MAA Group

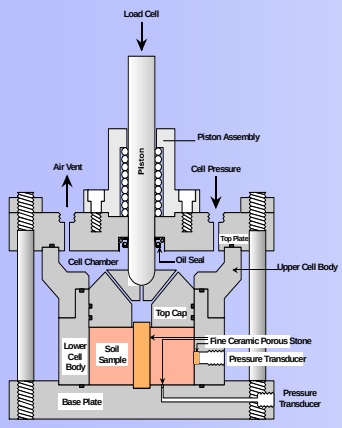
Experimental Research at the Asian Institute of Technology 1990s

Some Research Examples

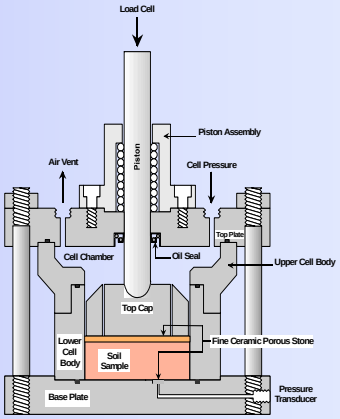
MAA Group

- Constant Rate of Strain Consolidometers
- Piezoprobes
- Shearing Mode of Vane
- Anisotropic Study

Constant Rate of Strain Consolidometer



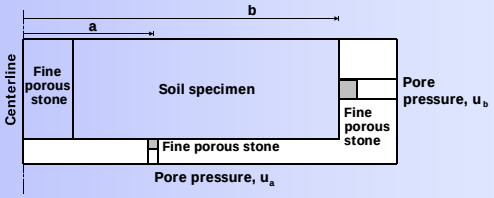
a) CRS Consolidometer for Radial Drainage



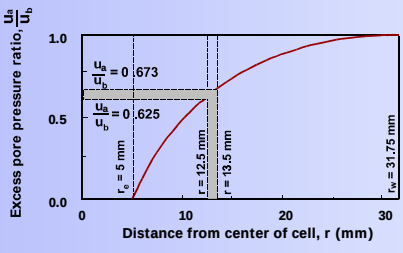
b) CRS Consolidometer for Vertical Drainage

Load Cell

Pore Water Pressure Distribution under Radial Drainage Condition



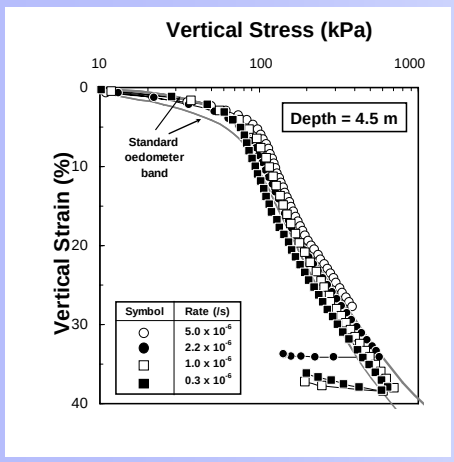
a) Locations of pore water pressure measurement

