

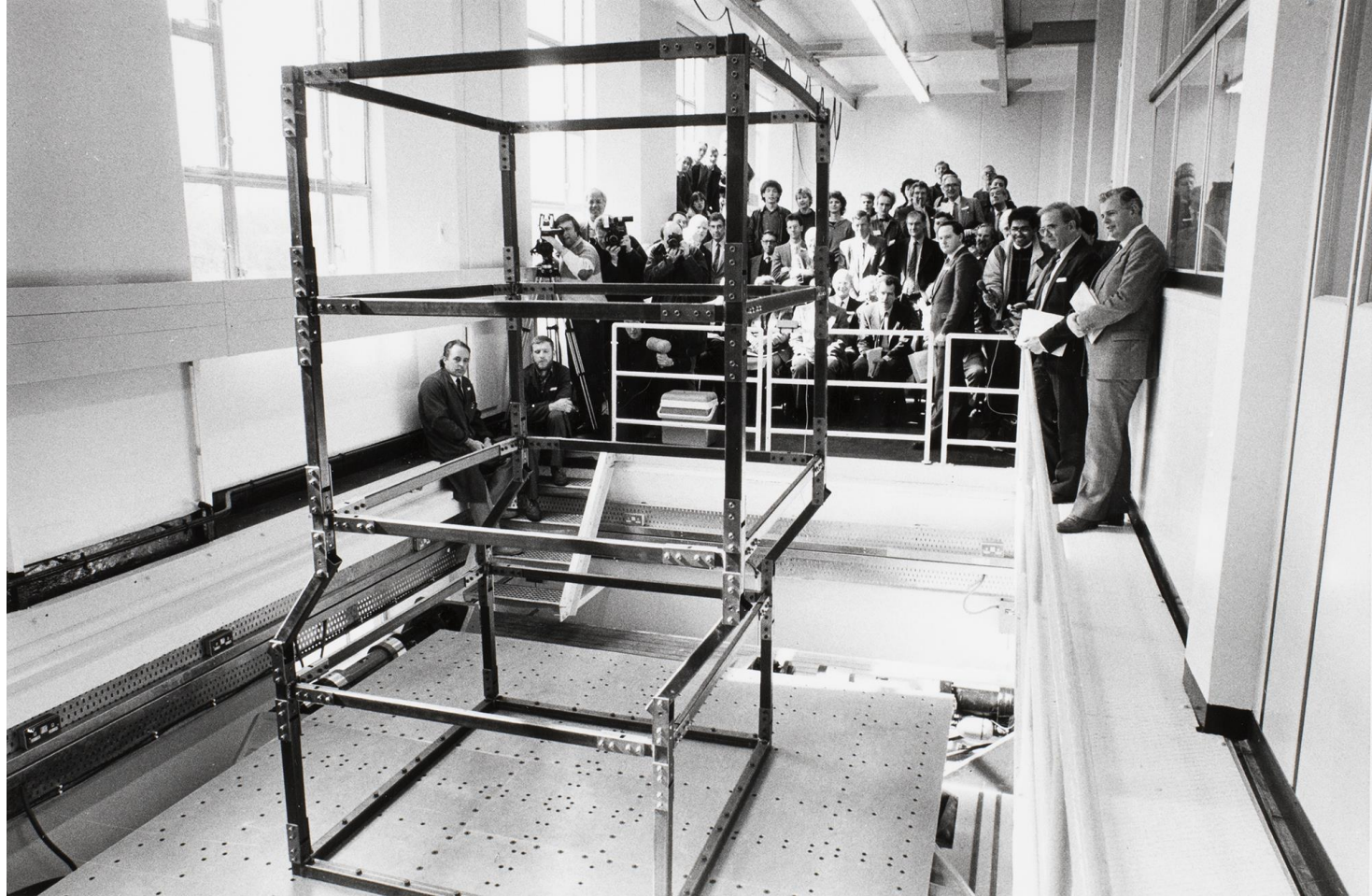


UKCRIC Facility Showcase

Soil-Foundation Structure Facility

Prof. Anastasios Sextos





1987



2 0 0 5



SCOTT
Established 1918

150

ARUP

