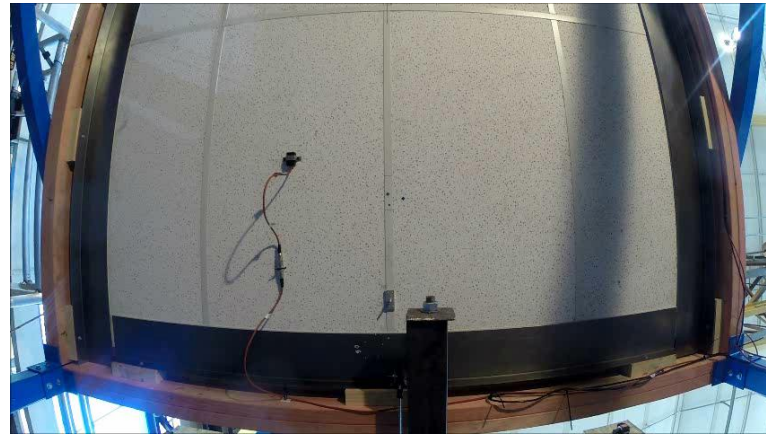
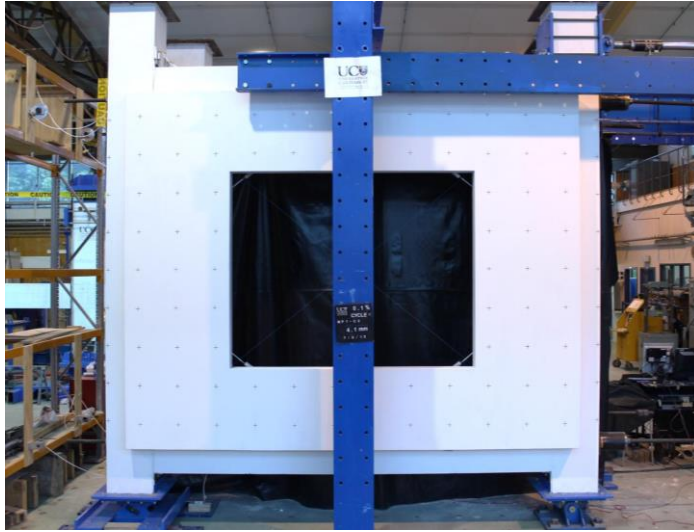


