Structural Testing Laboratory

●Outline

Structural Testing Laboratory is designed to examine the strength, deformation, vibration, and fatigue properties of a building structure and its elements and materials. The outcome of these experiments is used to verify structural design concepts and techniques to meet high level and/or multi-purpose performance requirements to building structures.

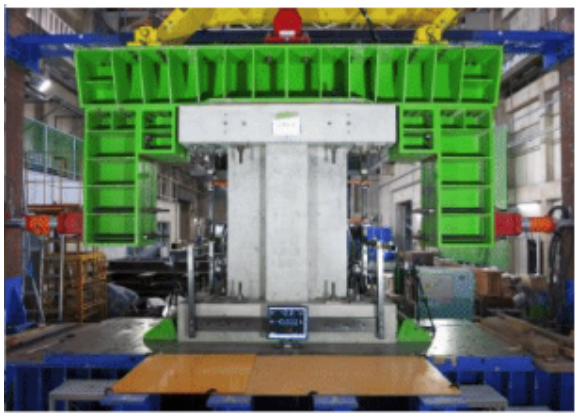
●Laboratory Equipment

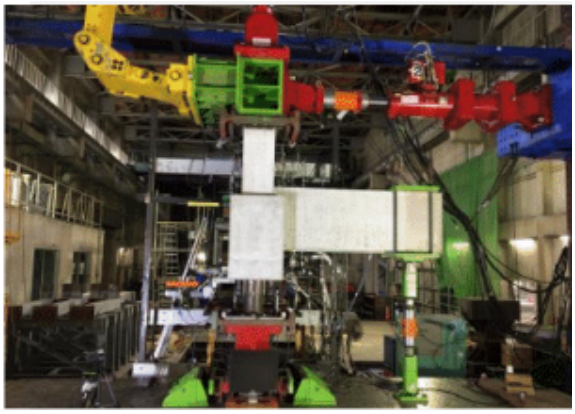
① **Medium size shaking table**

Shaking table is a testing equipment to investigate dynamic properties and/or earthquake response behaviors of buildings using scaled-model specimens of buildings or building components. Dimension and capacities of the shaking table are as follows, dimension: 3m×4m, maximum loading weight: 200kN, maximum acceleration: ±1G, maximum velocity: ±100cm/sec, maximum displacement: ±150mm.

② **Test machine for cyclic lateral loading system under axial force (so-called BRI-type horizontal loading machine)**

This testing machine is used to check the structural performance for a reduced-size member specimen. The left photo shows a machine that applies force horizontally while keeping the top and bottom surfaces of the specimen parallel using a pantograph (yellow portion at the top of the photo). This method of force application is called "BRI-style force application" because it was developed by staff of the Building Research Institute. Experiments on a beam-column joint (the right photo) can also be conducted as a sub-assembled frame. The load capacity is 2,000 kN in the horizontal direction, 2,000 kN (compression) and 1,000 kN (tension) in each vertical direction.





③ **General-purpose test machine for multi-degree-of-freedom loading system**

This machine is used to investigate the structural performance of building components and elements under earthquake. It consists of unit such as reaction wall, reaction floor, reaction frame and actuators. It can be used for multi-purpose, such as experiments on columns, beams, walls, beam-column joints and frames. The maximum loading capacities of the actuators is 3000kN.

④ 20MN Vertical and Multi Horizontal Direction Loading Test Machine

This machine can apply forces by at most seven hydraulic jacks which are simultaneously controlled by computer.

As for the horizontal force direction, any directioncan be chosen.

It can test a strength and a deformation condition of multi-story shear wall, frame specimen,and large-size column and concrete pile due to severe earthquake.

The maximum loading capacities are 20MN in a vertical direction, 4MN in a horizontal in-plane direction and 0.4MN in an out-of-plane direction

The front side of the Test Machine
(one hydraulic jack in a horizontal in-plane direction, four jacks in a vertical direction)

The back side of the Test Machine
(two hydraulic jacks in an out-of-plane direction)