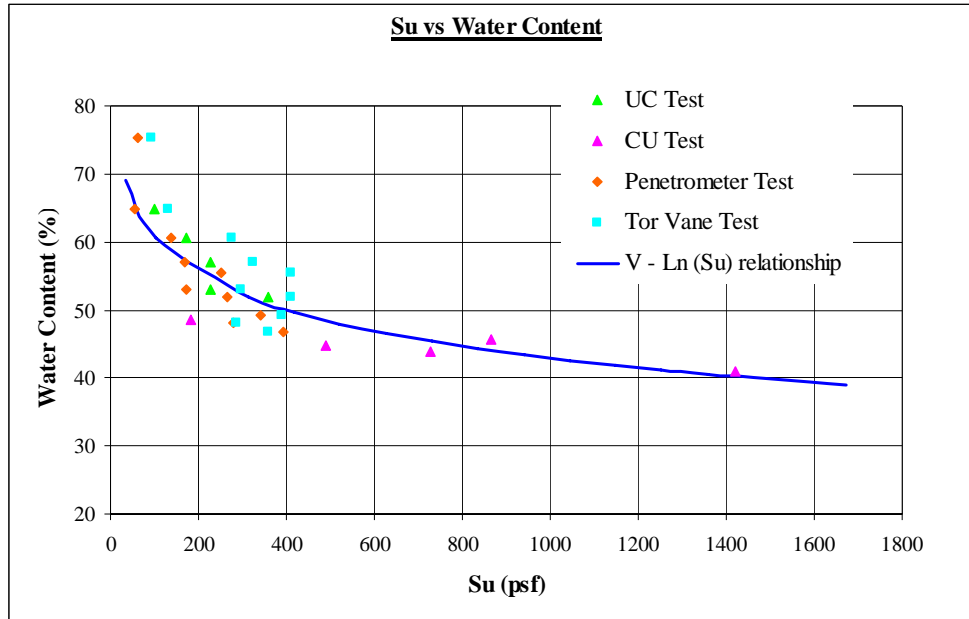- Beach: Fine sand such as Nevada Sand

17th Street Trial Model design, 50g

Model Preparation

Clay Placement

Clay Placement

Su vs Water Content

Legend:
- ▲ UC Test
- ▲ CU Test
- ◆ Penetrometer Test
- ■ Tor Vane Test
- —— V - Ln (Su) relationship

Axes: Water Content (%) vs Su (psf)

Shear Strength Estimation of Clay Layer @17th street

Location	Water Content (%)	Estimate S_u (kPa)	Estimate S_u (psf)
Surface (after Consol.)	75	3-5	70-110
Surface (after Testing)	64	5-7	110-140
Middle (after Testing)	59	9-12	200-250
Bottom (after Testing)	57	12-15	250-310

Swampy/Marsh Placement

Clay Levee Placement

Preliminary Results

New Orleans Levee Centrifuge Models
17th Street Test

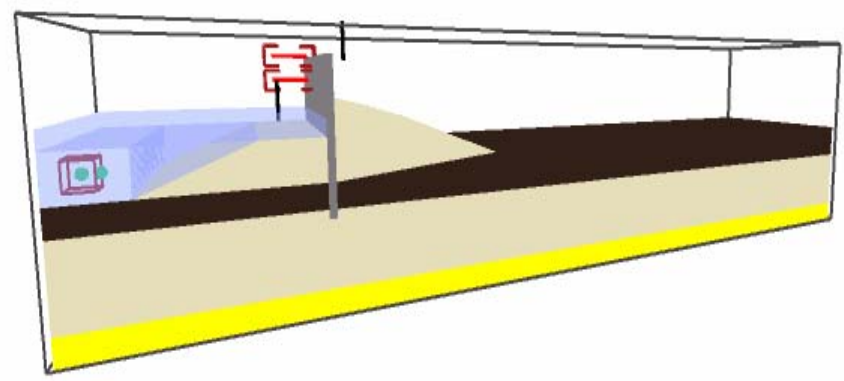Rensselaer Polytechnic Institute
CEES Center
http://nees.rpi.edu/

Menu

Open file from disk

Save 3D View as Image

Metadata

Move your mouse over an object to display its metadata.

