



Dynamic Loading Tests of Steel Beam-to-Column Connections

Katsuhiro Aoyagi (Laboratory of Structural Engineering, Graduate School of Engineering, Hokkaido University)

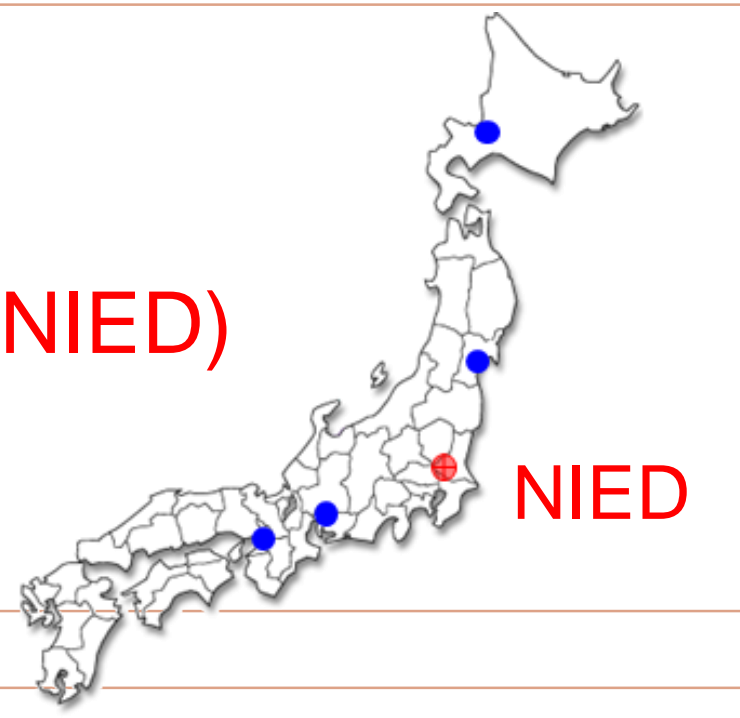
Objective

To examine the seismic performance of steel beam-to-column connections

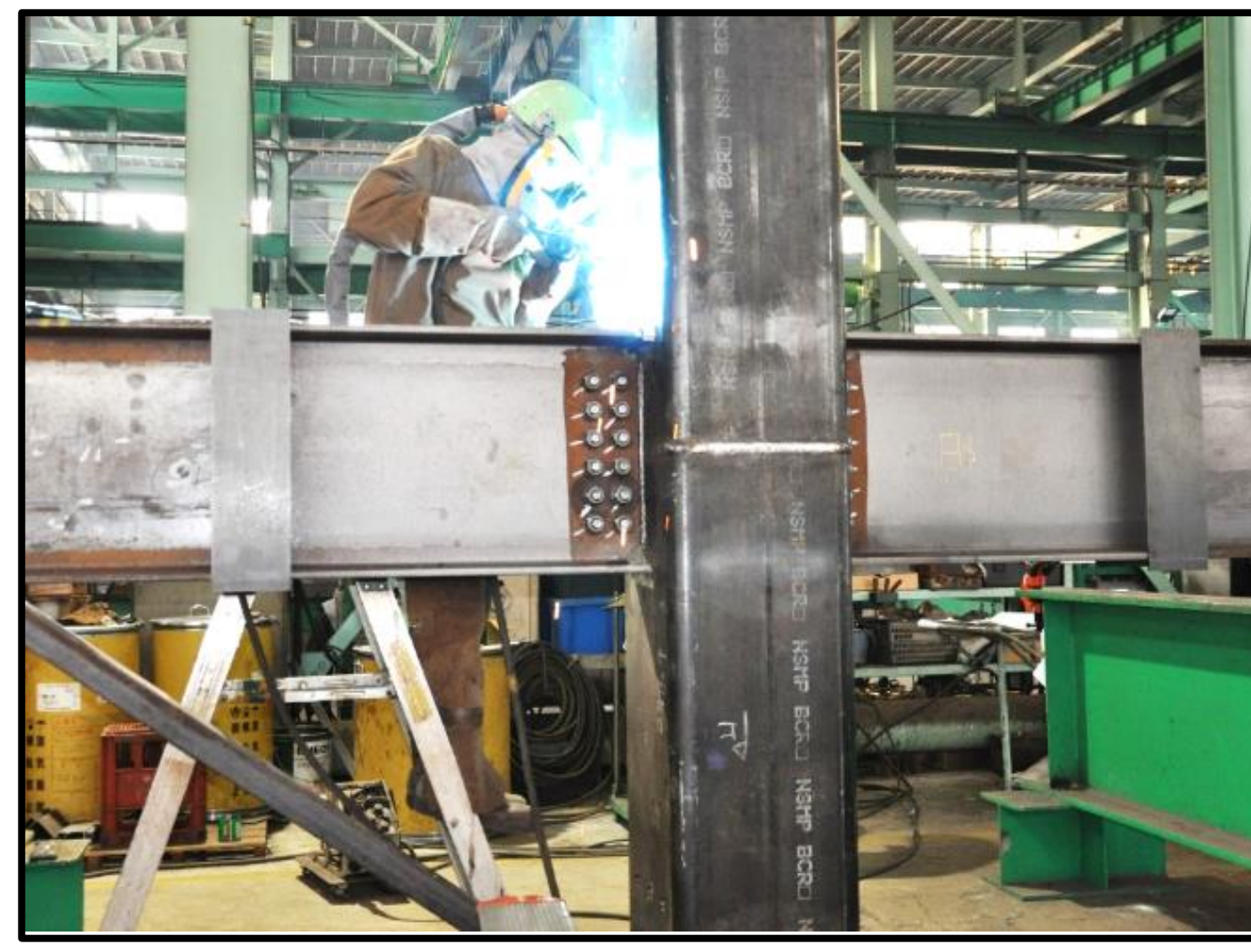
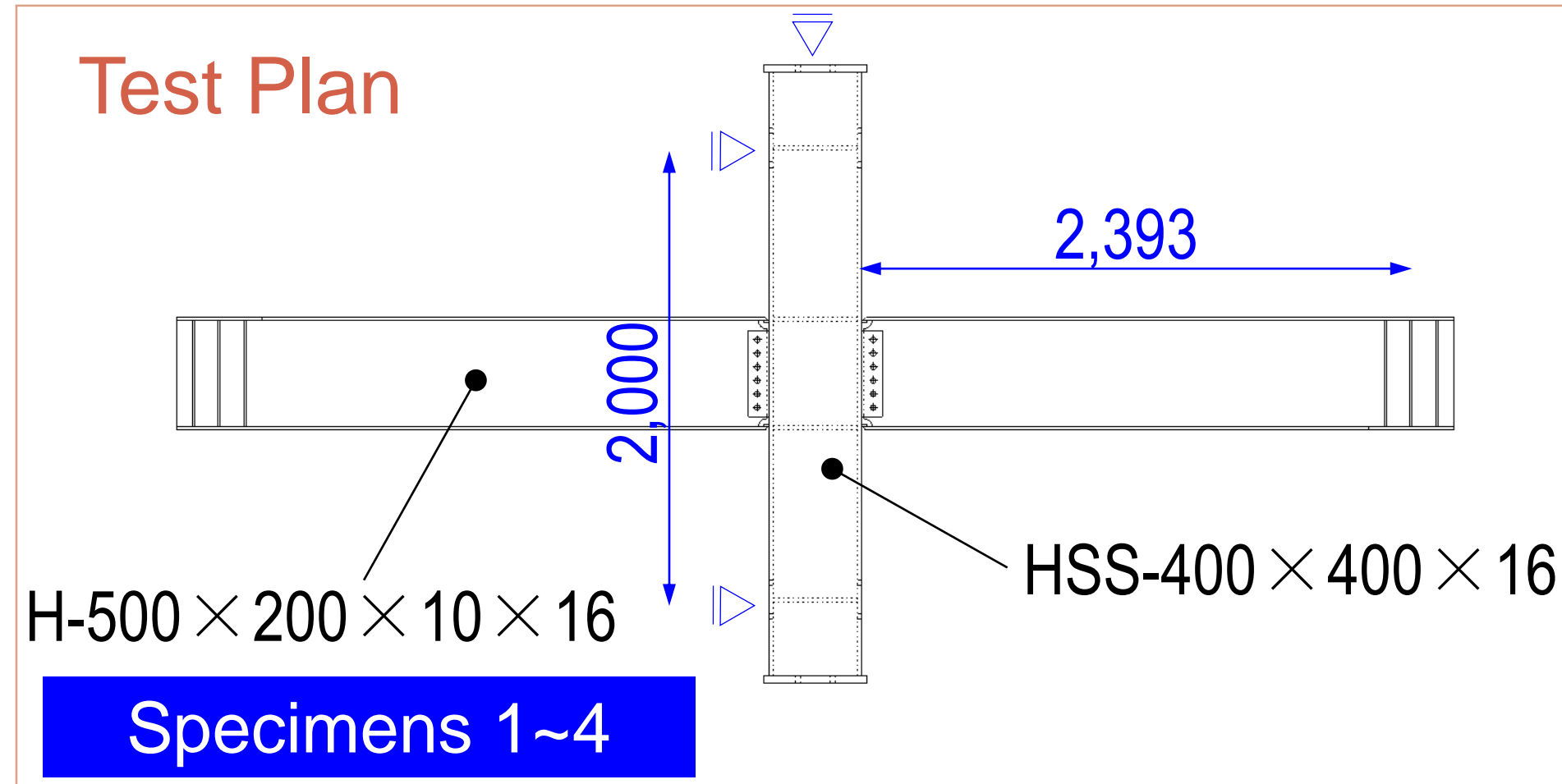
- Effect of dynamic loading
- Old vs. new
- Field welded vs. shop welded
- Effect of floor slab

