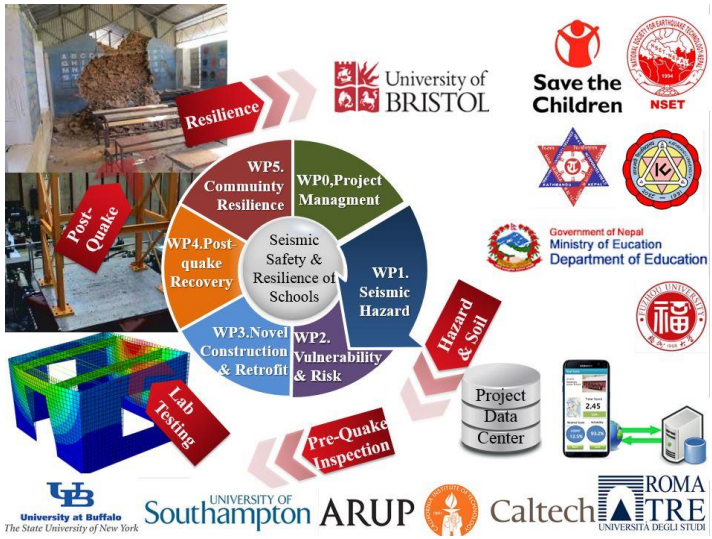
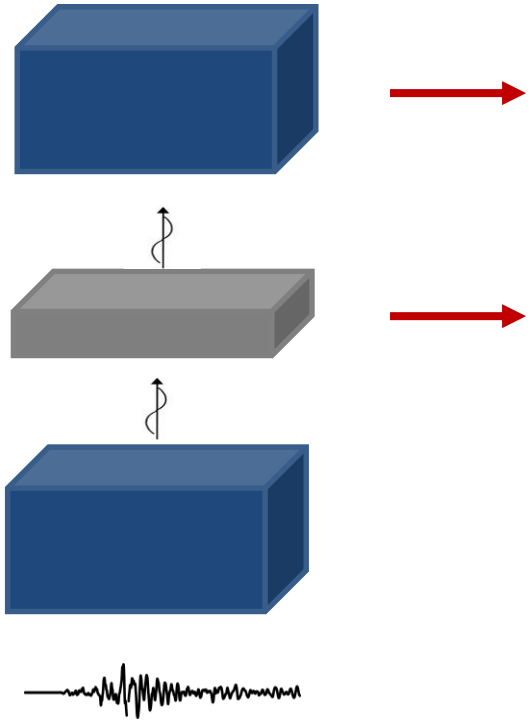
Seismic Resilience of Schools in Nepal (SAFER)-Workshop 24.04.2019

Work Package 3: Design and experimental testing of a novel low-cost seismic sliding foundation system for schools in Nepal

PI: Prof. Anastasios Sextos, Line Manager WP3: Dr. Nick Alexander, Research Associate: Dr. Anastasios Tsiavos





