

# ASAI LAB.

## Resilient design of buildings against earthquake and tsunami



Department of Fundamental Engineering

Building Resilience for Earthquake and Tsunami  
Department of Architecture, Graduate School of Engineering

<https://asai-lab.iis.u-tokyo.ac.jp/>

### Performance evaluation of buildings against natural hazards

Our laboratory investigates building performance against earthquakes, tsunamis, and other hazards based on experiments, numerical analyses, and field surveys. The main research topics are investigating the actual damage to buildings and evaluating design loads based on damage surveys, analyzing failure mechanisms of buildings based on shaking table tests and static loading tests using high-resolution measurements, numerical simulations, and developing comprehensive seismic performance evaluations including non-structural components by utilizing BIM.

#### Earthquake Damage Survey



Collapsed building



Tilted building



Non-structural damages

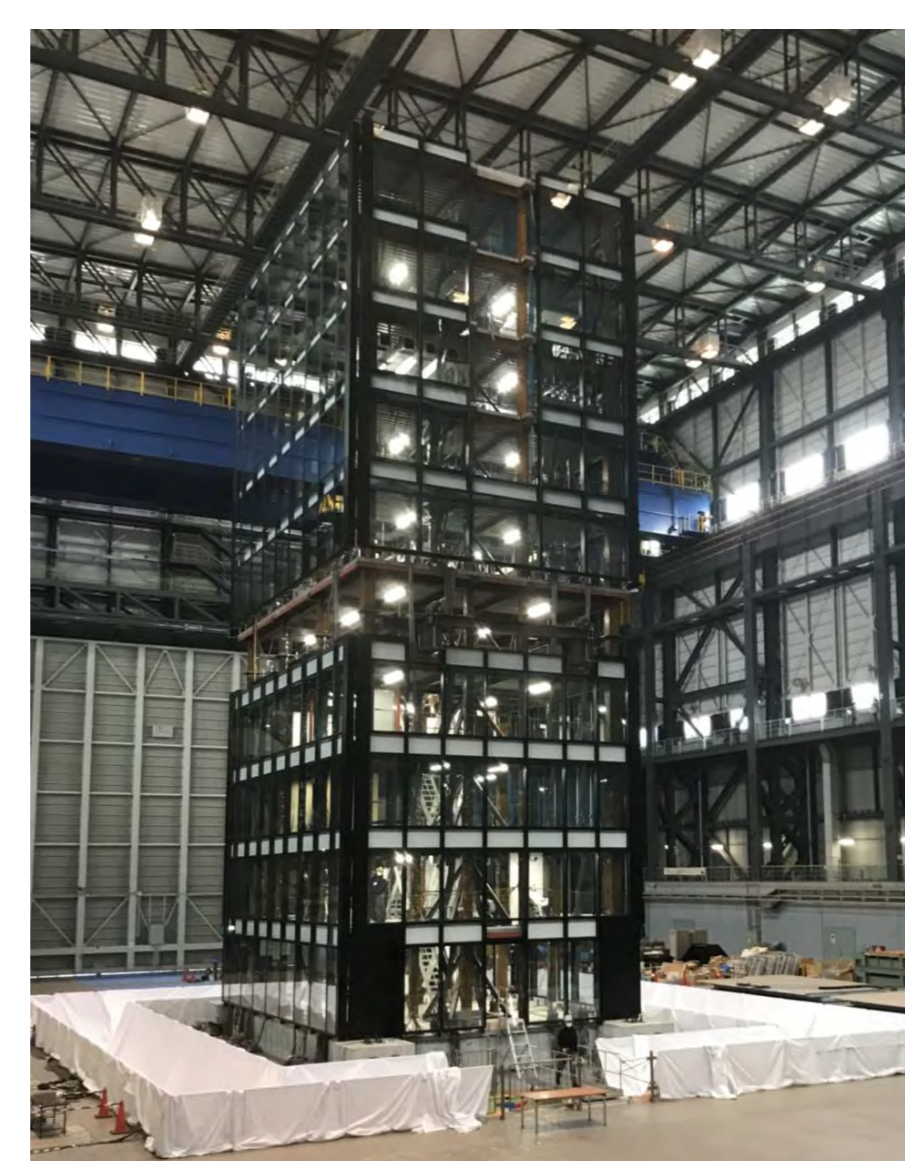


Building flushed away by tsunami

#### Full-scale shaking table test

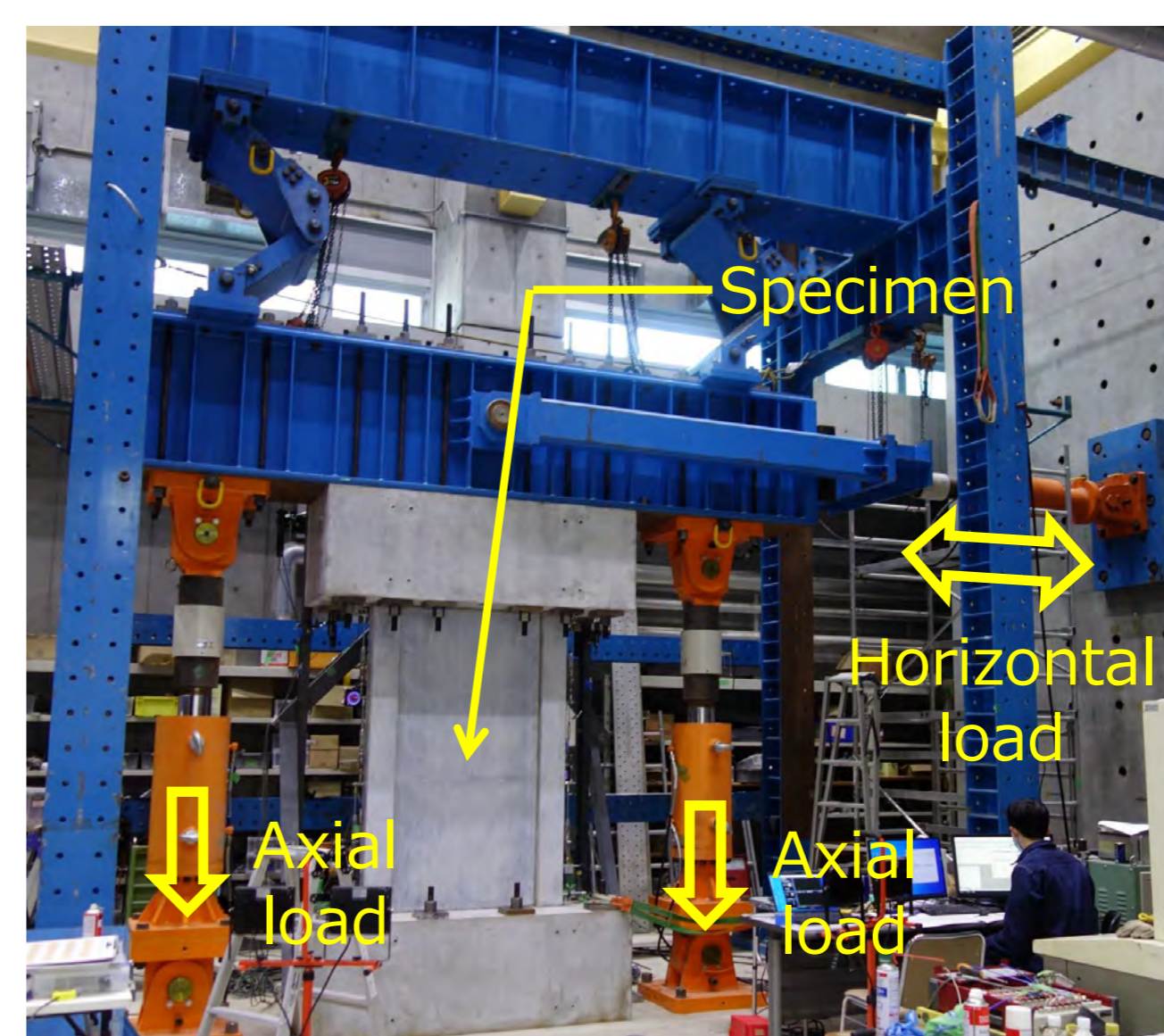


5-story RC in 2020

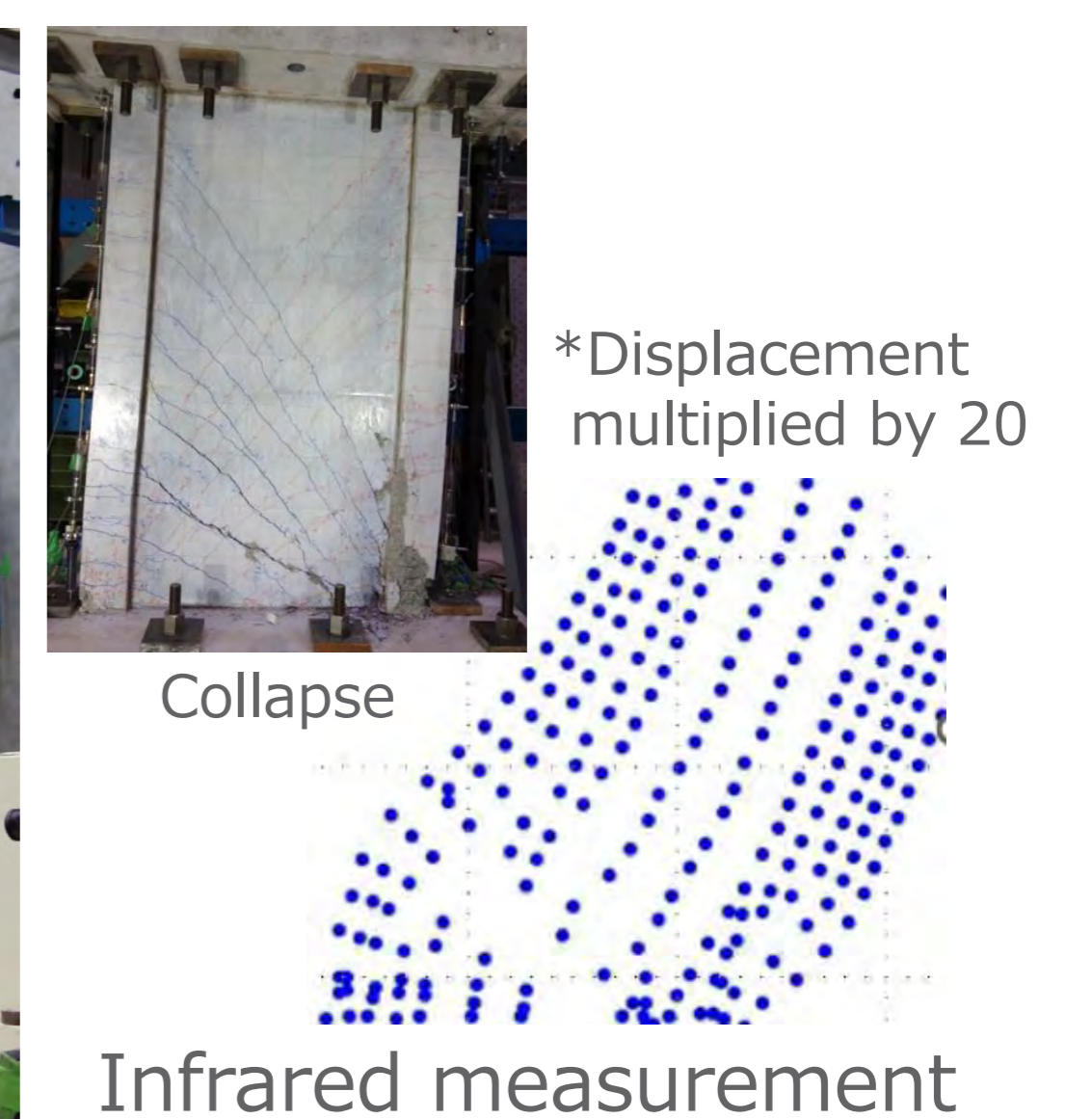


10-story steel in 2023