Joint Project

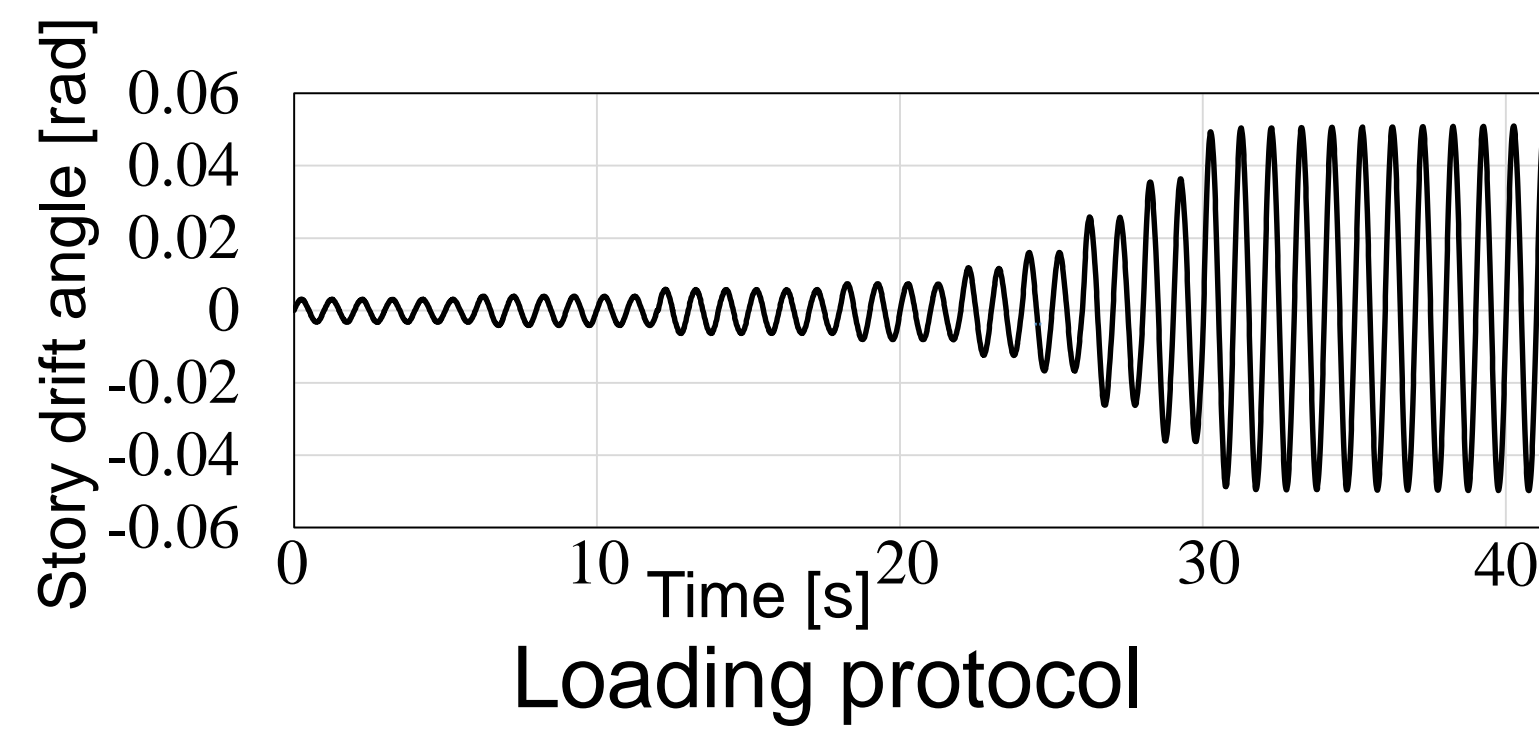
- Conducted at **Large-Scale Earthquake Simulator** of **National Research Institute for Earth Science and Disaster Resilience (NIED)**
- Project team: Hokkaido University, Tohoku University, NIED, Nagoya University, Kindai University