**STRIDE
TREGLOWN**

BLADE Earthquake Table
Design concept



Soil Pit

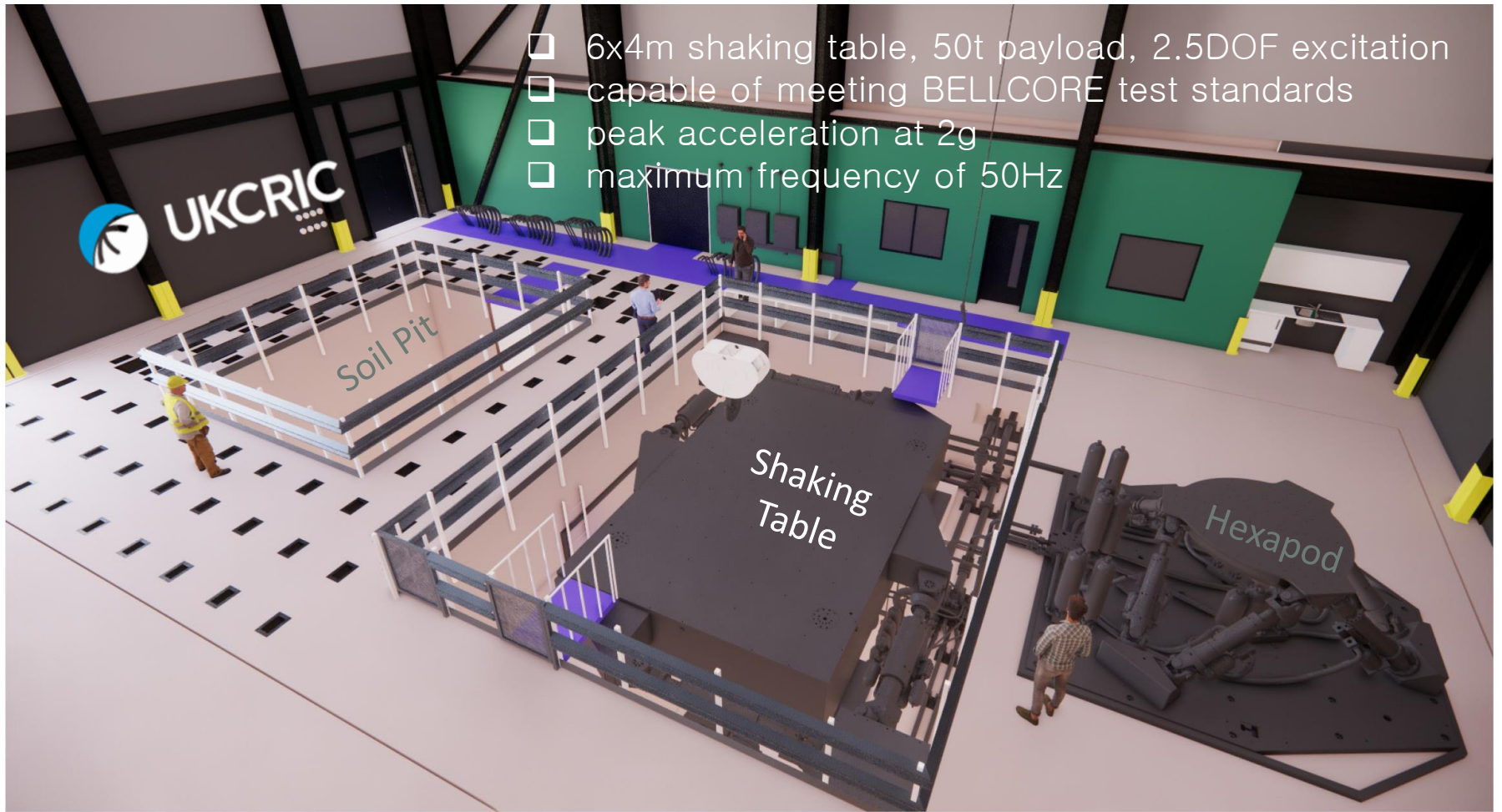


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Co-designed with the industry