#### Loading test of structural component



Cyclic loading test of seismic RC wall

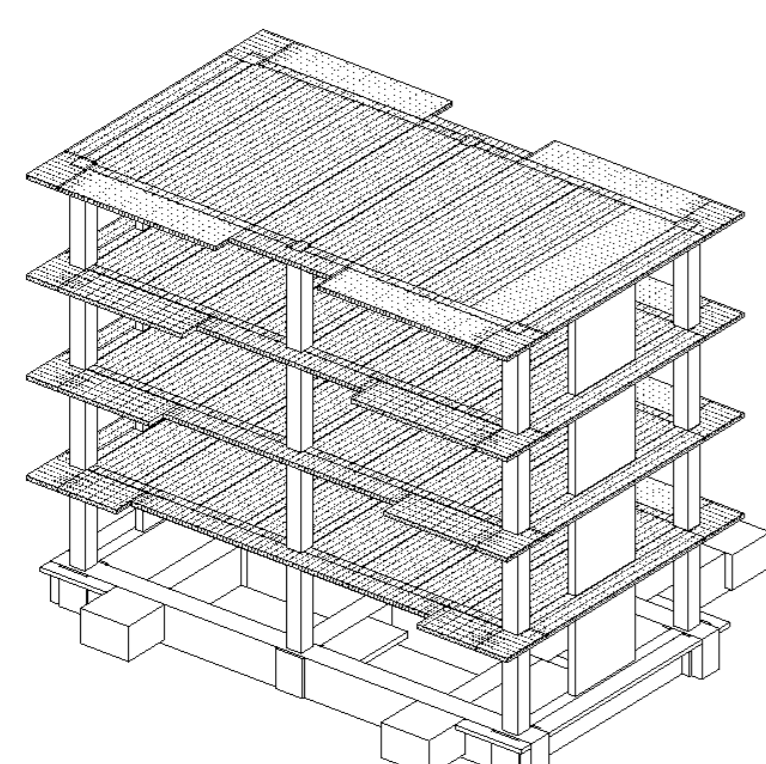


Infrared measurement

\*Displacement multiplied by 20

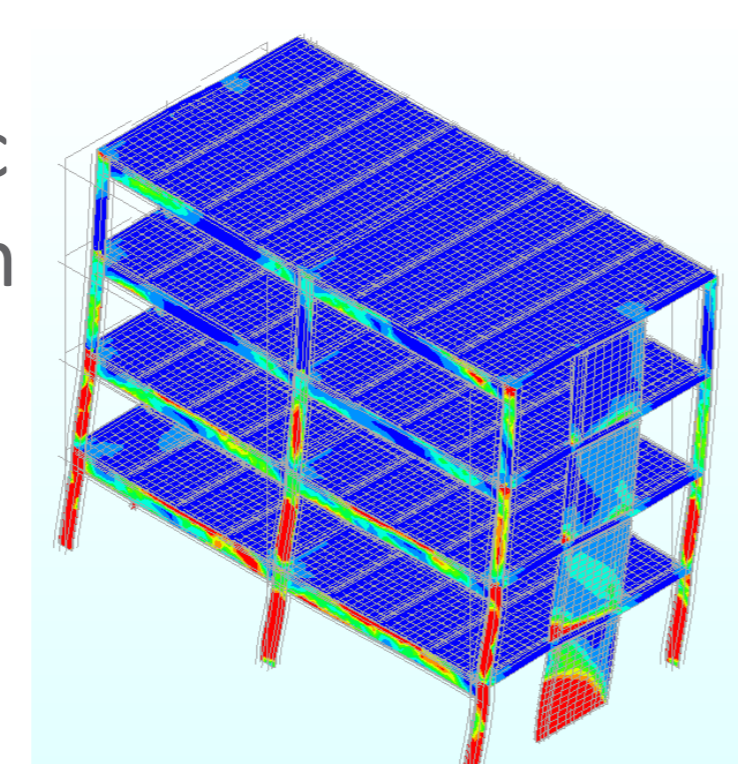
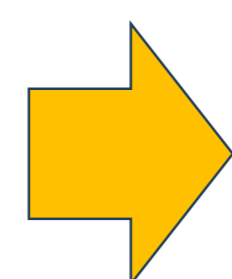
Collapse

#### Comprehensive performance evaluation



BIM model

Automatic conversion



FEM model

#### Investigation of building safety based on big data



Track of tsunami-driven ship in 2011