Cast-in-situ Tubular Piles (CTP)

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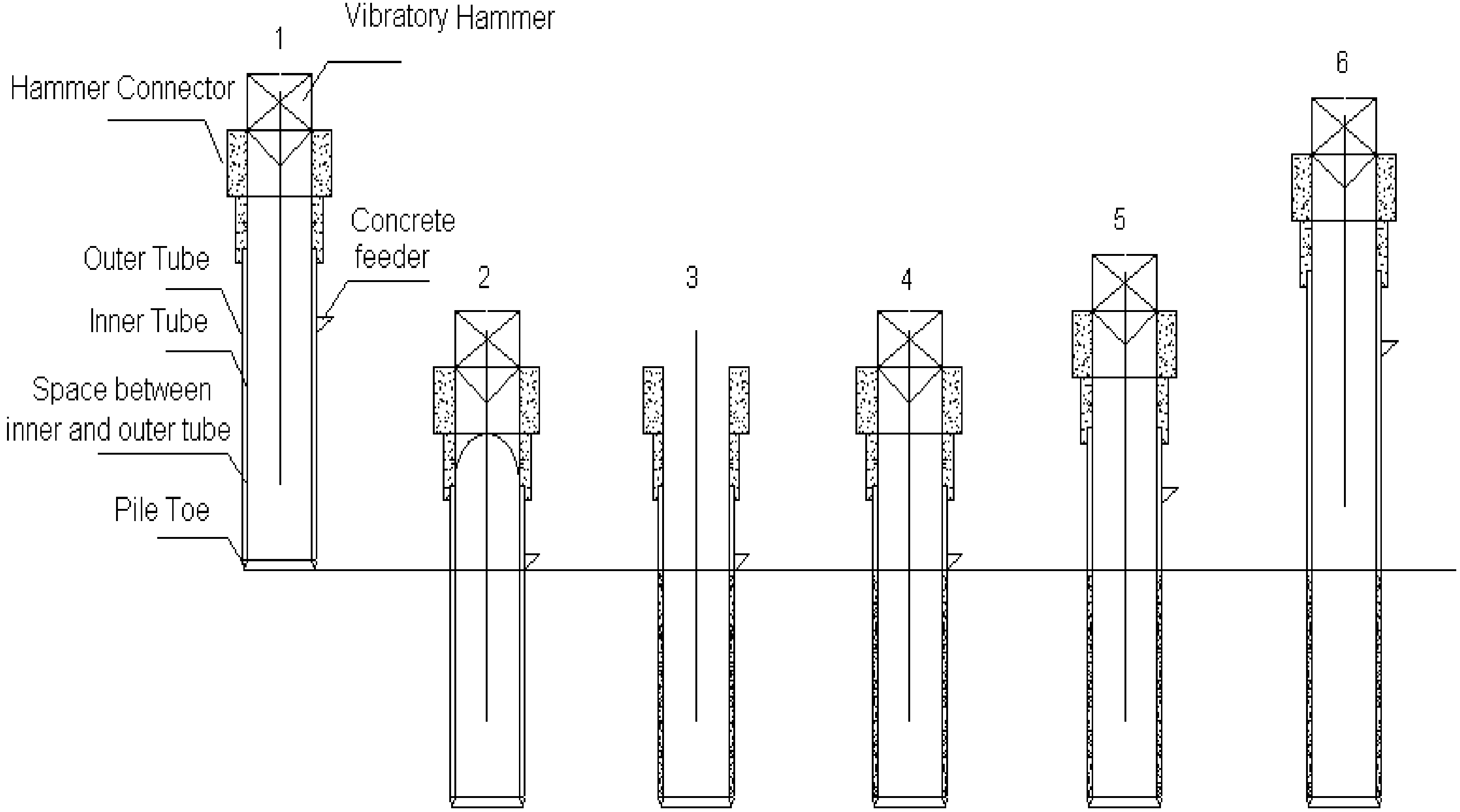
Single CTP Construction



(1) Positioning casing; (2) Driving casing; (3) Placing steel and pouring concrete; (4) Connecting hammer; (5) Extracting casing; (6) Completion of extracting.

