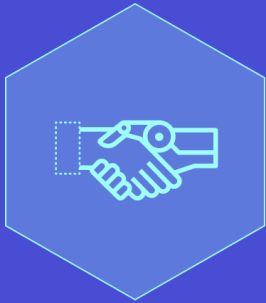


Pilot site & testing

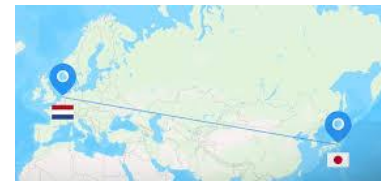


EU – Japan collaboration

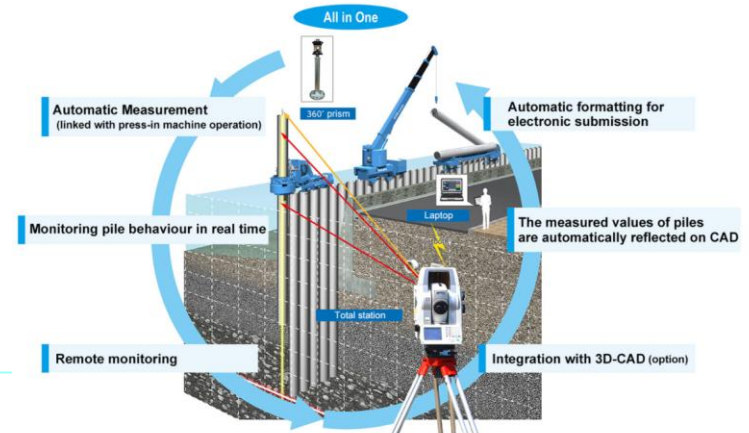
Digital twin Interface for GIKEN's press-in piling process