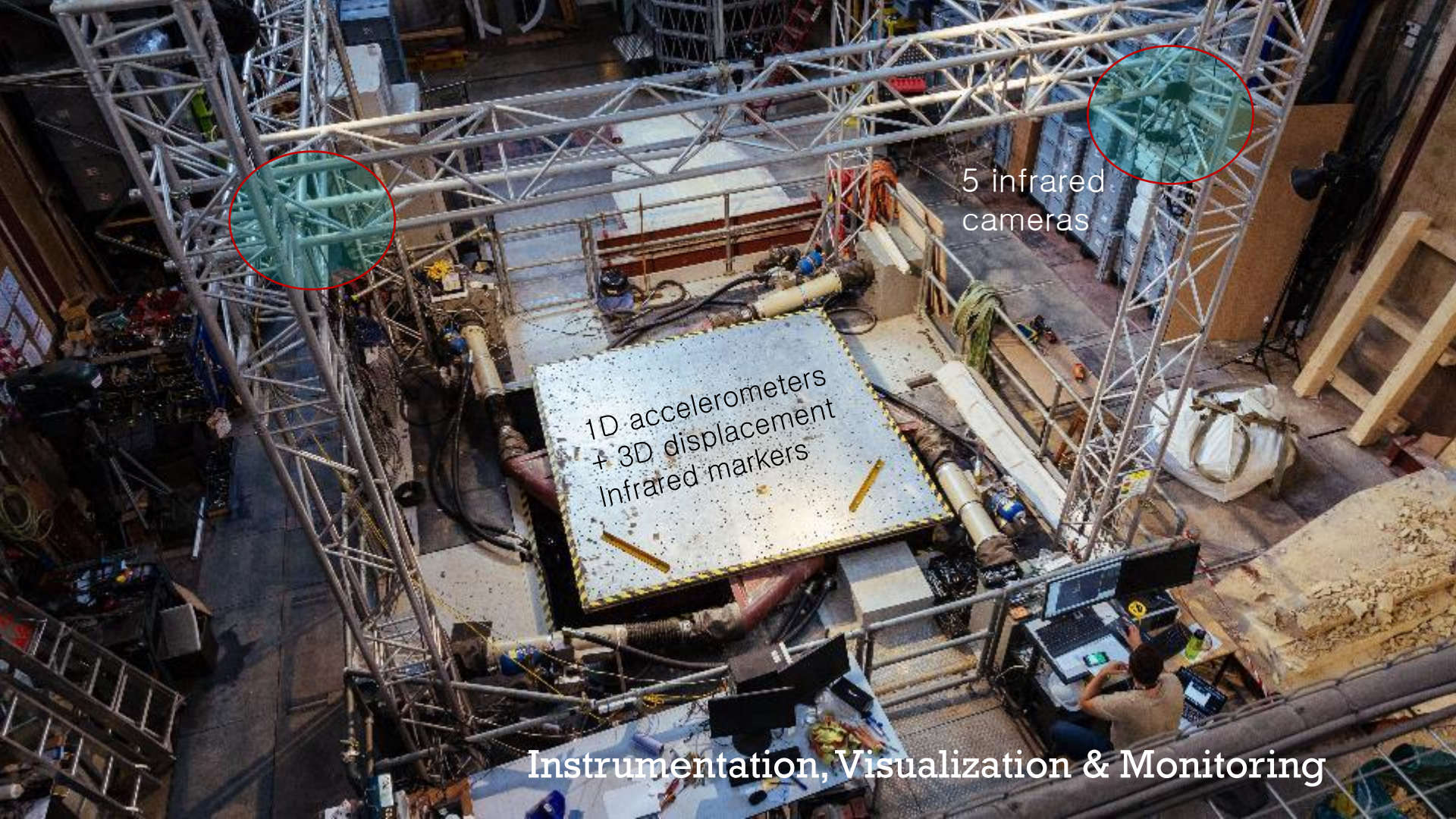
- ❑ 6x4m shaking table, 50t payload, 2.5DOF excitation
- ❑ capable of meeting BELLCORE test standards
- ❑ peak acceleration at 2g
- ❑ maximum frequency of 50Hz



50t Shaking Table

- ❑ Large-scale foundation, component and structural testing
- ❑ Use of a soil box (“shear stack”)
- ❑ Perform Hybrid Testing





5 infrared cameras

1D accelerometers
+ 3D displacement
Infrared markers

Instrumentation, Visualization & Monitoring

- ❑ a 6mx5m test pit with a depth of 4m
- ❑ strong floors for mounting two 1MN pseudostatic actuators (1000mm stroke)
- ❑ 1MN dynamic actuator (500mm stroke)
- ❑ provision for additional actuators depending on project needs