CTP Working principles

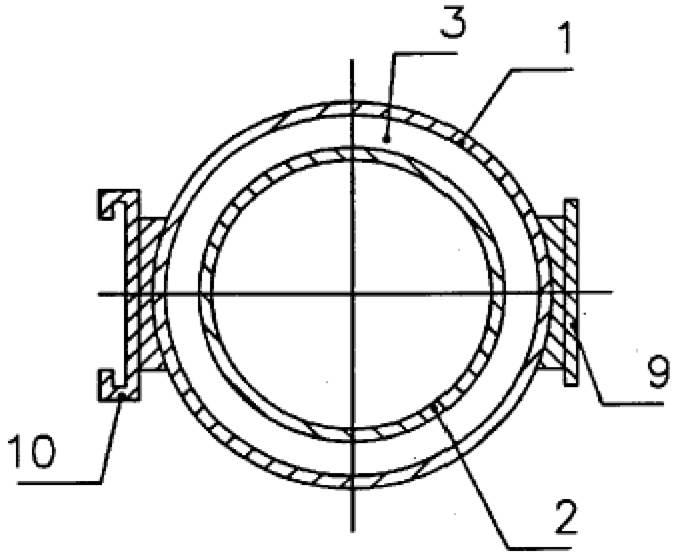


FIG. 2

- 1-Outer tube
- 2-Inner tube
- 3-Barrel core space
- 9-Male connector
- 10- Female connector

- O.D.= 3.3 ~ 6.6 ft (1000~2000 mm)
- T = 4.72 ~ 7.87 in (120~200 mm)

Continuous Wall Construction

Protection Levee

Protection Levee

Protection Levee

Protection Levee

Excavation Support

Excavation Support

Railway Embankment

Advantages

- Large diameter
- Consistent, high quality concrete
- High axial capacity
- Fast construction

Advantages

- Excellent lateral load resistance
- Composite foundation
- Minimum post-construction settlement (No preloading is needed)
- Effective in soft soil deposits (clay or sand) (Liquefaction mitigation)

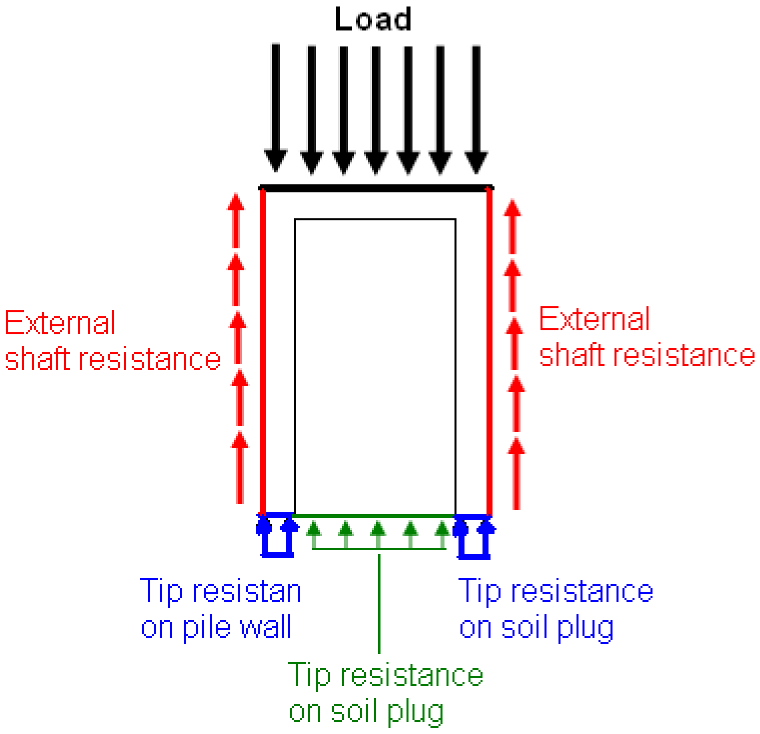
Environmental Advantages

- Small ground vibration (compared to pile driving)
- Low noise (compared to pile driving)
- No or little soil spoils (compared to drilled shafts)
- Small concrete volume (less carbon foot print)