Ken Gavin, INGEO Consulting

Maritime Construction & EU-Japan Collaboration

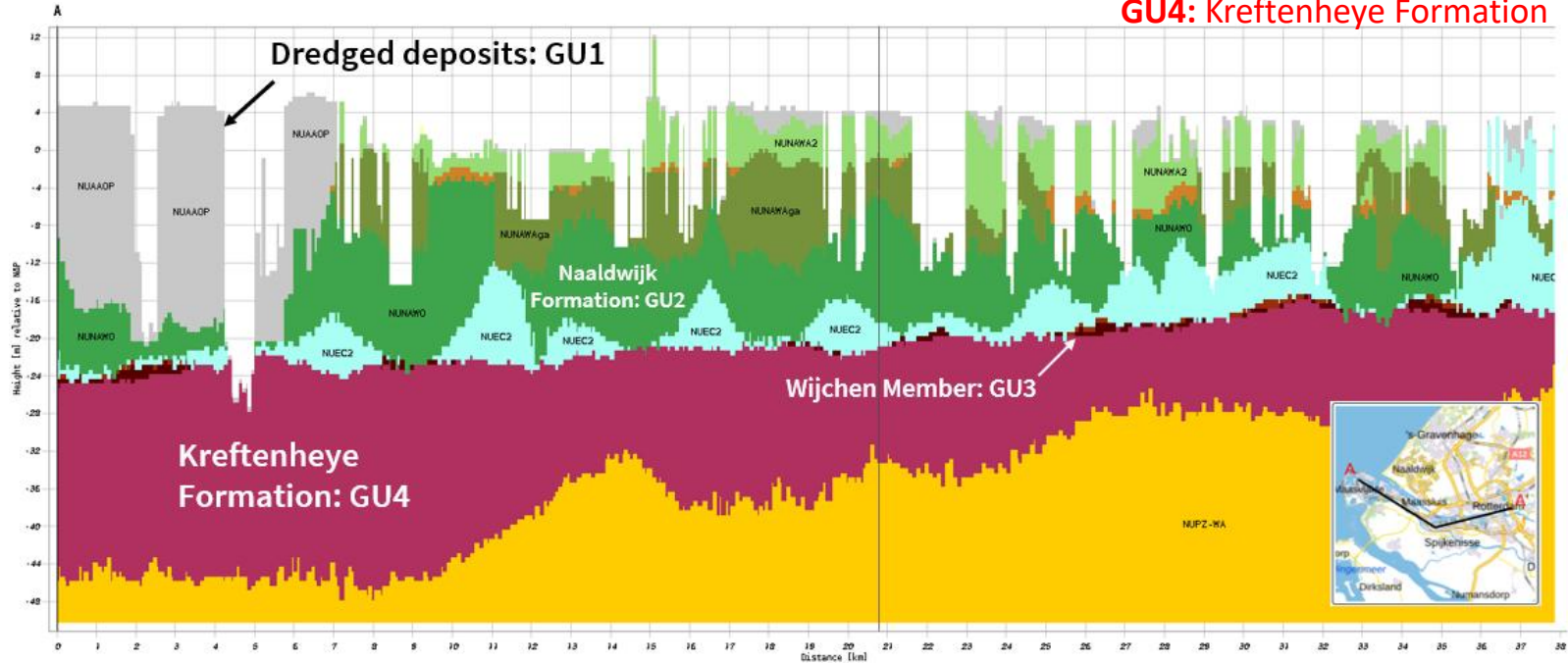