Sliding layer from locally available materials

Parallel subtasks serving the goal of the project

Numerical analysis

Conceptual thinking

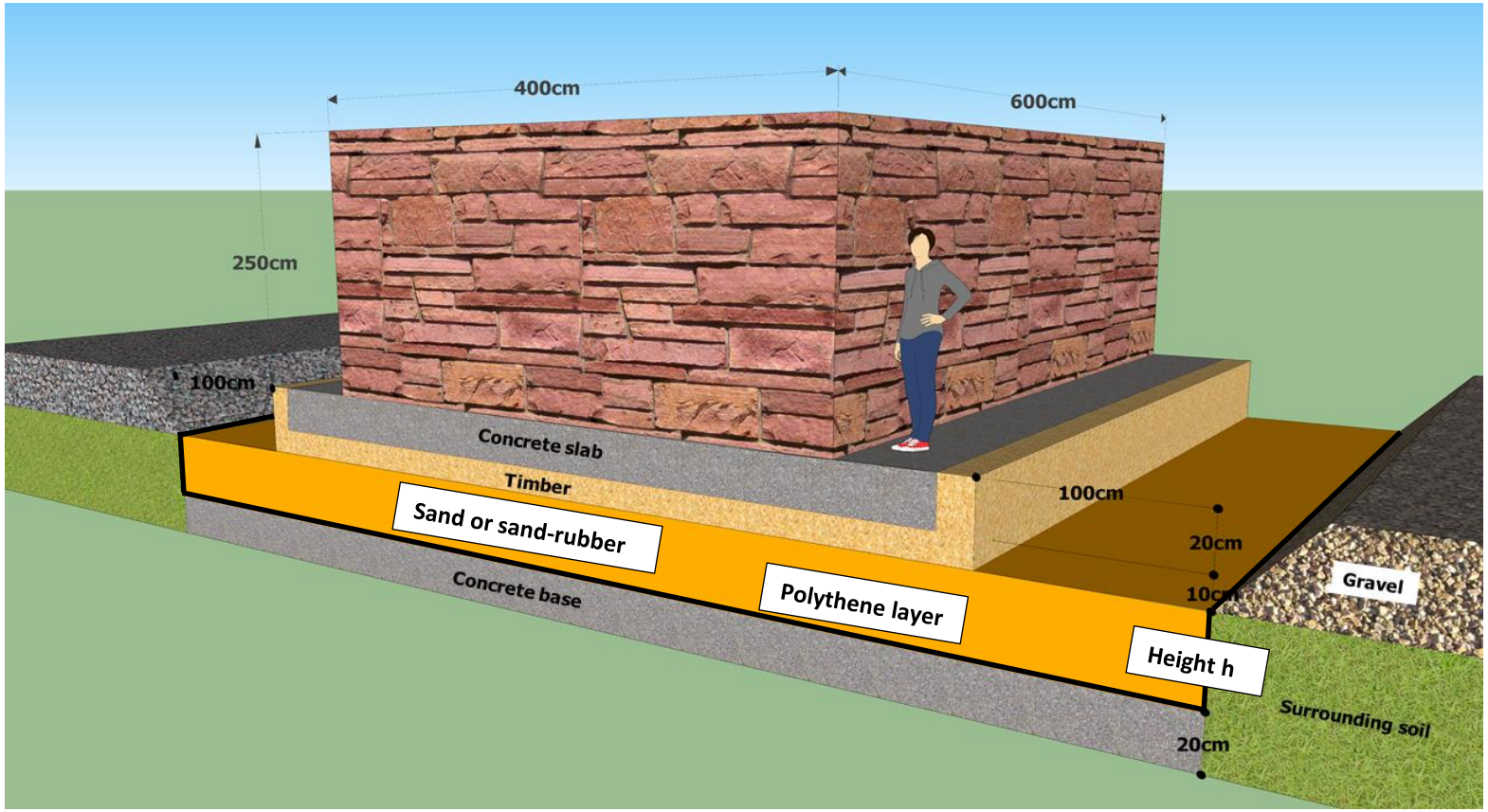
Small-scale Experiments

Medium-scale Experiments

Large-scale Experiments