- ❑ 1mx1m high performance (10g) shaking table
- ❑ 6DOF excitation up to 18g in 1D
- ❑ 500kg capacity
- ❑ Wide range of industrial applications



- Nodes
- Elements
- Displacement-Based nonlinear

(a) Element Definition
(No. of Elements)

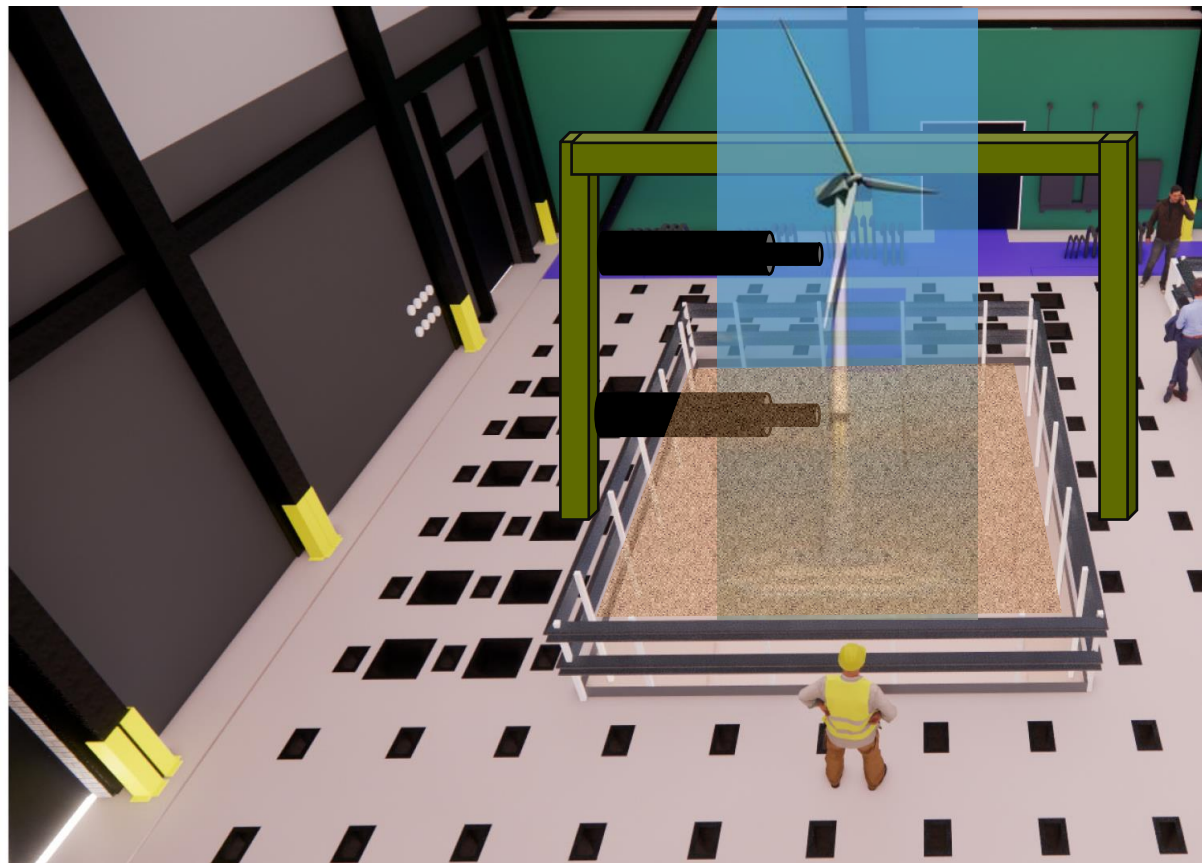
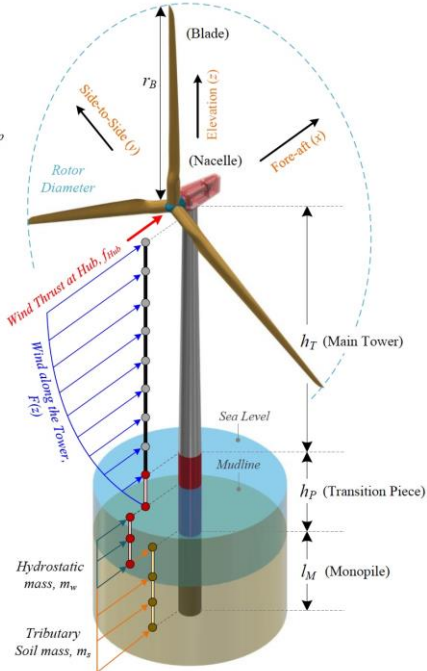
- 34 to 142 (109) Tower Top
- 1 to 33 (33) Mudline
- 143 to 172 (30) Pile Tip