Non-Structural Elements: Experimental Research Needs

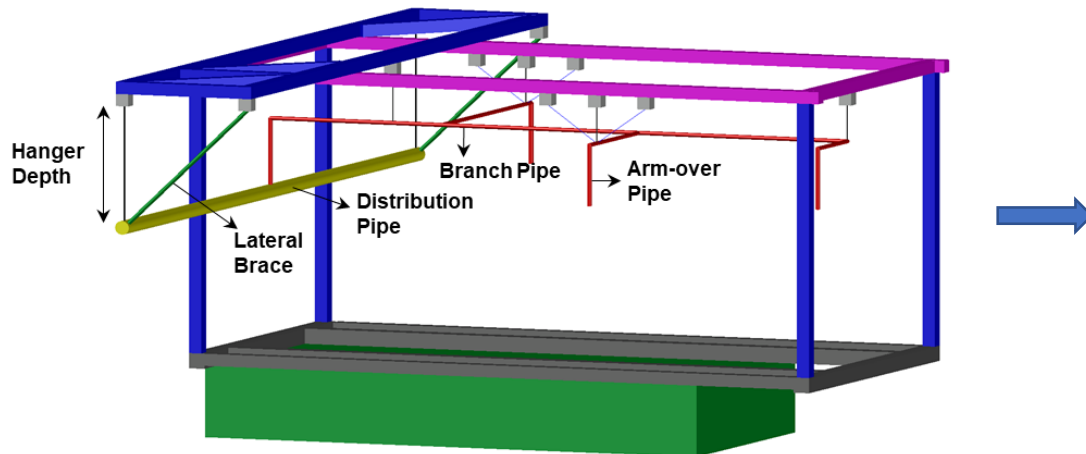
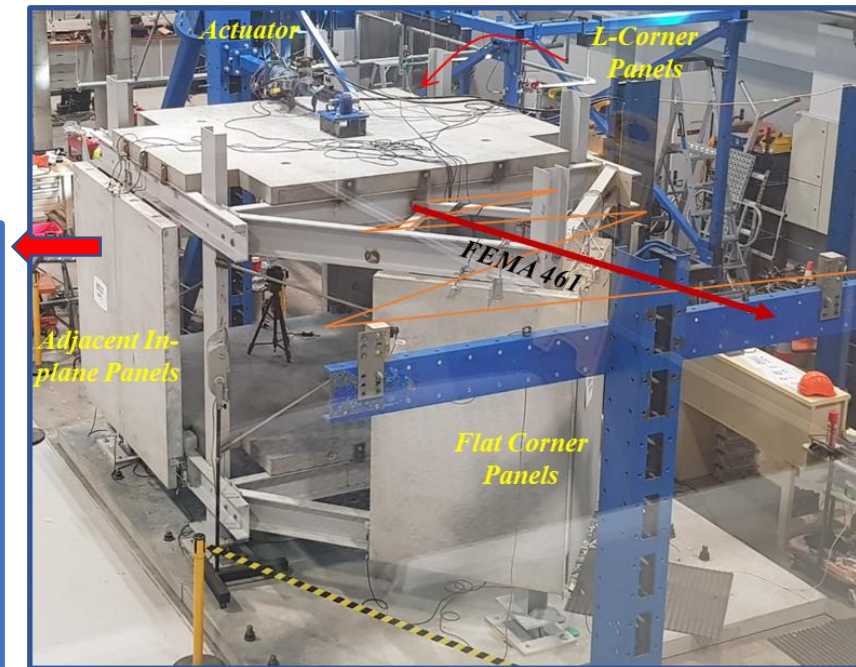
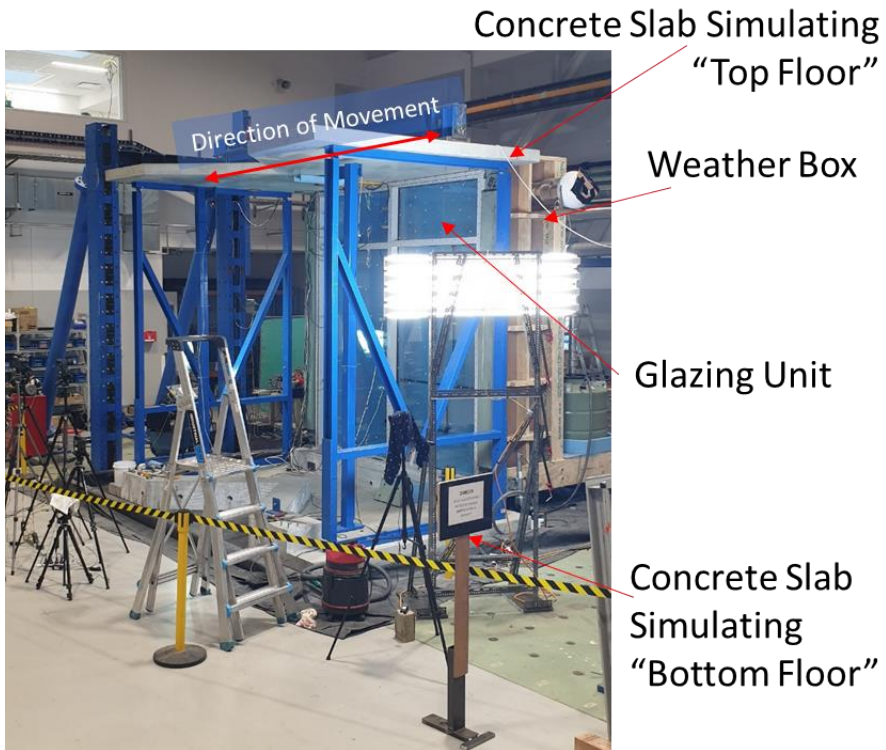
Rajesh Dhakal
University of Canterbury