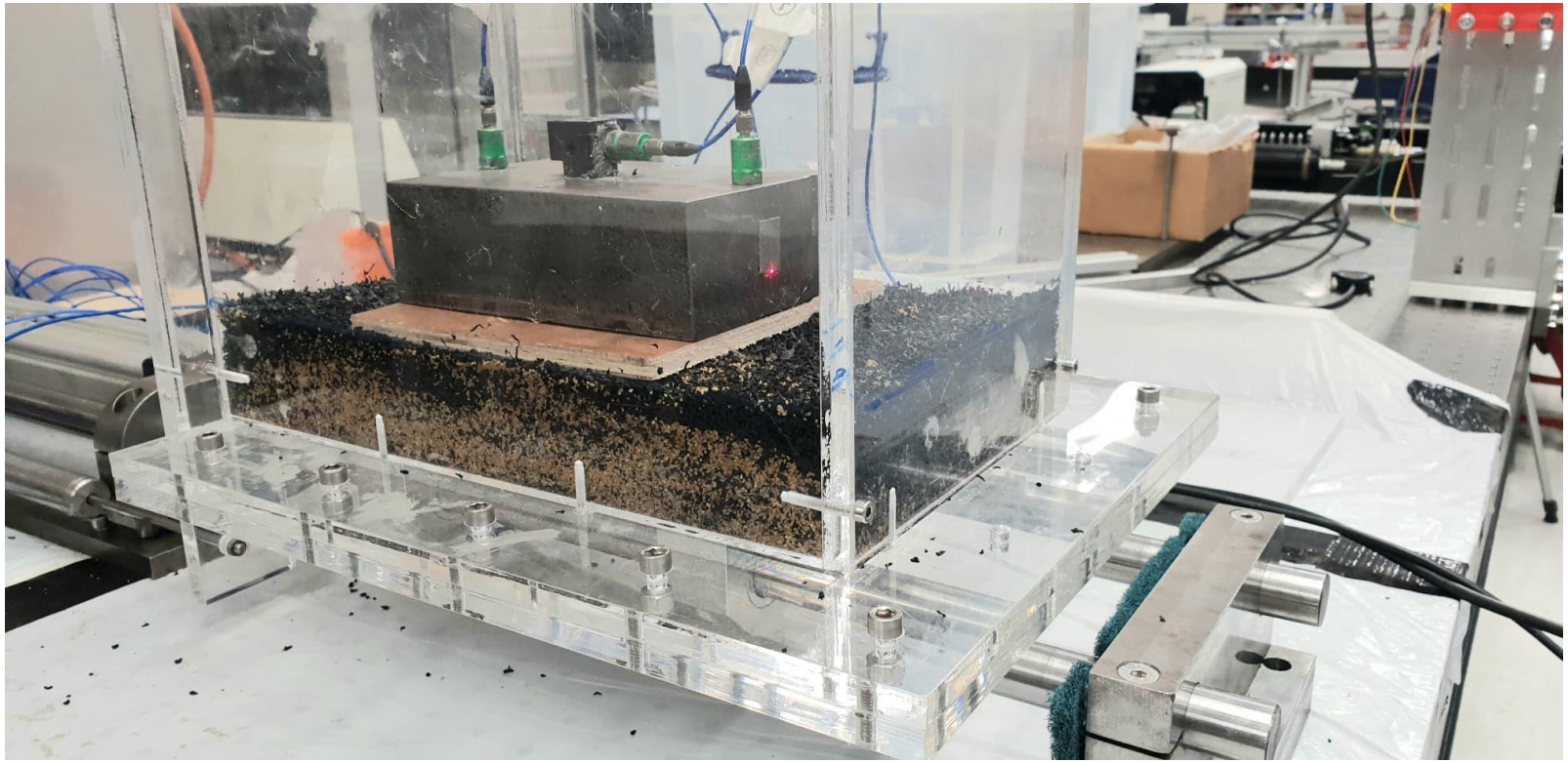
Prototype structure in Nepal

Conceptual thinking



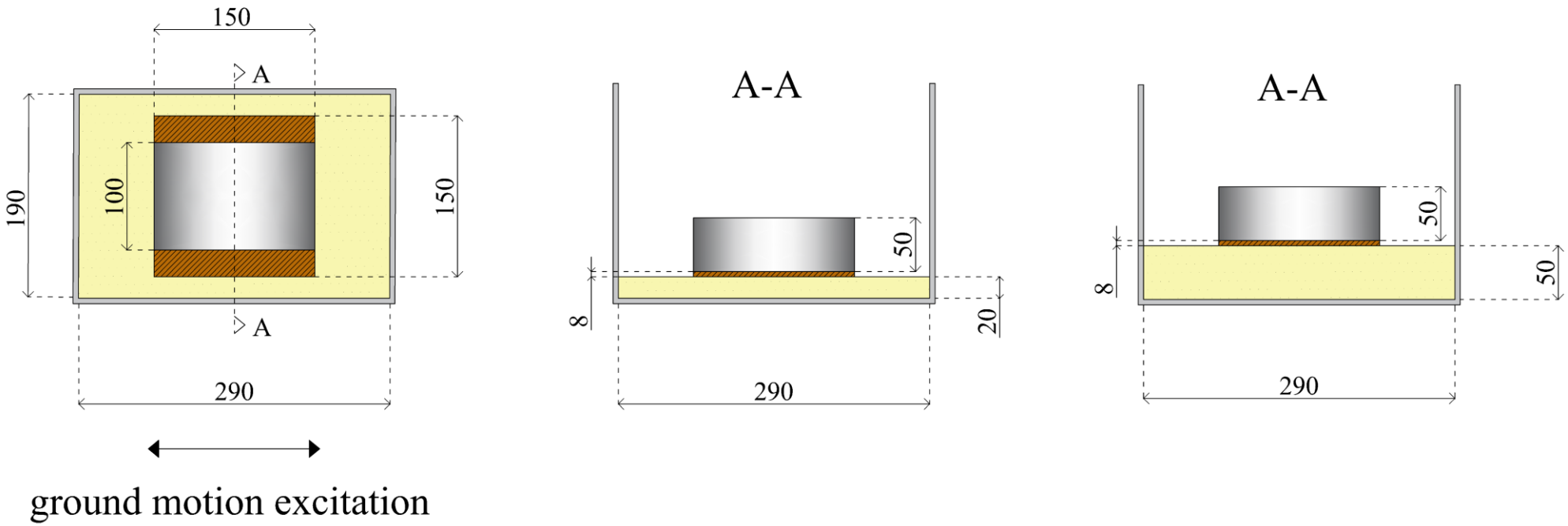
Experimental setup

Small-scale tests



Experimental setup

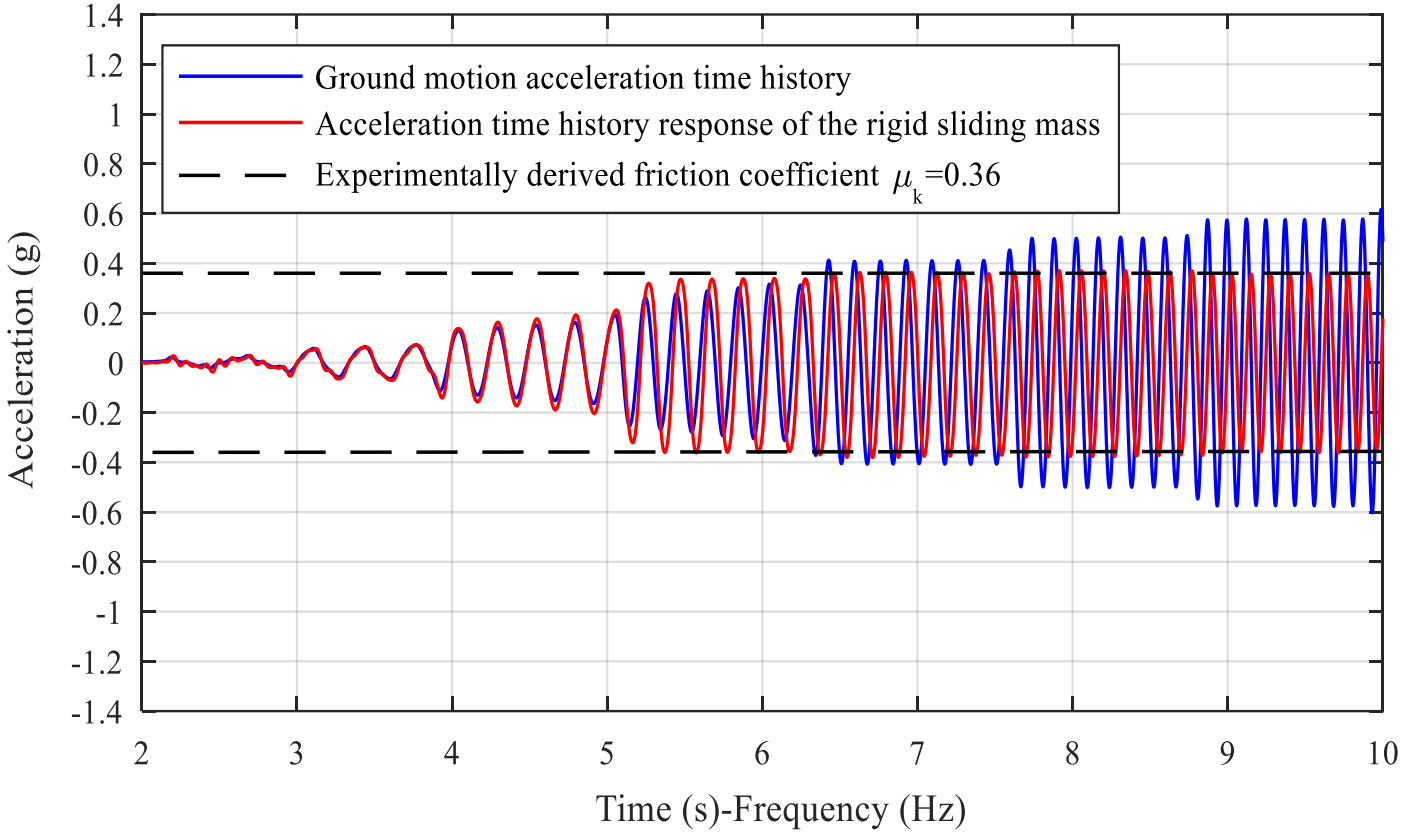
Small-scale tests



(a) (b) (c)