Giken Piling Technology

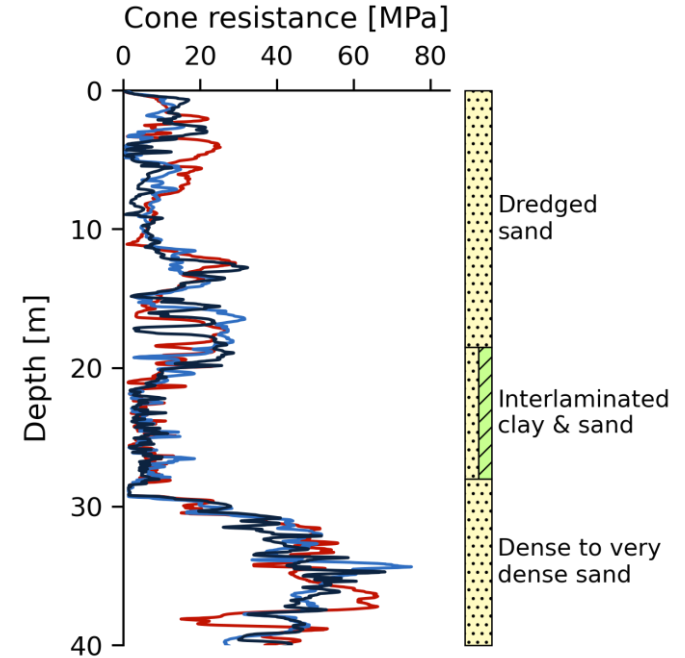
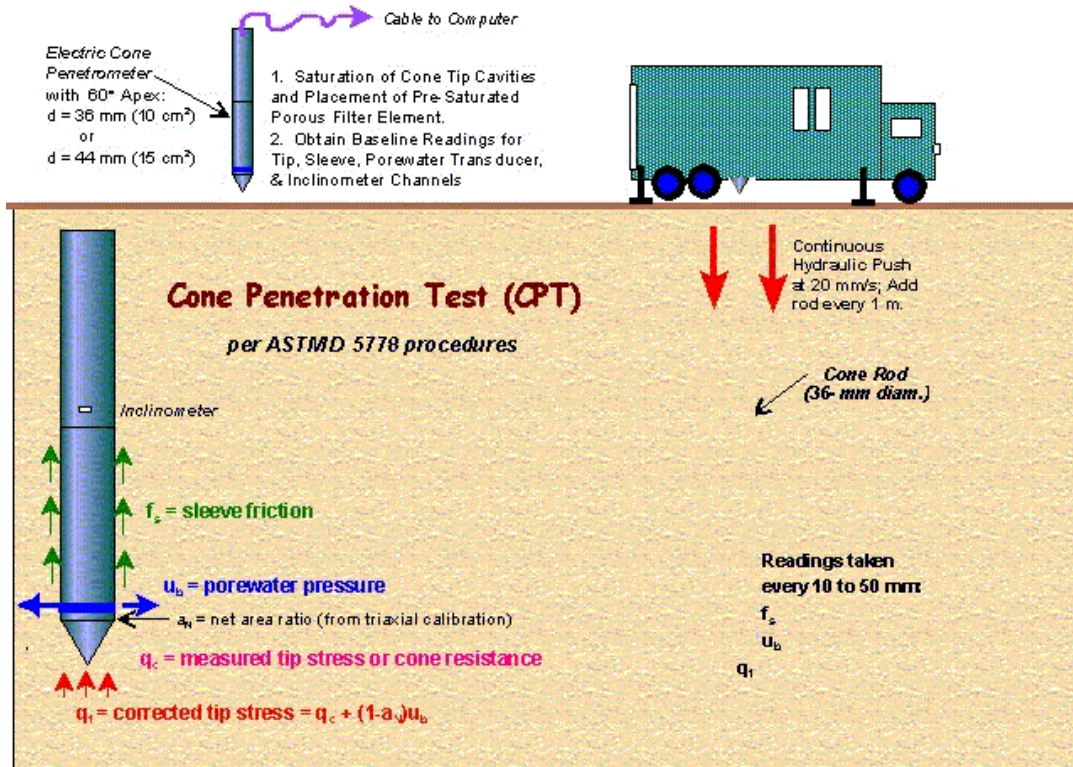