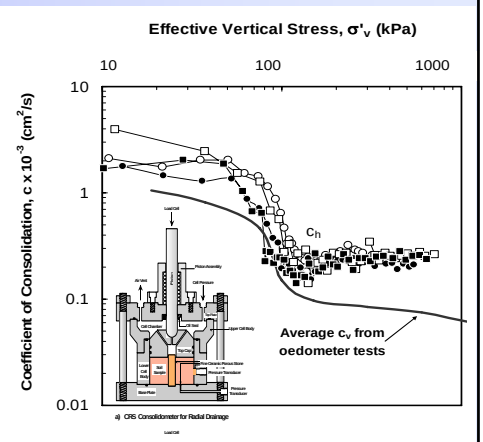


b) Excess pore pressure ratio versus radius

CRS under Radial Flow Condition

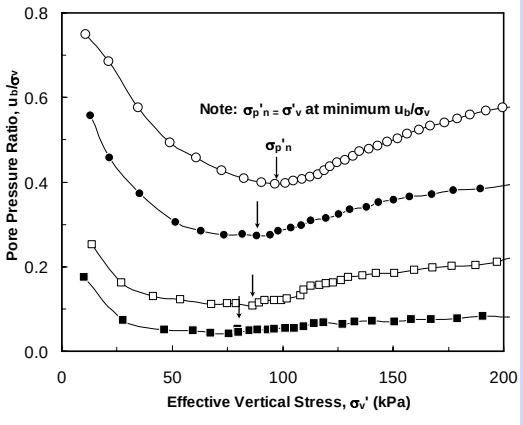
MAA Group

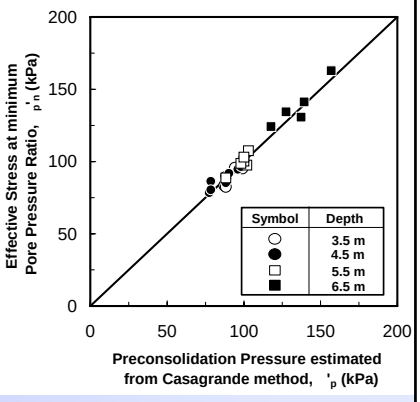




Determination of Preconsolidation Pressure from Pore Pressure Ratio

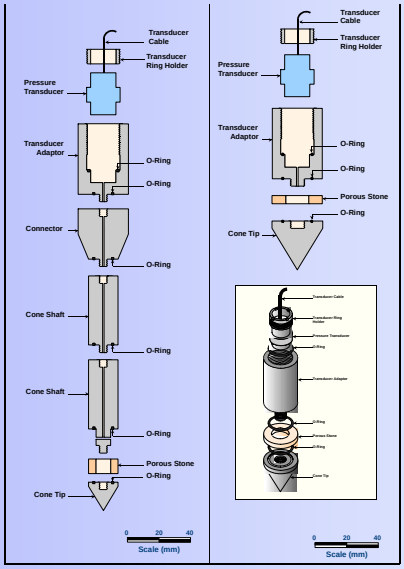
MAA Group





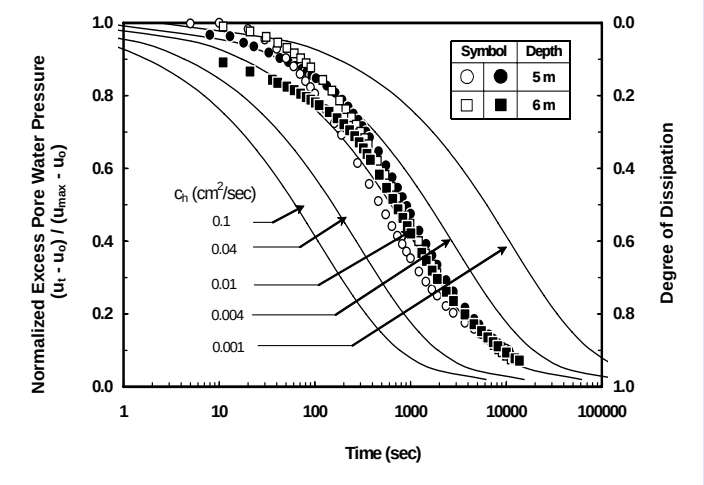
Mini-Piezoprobe (Dissipation Test)