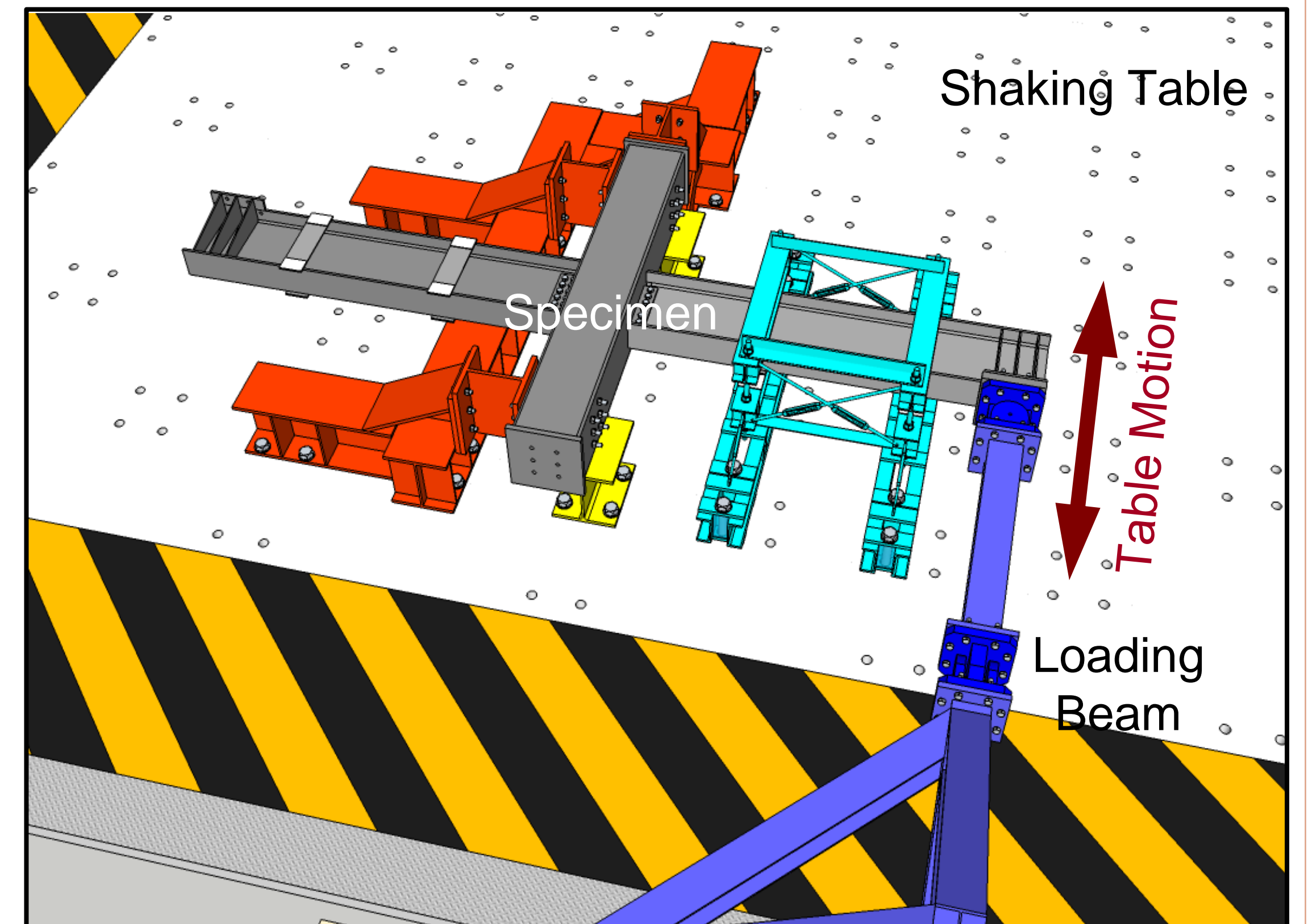
Test Plan



Fabrication



Loading protocol

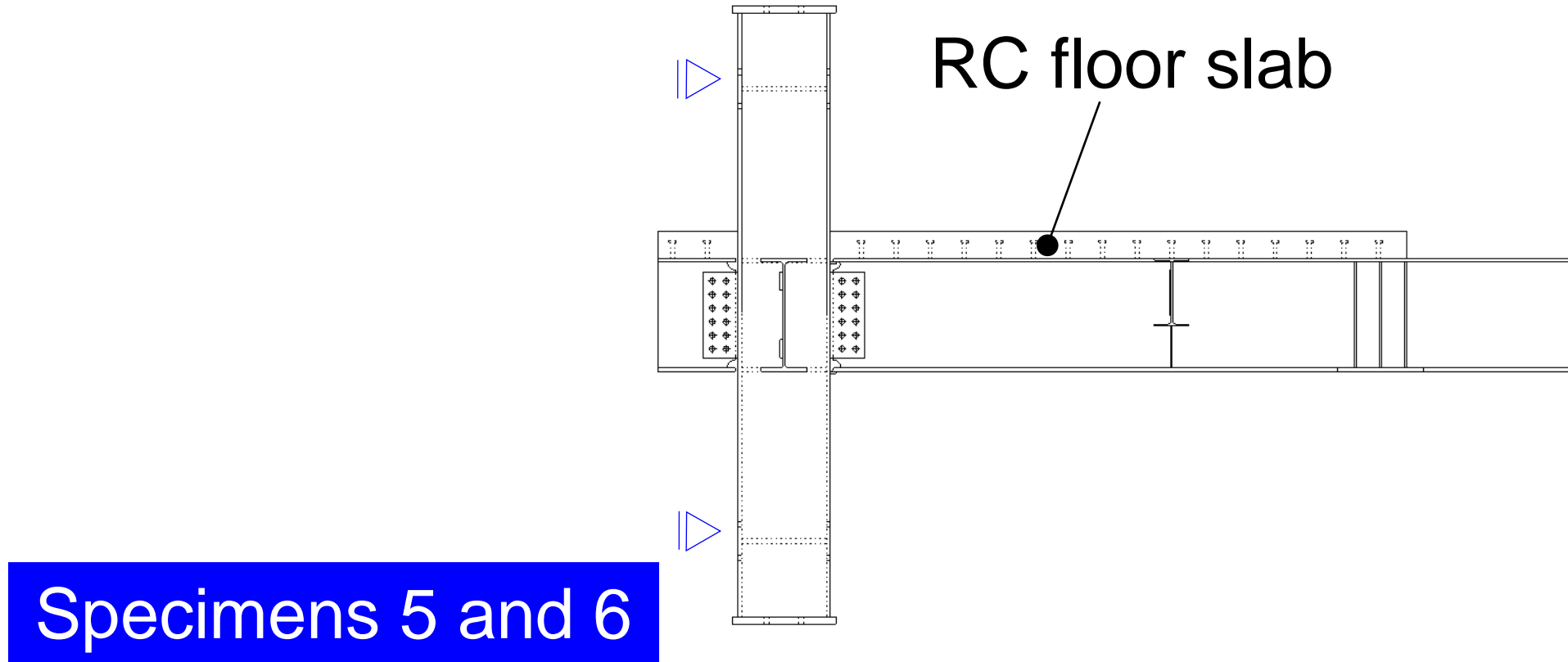


Shaking Table

Specimen

