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Research Projects on Micropile Groups

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Recent and current research projects on micropiles

- Leonora Begaj Qerimi:

“Foundation Improvement using Micropile Groups” (PhD)

- Hitesh Halai:

“Laboratory Experiments on Micropile Groups” (MEng)

- Alexis Rose:

“High Capacity Foundations using Micropile Groups” (PhD)





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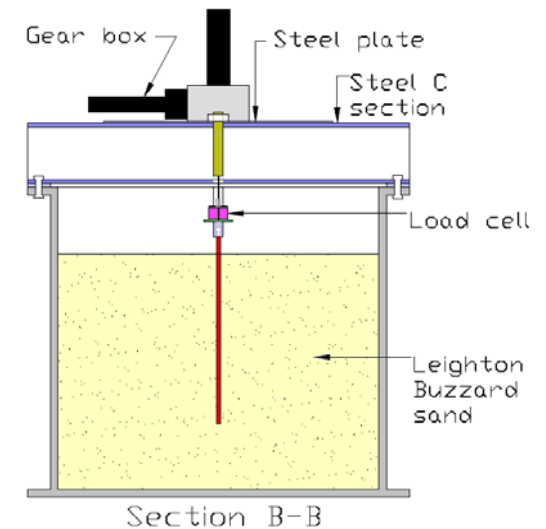
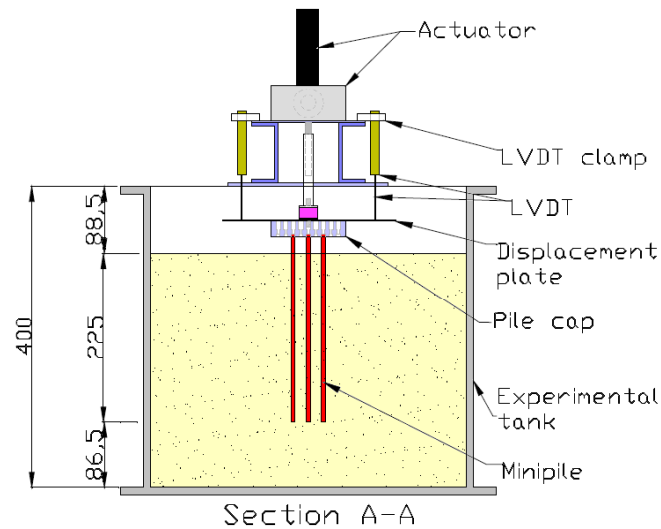
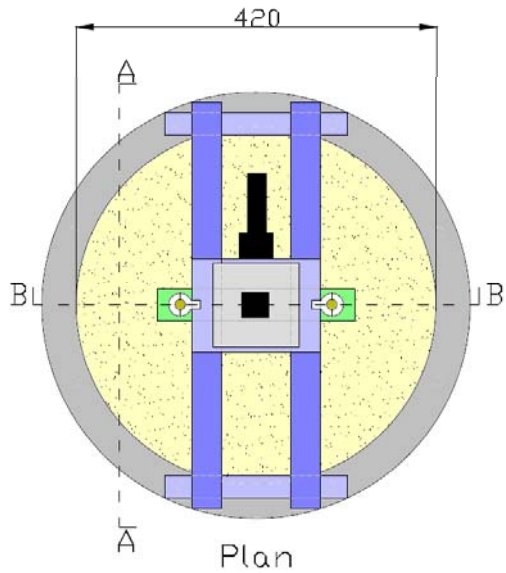
Hitesh Halai: “Laboratory Experiments on Micropile Groups”

- Simple laboratory tests using model piles in dry sand
- Investigation of linear and rectangular groups
- Main findings relate to confirmation of critical pile spacing



