

Large Size Structure Laboratory

●Laboratory Outline

Large Size Structure Laboratory is designed to examine the strength, deformation properties of a building structure and its elements. The test area is 400 m² and mainly consists of two areas. This lab is capable of performing full size scale building structure such as 7 story building (25m of building height). To observe the ultimate limit state of building structure, huge and stiff 2 reaction floors and 2 reaction walls are installed in each test area. This lab is the one of largest testing facilities all over the world.



Outside appearance

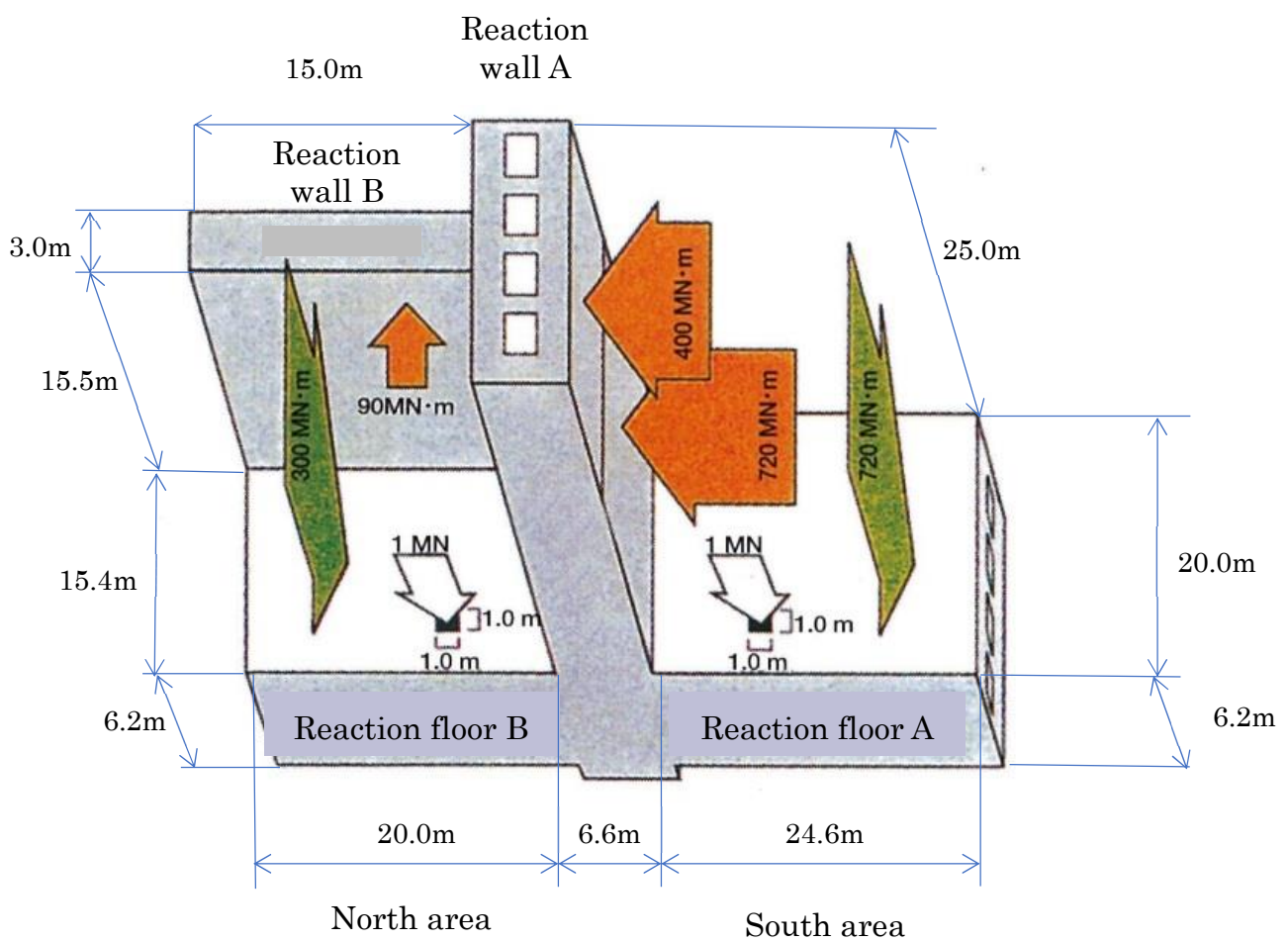


Inside appearance

●Facility Outline

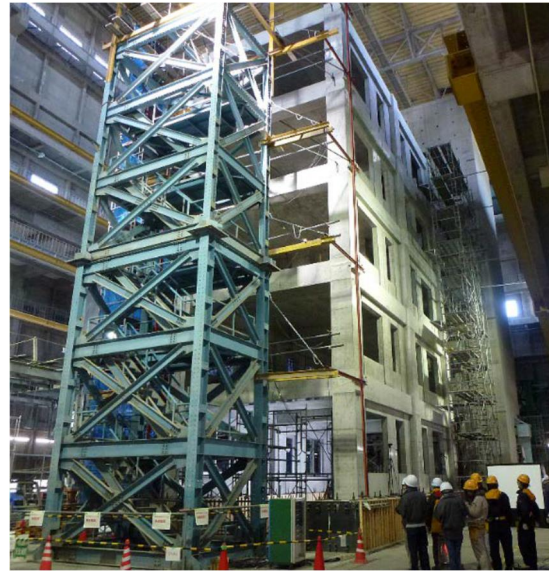
●Reaction Floor, Reaction Wall, Steel Frame for Vertical Loading

Reaction wall A has 25m height, 20m width, allowable shear force is 40,000kN, and allowable moment at wall end is 720,000kNm. In the north test area, there is reaction wall B locates perpendicular plane of Wall A. Each reaction wall has holes for anchorage to attach specimens.





Full scale specimen at North area



Full scale specimen at South area

1 story building with non-structural components in 2010 /

5 story building utilizing wing-wall in 2014

Experimental test at each test area

●Actuators (Loading Machines)

Actuator is a machine for loading specimen and set between specimen and reaction wall. At north area, horizontal loads in two directions and vertical load can be applied at the same time. At south area, horizontal loads can be applied in one direction.

Four hybrid hydraulic actuators, which do not require an external hydraulic power source, can be used in this laboratory. These actuators can be controlled using a computer to apply loads and displacements. The hybrid hydraulic actuators have a capacity of 2,500kN and a stroke of ± 500 mm. Additionally, eight Magnescales are installed as high-precision, long-stroke (± 500 mm and $\pm 1,000$ mm) measurement devices, which can also be used to control the hybrid hydraulic actuators by inputting external signals.

Furthermore, the facility is equipped with static hydraulic jacks for horizontal and axial loads, which can be used with external hydraulic power sources.



Hybrid hydraulic actuators



Magnescale



Loading test with hybrid hydraulic actuators
(Four actuators are controlled at the same time)