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
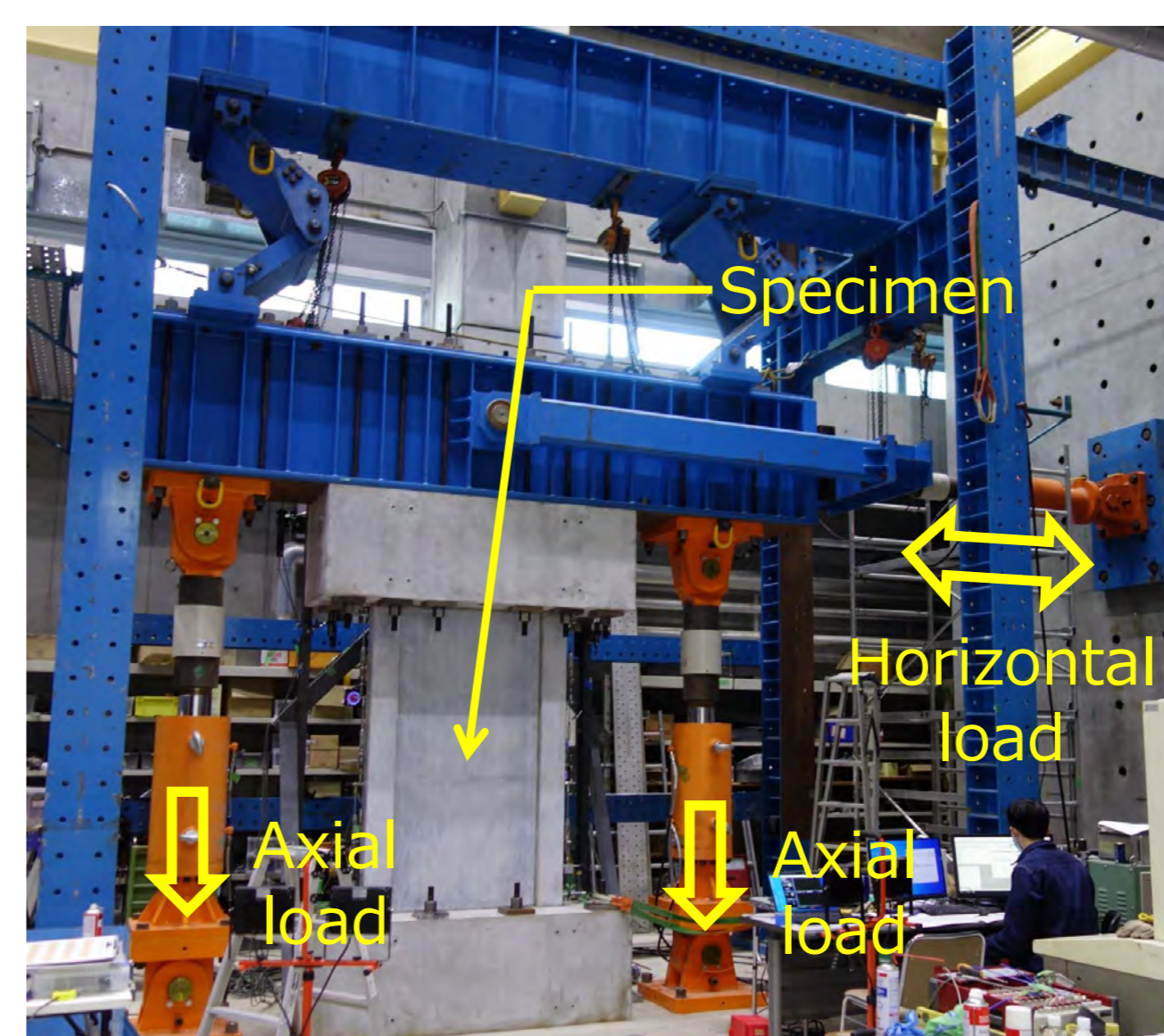