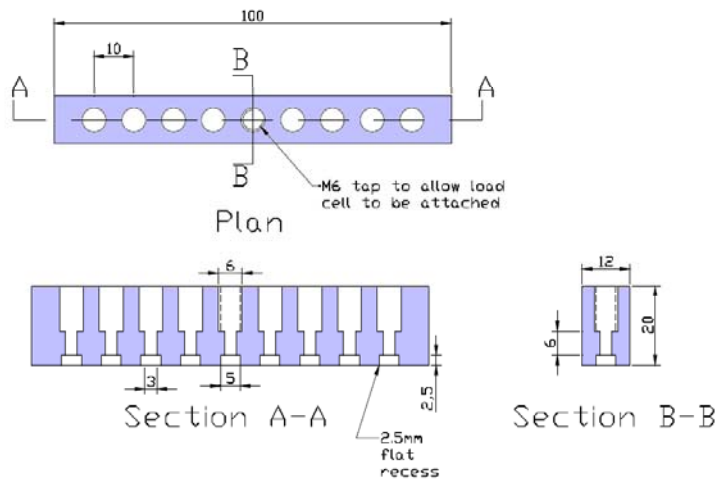


Apparatus used for laboratory tests

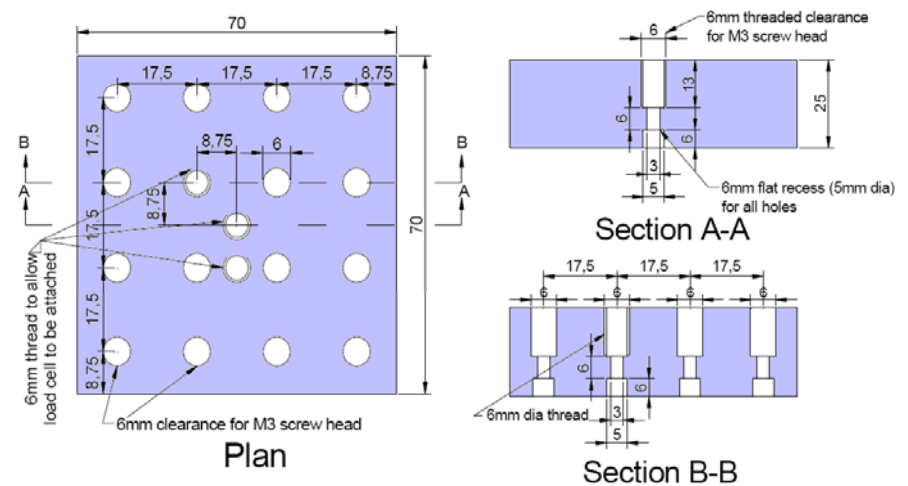




Pile cap: linear pile group

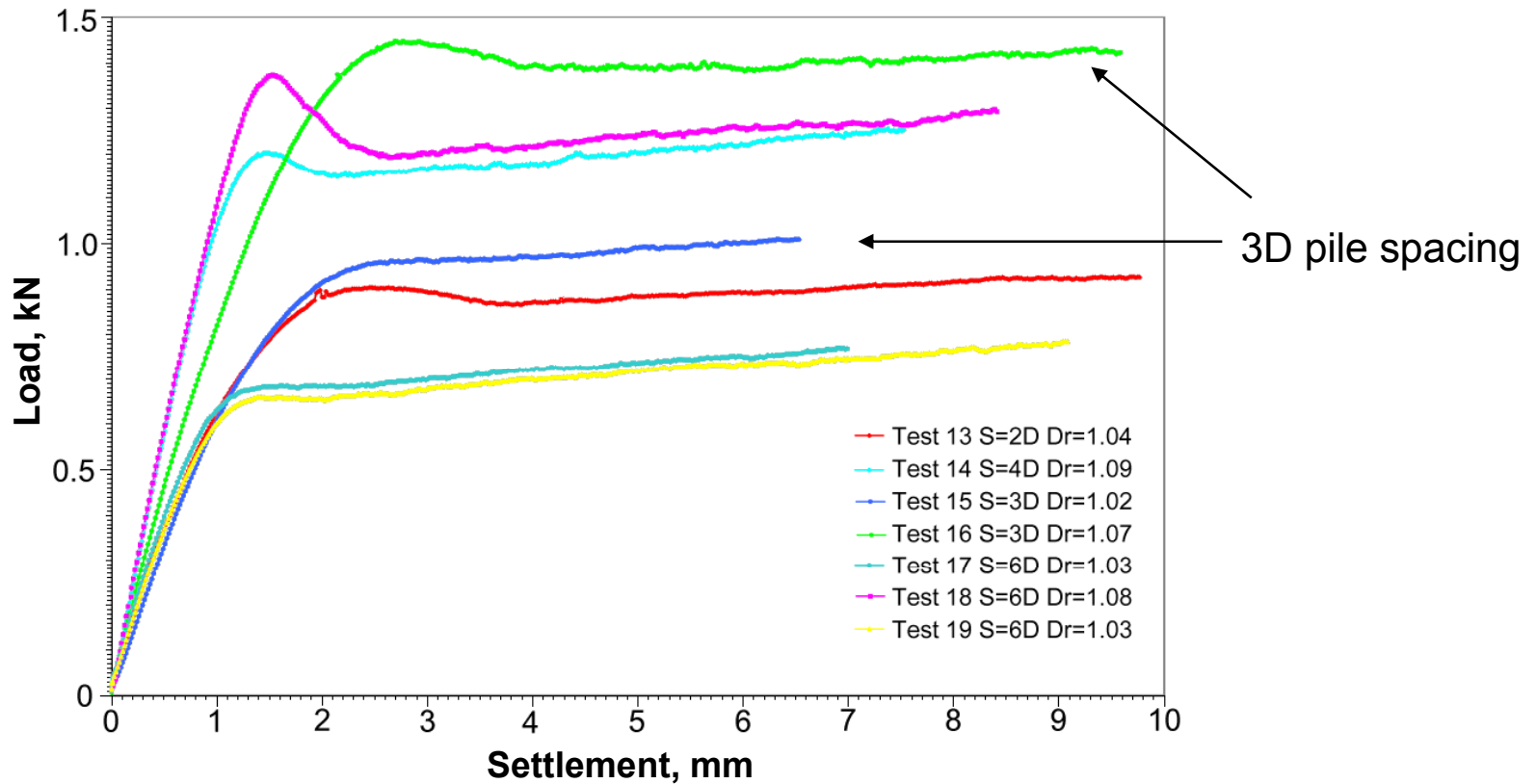


Pile cap: rectangular pile group



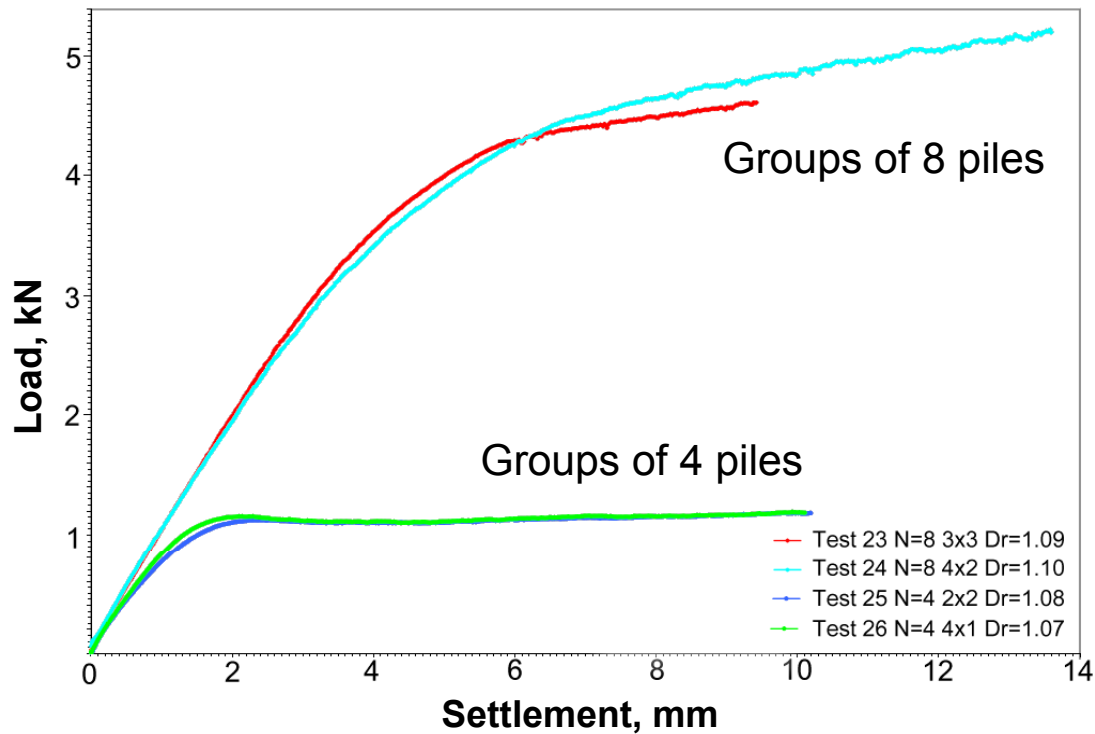


Load-settlement response for 5x1 linear pile groups