MAA Group



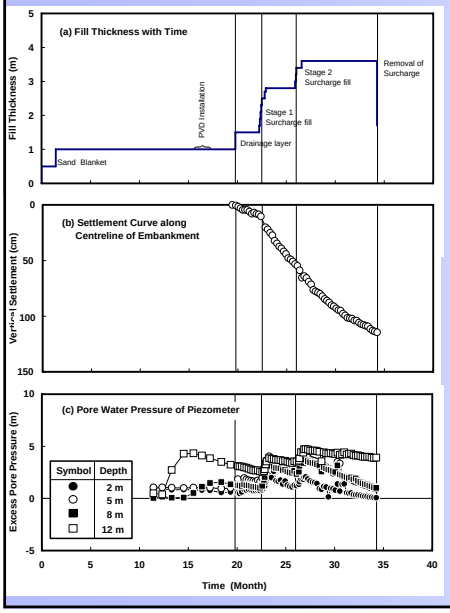
Dissipation Curves

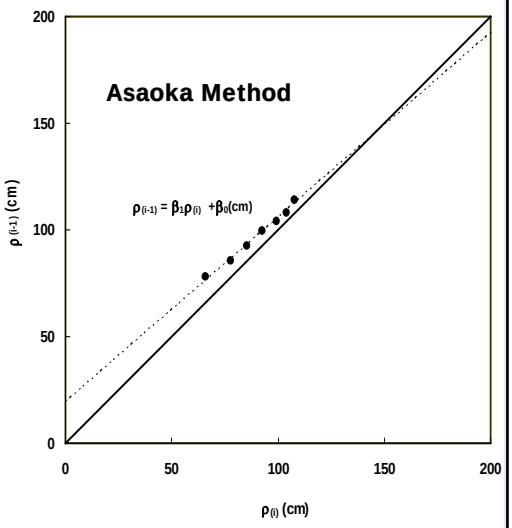
MAA Group



PVD Embankment – Final Settlement Prediction

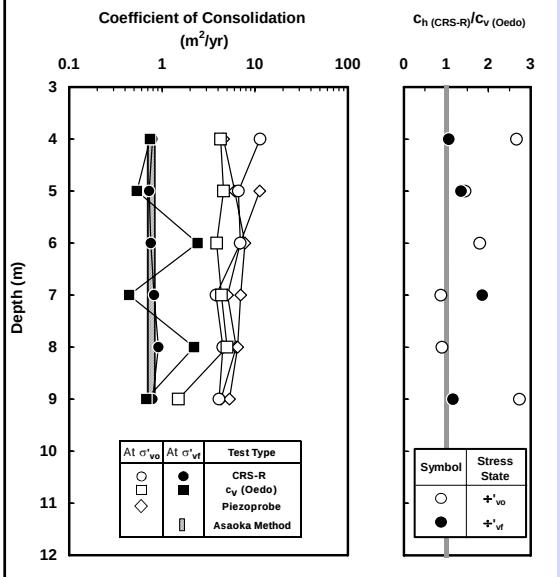
MAA Group

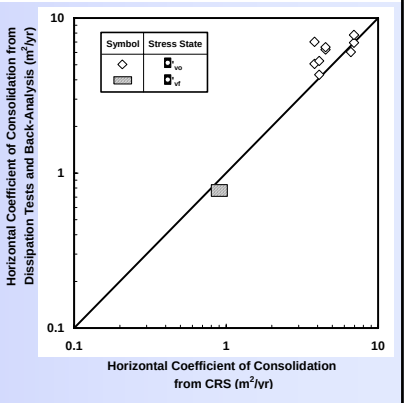




c_h versus Stress Range

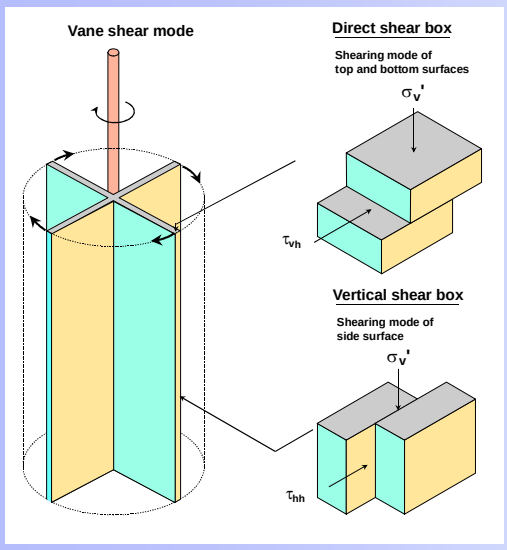
MAA Group

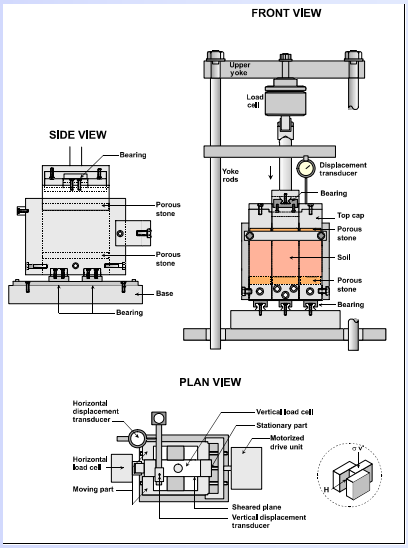




Vane Shear Mode

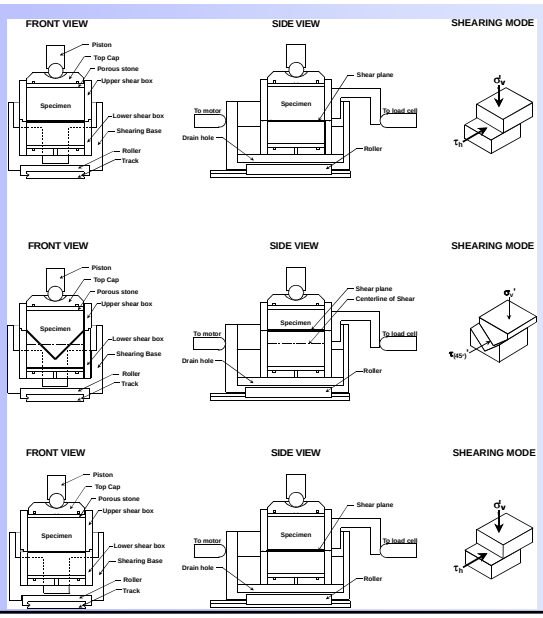
MAA Group





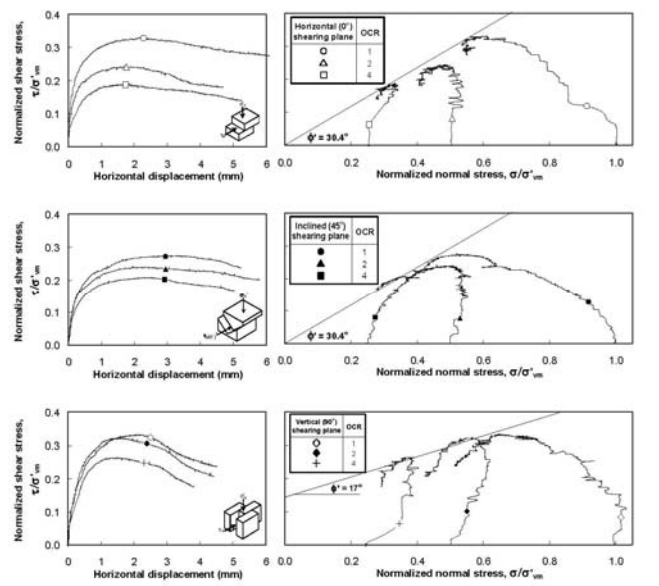
Different Planes of Shearing

MAA Group



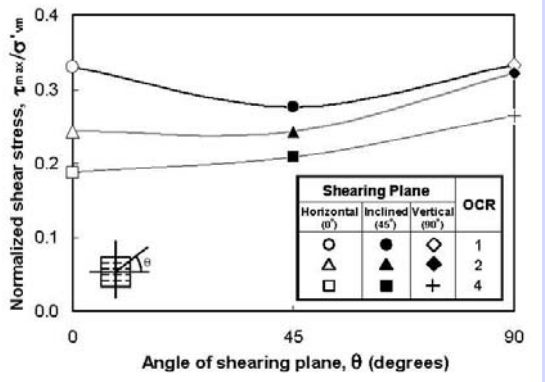
Stress-Displacement & Stress Paths
SHANSEP Technique