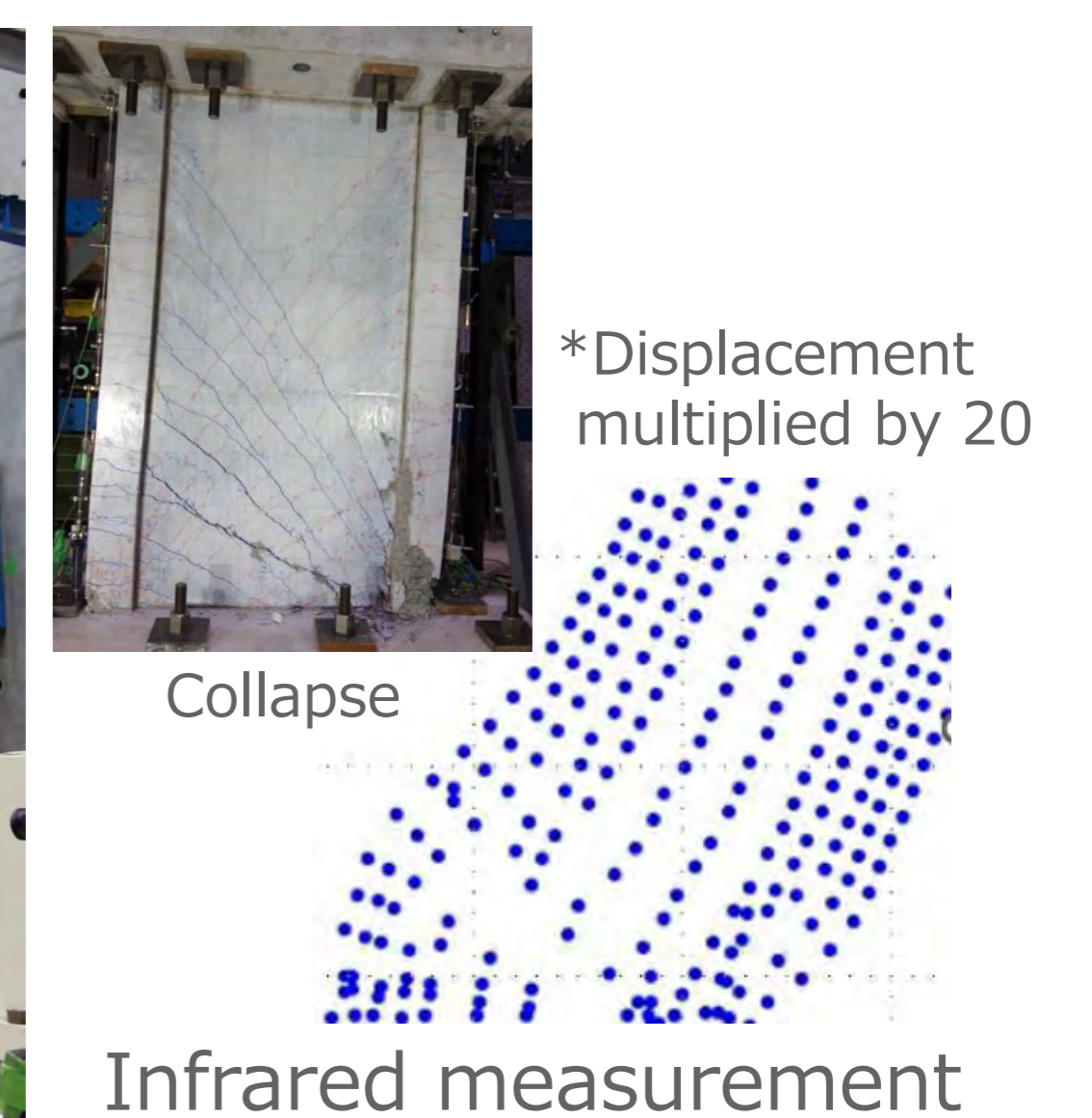### Full-scale shaking table test