Axial Geotechnical Resistance (Compression)

$$Q_{UK} = \xi_1 Q_{SK} + \xi_2 Q_{PK} + \xi_3 Q_{PSK}$$

- Q_{uk} total resistance
- $\xi_1 Q_{SK}$ shaft resistance
- $\xi_2 Q_{SK}$ tip resistance on pile wall
- $\xi_3 Q_{PSK}$ tip resistance soil plug



Vertical load-settlement predictions using SHAFT program

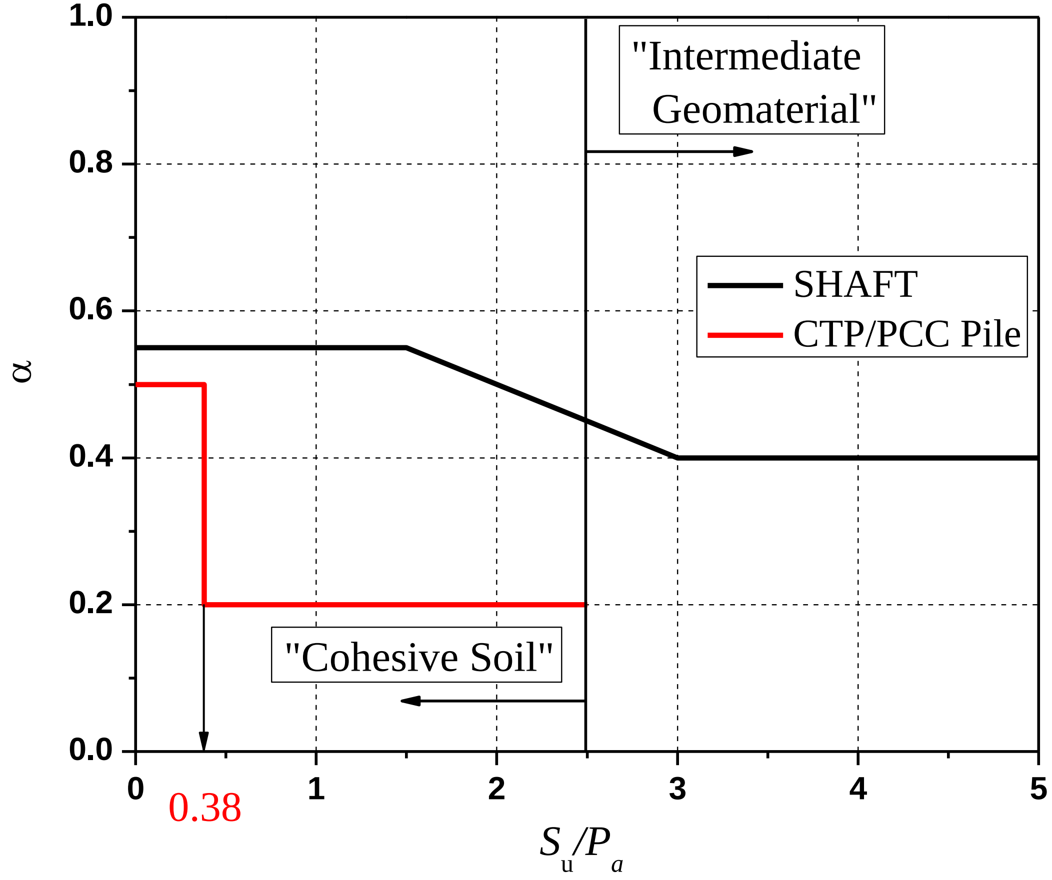
$$f_{sn} = \alpha (S_u)_s$$

α is shown in Figure.