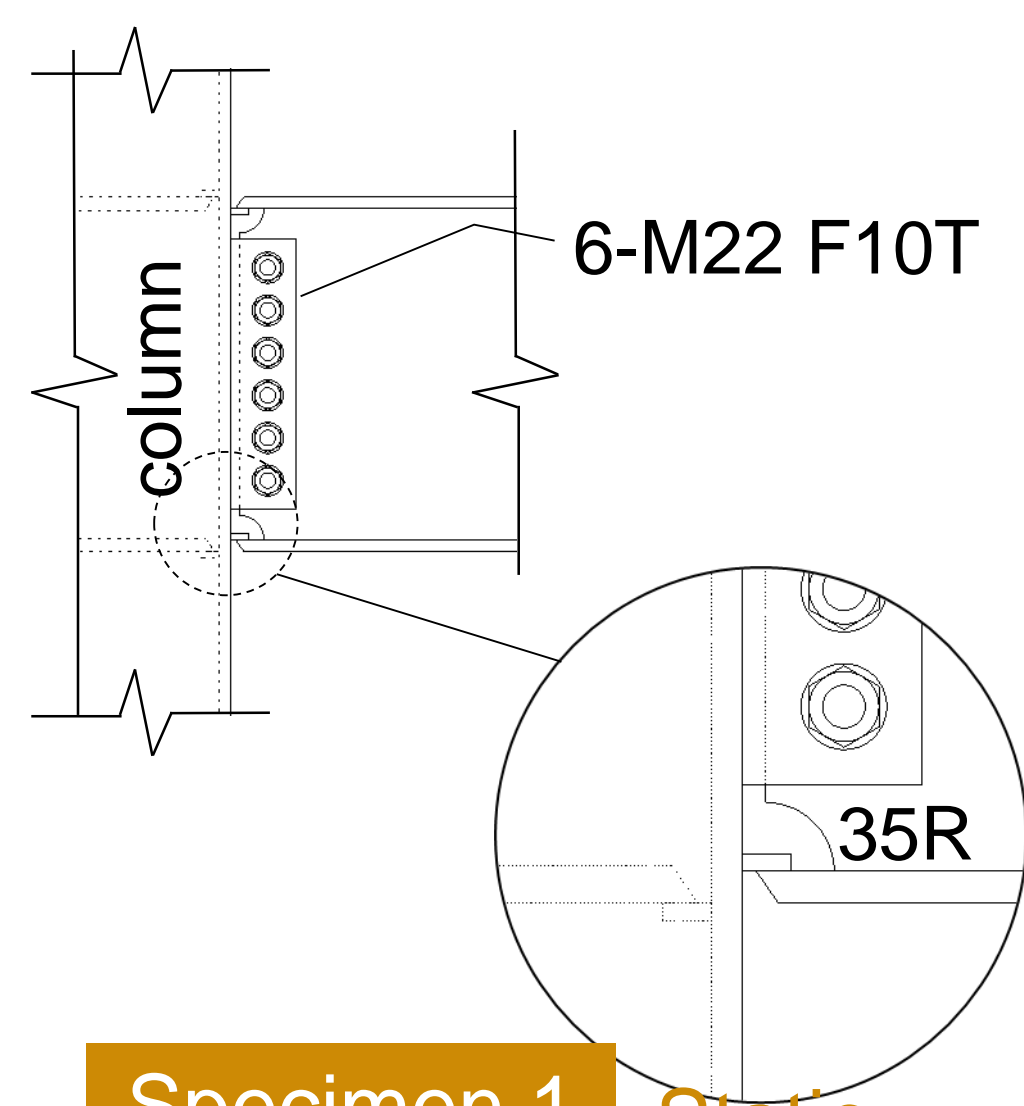
Table Motion

Loading Beam



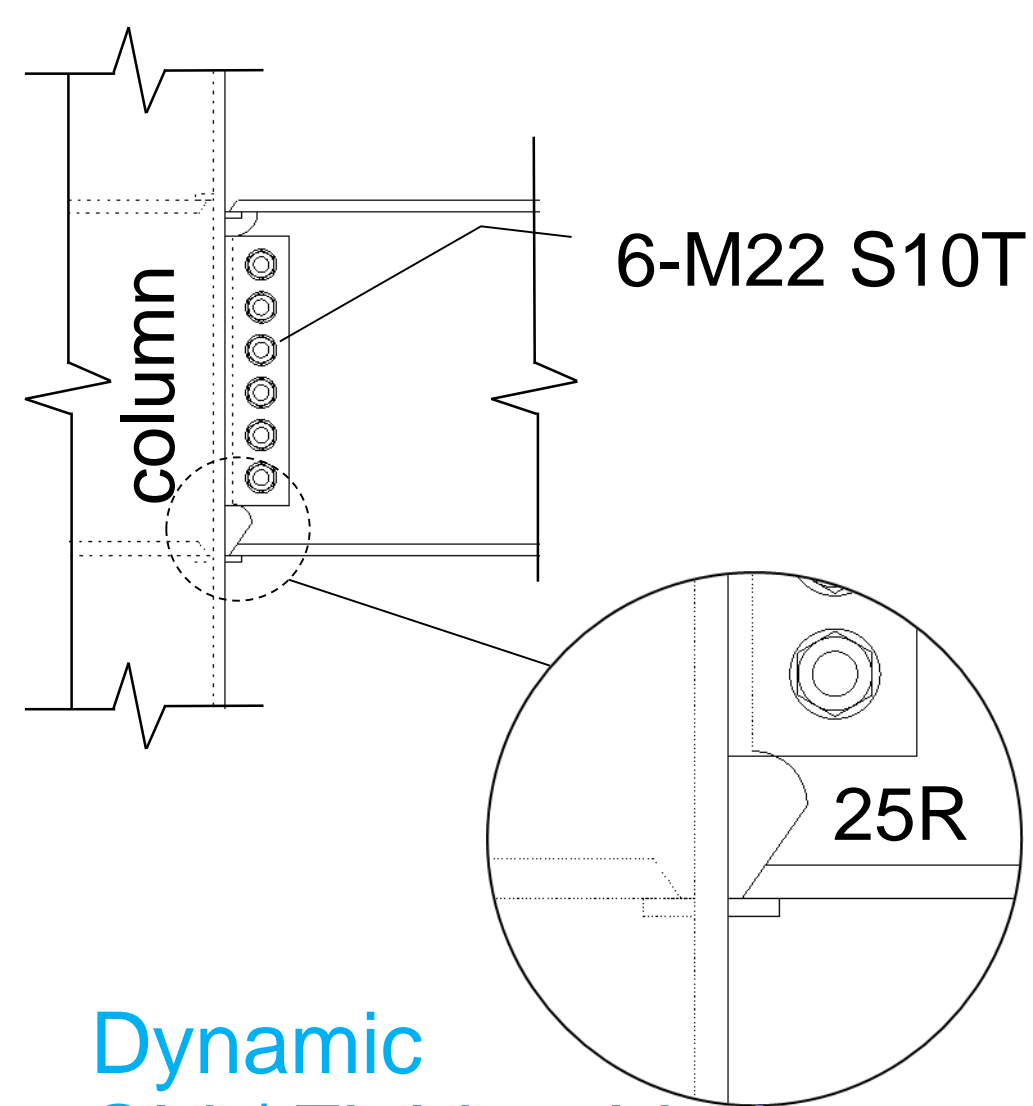
RC floor slab

Specimens 5 and 6