Port Scale Geology

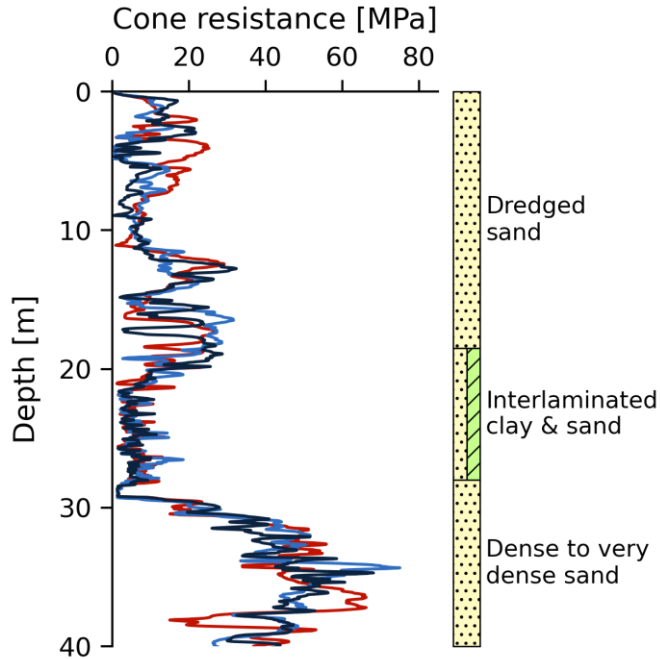
- GU1:** Maasvlakte dredged sand
- GU2:** Naaldwijk tidal sand and Echteld.
- GU3:** Wijchen Member
- GU4:** Kreftenheye Formation



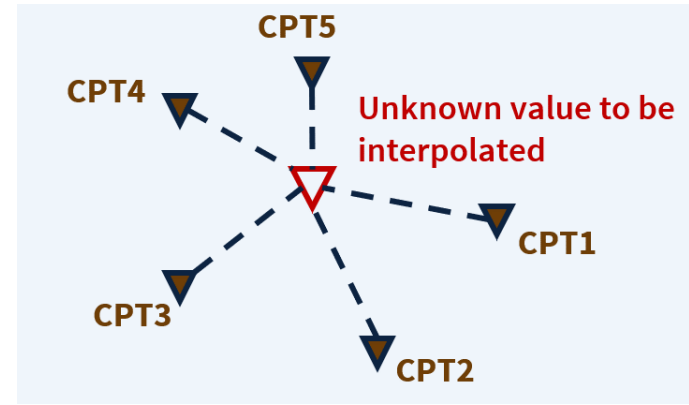
Ground modelling



Ground modelling

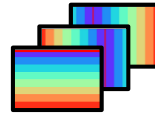


Example of a Cone Penetration Test (CPT)



Point coordinates

(x, y, z)



Spatial correlation functions

Machine learning model
(ANN, SVM, RF)

CPT q_c

Trained on both site-specific and port geological data!