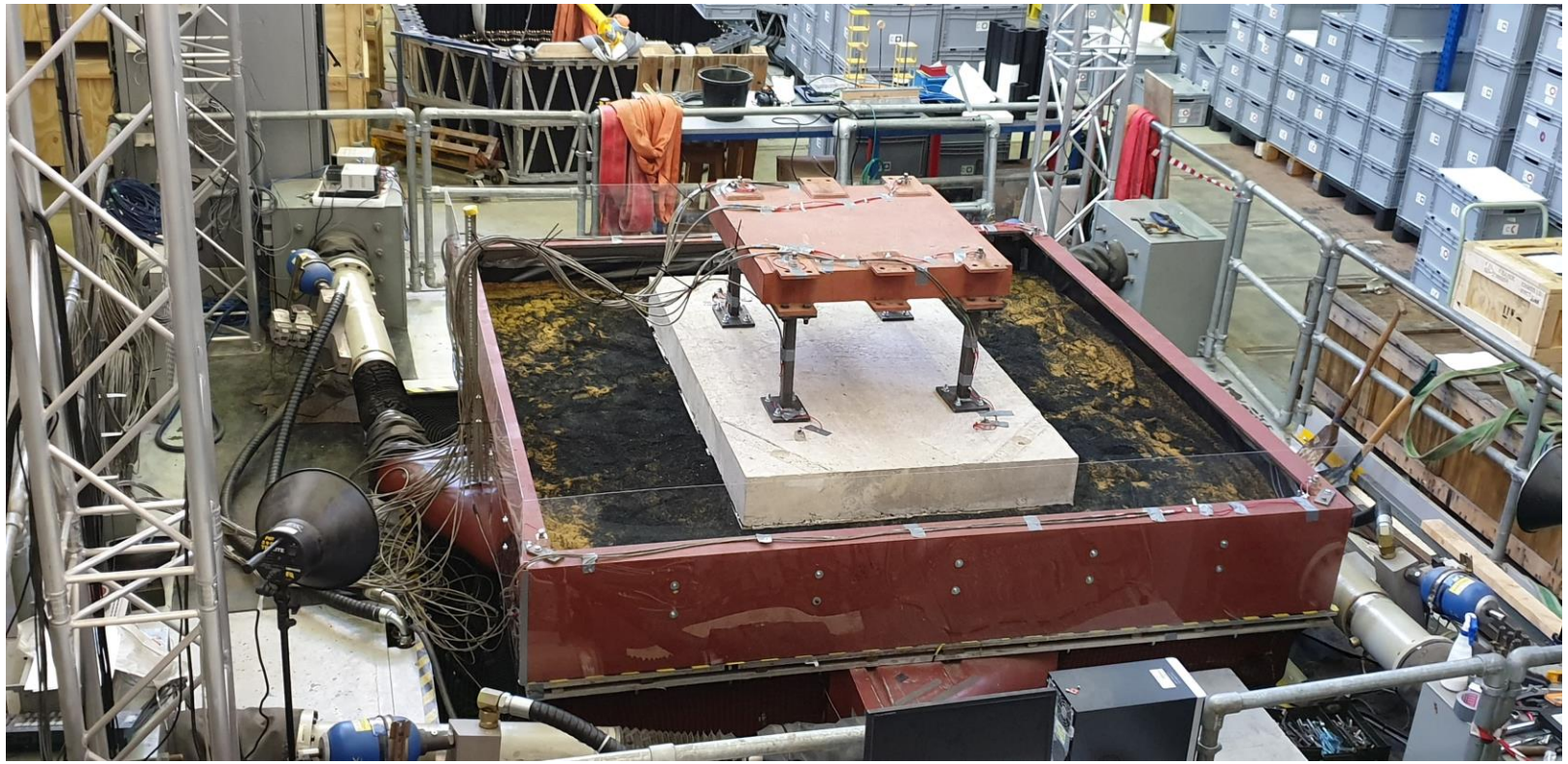
Harmonic ramp loading

Small-scale tests



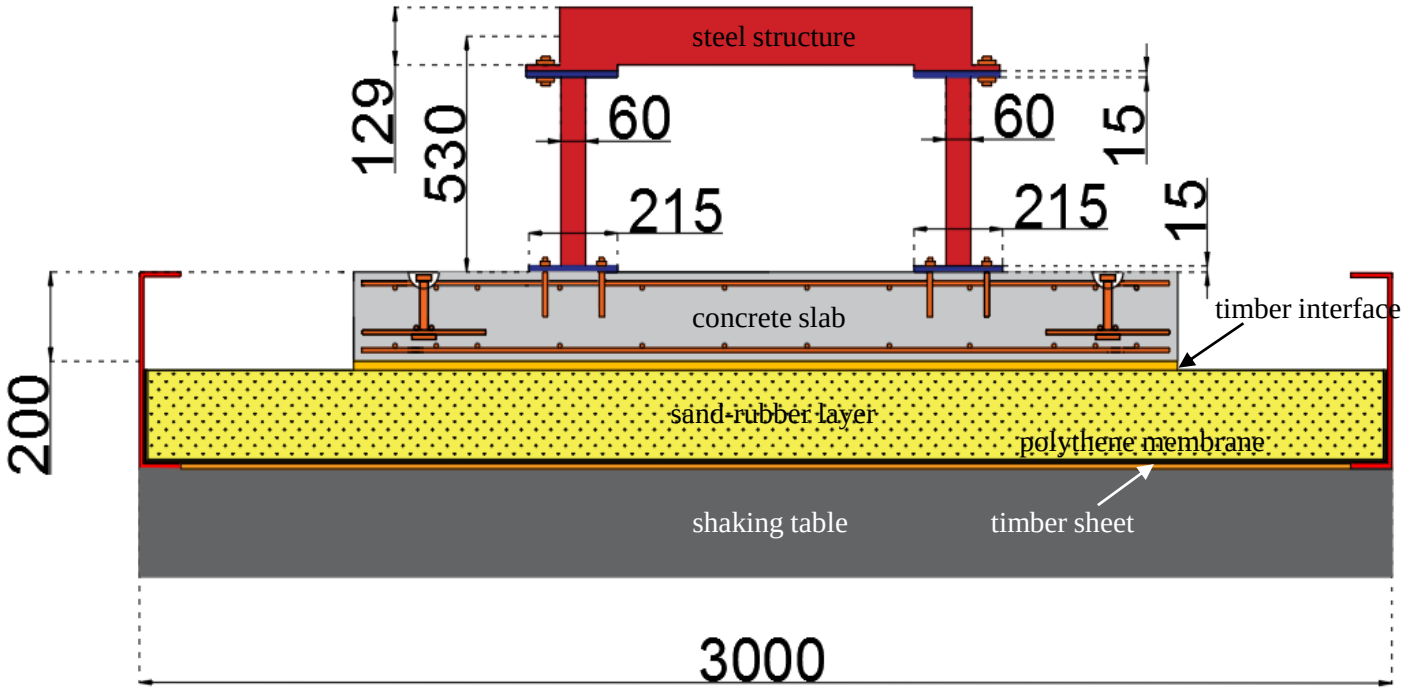
Large-scale shaking table test
Experimental setup

Large-scale tests



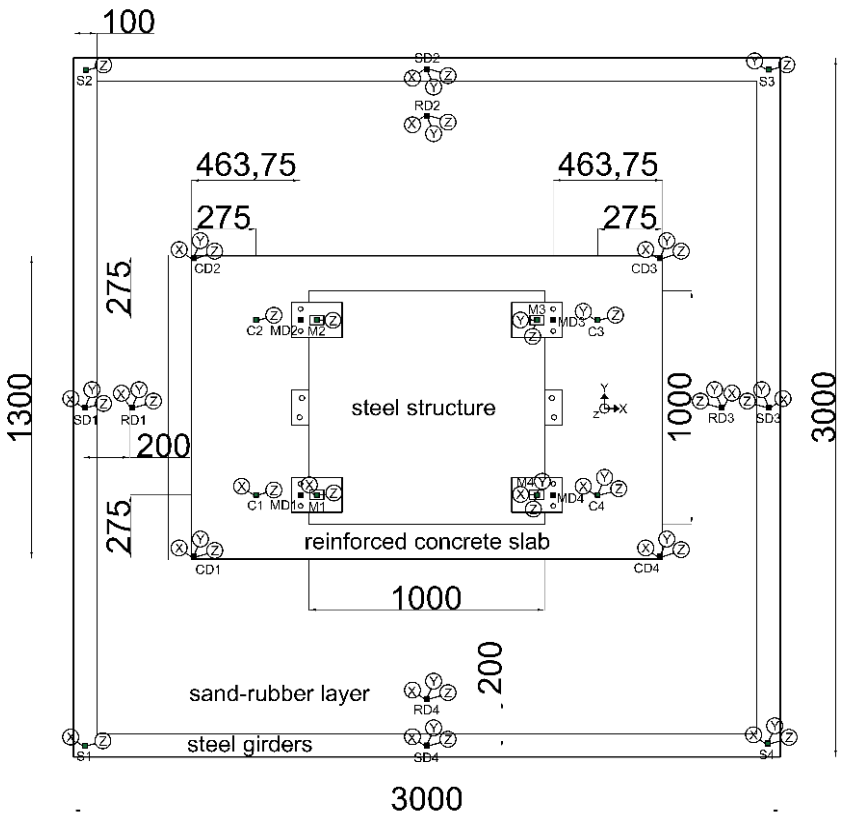
Large-scale shaking table test
Experimental setup

