Better ZSOIL, Better Geotechnical Analysis
—Settlement prediction of super high-rise

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Suzhou ZhongNan Center, 729m

- Building height
  - 729m, 121F+B5F
- Foundation
  - thick raft+bored pile
- Prediction method
  - ZSOIL.PC
  - HS model
  - total stress method
- Raft thickness
  - ~6.3m

- Tower piles
  - 1100mm Dia., ~70m length
  - cast-in-place concrete pile, end & side-grouting
  - bearing layer is No. 13, \( P_s = \sim 21\text{MPa} \)
  - compressive capacity characteristic value is 13000kN
  - 876 piles total
Suzhou ZhongNan Center, 729m

Concrete core tube

Mega column
Suzhou ZhongNan Center, 729m

Max. settlement 11.0 cm
Suzhou ZhongNan Center, 729m

Max. settlement 11.0cm
Suzhou ZhongNan Center, 729m

- Project progress
  - construction of diaphragm wall and piles has been completed
Shanghai Center, 636m

- **Building height**
  - 636m, 121F+B5F

- **Foundation**
  - thick raft+bored pile

- **Prediction method**
  - ZSOIL.PC
  - HSS model
  - coupled analysis
- **Raft thickness**
  - ~6.0m

- **Tower pile**
  - 1000mm Dia., ~50m length
  - cast-in-place concrete pile, end grouting
  - bearing layer is No. 9-2, $Ps=\sim18\text{MPa}$
  - compressive capacity characteristic value is 10000kN
  - 1032 piles total
Shanghai Center, 636m

- Bottom of excavation
  - $H = \sim 34.0m$
Shanghai Center, 636m
Shanghai Center, 636m

2675 piles total
Shanghai Center, 636m

Max. settlement 13.5cm
Shanghai Center, 636m

Max. settlement 13.5cm
Shanghai Center, 636m
Wuhan GreenLand Center, 606m

- Building height
  - 606m, 123F+B6F
- Foundation
  - thick raft+bored pile
- Prediction method
  - ZSOIL.PC
  - HSS/MC model
  - total stress method
- Raft thickness
  - ~6.0m

- Tower pile
  - 1200mm Dia., 20~31.5m length
  - cast-in-place concrete pile, end grouting
  - bearing layer is partially weatherd sandstone/sandy mudstone, axial compression strength 8~17MPa
  - compressive capacity characteristic value is 15000kN
  - 358 piles total
Wuhan GreenLand Center, 606m
Wuhan GreenLand Center, 606m

Max. settlement 3.9cm (including structure compression)
Wuhan GreenLand Center, 606m

Max. settlement 1.9cm
Wuhan GreenLand Center, 606m
ShiMao Center, 348m

- **Building height**
  - 328m, 75F+B4F

- **Foundation**
  - thick raft

- **Prediction method**
  - ZSOIL.PC
  - Hoek-Brown model
  - total stress method
- Raft thickness
  - ~4.5m
- Axial compression strength
  - argillaceous siltstone, 2.63~6.35MPa
  - limestone, 25.3~110.4MPa
ShiMao Center, 348m

- argillaceous siltstone
- limestone
ShiMao Center, 348m

- limestone
- argillaceous siltstone
- fracture zone
ShiMao Center, 348m

Max. settlement 4.4cm (including structure compression)
Changsha ShiMao Center, 348m

Max. settlement 3.0cm
ShiMao Center, 348m
PuLi Center, 260m

- **Building height**
  - 260m, 60F+B3F
- **Foundation**
  - thick raft+bored pile
- **Prediction method**
  - ZSOIL.PC
  - Hoek-Brown model
  - total stress method
- **Raft thickness**
  - ~3.4m

- **Tower pile**
  - 1500~2800mm Dia., ~12m length
  - Compressive capacity characteristic value is 21000~73000kN

- **Bearing layer**
  - Moderately weathered diorite
  - Axial compression strength 10~37MPa

- **176 piles total**
PuLi Center, 260m
PuLi Center, 260m
PuLi Center, 260m

Max. settlement 3.1cm
PuLi Center, 260m

Max. settlement 2.6cm
### Settlement when the structure capped

- **measured:** 12.6~16.3mm
- **calculated:** 12.5~15.7mm
PuLi Center, 260m
The purpose of computing is insight, not numbers.

—Richard W. Hamming

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