Accomplished Experimental NSE Projects

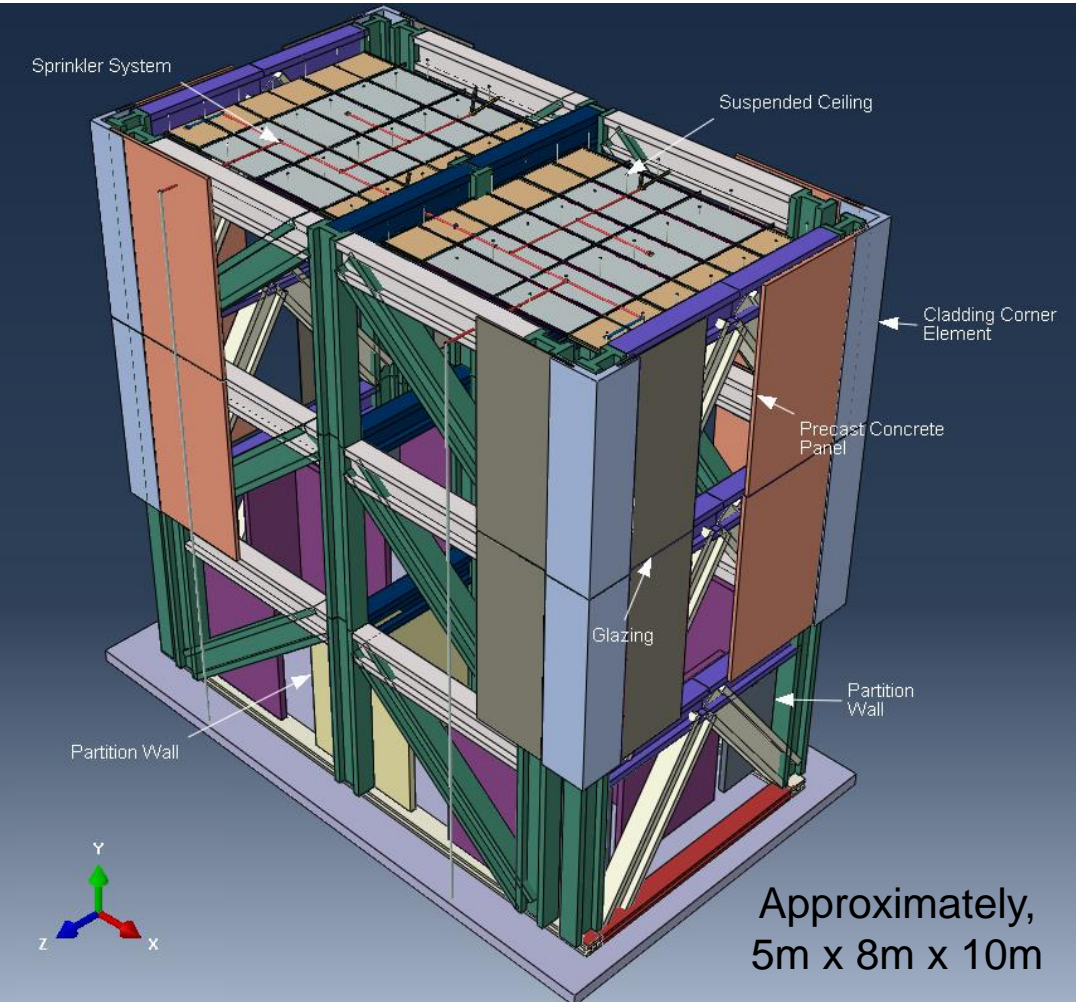


RP Dhakal, A Purali, S Tasligedik, T Yeow, A Baird, G MacRae, S Pampanin and A Palermo (2016).
"Seismic Performance of Non-Structural Components and Contents in Buildings: An Overview of NZ Research".
Earthquake Engineering and Engineering Vibration, 15(1): 1-17. <https://doi.org/10.1007/s11803-016-0301-9>

