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Pseudo-dynamic testing of a fabricated composite frame with steel plate shear walls

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Fabricated composite frame with steel plate shear walls



Composite beam



BHA connection



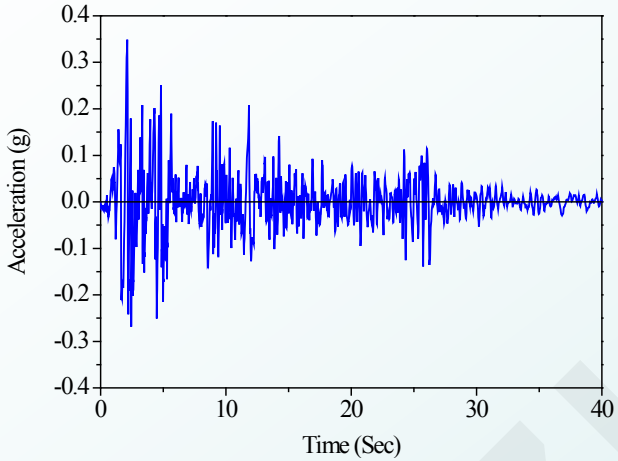
Infill panel

Fabricated construction technology



Fabricated composite frame with steel plate shear walls

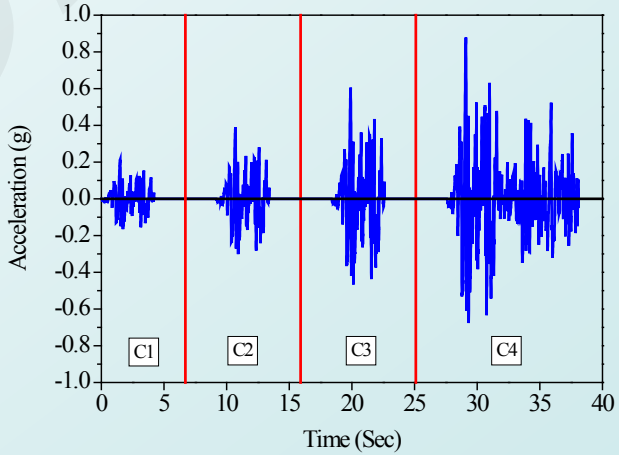
Loading Cases



Original ground acceleration (EL Centro, 1940)

PGA and duration of four loading cases

Case	C1	C2	C3	C4
PGA	0.22g	0.4g	0.62g	0.9g
Duration (s)	4.2	4.2	4.2	10.5



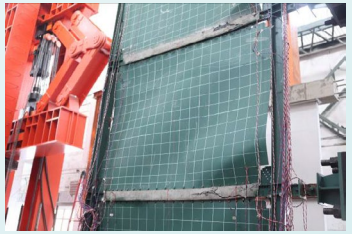
Continued scaled ground acceleration

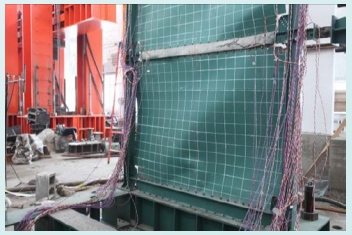
Experimental phenomena



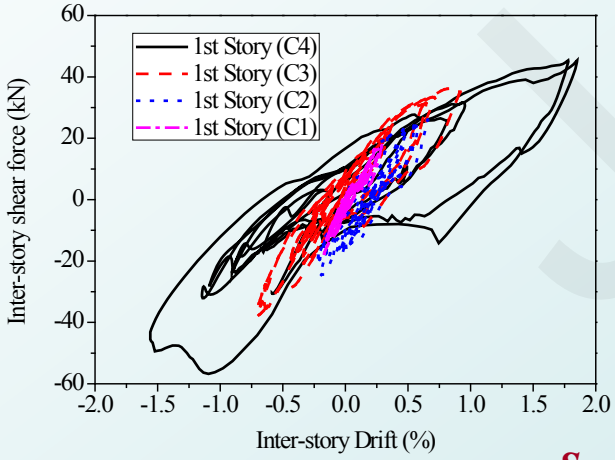




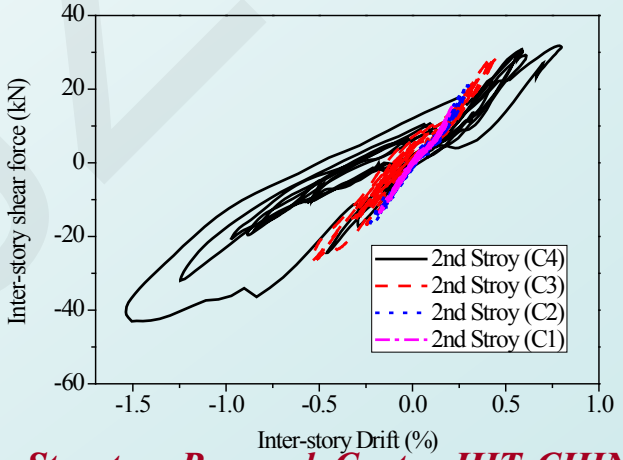




Case C1

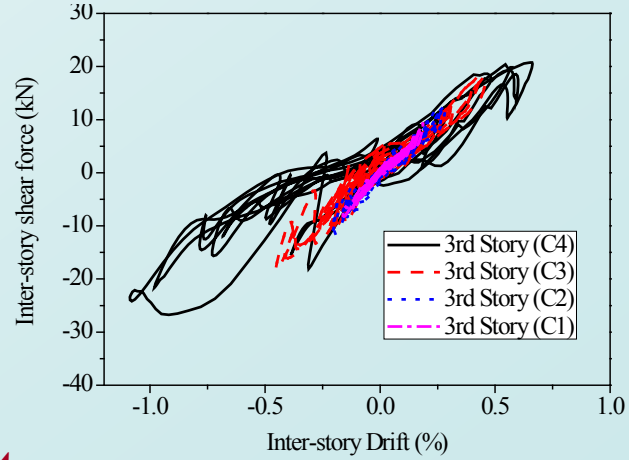


Case C2



Case C3

Case C4



Conclusions

- Beam-only-connected SPSWs buckled at a relatively small inter-story drift, and post-buckling tension fields were formed and yielded to resist lateral loads and dissipate earthquake energy.
- No damage or obvious connector slippage was observed in BHA connections, which was in accordance with the strong connection design principle.
- An undesirable failure mode of the fabricated composite frame in huge earthquakes was the horizontal cracks progressed in composite beams and the block shear failure in SPSWs' connections.
- The first story was the critical position of the prototype building and needed to be well designed to avoid the formation of soft-stories.