5-story RC in 2020   10-story steel in 2023

Loading test of structural component

Specimen

Horizontal load

Axial load   Axial load

*Displacement multiplied by 20

Collapse

Infrared measurement
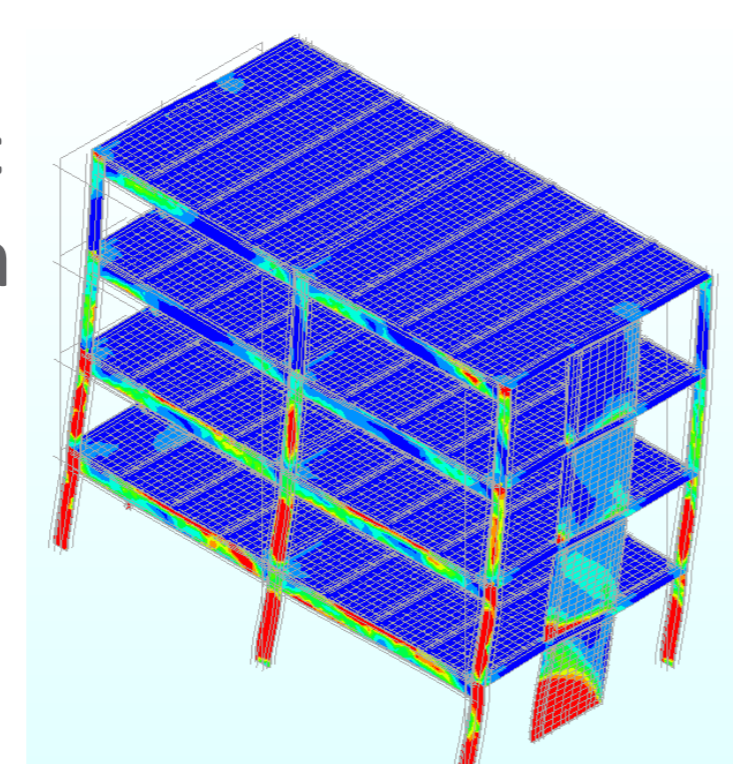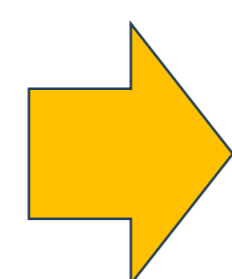
Cyclic loading test of seismic RC wall