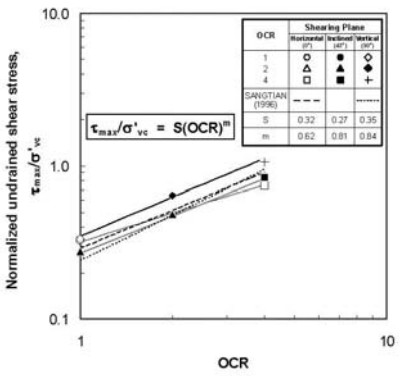
MAA Group



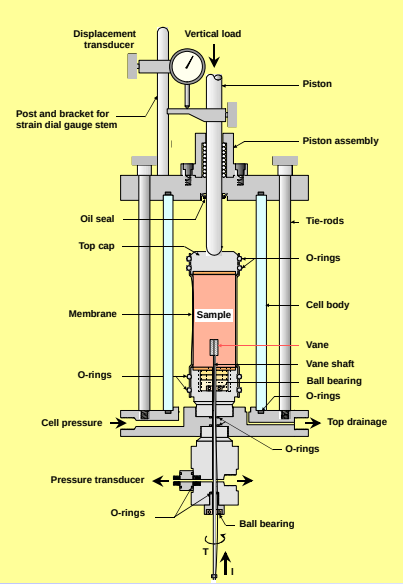
Anisotropy & SHANSEP Parameters

MAA Group

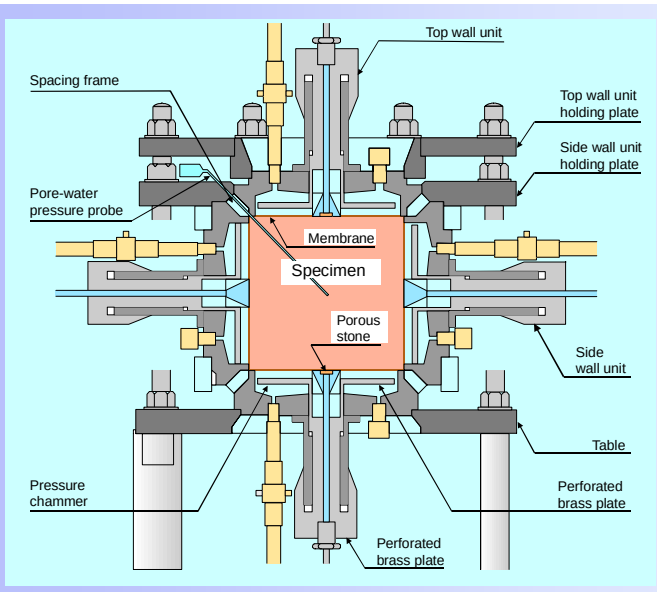




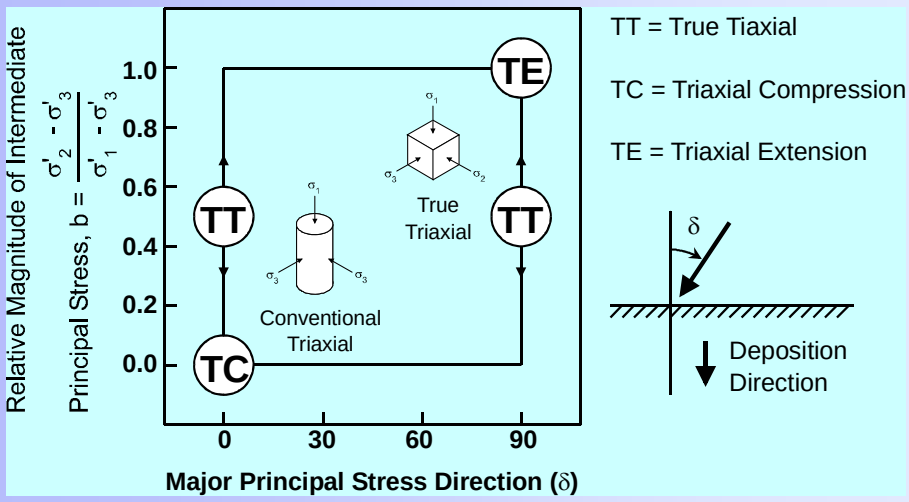
Consolidated Laboratory Vane



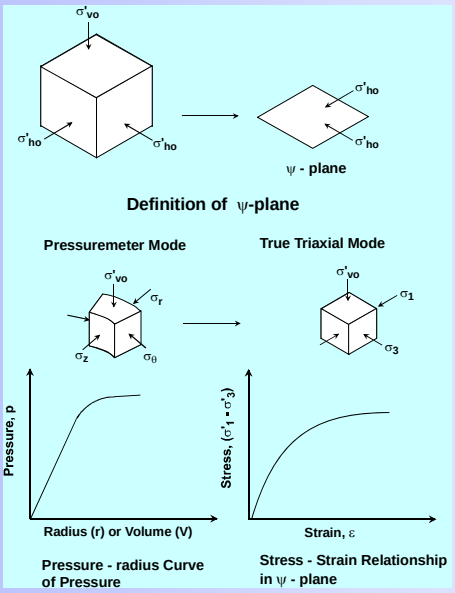
True Triaxial –Flexible Boundaries



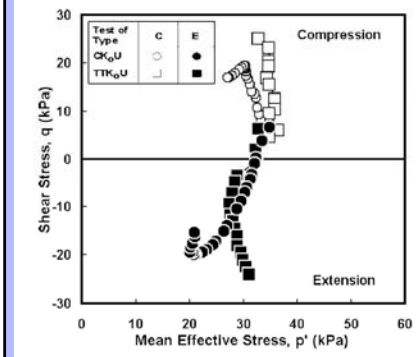
Stress Systems

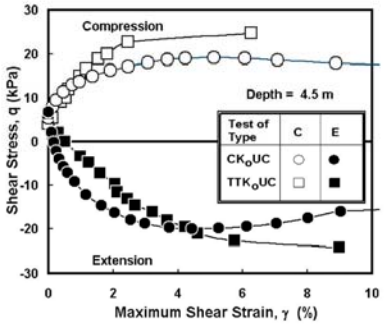


Simulation of Pressuremeter Mode

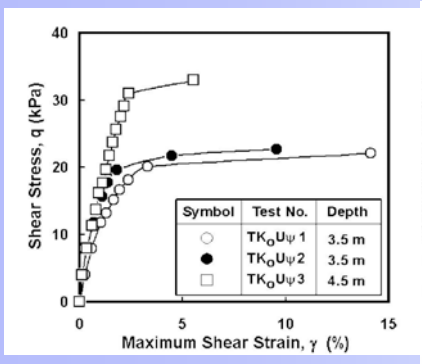