Note that some objects don't have any metadata associated with them.

View Control

Preset Views

Default View

Side Left   Side Right

Left   Right

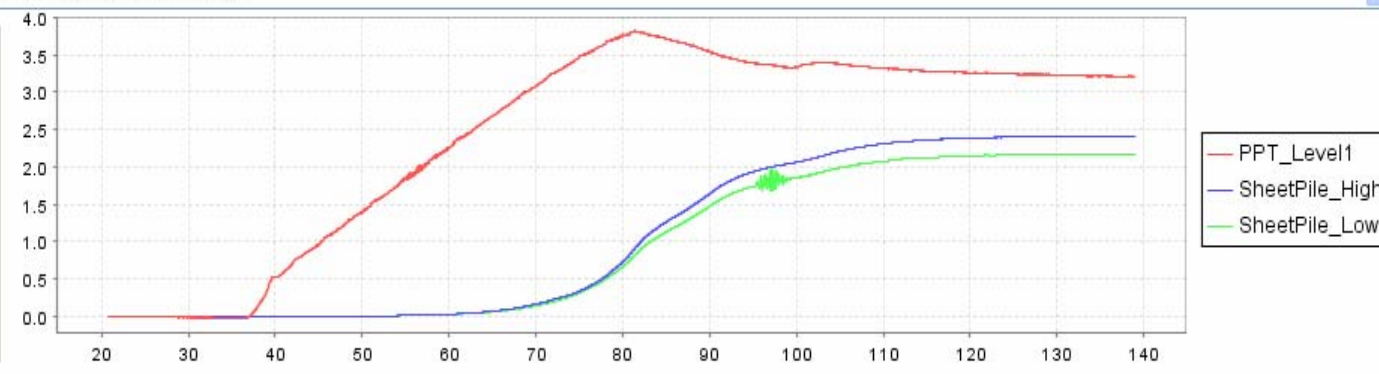Top   Bottom

Appearance Control

Sand	On	Solid
Clay	On	Solid
Peat	On	Solid
Levee	On	Solid
Sheet Pile	On	Solid
Water	On	Trans.
LVDTs	On	Solid
Lasers	On	Solid
Pore Pressures	On	Solid
Container	On	Line

Current Model Title: New Orleans Levee Tests - 17th Street

Plot Control

Clear Selection(s)

Reset Plot Zoom

PPT_Level1
SheetPile_High
SheetPile_Low
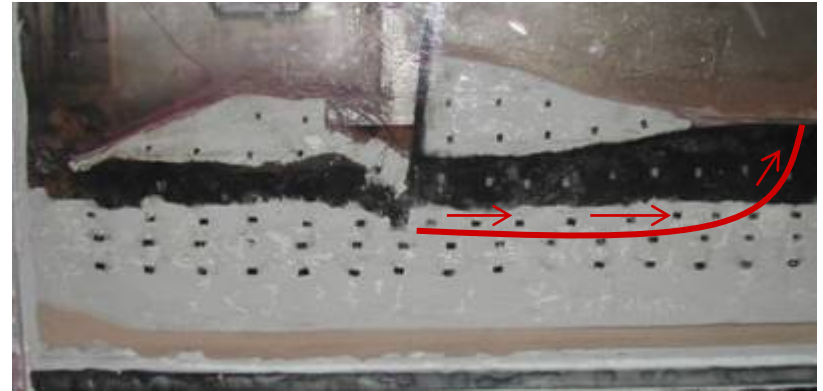
Ready

Preliminary Observations

- The wall experienced limited tilt and limited increase in the hydrostatic pressure under the downstream levee

- Shear failure occurred in the clay layer comparable to the field observation

Thank You
Questions