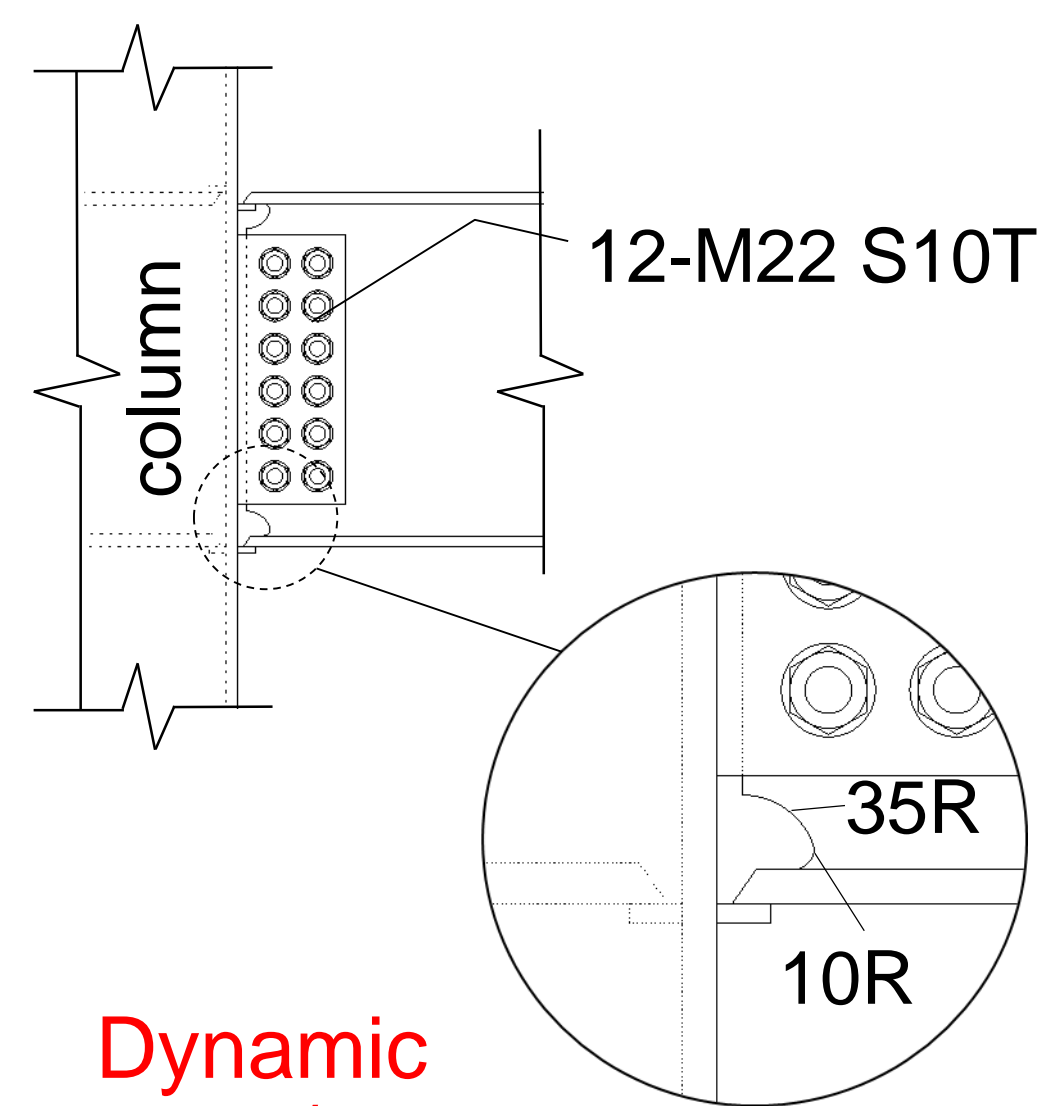


Specimen 1 Static

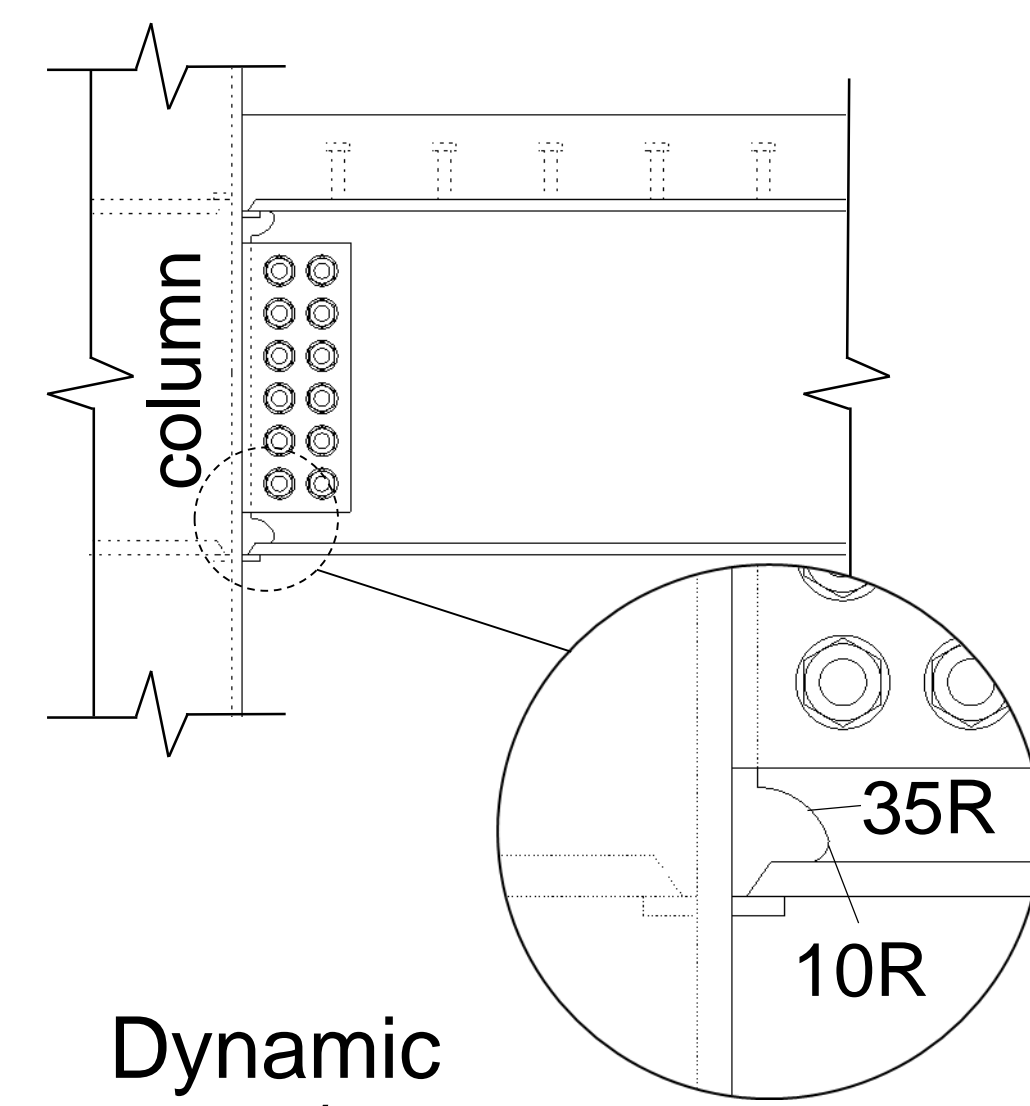
Specimen 2 Dynamic



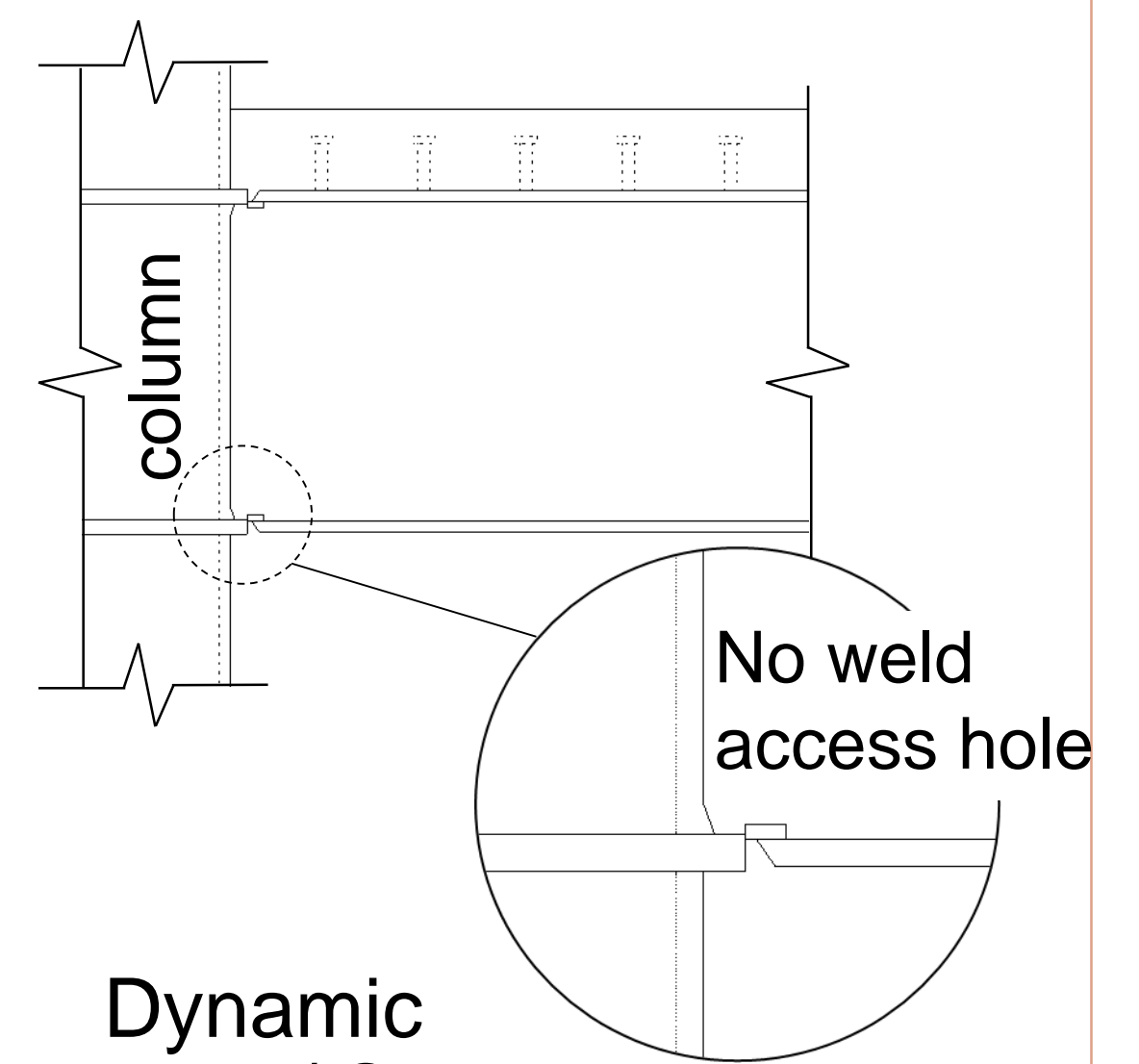
