

## **Geotechnical physical modeling and high gravity technology**

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### **Summary**

To investigate geotechnical systems, high gravity is needed due to the dominance of material self-weight. A centrifuge is a common technique to generate high gravity, which causes centrifugal acceleration. In geotechnical physical modeling, geotechnical centrifuge can generate the same gravity stress as the prototype, guarantees the consistency of model deformation and failure mechanism between the centrifugal model and real objects and solve complex problems in geotechnical engineering, hydraulic engineering and environmental engineering etc. In view of the scientific values of centrifuge and shaking table, Zhejiang University develops one of the largest geotechnical centrifuges in China. The centrifuge is a beam of double platform type with a payload capacity of 400gCton and an effective arm radius of 4.5 m. The maximum centrifugal acceleration is 150 g for static tests and 100 g for dynamic tests. The centrifuge platforms have overall dimensions of 1.5m (L) A-1.2m (W) A-1.5m (H). Meanwhile, an in-flight uni-axial electro-hydraulic shaker is made for the centrifuge to simulate seismic excitation. Within the payload of 500kg, the maximum lateral displacement and acceleration is 0.6cm and 40 g. This report presents the basis principle and similitude of physical modeling using high gravity and some details about the specifications and components of the ZJU400 centrifuge. Several model tests are presented to show the powerful capability in solving practical problems.