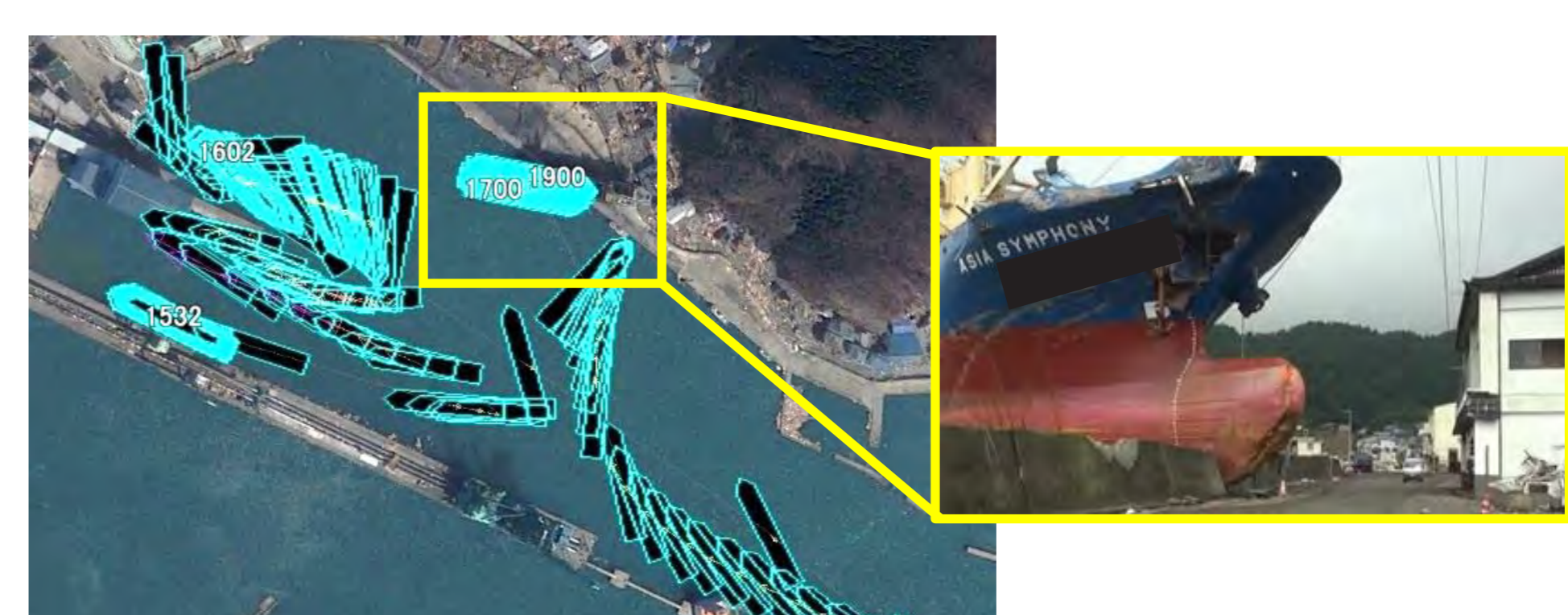### Comprehensive performance evaluation
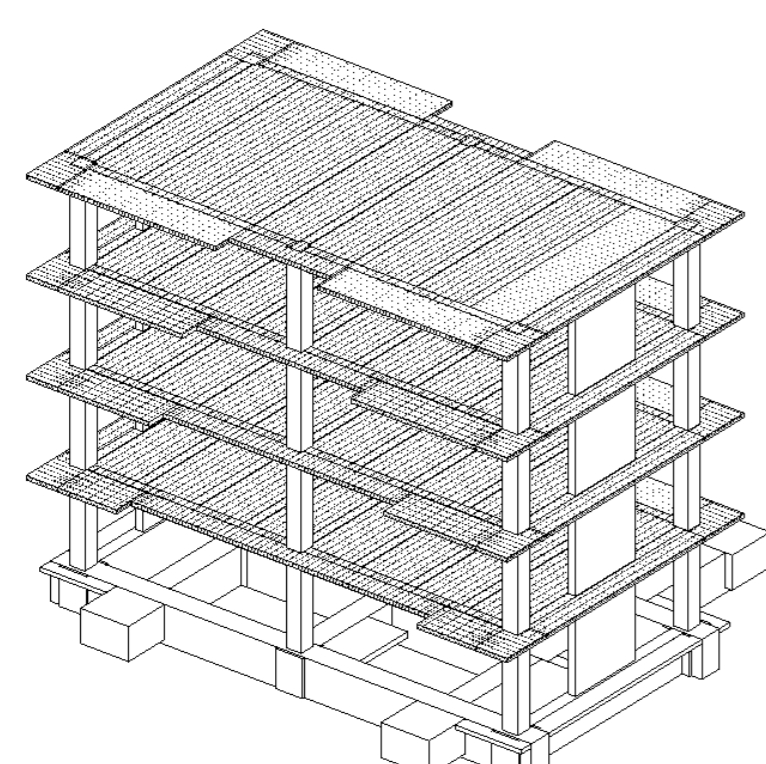
Automatic conversion

BIM model   FEM model

Investigation of building safety based on big data

Track of tsunami-driven ship in 2011

Institute of Industrial Science, The University of Tokyo