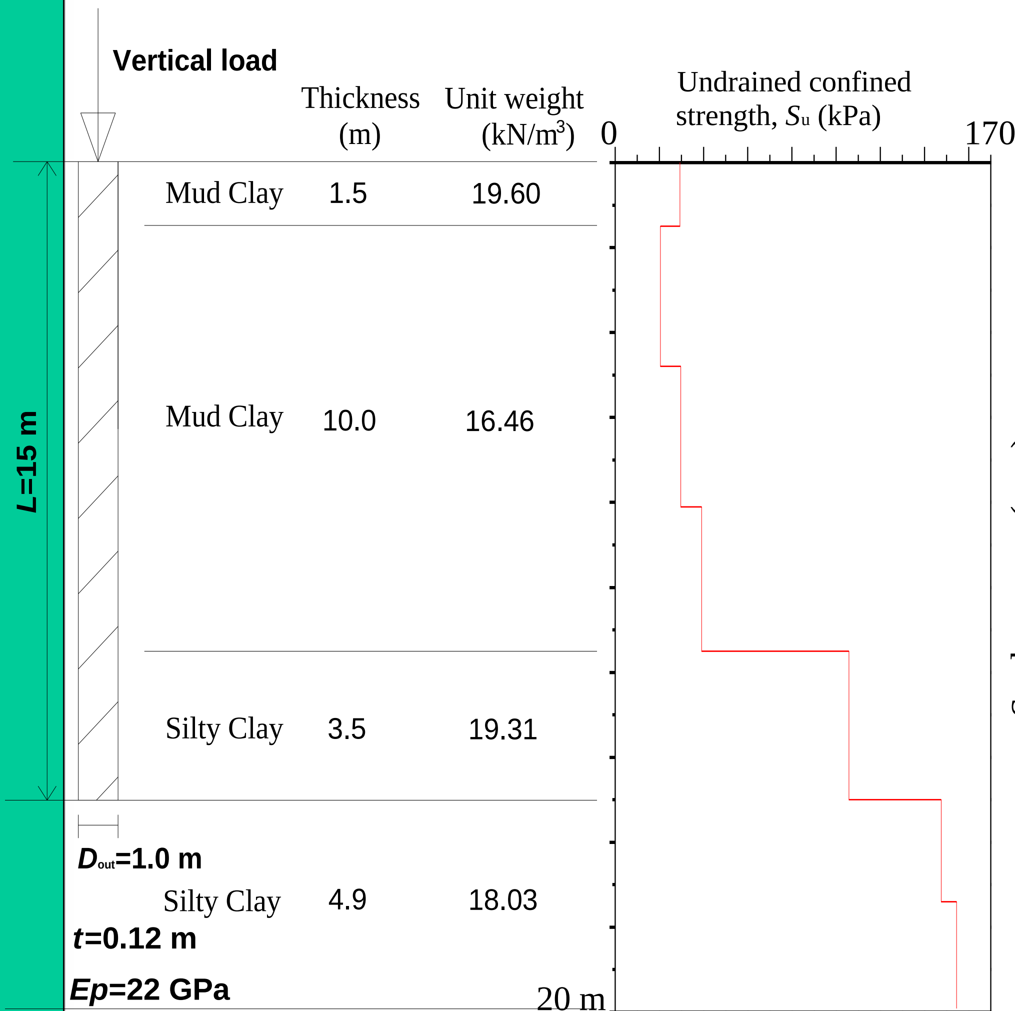
$$f_{sb} = 0.83 N_c^* (S_u)_b$$

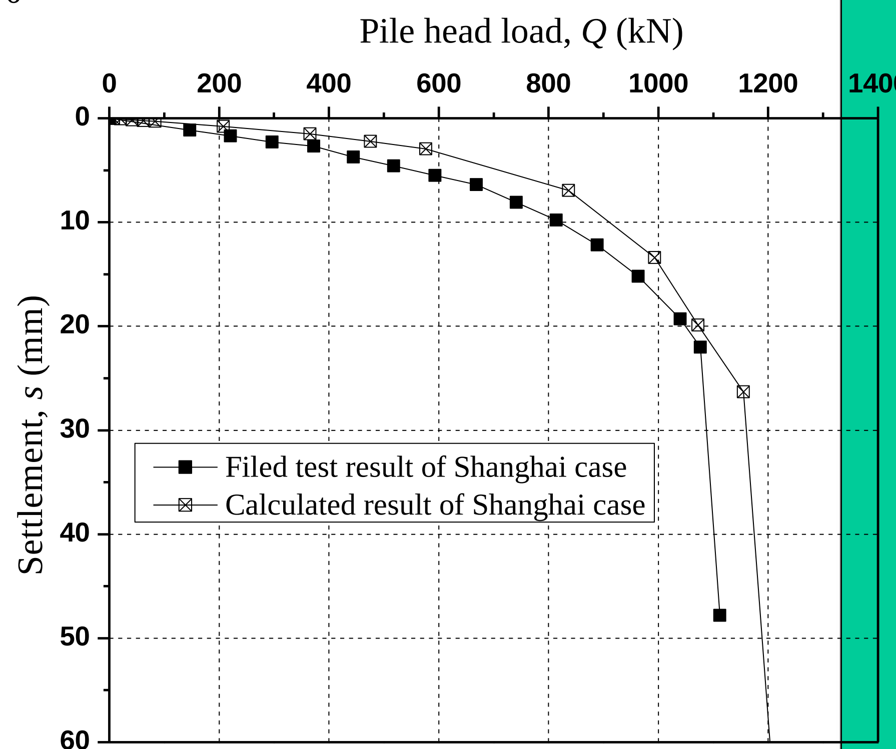
N_c^* is given by SHAFT