(b) Soil-Pile Model

- p - y spring
- t - z spring
- Same Location
- Zero Length Element
- Q - z spring
- Pile Tip
- Equal DOF Nodes
- Master (blue circle)
- Slave (red circle)
- Fixed Node (black circle)

(c) Seismic Input

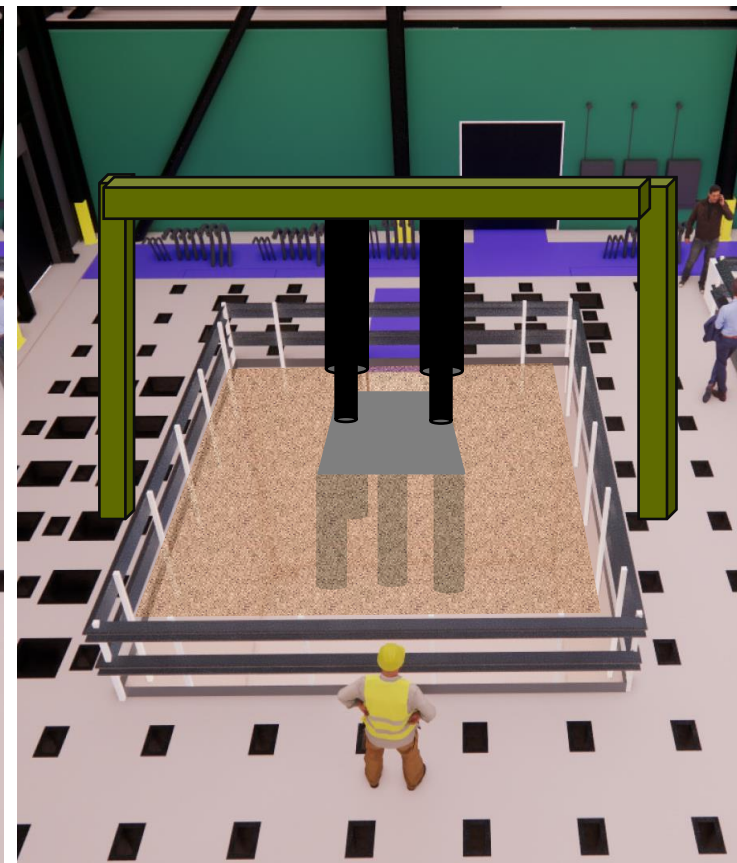
- z -dir
- y -dir
- x -dir
- $\min(H1, H2)$
- $\max(H1, H2)$