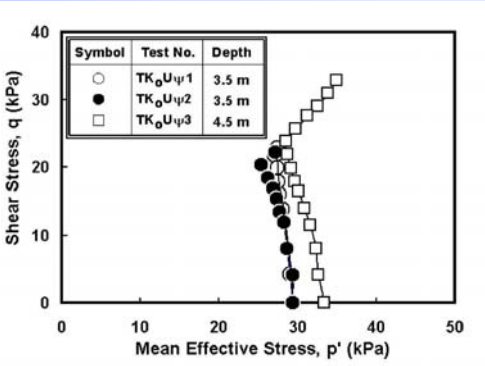
True Traxial vs Conventional Triaxial



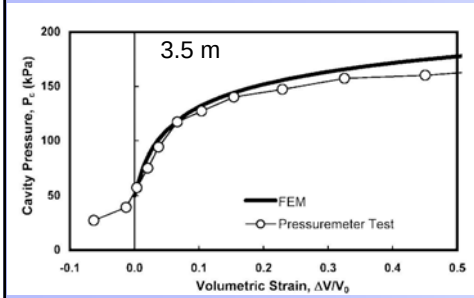


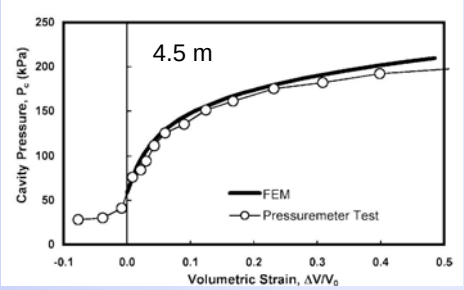
Pressuremeter Plane Mode





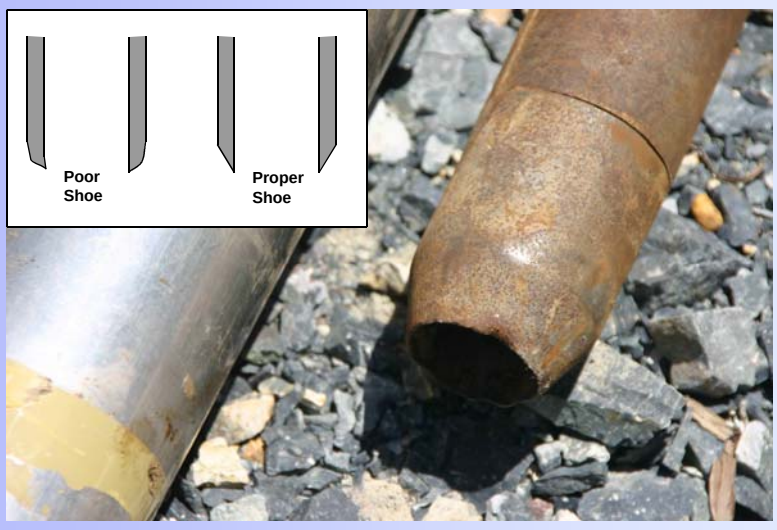
Pressuremeter Simulation by FEM



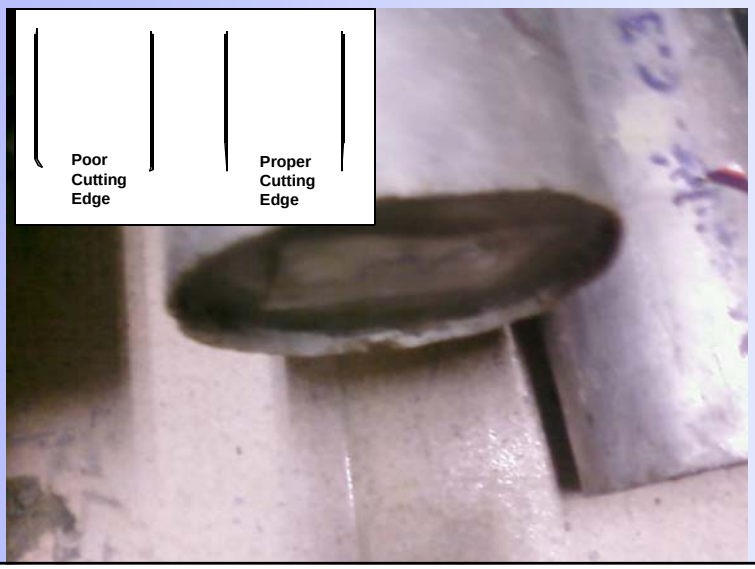


Some Testing Problems Encountered

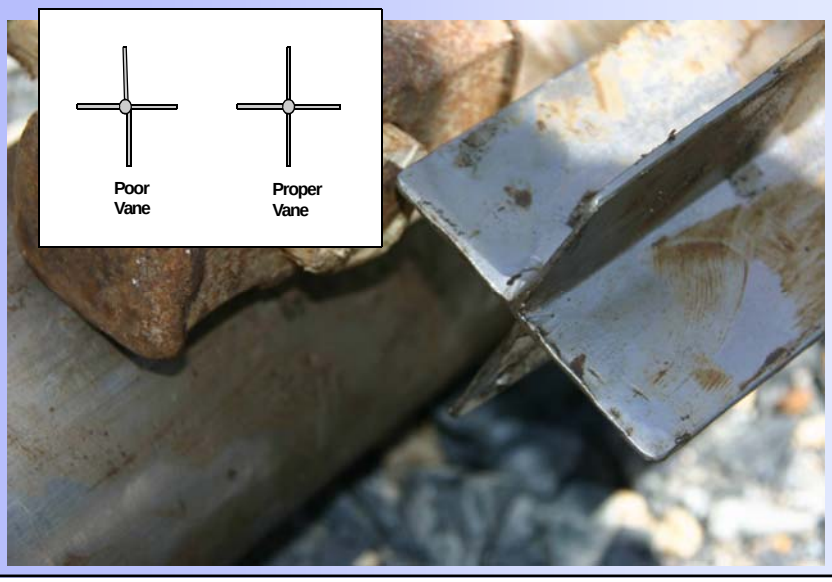
Split Spoon Sampler



Shelby Tube



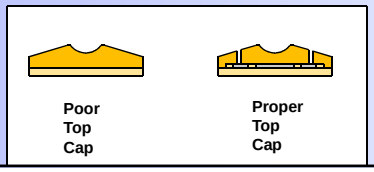
Vane



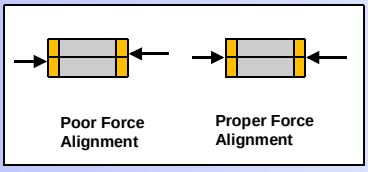