- Documentation
- API
- Query Editor
- Ontology
- Building construction
 - Helsinki Metropolitan Area
 - Maritime construction (Spain)
 - Port of Gijón
 - Maritime construction (Japan)
 - Port of Rotterdam
- Road construction
 - A24 Highway, Firenze
 - Road maintenance
 - A24 Highway, Rome
- Tunnel construction
 - Tunnel construction Santa Barbara

Operation overview Synthetic CPTs Installation data Geology

Port-scale Model

Prediction mode:
POINT POLYGON

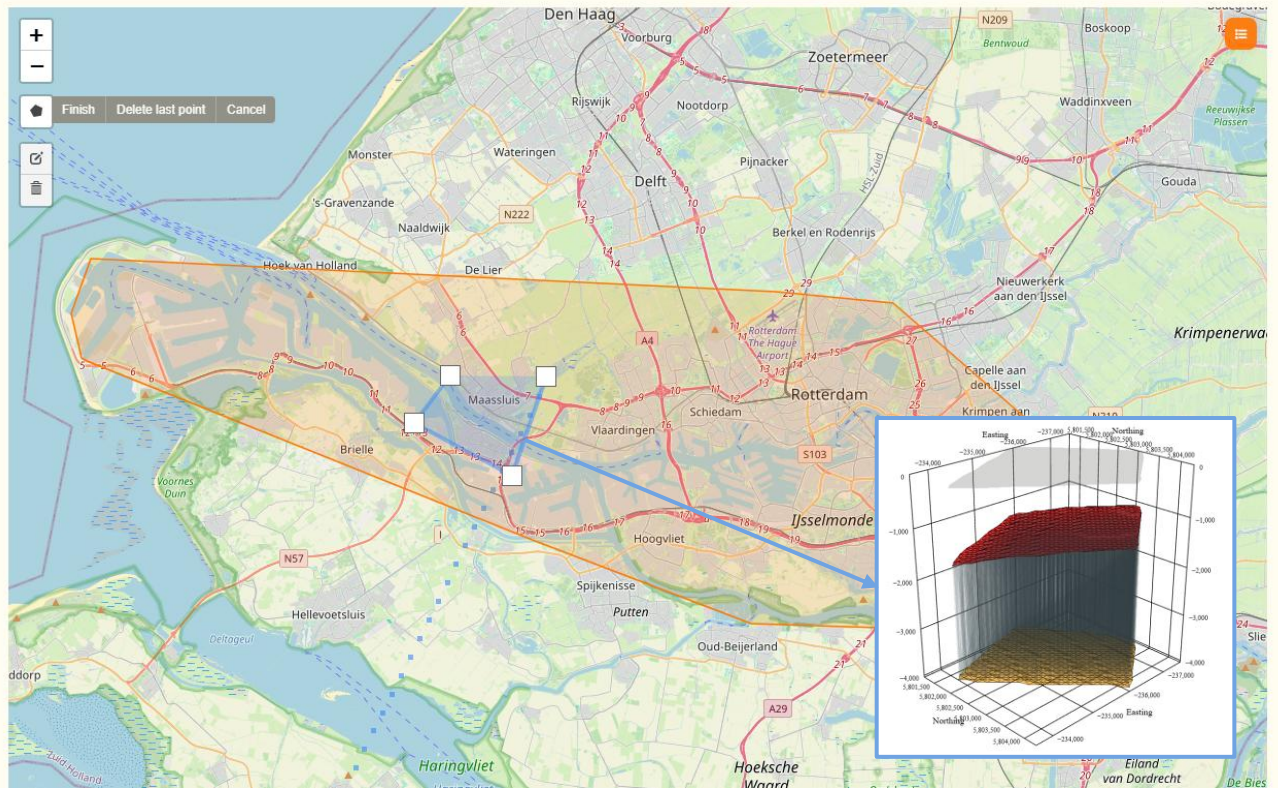
Threshold:
0.3

Resolution (X):
1

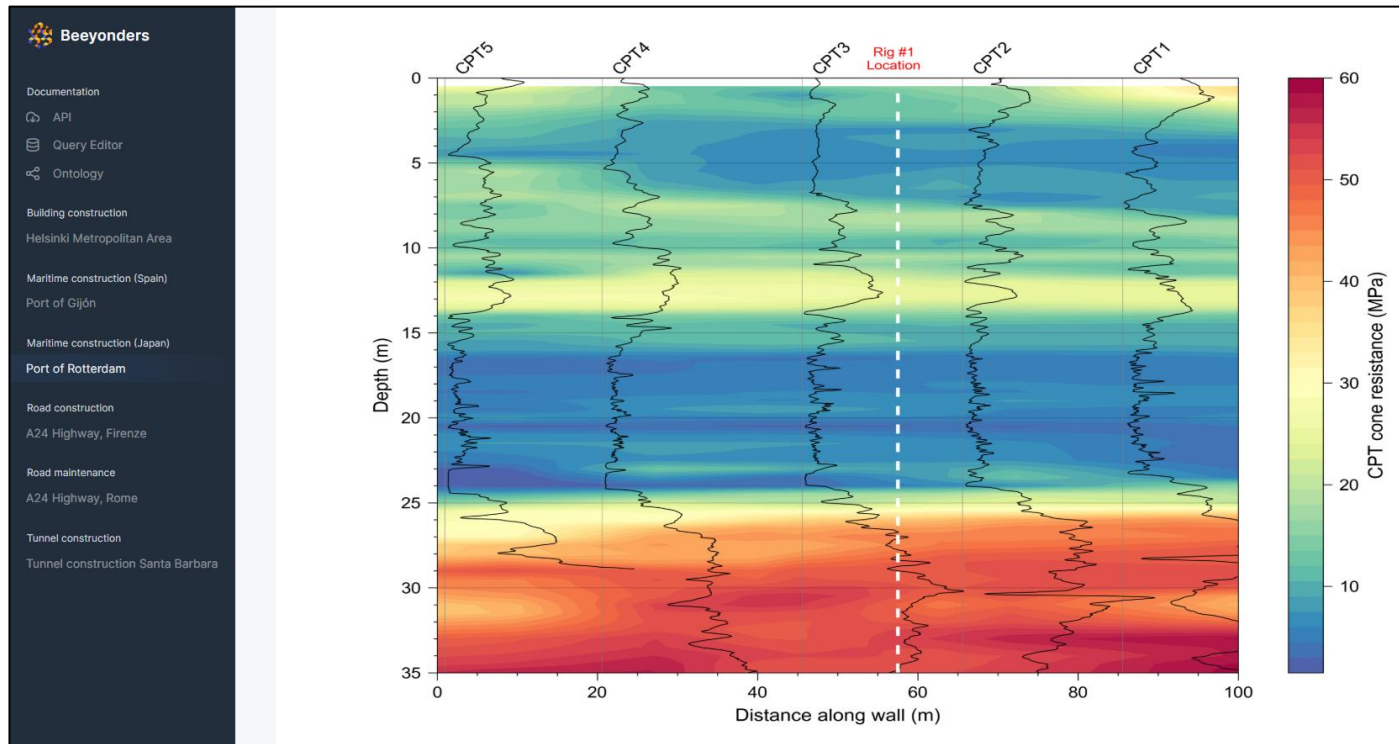
Resolution (Y):
1

Resolution (Z):
0.5