($N_c^* = 6.5 - 9.0$)



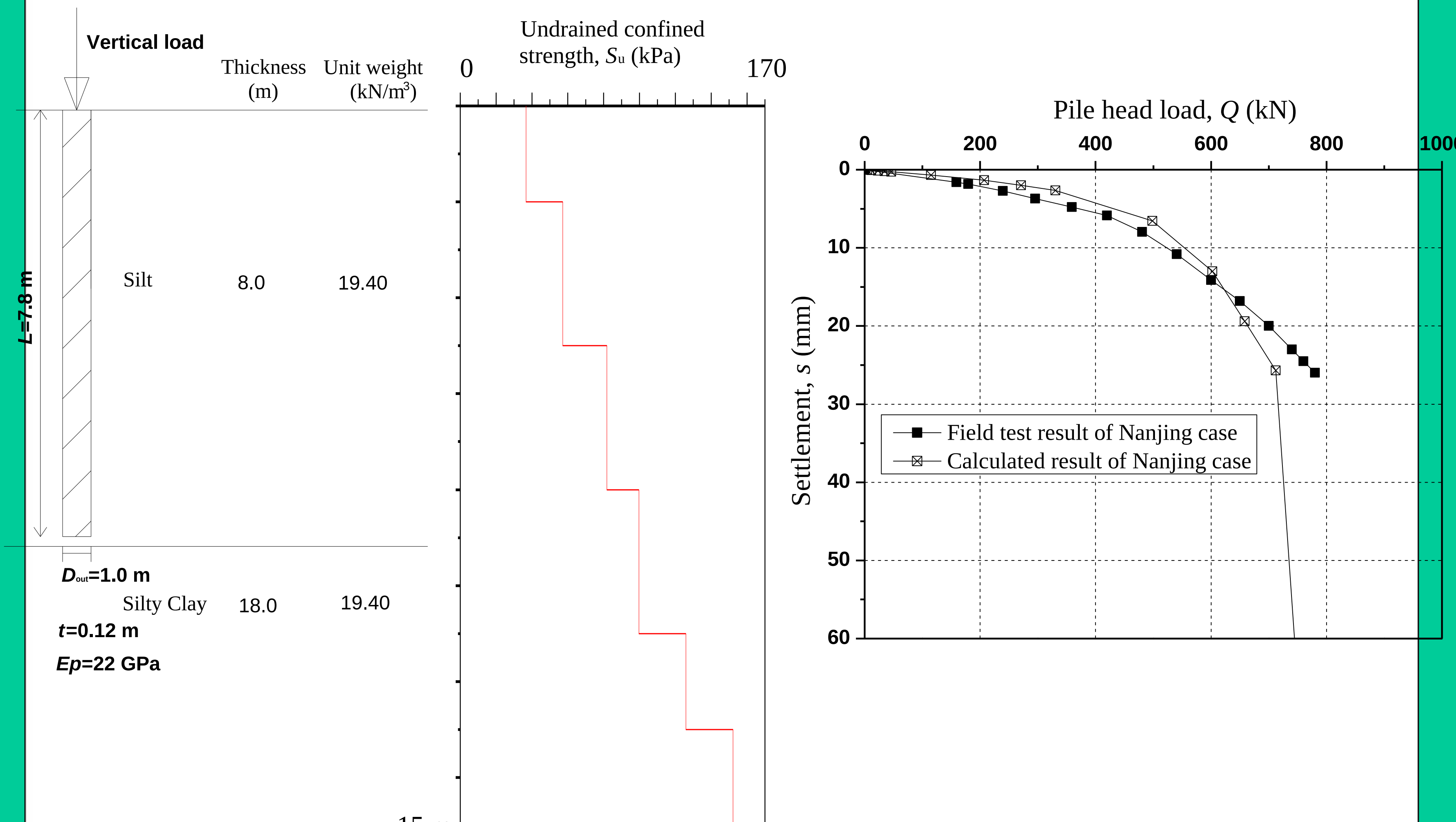
Vertical load test results and SHAFT program predictions