Sieve

Consolidation

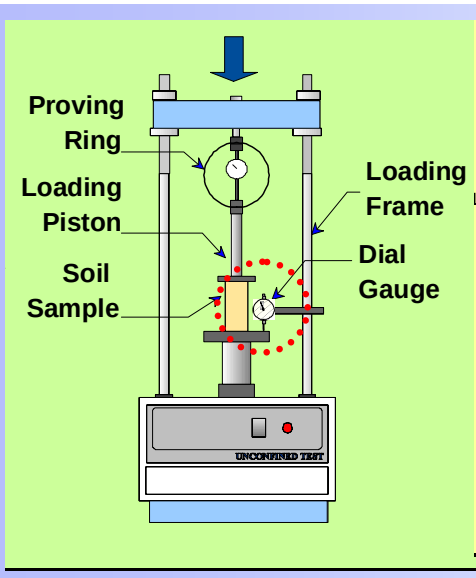
Floating Ring Consolidometer

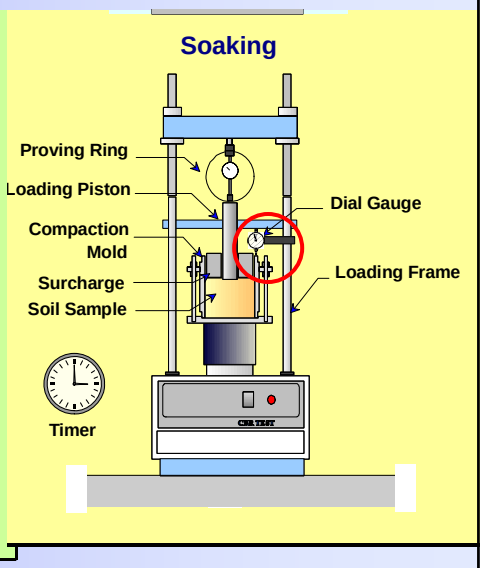


Shear Box



Loading Frame





Some Interesting Geotechnical Works in Thailand


Ground
Subsidence

Unsuccessful Works – Prefabricated Vertical Drains (1995)

MAA Group

Unsuccessful Works – Prefabricated Vertical Drains (1995)

Unsuccessful Works – Soil Cement Columns (2007)


Spun Pile
Problems

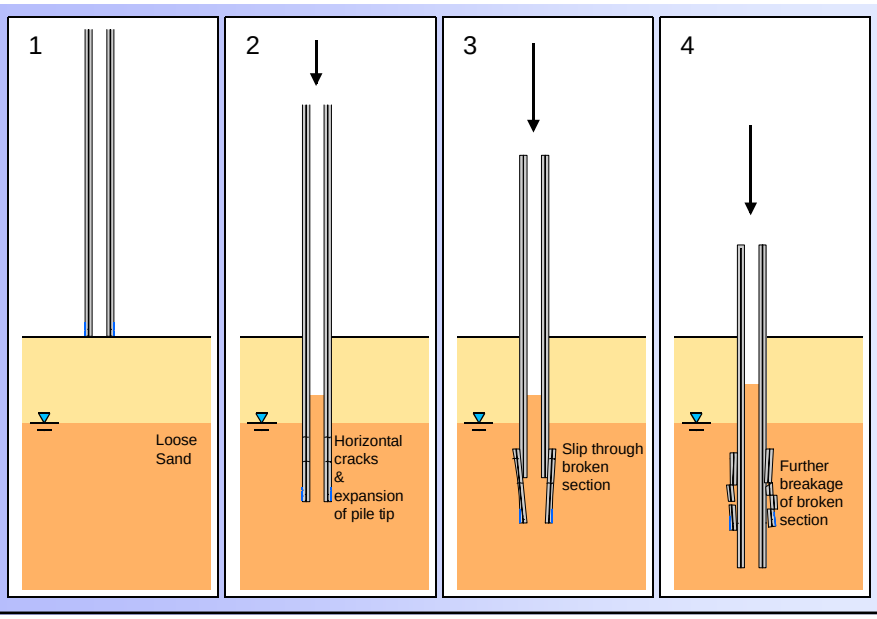

P
41


P
