

# **Earthquake Technology Lab**

**Lab-In-Charge:** Dr. Shilpa Pal

**Technical Assistant:** Mr. Shashikant

**Lab Attendant:** Mr. Sanja

## **About the Lab:**

Basic issues related to vibration behaviour, such as, damping, dynamic response magnification, resonance, structural vibration under support motions, normal modes, vibration isolation, vibration absorption, dynamics with soft and/or weak first/intermediate stories, role of structural ductility in resisting dynamic loads, liquefaction of soils under dynamic loads, and rocking and up throw of rigid objects under dynamic base motions. These setups would provide valuable physical insights into the basic vibration behavior of structures in general, and structural dynamic responses under base motions.

## **List of Equipment:**

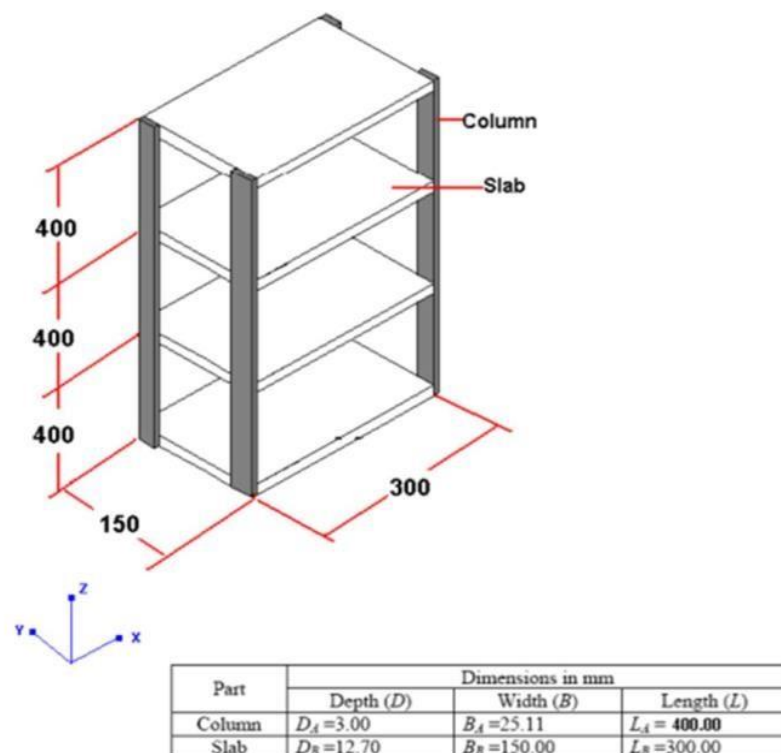
1. Vibration Isolation model, Liquefaction model.
2. Three storey frame- shear building model.
3. Four storey frame with stiffeners- soft storey model.
4. One storey frame with stiffeners.
5. Four storey frame- weak storey.
6. Horizontal shake table with cylindrical cam
7. Vertical shake table.
8. Vibration analyzer with suitable accessories.

## **List of Experiments:**

1. Dynamics of a three storied building frame subjected to harmonic base motion.

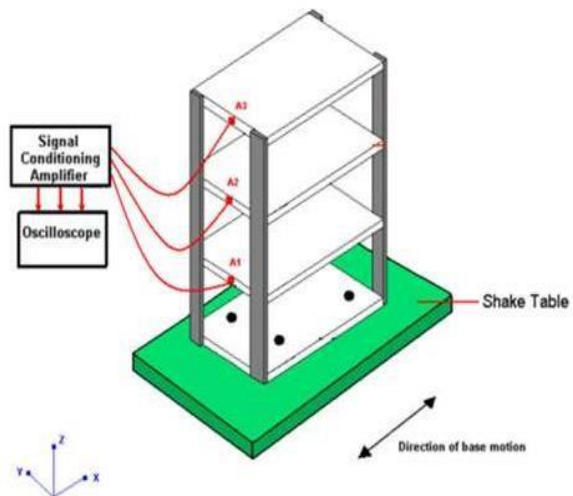
2. Dynamics of a one-storied building frame with planar asymmetry subjected to harmonic base motions.
3. Dynamics of a three storied building frame subjected to periodic (non- harmonic) base motion.
4. Vibration isolation of a secondary system
5. Dynamics of a vibration absorber.
6. Dynamics of a four storied building frame with and without an open ground floor
7. Dynamics of one-span and two-span beams.
8. Earthquake induced waves in rectangular water tanks
9. Dynamics of free-standing rigid bodies under base motions
10. Liquefaction problem
11. Seismic wave amplification studies and soil structure interaction
12. Earthquake induced waves in rectangular water tank.

### 1. Data acquisition system for strain measurement



Three-story shear building model used in experiment

## 2. Accelerometers

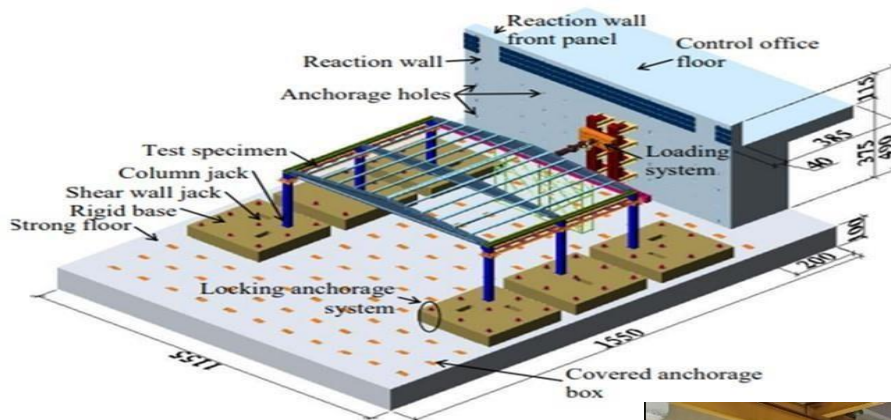


## Strong Floor and L shape Reaction wall

The Reaction Wall and Strong floor make it possible to test multiple full-scale structural experiments. The wall can be used to perform seismic tests by using experimental methods,

such as traditional quasi-static tests, cyclic loading tests and pseudo-dynamic tests. The reaction wall is L-shaped and has dimensions: 6 m x 4.5 m, 6m x 4.5 m. The strong floor is a reinforced block of concrete 12 m x 6 m x 0.75 m. The compressive strength of the concrete for both the reaction wall and the strong floor is 350 kg/cm<sup>2</sup>

During experiments, full-scale and large-scale constructions are mounted onto the strong floor. Hydraulic actuators then exert forces on the test objects, making it possible to see the resistance of various structures and performances of seismic isolators and energy dissipaters. The experimental data has helped proved that seismic theories can be applied and are a reference to earthquake resistant building designs.



View of the L shape Reaction Wall next to strong floor