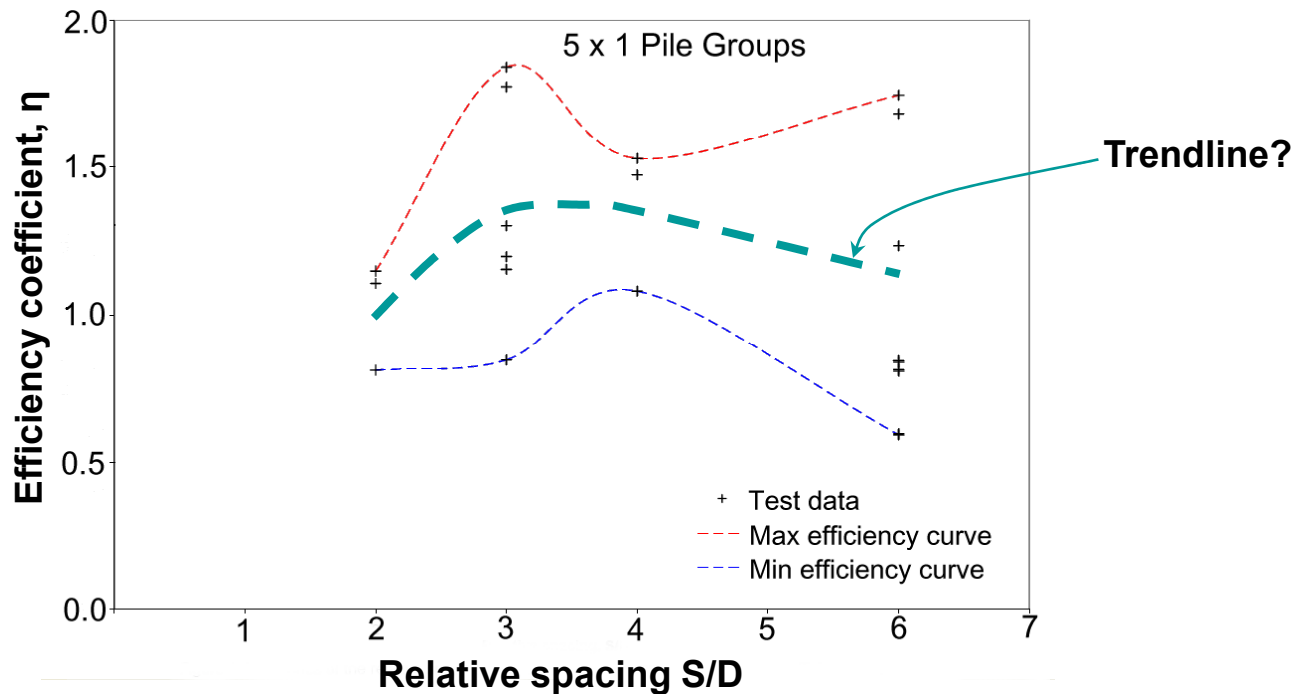


Load-settlement response for square and rectangular pile groups





Efficiency coefficient for linear groups – critical spacing approx. 3D





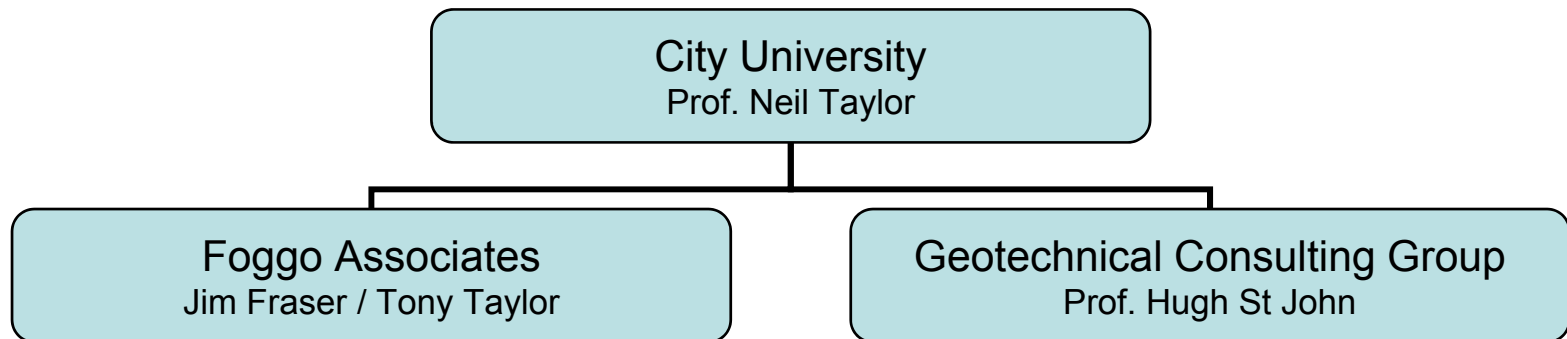
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Alexis Rose: “High Capacity Foundations using Micropile Groups”

Aim: to explore the strength and stiffness characteristics of ‘rings’ of micropiles

Actions:

- Centrifuge model tests (City)
- Numerical analysis (GCG)
- Testing and monitoring prototype (Foggo)





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Cannon Place, London

- Micropile summary
 - 11 micropile groups with 16 to 24 piles in each
 - 300mm diameter, 30m long, 500mm c/c
- Monitoring
 - Precise levelling
 - Extensometers





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Existing knowledge in area of research



- FOREVER – French National Project on Micropiles (R. Frank)
- Foundation Improvement using Micropile Groups (L. Begaj-Qerimi)
- Fleming
- Vesic
- De Mello
- O’Neill