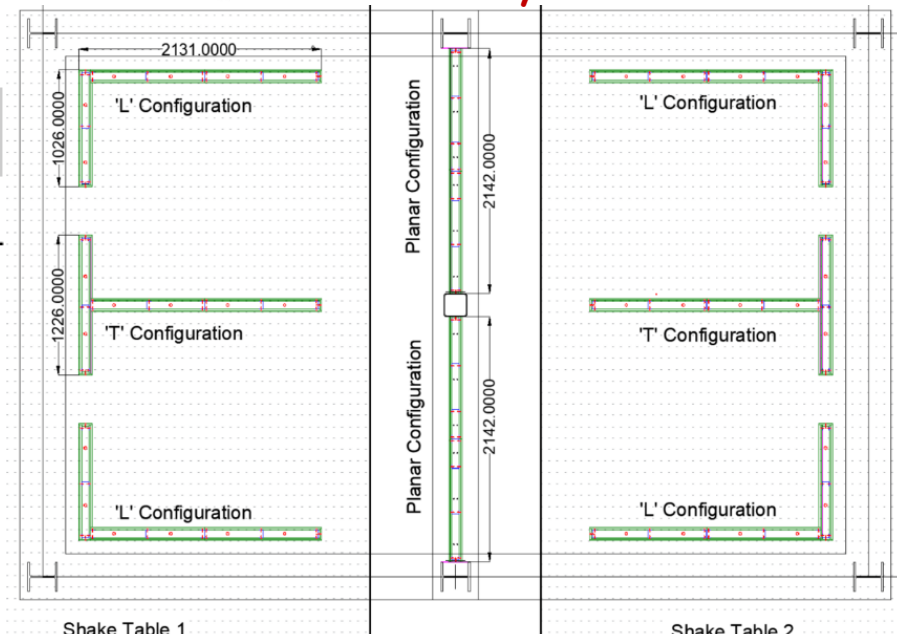
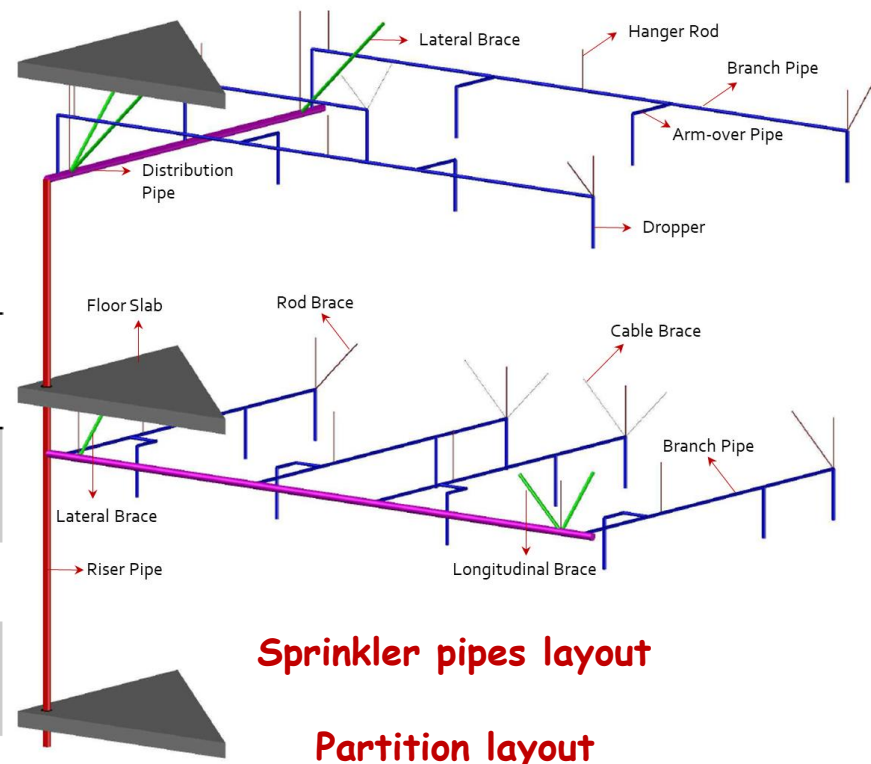
Current NSE Testing Capability



