

Geotechnical Centrifuge at Ehime University



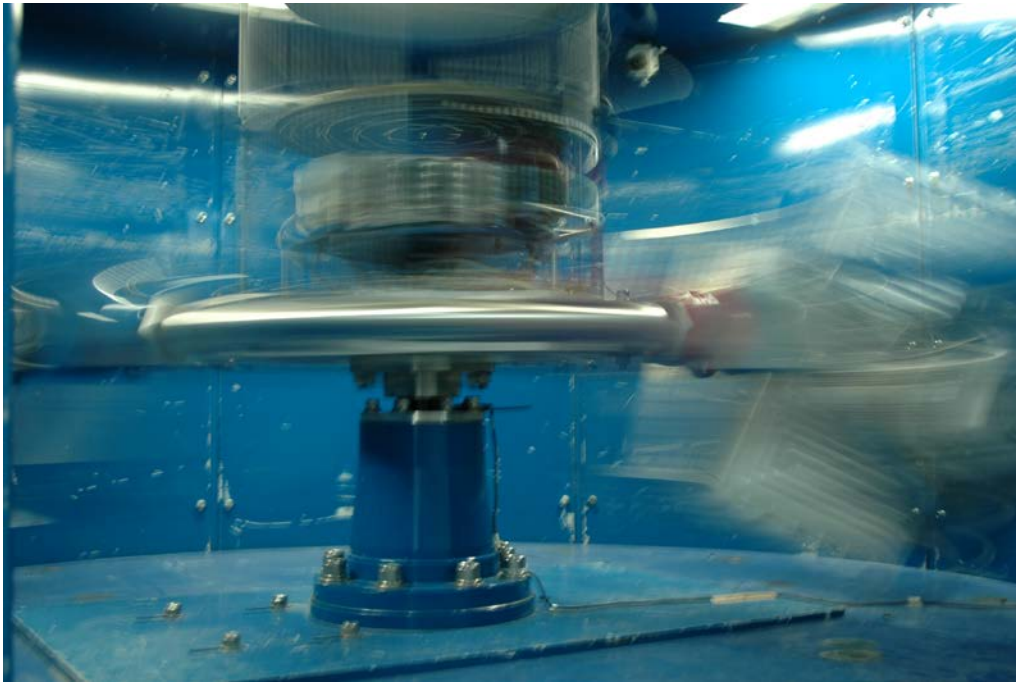
Geotechnical centrifuge is the experimental facility which is capable of reproducing the stress state in a scaled model similar to that of corresponding prototype. Since mechanical behavior of soils exhibits significant stress level dependency, it is most important to reproduce the similar stress state in models to obtain realistic responses of the models. This can be achieved by applying centrifugal acceleration N times higher than the gravitational acceleration to a $1/N$ scaled model.

Ehime University Geotechnical Centrifuge is a beam type machine of effective radius of 1.2m and maximum acceleration of 70g. It can carry a model container with dimensions of 0.60m x 0.45m (plan) x 0.3m(high). The centrifuge is equipped with a mechanical shaker which can impart base shaking to the model up to 25g, corresponding to 500gal shaking event to models at 50g centrifugal acceleration field. The centrifuge is also equipped with 2D(x-y) loading table, which is capable of applying arbitrary load (V-H-M) to foundation on ground. Responses of models can be observed using several onboard CCD cameras as well as sensors set in models. Analogue signals from the sensors are converted to digital with high resolution (24bit) AD converter and sent to data acquisition system in the operation desk via wireless connection. About hundreds of tests have been conducted on the Ehime University Geotechnical Centrifuge every year, since it has been introduced to the geotechnical engineering laboratory in 2007. Most of tests are related to research projects in the geotechnical engineering laboratory and conducted by undergraduate (B4) and graduate students. Few tests are also conducted for a course study of under graduate students (B3).

Auxiliary Equipment

1. Mechanical shaker (Max. 250 m/s²)
2. 3D Laser profiler: This equipment is used to acquire precise model surface topography with a height accuracy of 0.005mm.

3. Rain precipitation simulator: The device is equipped with pneumatic spray nozzles producing fine mist to precipitate 1000 mm/hr rain.
4. 2-way cone penetration device. The device is designed so that cone penetration tests are conducted at arbitrary locations without stopping the centrifuge.
5. Bender elements
6. Laminar box for dynamic centrifuge test..



Centrifuge in flight