Large-scale tests



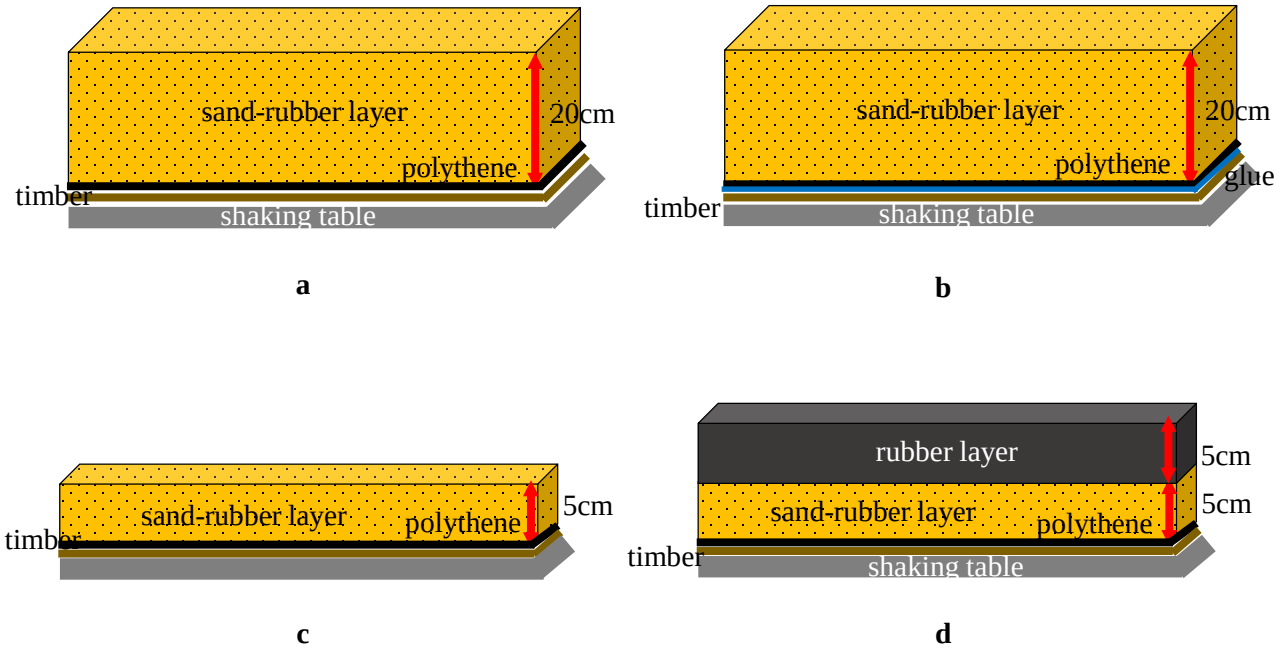
Large-scale shaking table test
Instrumentation plan