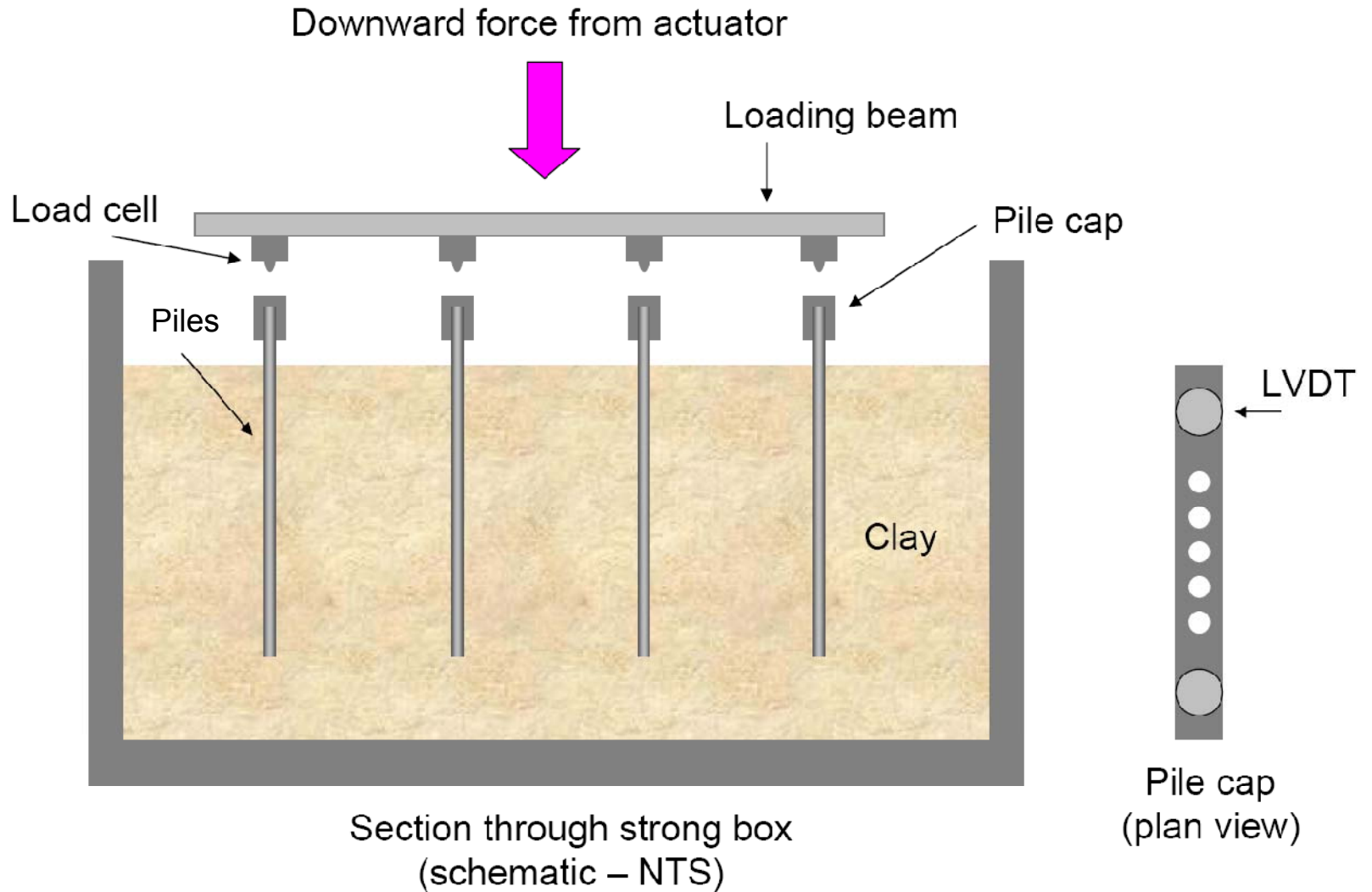


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Centrifuge model tests

- Established at City University in 1989
- Acceleration field up to 200 times Earth's gravity
- Acceleration scale = geometric scale
- Study various geotechnical events







Apparatus

- 100+ components will be made to allow variety of pile groups to be tested
- Test 30+ pile groups and pile arrangements over 12 months

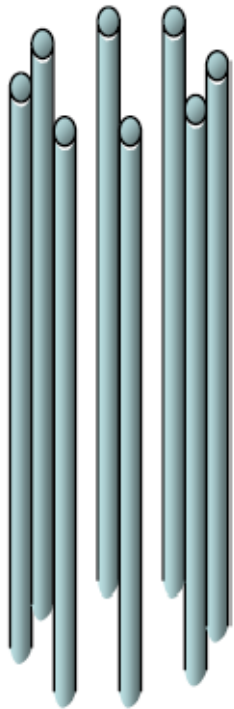
Current situation:

- Strong box and main frame constructed
- Pile caps and installation system being made