278


P
19

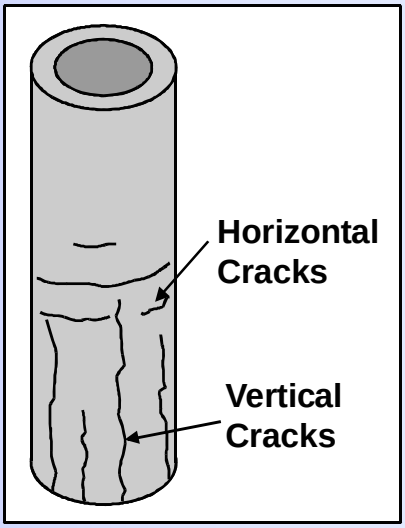

P
81

Possible Failure Mechanism



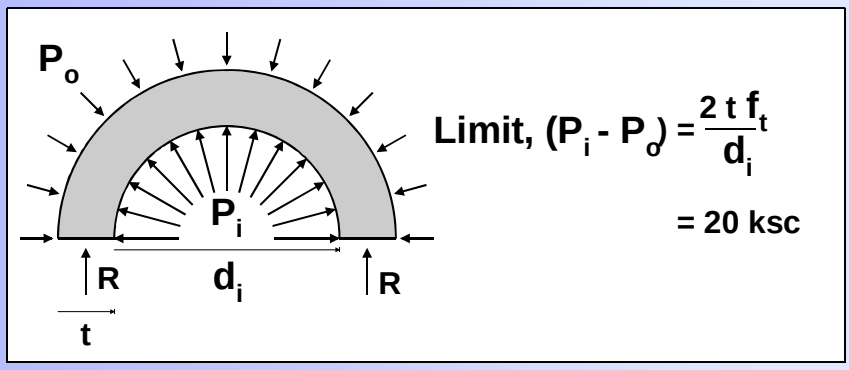
Possible Causes

- 2 Stages
  - Horizontal Cracks due to high tensile wave when pile is in loose sand
  - Pile Expansion due to pressure buildup internally
- Pile Expansion
  - High Energy Input in loose sand with high water table resulted in high penetration
  - High penetration/blow gives rise to high water pressure buildup
  - Water pressure causes expansion of pile