Large-scale tests



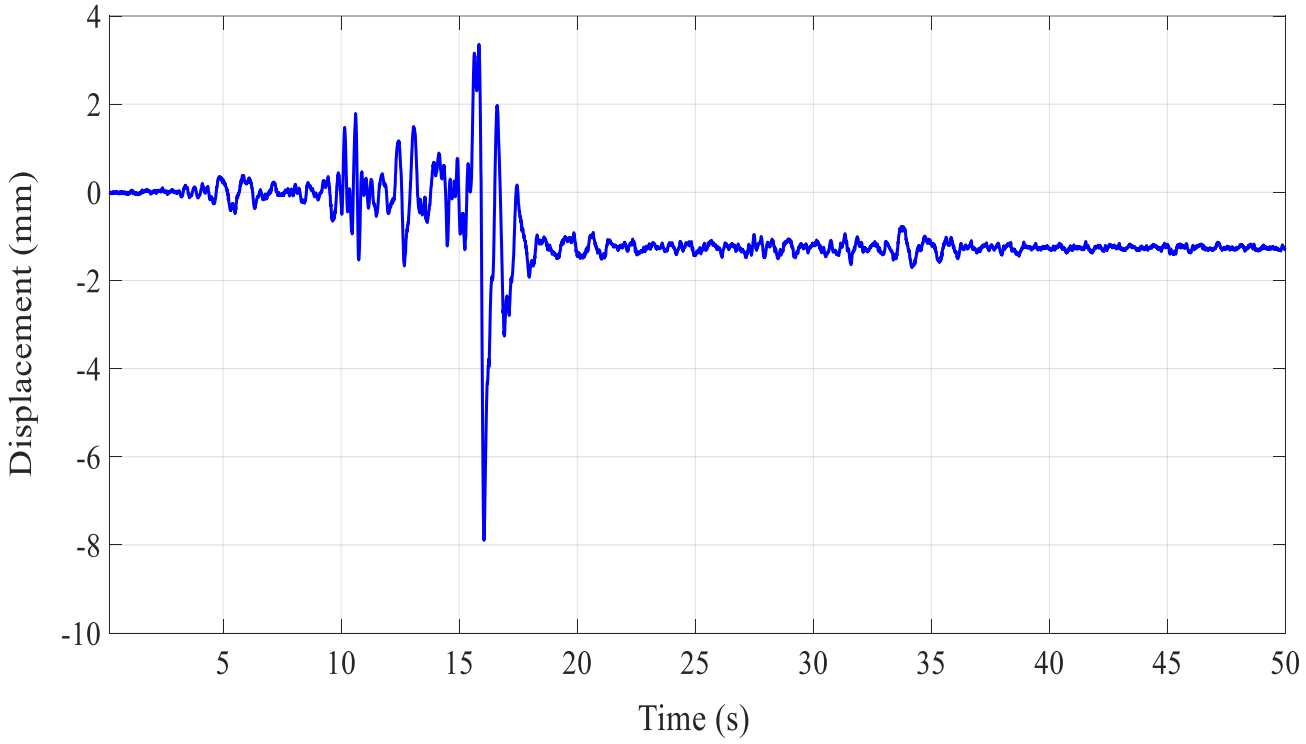
Sand-rubber layer configurations

Large-scale tests



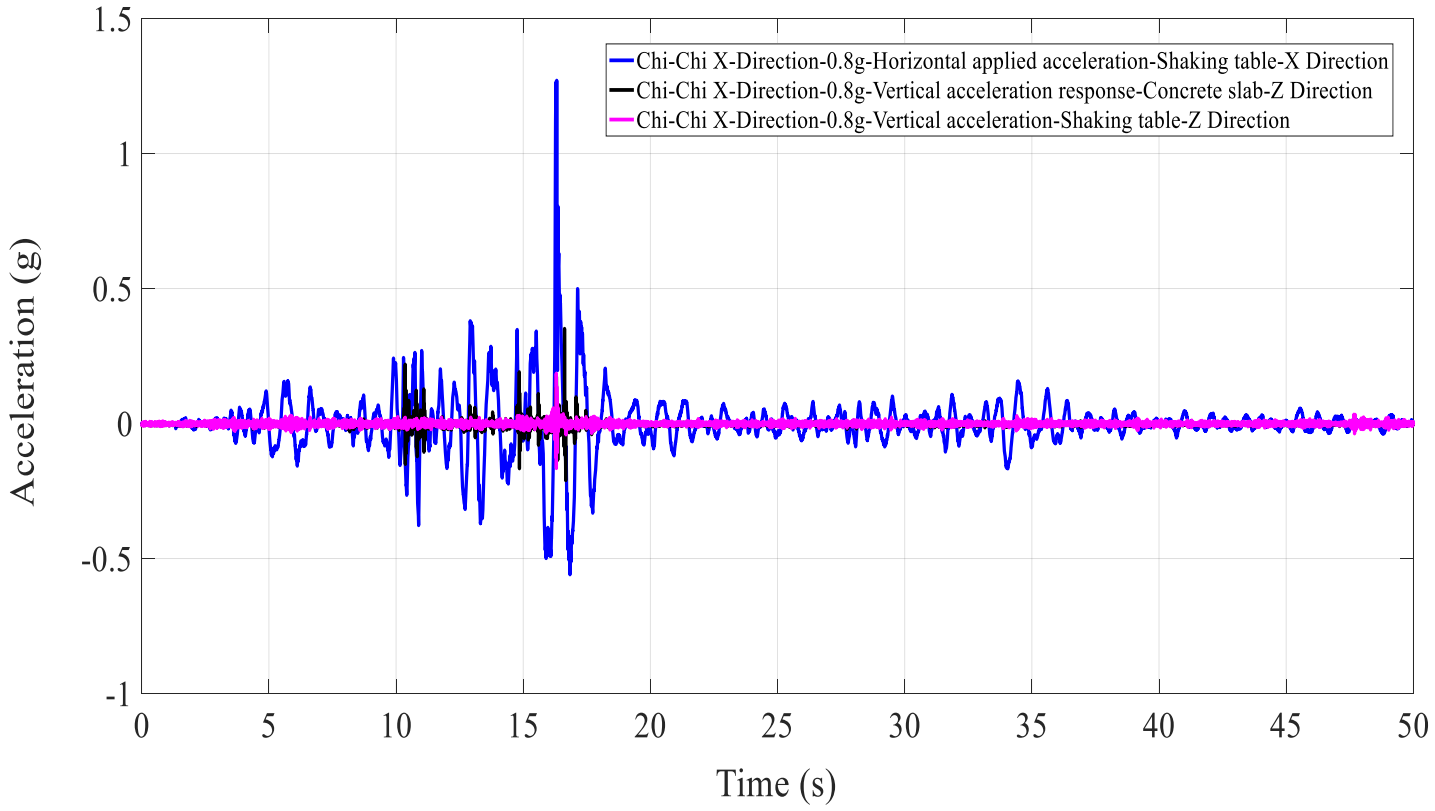