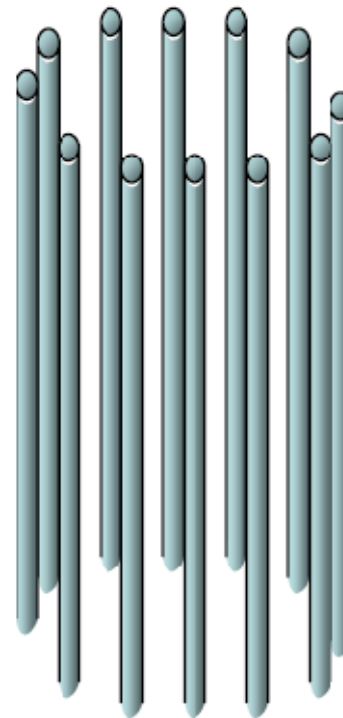
Proposed pile group variations (1)



8 piles

circular group

area = 329mm^2
(at 2dia. c/c)



12 piles

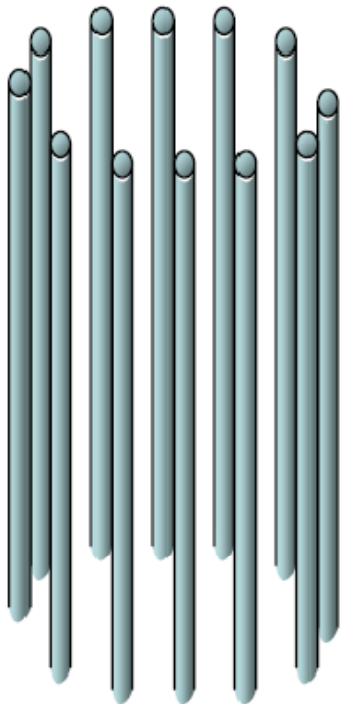
circular group

area = 866mm^2
(at 2dia. c/c)





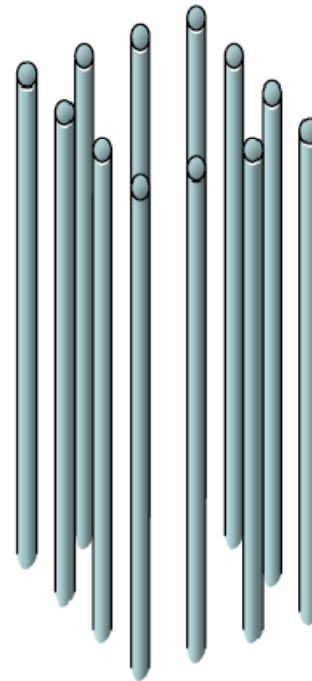
Proposed pile group variations (2)



12 piles

circular group

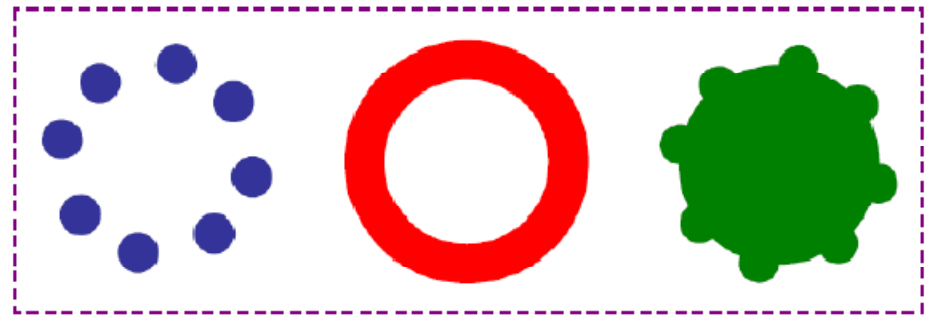
area = 866mm^2
(at 2dia. c/c)