PREDICT

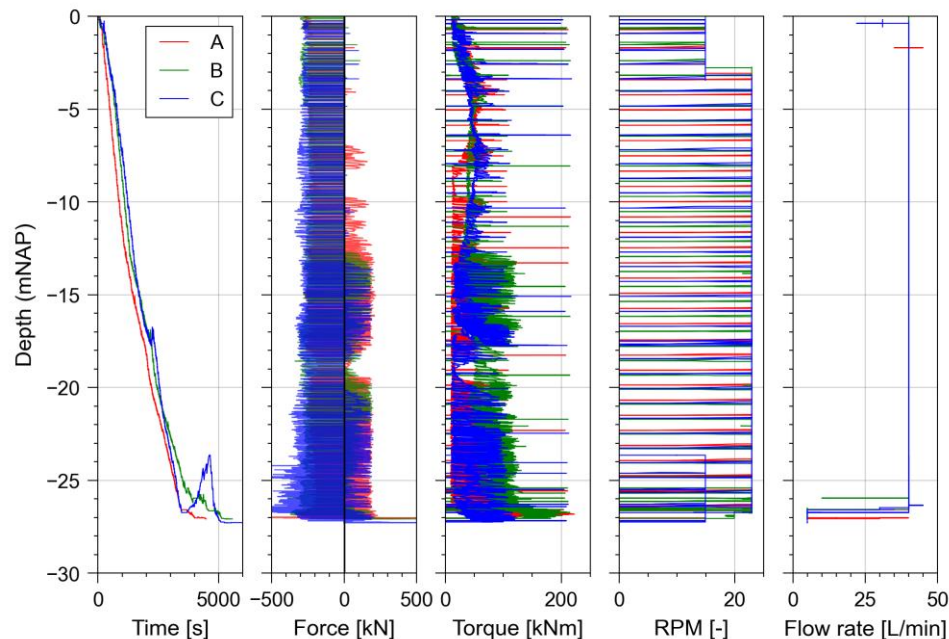
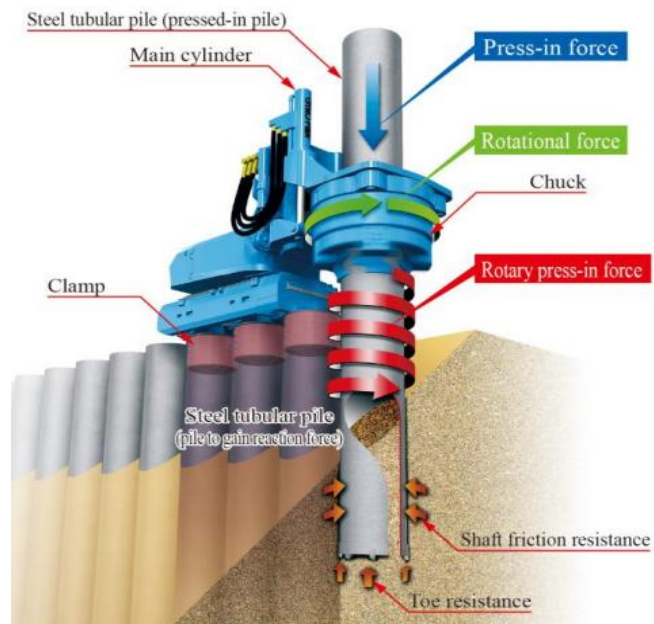


Synthetic CPTs



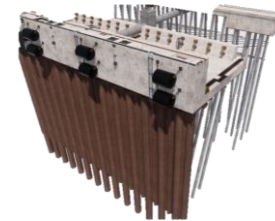
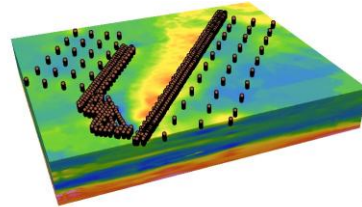
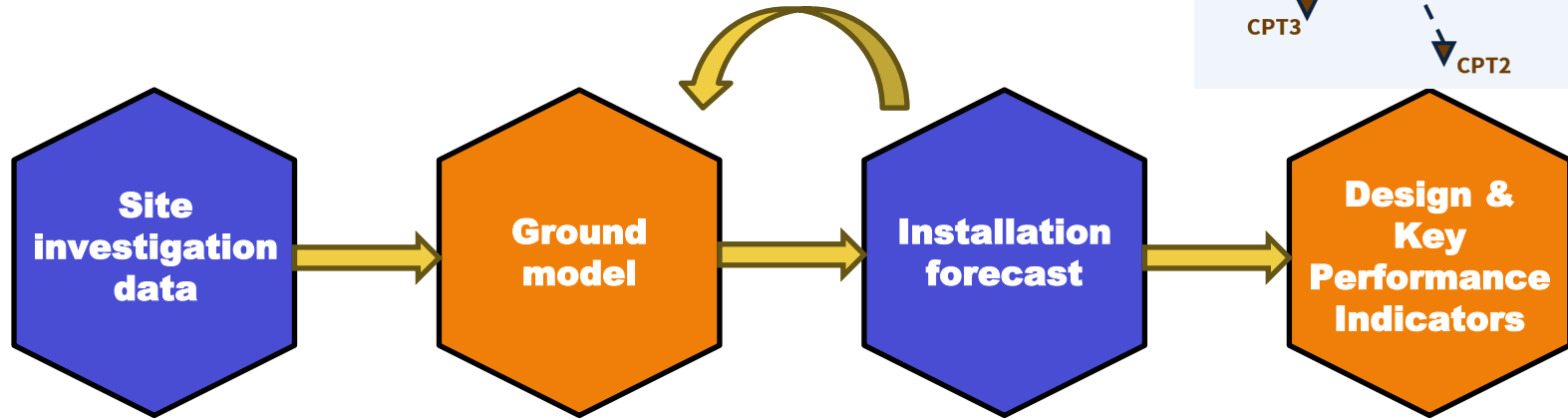
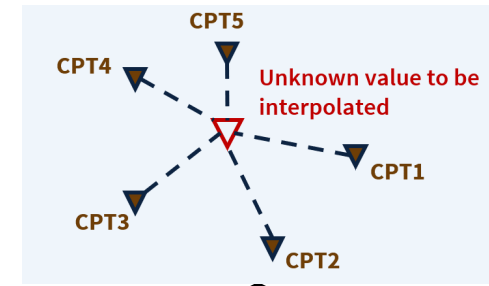
Collaboration with GIKEN Japan