Case_1: Shanghai North Central Expressway

Vertical load test results and SHAFT program predictions

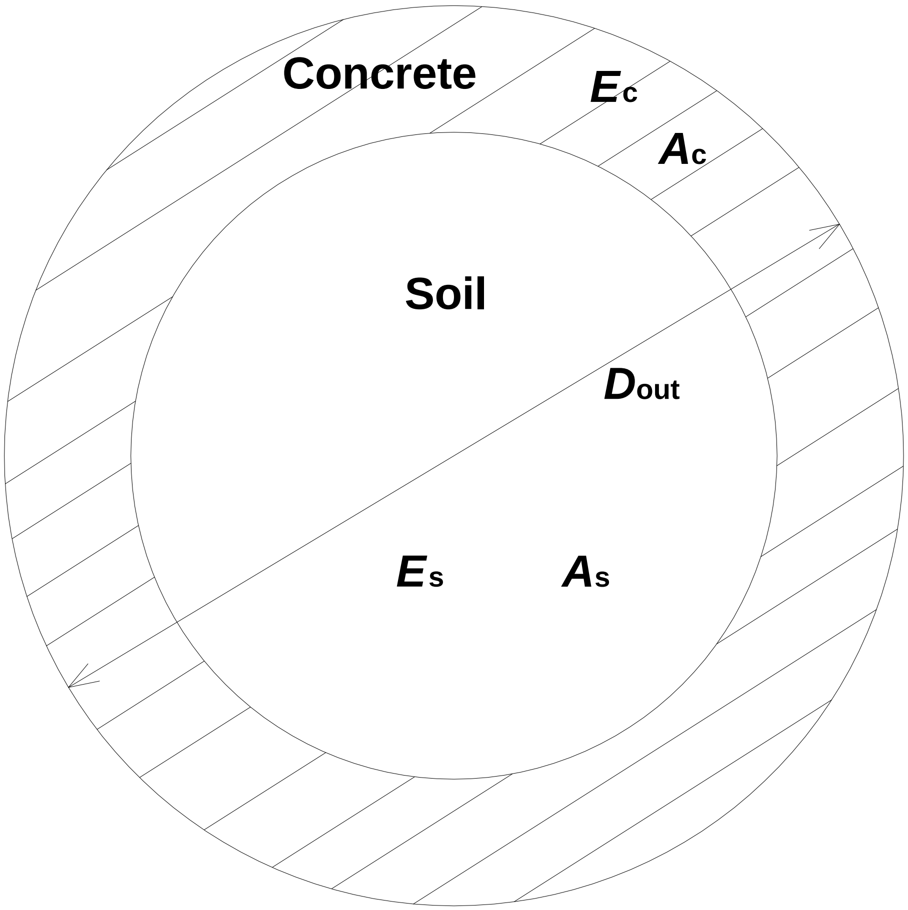