ROBUST Building System Shake Table Test with Multiple NS Components

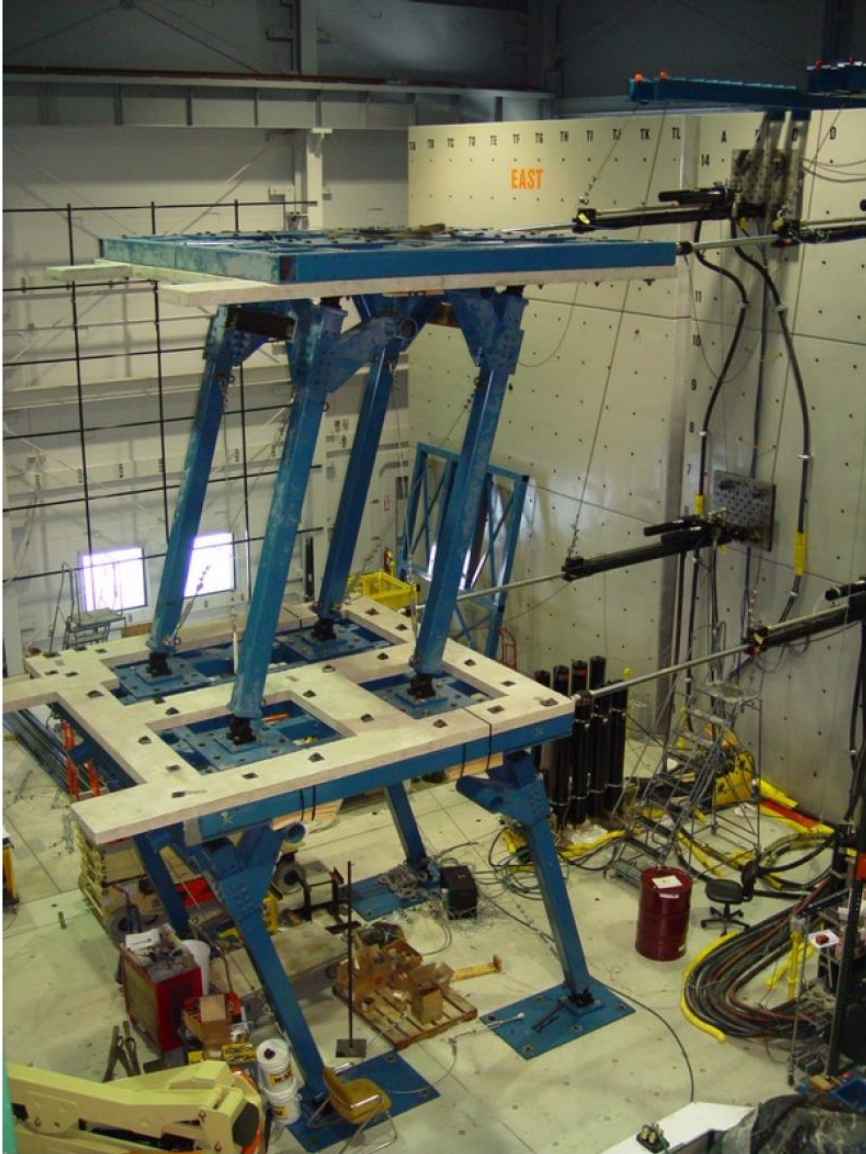


Non-Structural Element	Installation Level
Suspended Ceilings	Levels 2 & 3
Partition Walls	Level 1
Precast Cladding Panels	Levels 2 & 3
Glazed Curtain Walls	Levels 2 & 3
Sprinkler pipes	Levels 2 & 3
Contents	Level 3

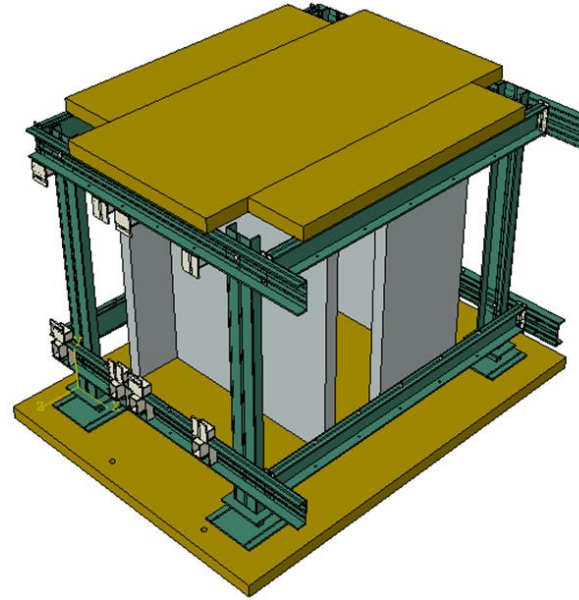


RP Dhakal, M Rashid, J Bhatta, C Chen, GQ Song, TJ Sullivan, GA MacRae, GC Clifton, P Xiang and LJ Jia (2020). "Shake table testing plan for multiple non-structural elements and contents in a low-damage structural steel building". 17th World Conference on Earthquake Engineering (17WCEE), September 27-2 October 2021, Sendai, Japan, 12pp.