An exploration of the Gyopress: a silent, vibration-free way of installing piles

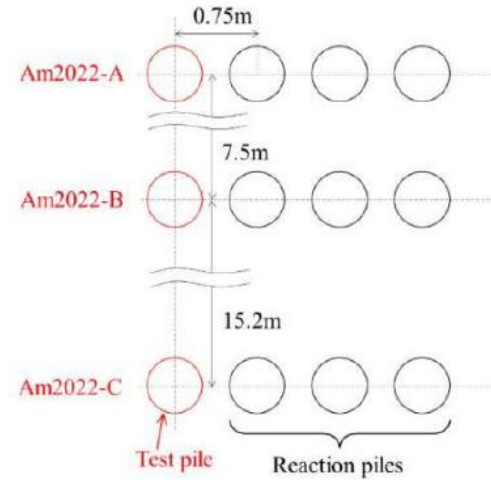


T7.6: Maritime construction

International Collaboration with Japan

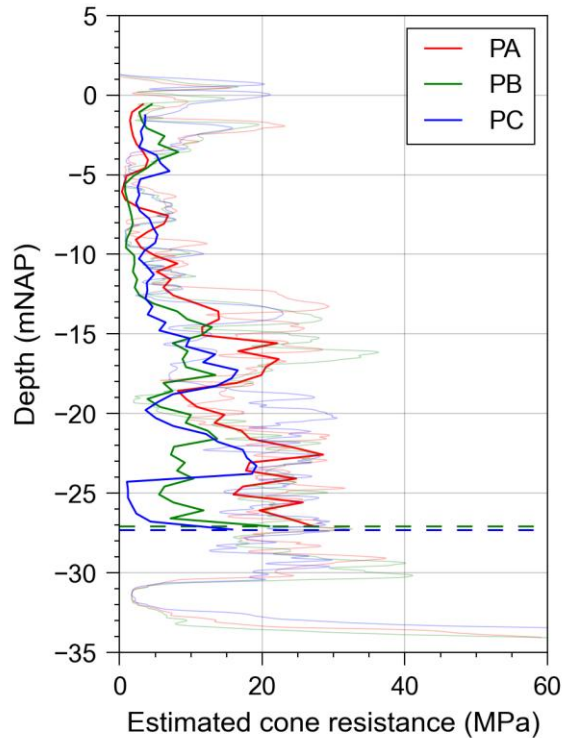


Giken Test Site

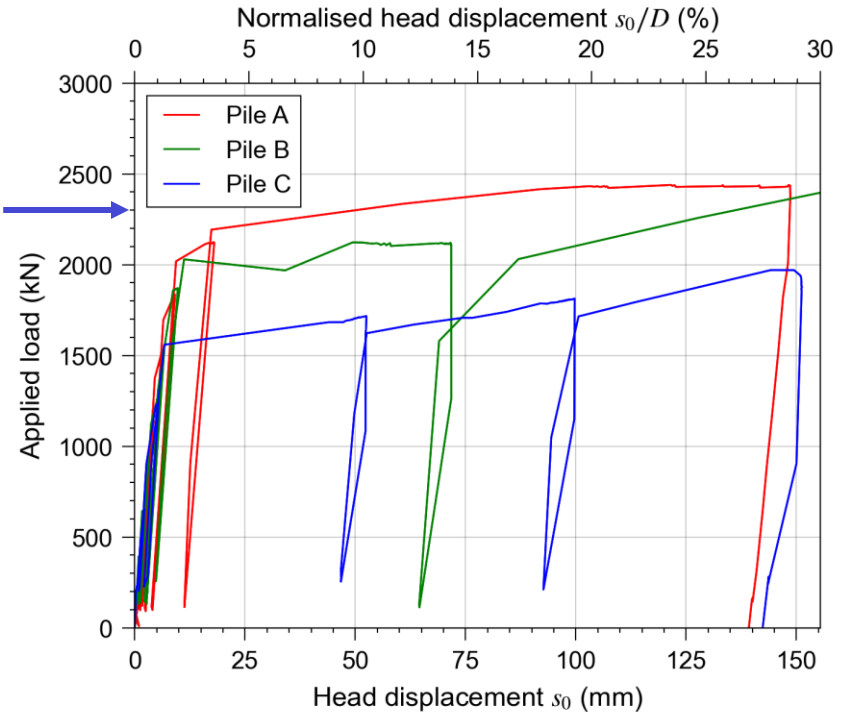


Estimating CPTs from installation data

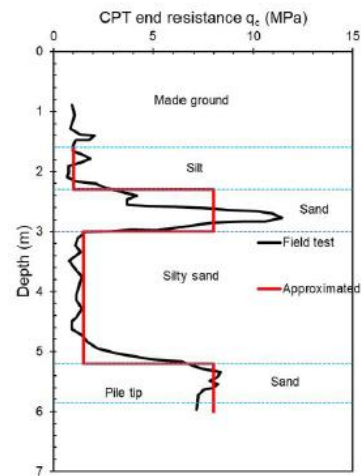
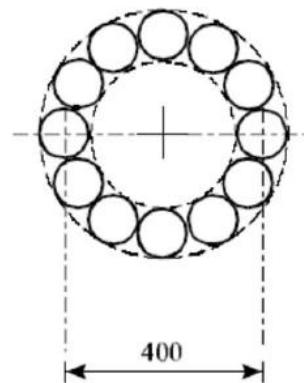
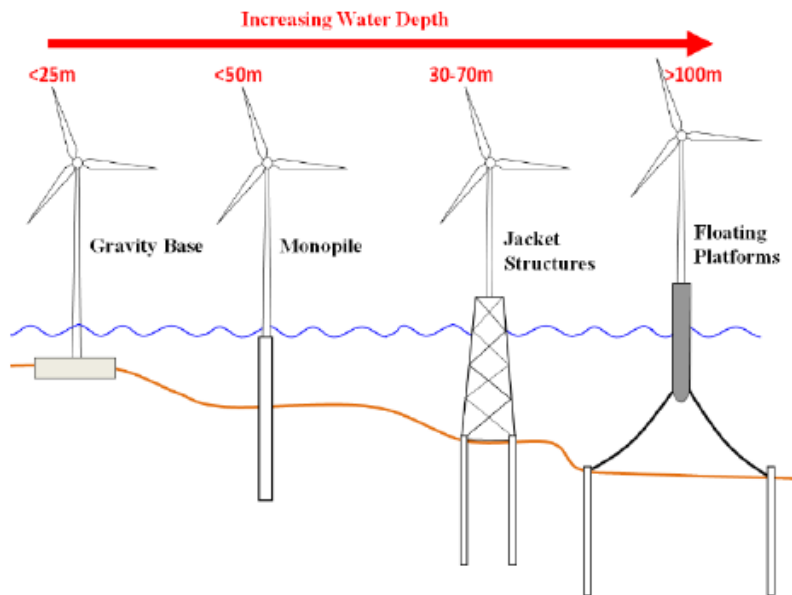
A useful way of forecasting pile capacity and updating ground models



Design capacity



Future Applications – Offshore Wind



Conclusion

- New machine learning tools for ground modelling can provide an efficient way of incorporate different types of site investigation data
- Pile installation data can be extremely useful for:
 - Knowing the ground conditions in between site investigation points
 - Updating existing ground models
 - Understanding the reliable and operational lifetime of a structure