Chi-Chi 0.4g
20cm thick Sand-rubber layer

Large-scale tests



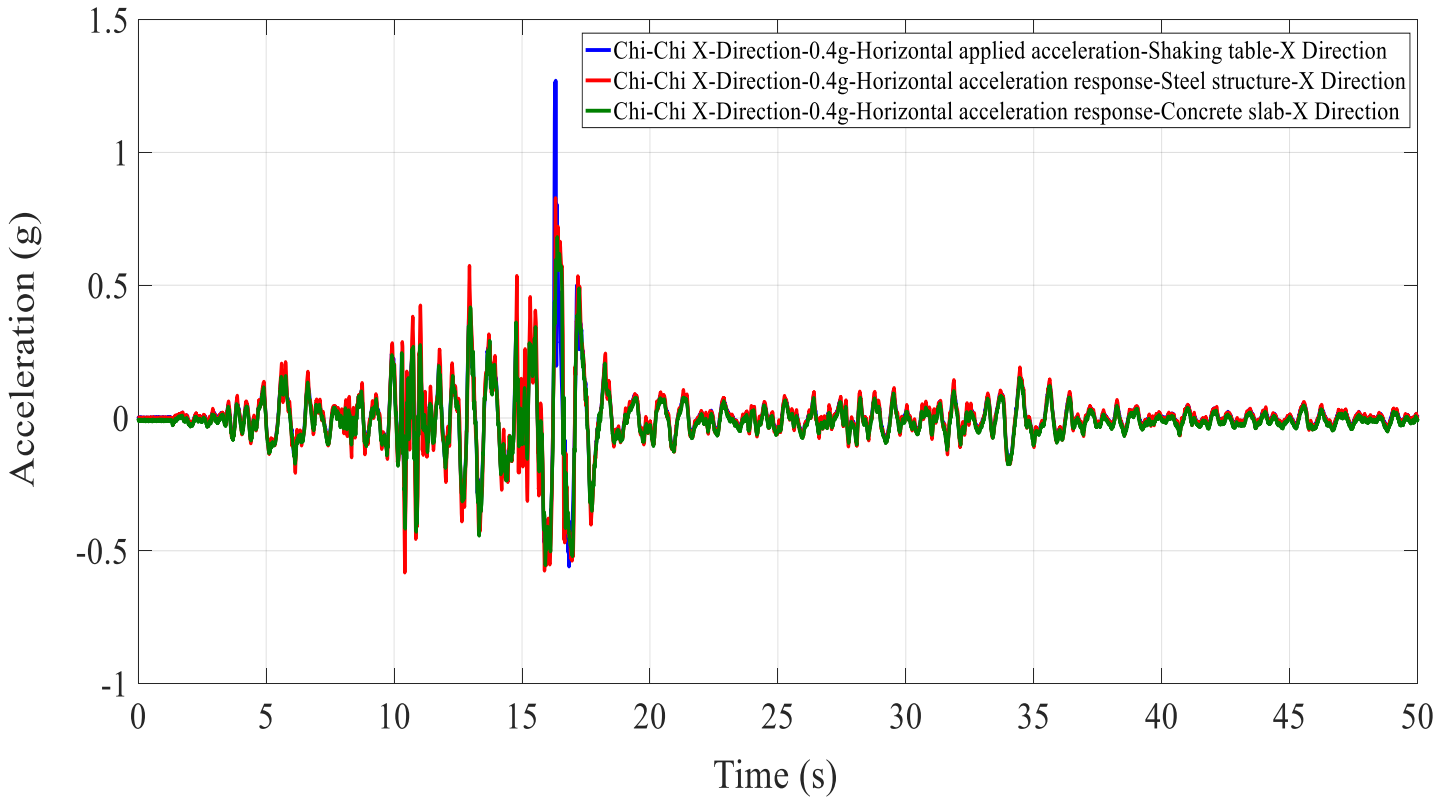
Chi-Chi 0.8g-Rocking effect
5cm thick Sand-rubber layer

