



## In-Situ Measurement of the Nonlinear Properties of Soils in Shear and Compression

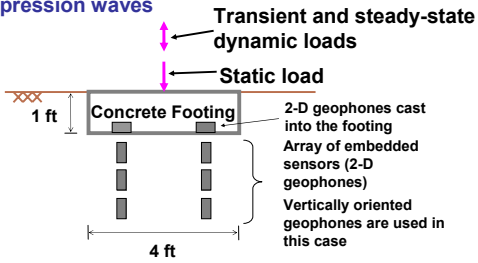
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G. Biscontin, J.M. Roesset, L.R. Barroso, Texas A&M University

### Elements of In-Situ Nonlinear Tests

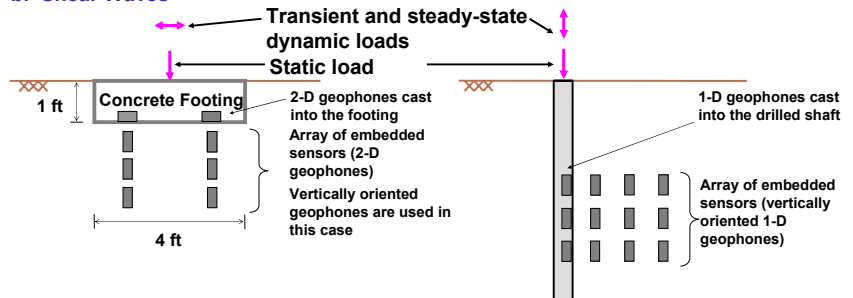
- Dynamic loading source (similar to EQ shaking)
- Embedded instrumentation array (to monitor ground motion)

### General Approach in the Field

#### a. Compression waves



#### b. Shear Waves



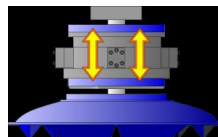
### Equipment and Field Loading

#### Tri-Axial Shaker ("T-Rex")



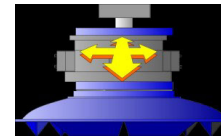
- Total weight – 64,000 lb (29,030 kg)
- 3 Vibration orientations: Vertical, Horizontal in-line, Horizontal cross-line

#### Vertical Mode



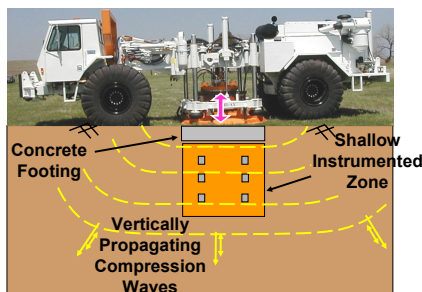
- Peak Force – 60,000 lb (267 kN)
- Reaction Mass Weight – 8000 lb (3,630 kg)

#### Shear Modes

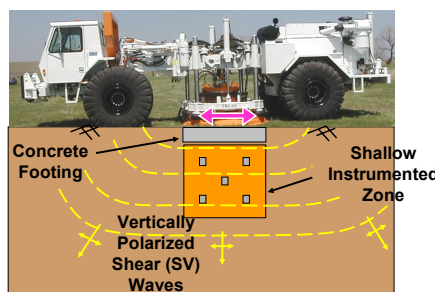


- Peak Force – 30,000 lb (133 kN)
- Reaction Mass Weight – 4850 lbs (2,200 kg)

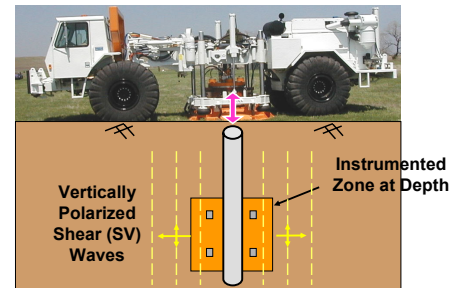
#### Loading with Compression Waves



#### Loading with Shear (SV) Waves



#### Loading with Shear Waves (SV) at Depth



### Typical Results in Early Prototype Study (P. Axtell, 2001, M.S. Thesis, Univ. of Texas at Austin)

