

# 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 field surveys, experiments, and numerical analyses. 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 (such as fiber-optics strain measurement), numerical simulations, and developing comprehensive seismic performance evaluations including non-structural components by utilizing BIM.

### Earthquake Damage Survey



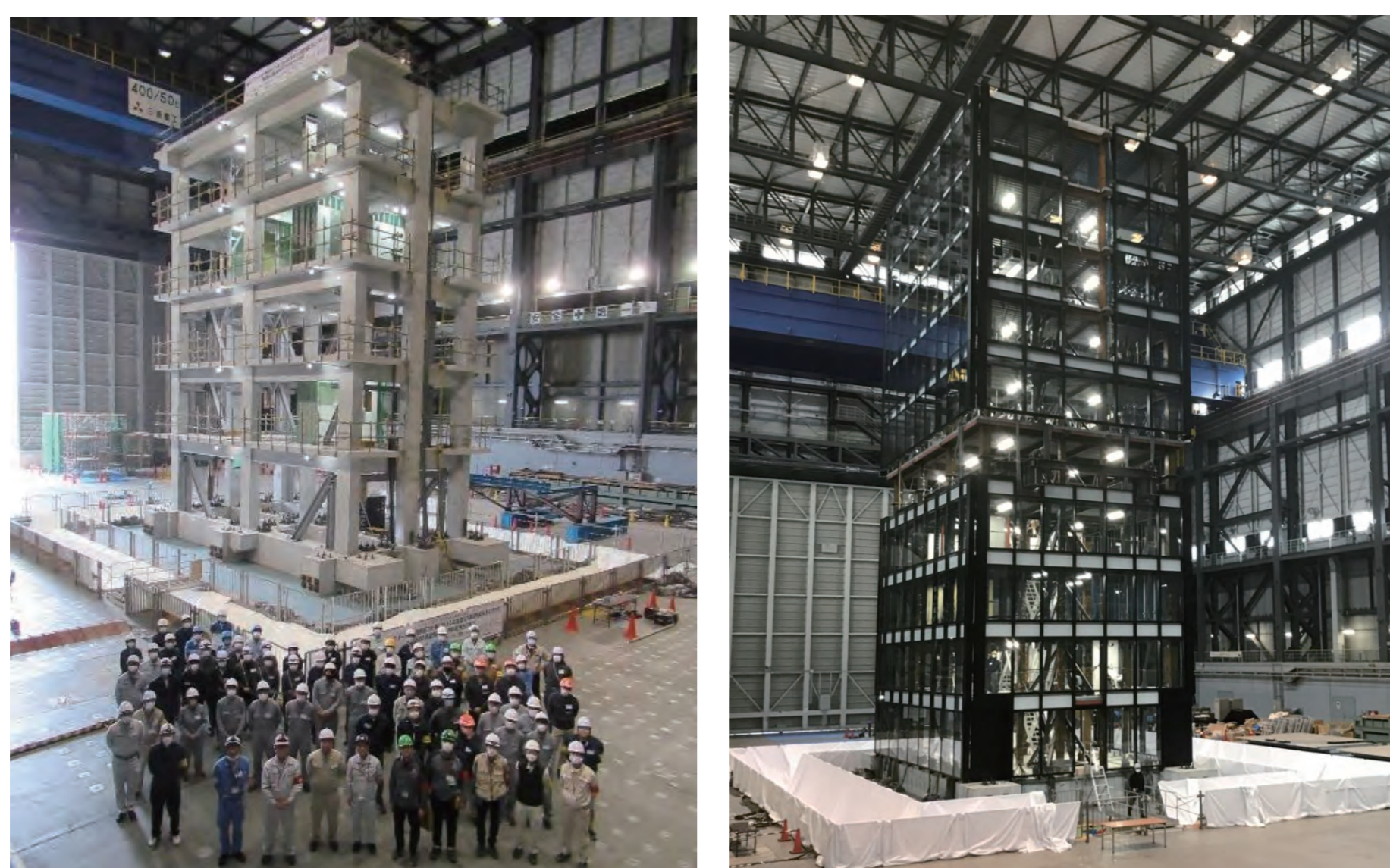
Collapsed building

Tilted building

Non-structural damages

Building swept by tsunami

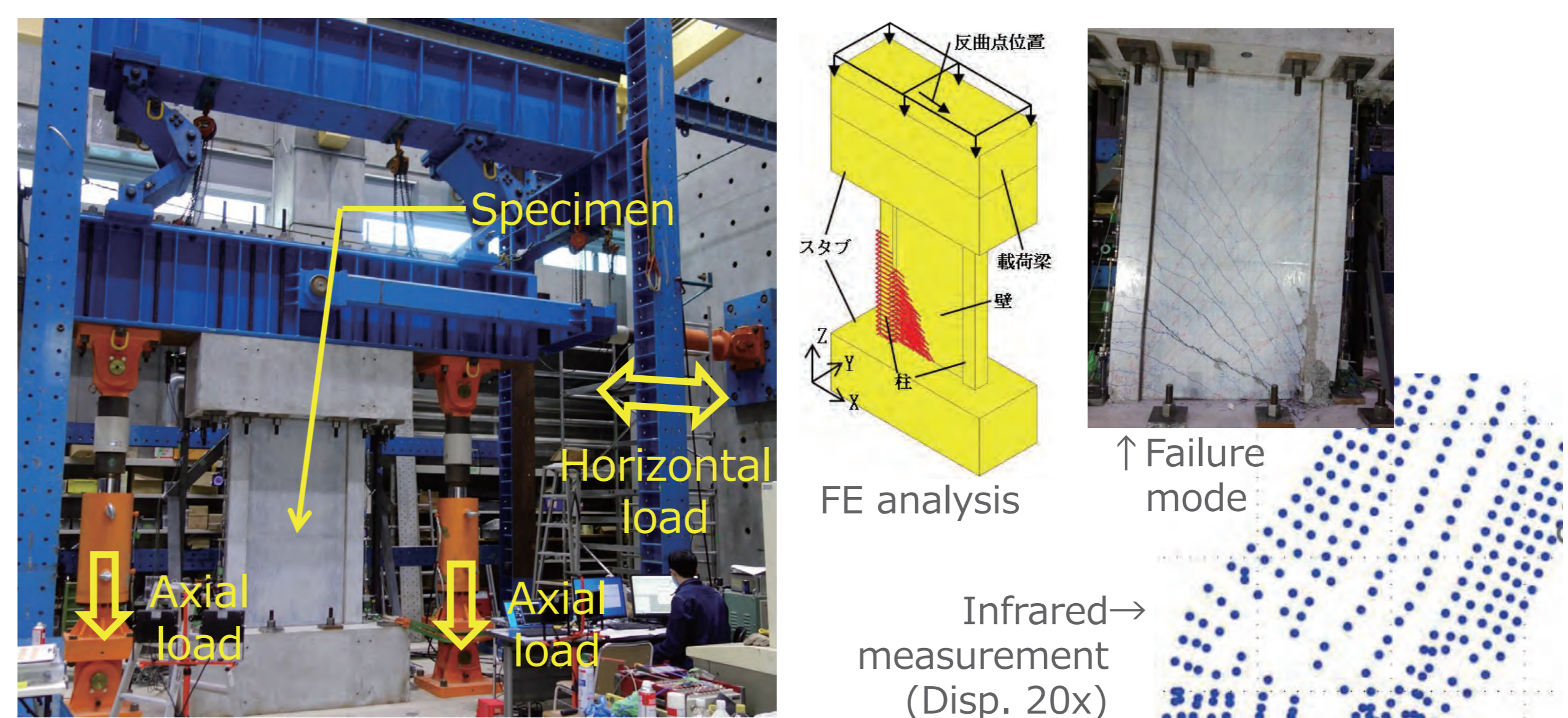
### Full-scale shaking table test



5-story RC in 2020

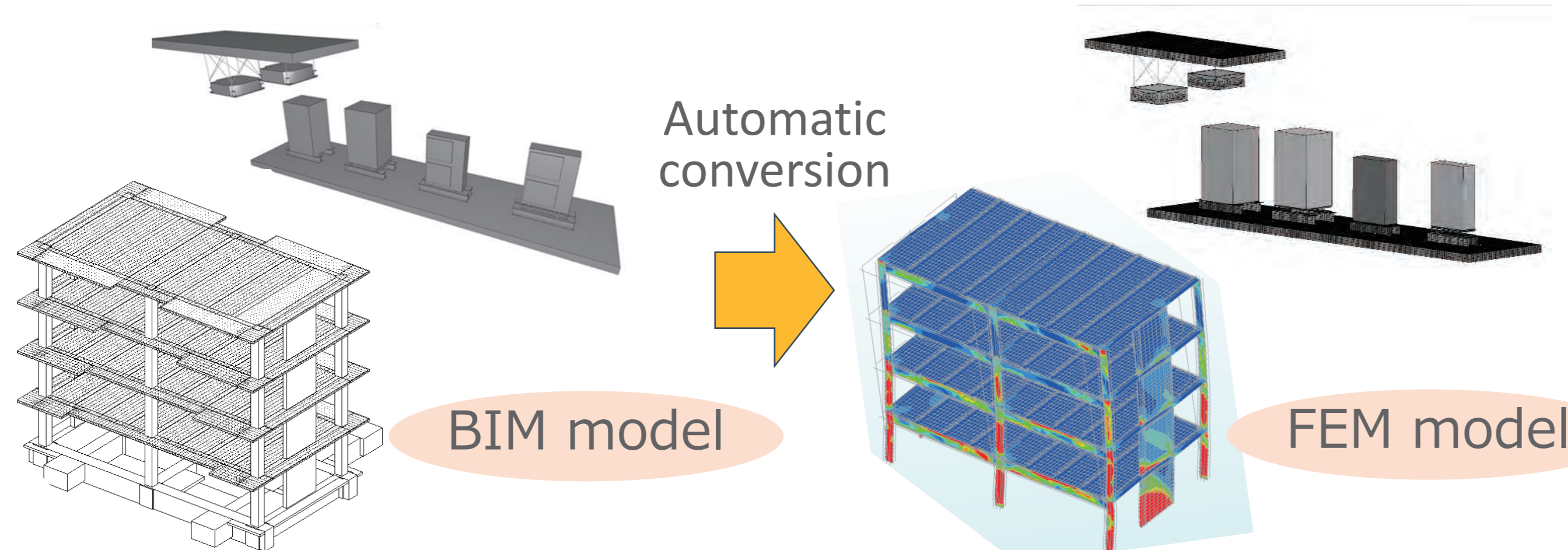
10-story steel in 2023