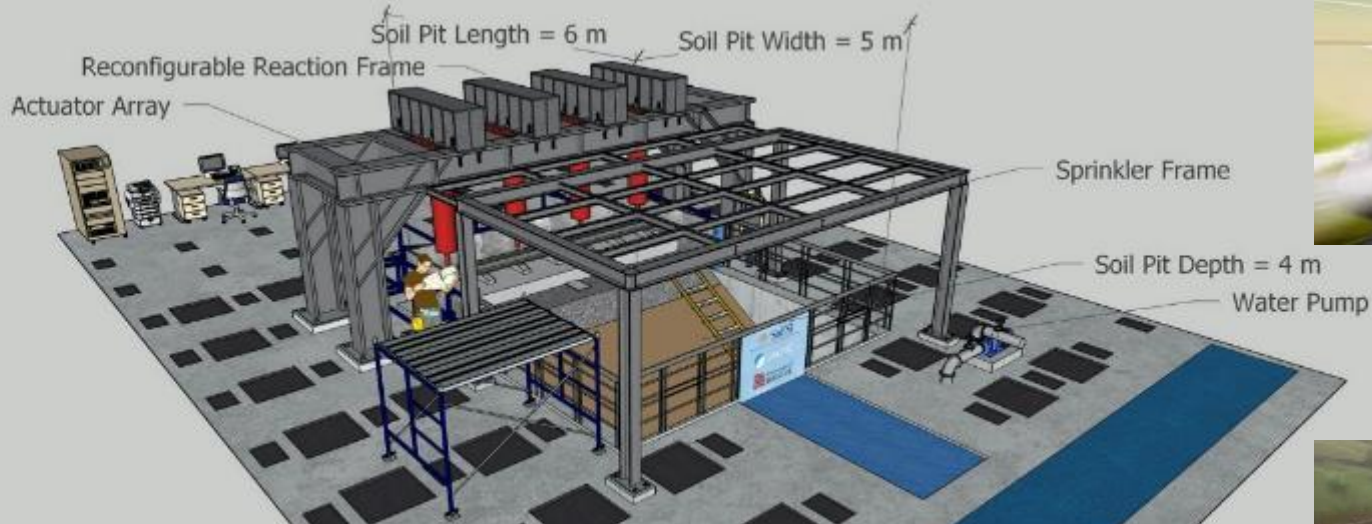
Offshore Wind Turbines



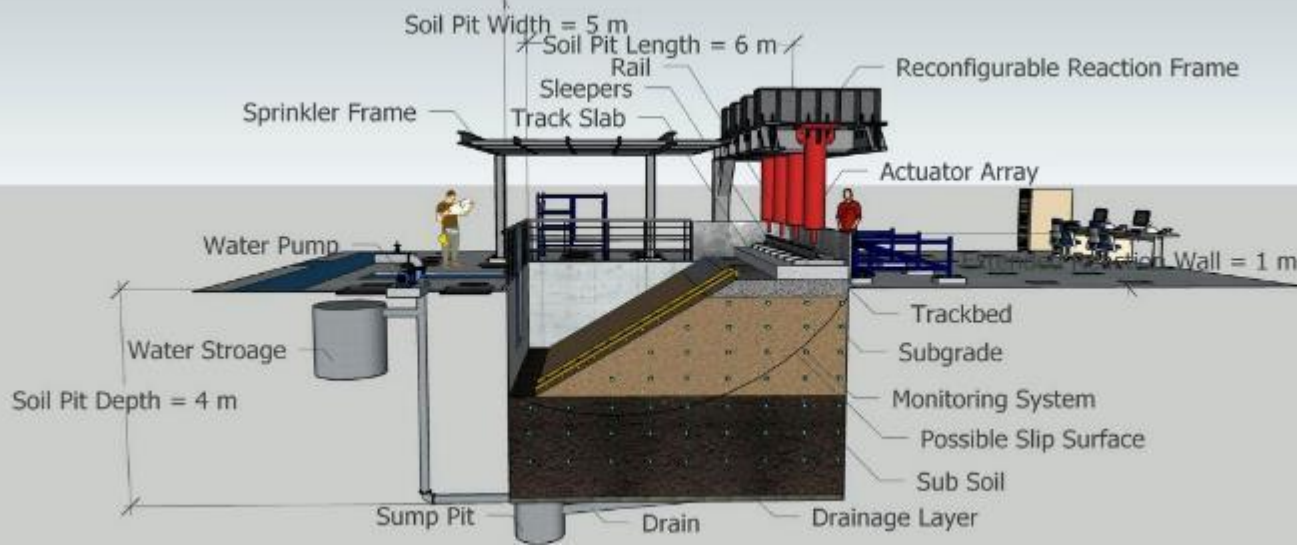
Bridge abutments, scour, in-soil
earth pressure monitoring