Dynamic Old / Field welded Specimen 3



Dynamic New / Field welded Specimen 4

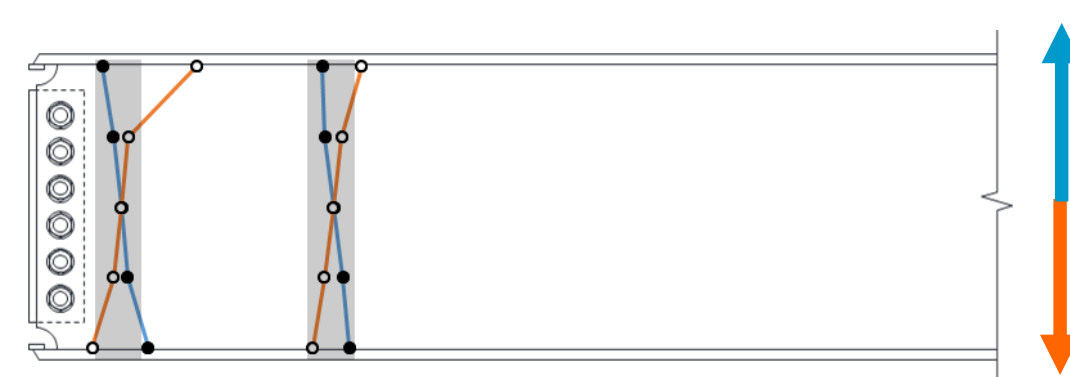