Case_2: Jiyi Road, Nanjing, China

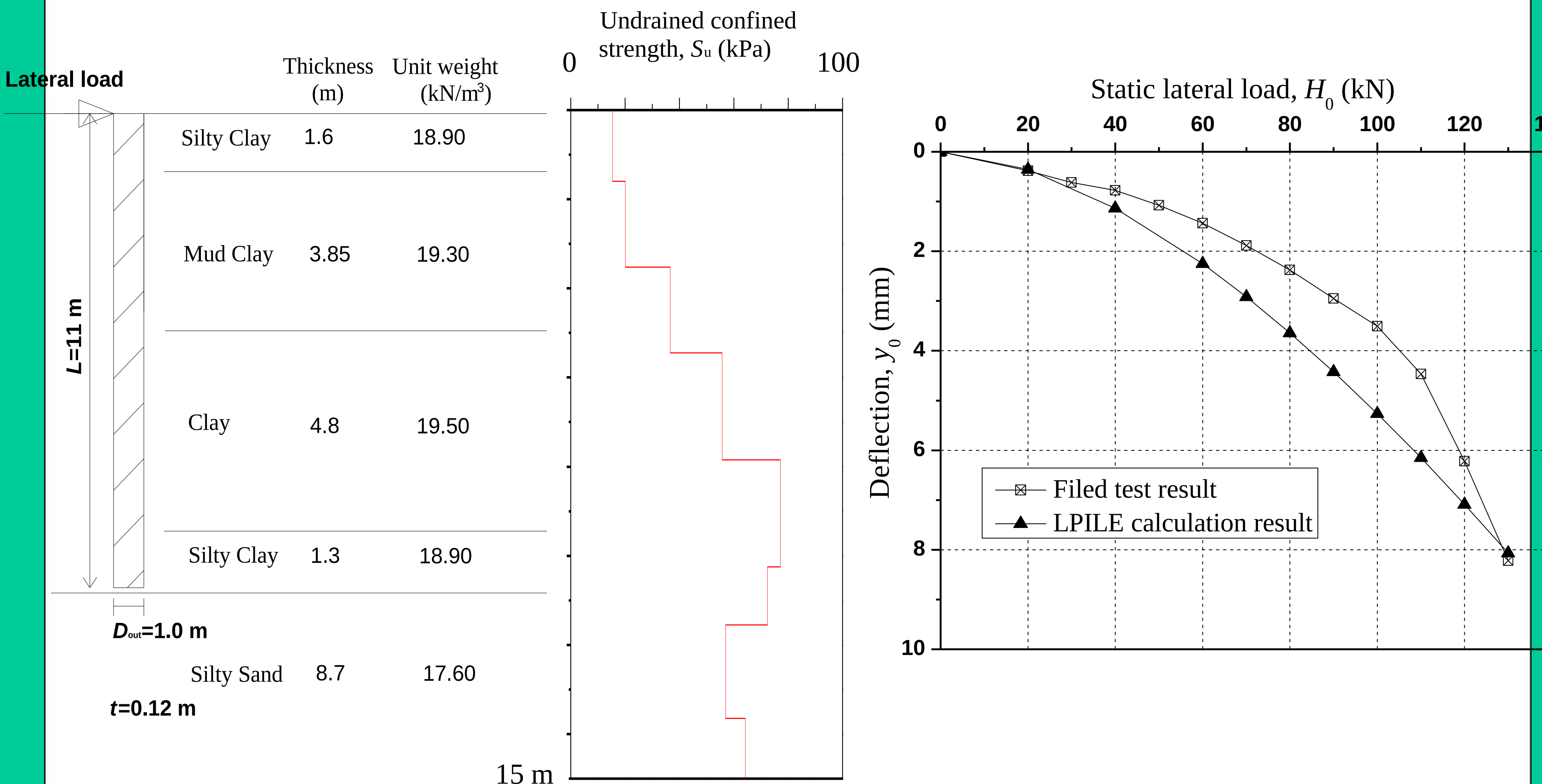
Lateral load-deflection predictions using LPILE program