Large-scale tests



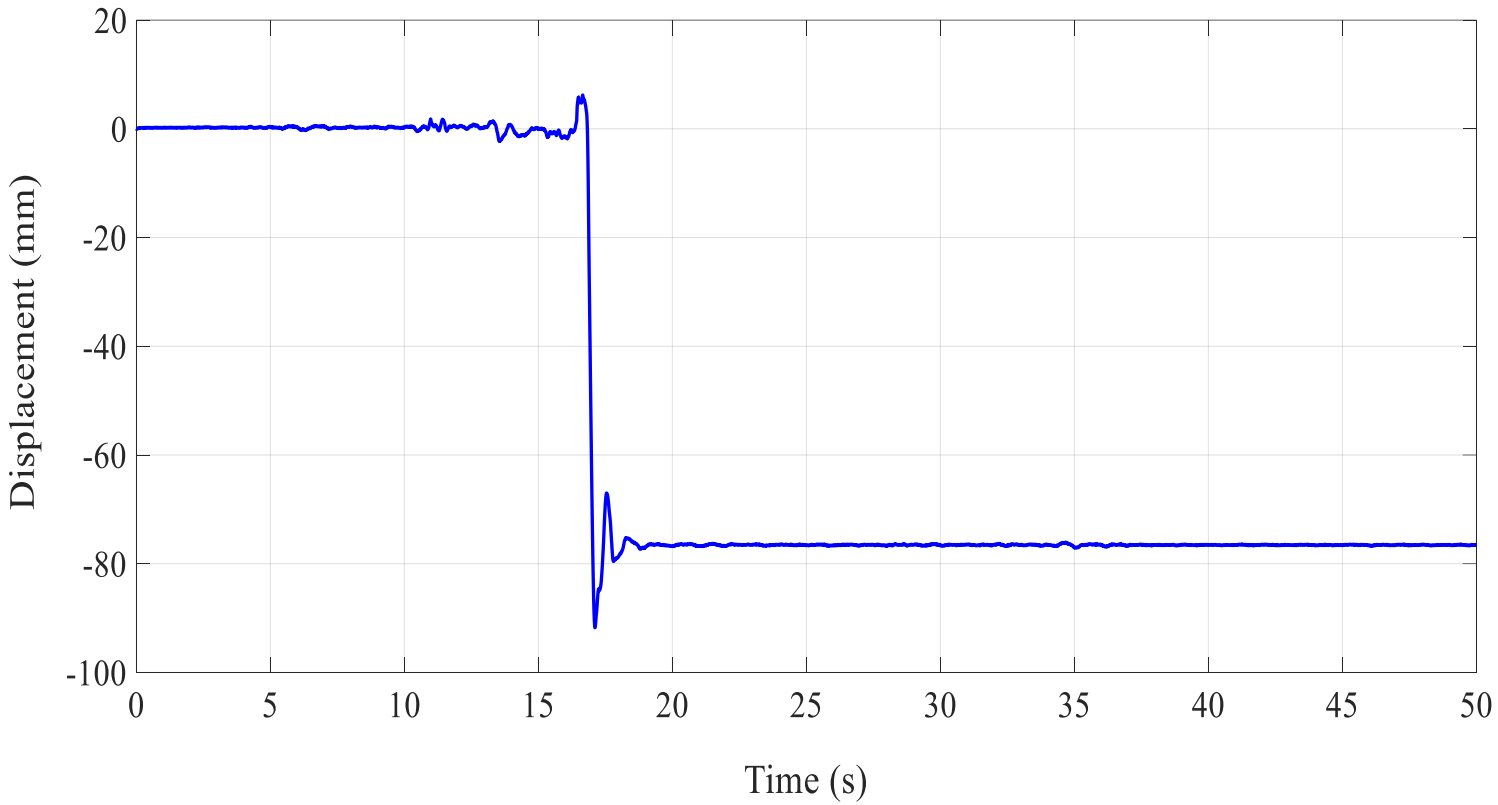
Chi-Chi 0.8g-Horizontal acceleration response
5cm thick Sand-rubber layer

Large-scale tests



Chi-Chi 0.8g-Sliding response
5cm thick Sand-rubber layer

Large-scale tests



Conclusions

- A three-times scaled down model of a prototype structure founded on a sand-rubber layer of four different configurations has been designed, constructed and experimentally tested on the 3mx3m shaking table of University of Bristol.
- The observed response included rocking and sliding for different ground motion acceleration levels.
- A decrease of the height of the sand-rubber layer is beneficial for the sliding response of the structure founded on this layer.
- This set of tests will be followed by a second and a third set of tests (June 2019, September 2019).
- The ultimate goal is to propose a holistic response modification strategy for seismic damage mitigation in developing countries.