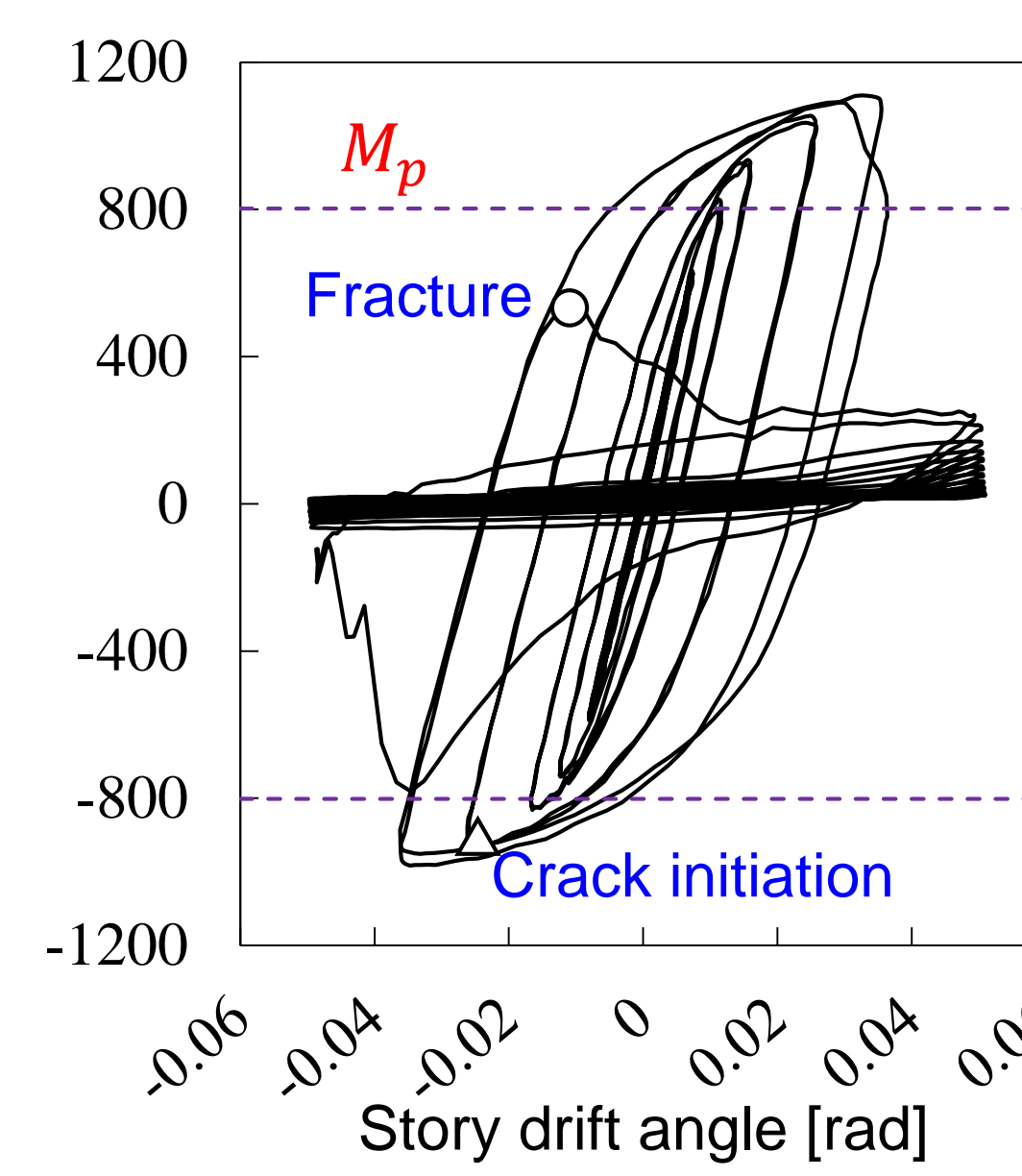
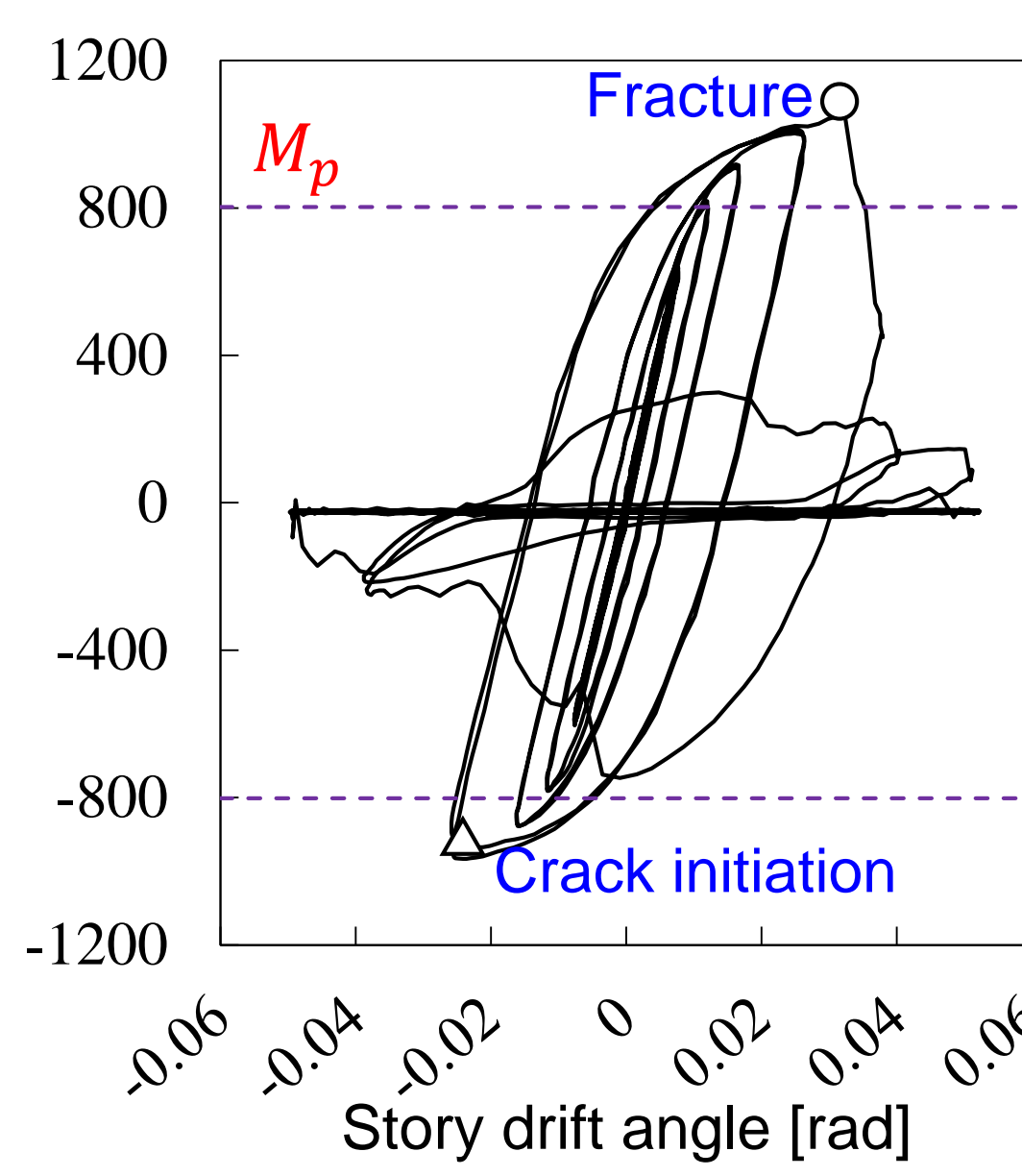
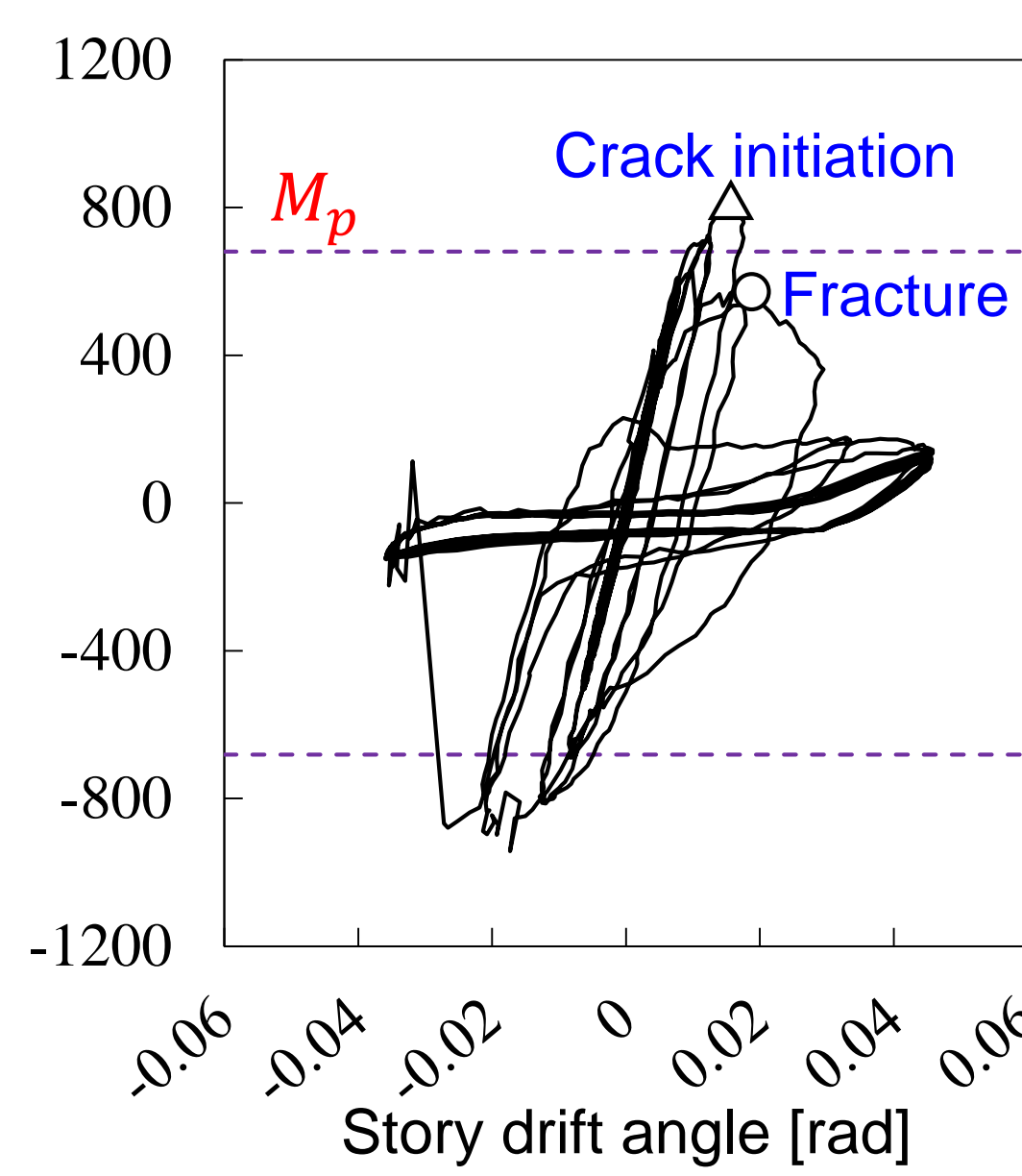
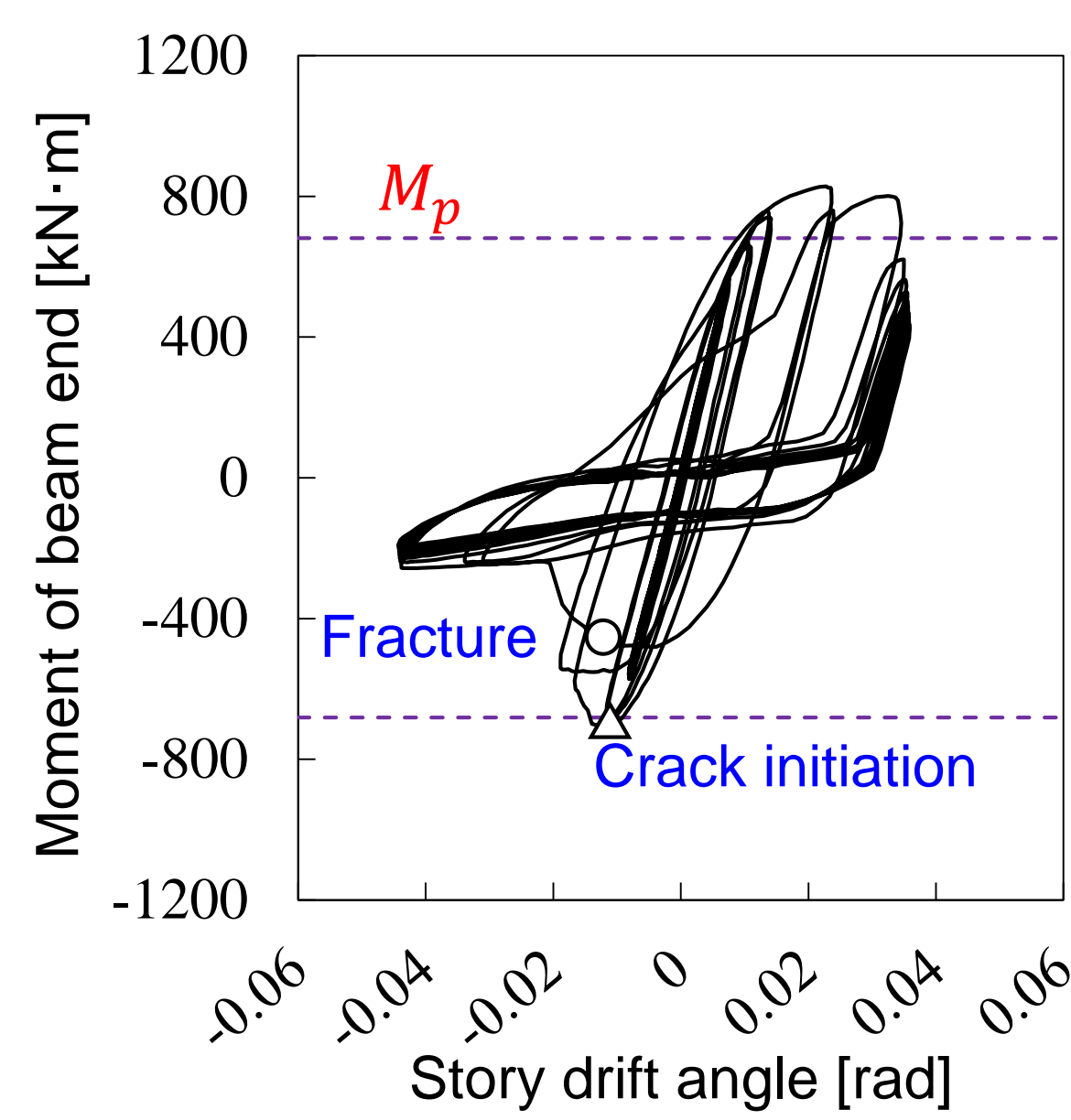