### Loading test of structural component



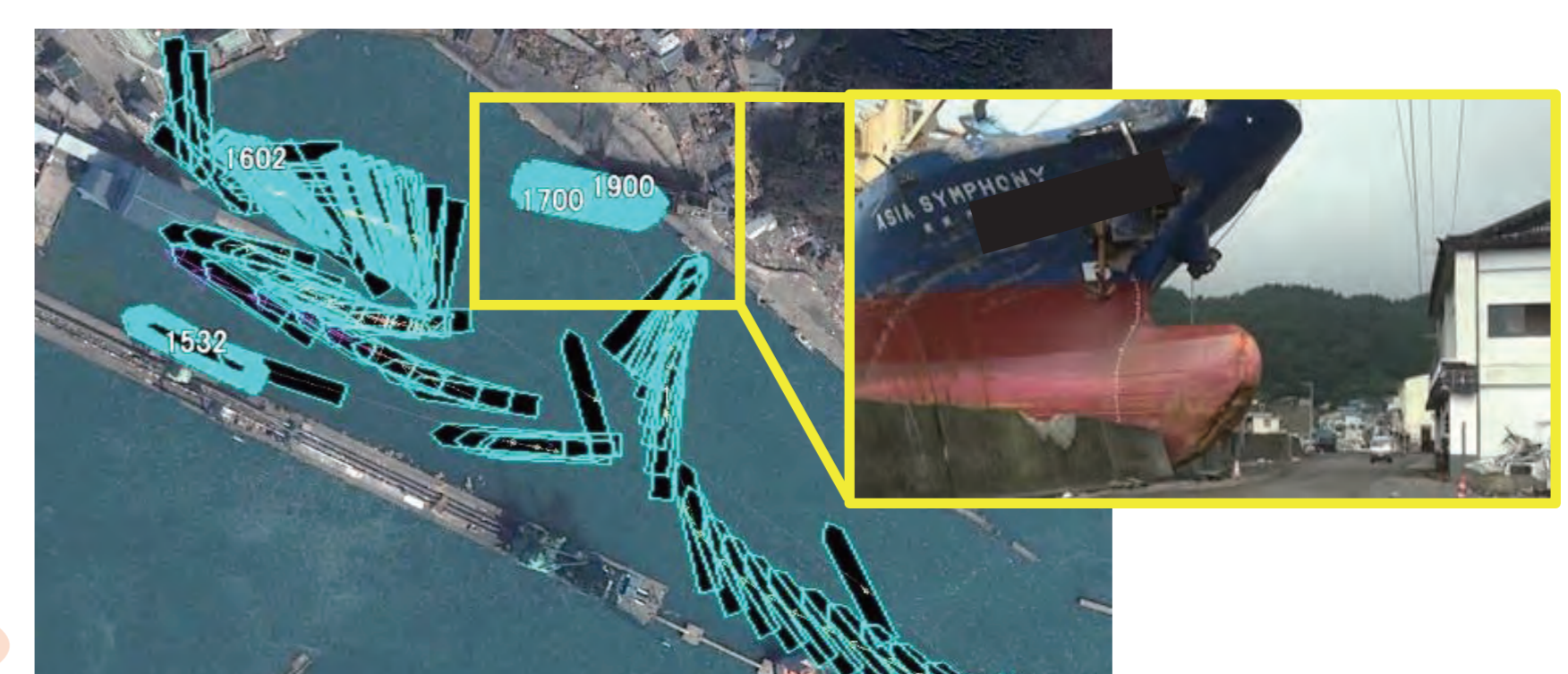
Cyclic loading test of seismic RC wall

### Comprehensive seismic performance evaluation



Development of BIM to FEM conversion system including NSCs

### Tsunami-resilient building design



Evaluation of load due to tsunami-driven ship collision based on ship-track bigdata