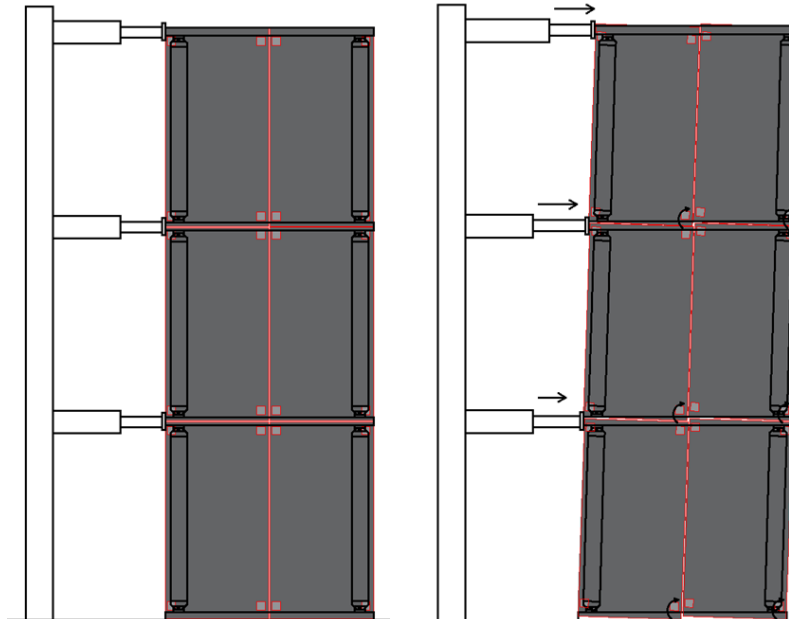
Non-Structural Components Simulator



Non-structural simulator at SUNY Buffalo

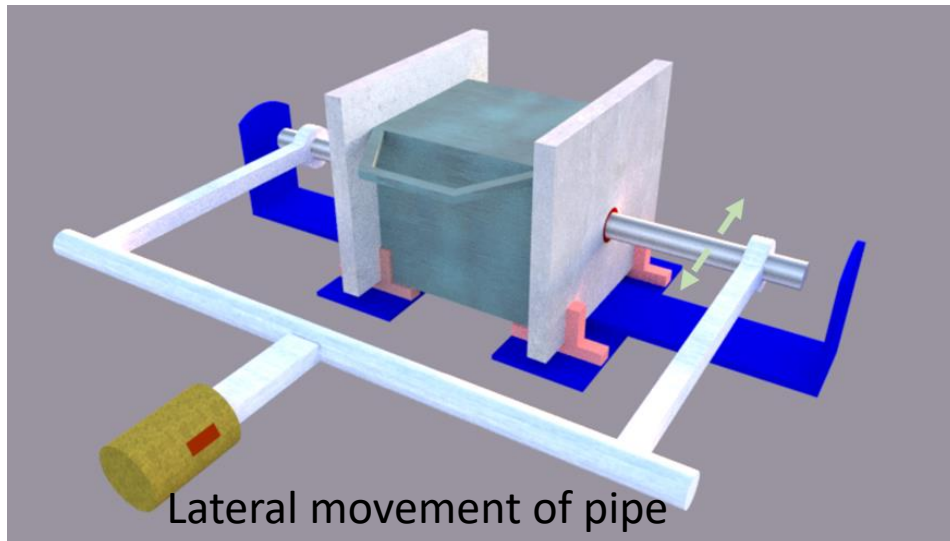
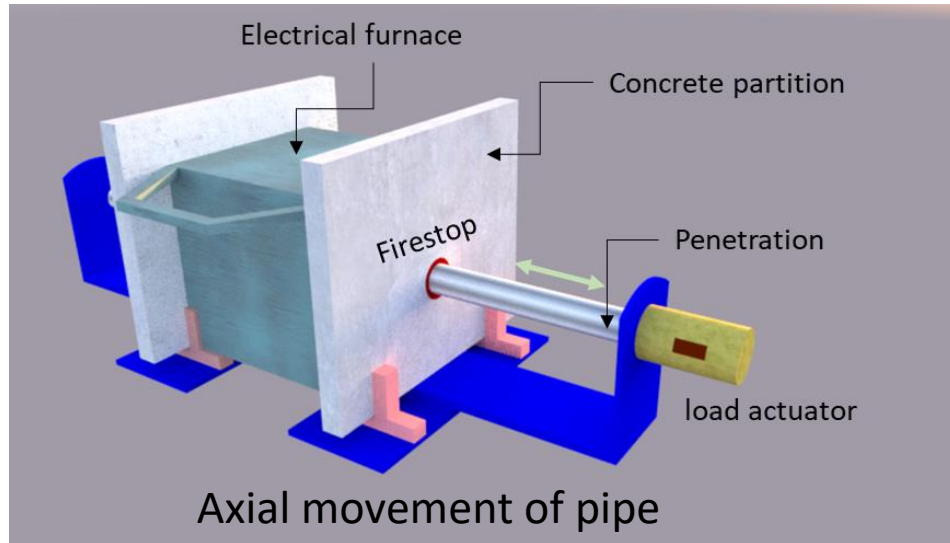