Dynamic New / Field welded Specimen 5

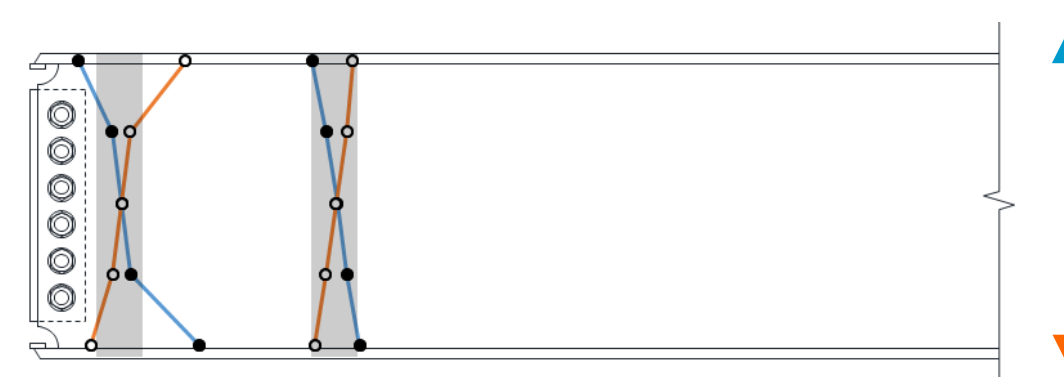


Dynamic New / Shop welded Specimen 6

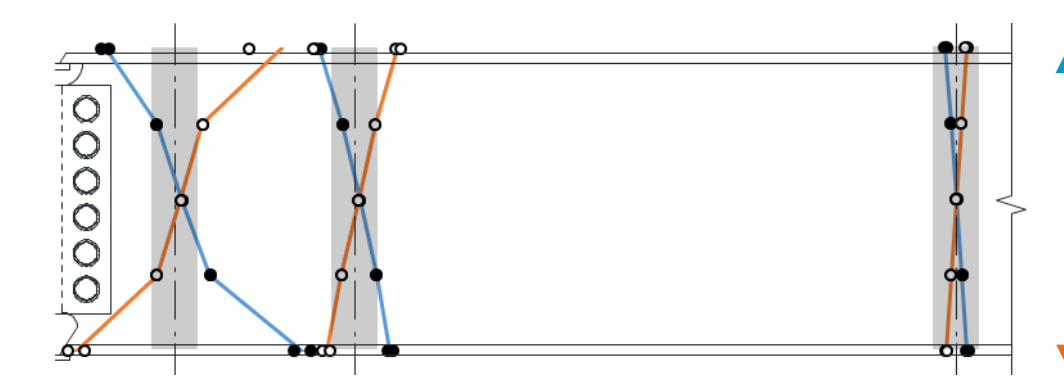
Test Result



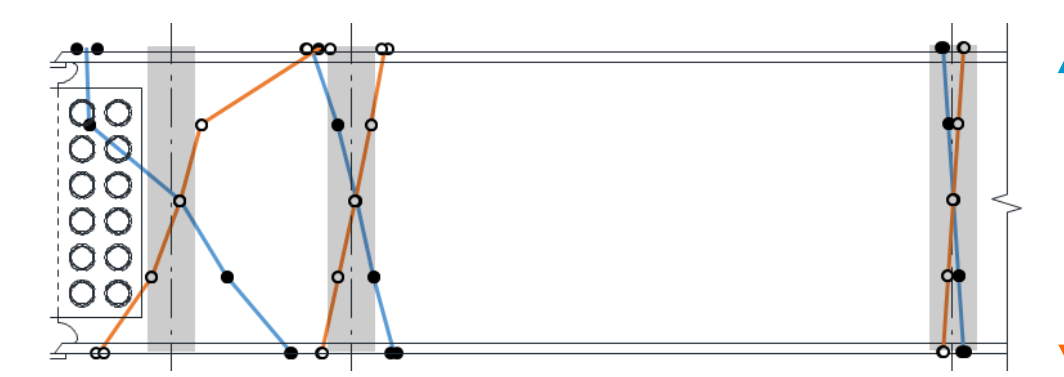
Specimen 1



Specimen 2



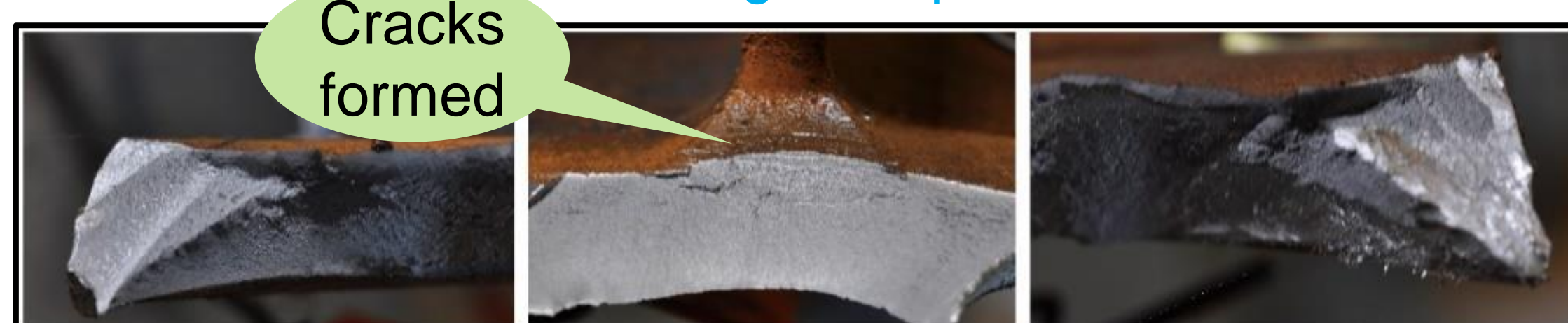
Specimen 3



Specimen 4



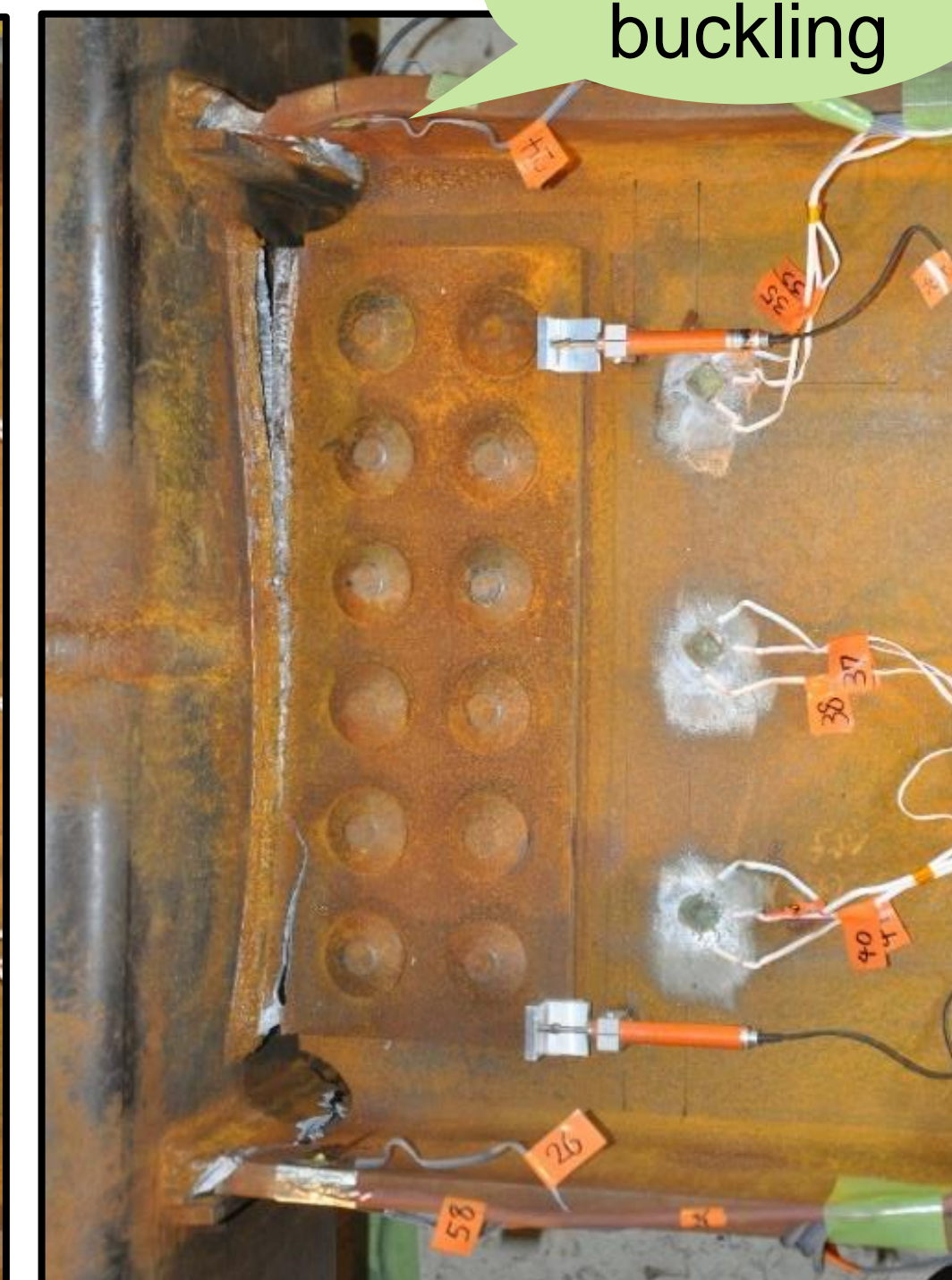
Bottom flange of Specimen 3



Bottom flange of Specimen 4



Specimen 3



Specimen 4

Photos after test

Observations

- Effect of dynamic loading was minimal
- Specimens 1 and 2 performed poorly
- New detail performed better than Old mainly due to difference in web connection strength
- Specimens 5 and 6 will be tested next January