Limit of Internal Pressure

- D = 600 mm, t = 100 mm, d_i = 400 mm
- f_c = 500 ksc, f_t =50 ksc

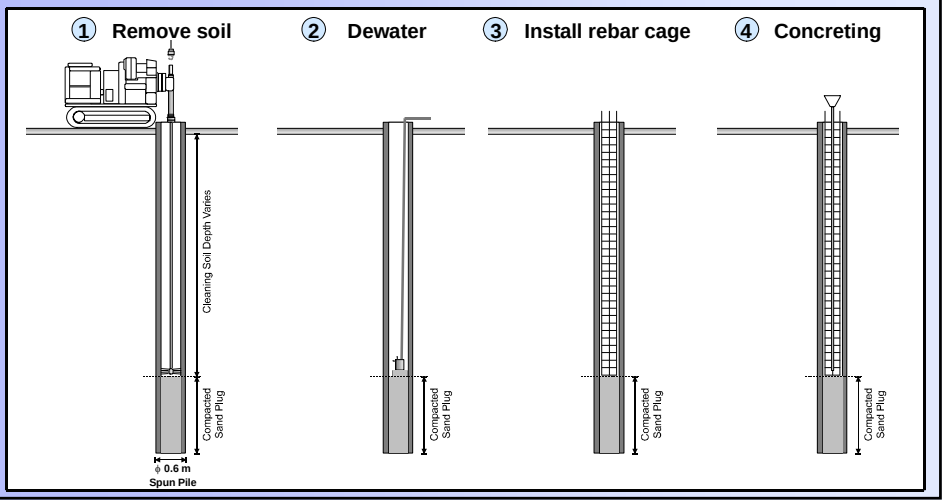


$$\text{Limit, } (P_i - P_o) = \frac{2\,t\,f_t}{d_i}$$

$$= 20 \text{ ksc}$$

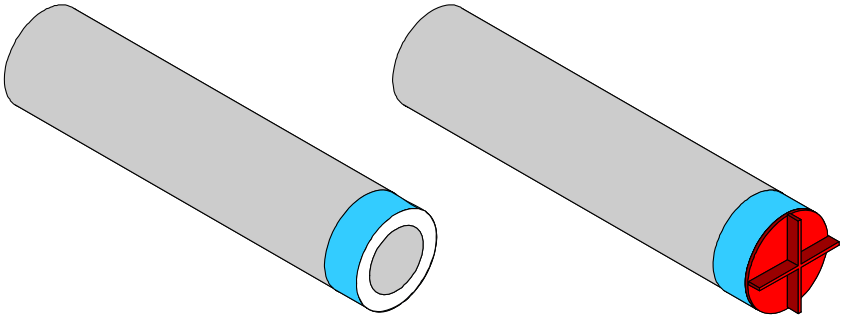
Remedial Measures

- Fill Inner Hole with Rebars and Concrete to improve Long Term Durability



Pile Tip Modification

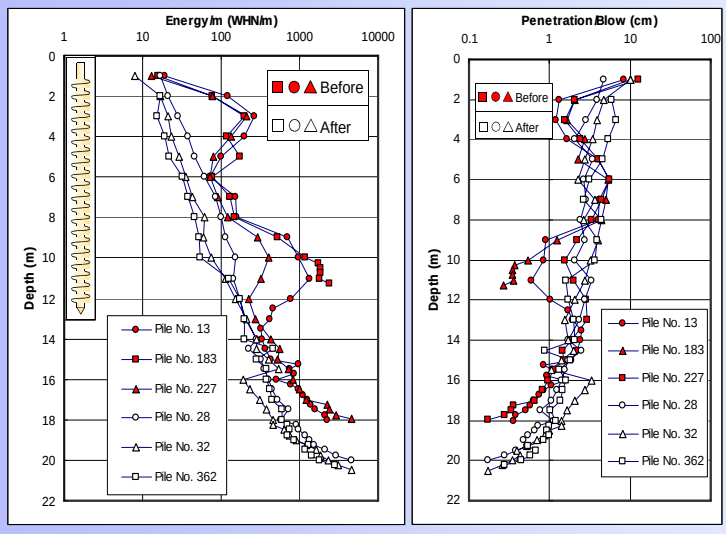
- CCTV Inspection after Piling
- Plug partially with concrete



Standard Shoe

Modified Closed End

Augering and Lower Energy Input




Tsunami


Tsunami