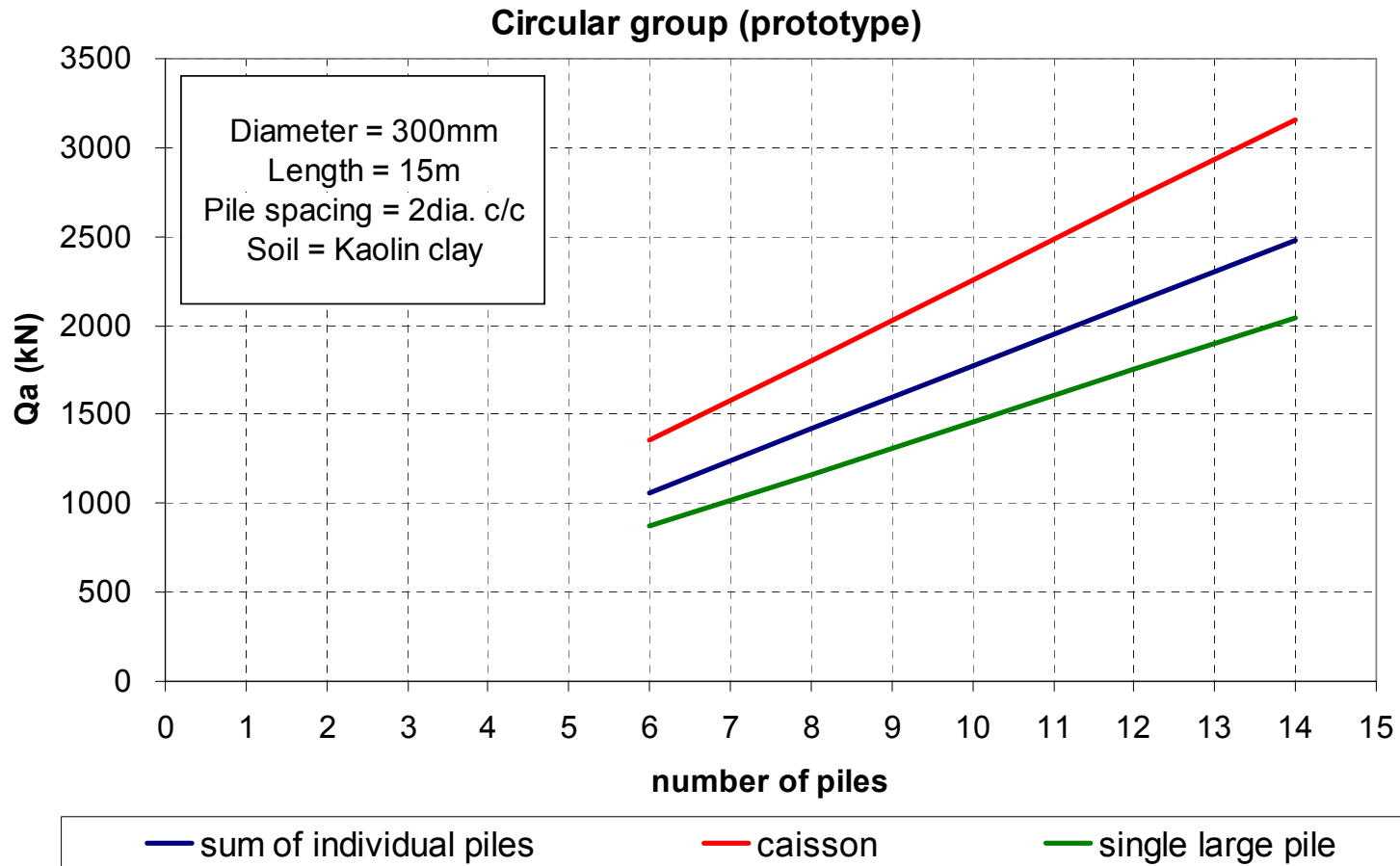
12 piles

square group

area = 625mm^2
(at 2dia. c/c)



Results...?





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What next?

- Begin centrifuge tests in June 2009
- Report on interim results at the Physical Modelling in Geotechnics Conference (June 2010)
- Final report expected end of 2011.....