$$E_{\text{combined}} = \frac{E_c A_c + E_s A_s}{A_c + A_s}$$

$$A_{\text{combined}} = A_c + A_s = \frac{\pi D_{\text{out}}^2}{4}$$

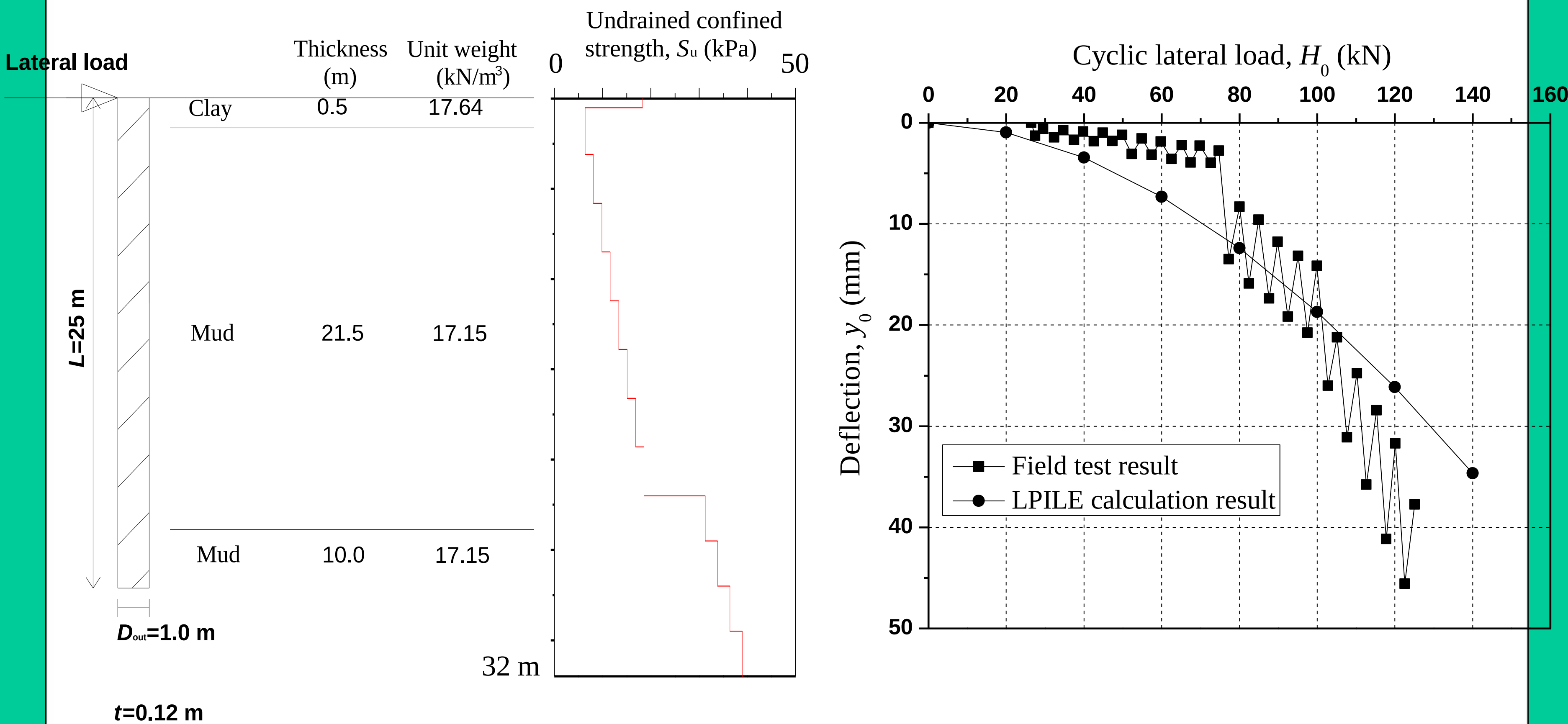


Lateral load test results and LPILE program predictions



Case_3: Hang-Qian Expressway, China

Lateral load test results and LPILE program predictions



Case_4: Xuyang Road, Zhejiang, China


Thank You