Kinematic pile group
interaction

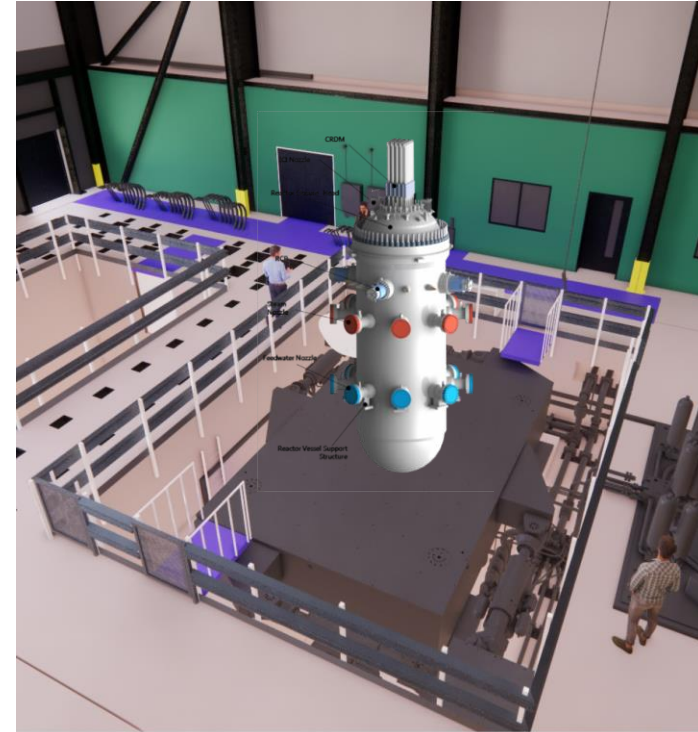
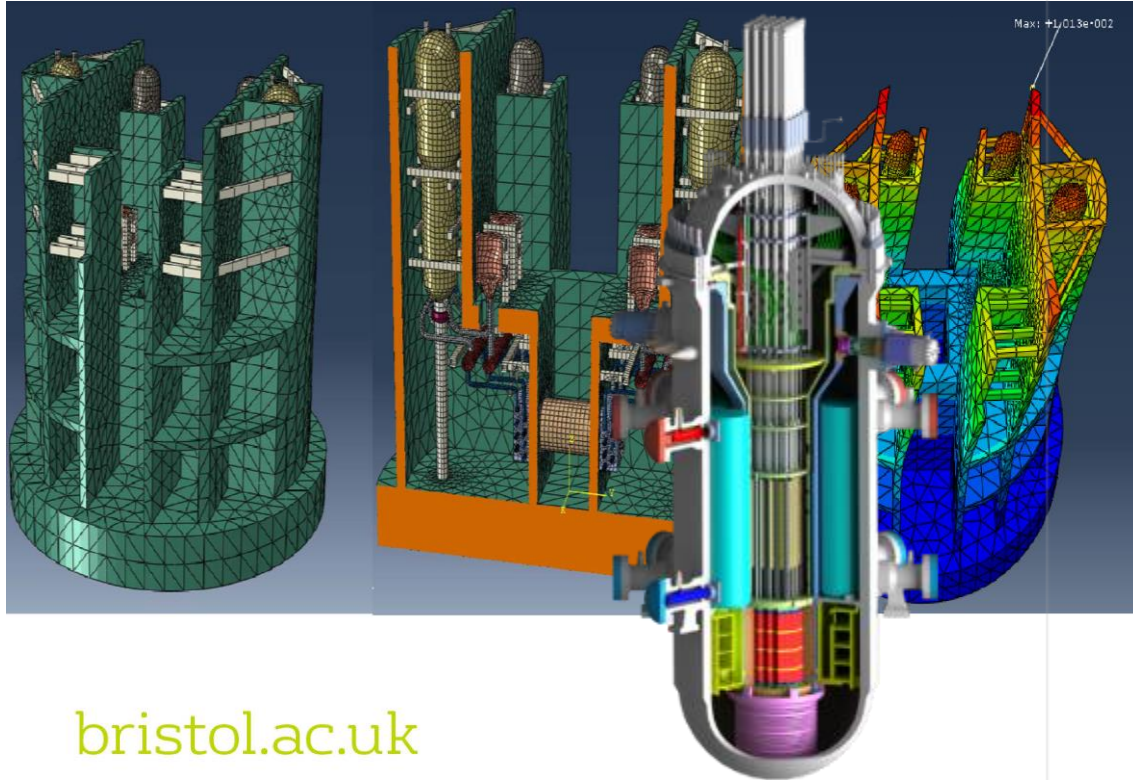


HS2 and NR
Victorian
embankments



**Rail track-soil
interaction**

Small Modular Reactors



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Thank you