← Current ability

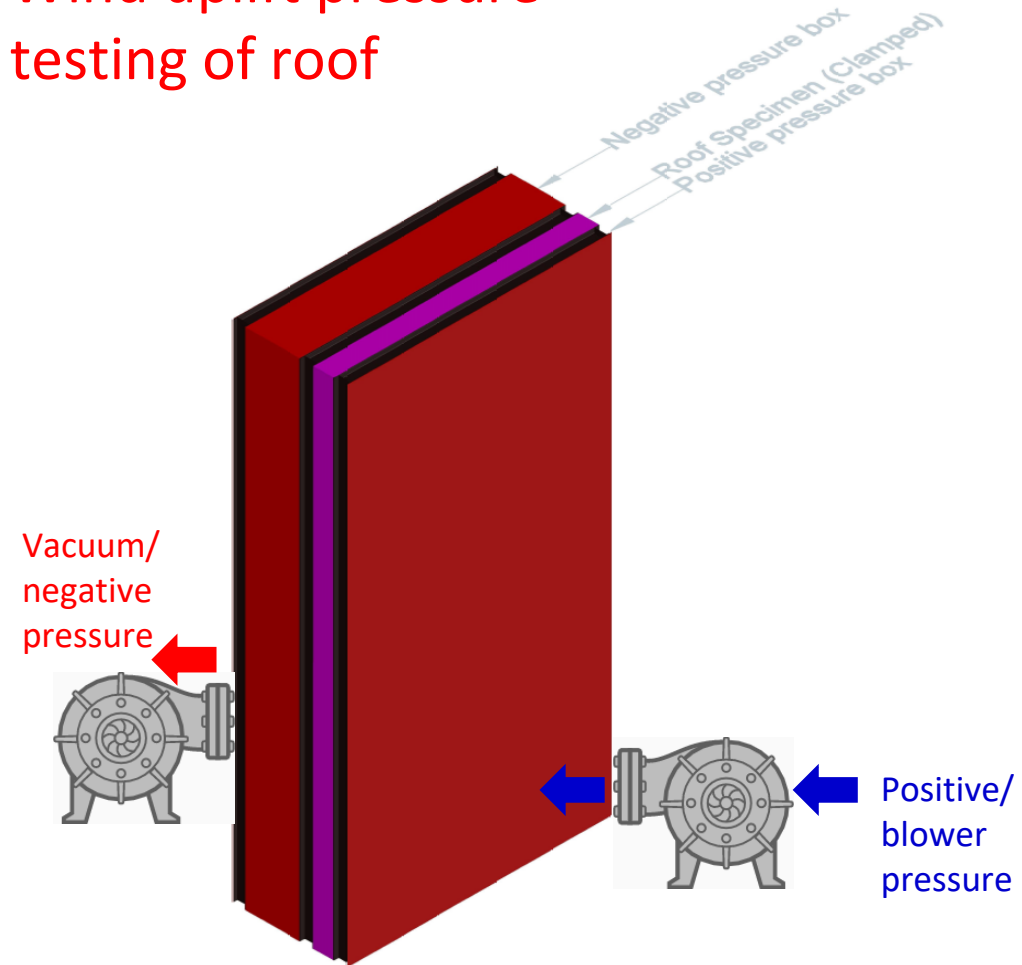


← Future need

Seismic + Fire or Air/Water Pressure Hybrid Tests



Wind uplift pressure testing of roof



NSE Experimental Needs

- Two-three story 3D frame to test drift-sensitive NSEs subjected to different ISD ratios in different floors
- Large scale shaking table facility to test interaction between different NSEs and whole of building performance
- Using air/water pressure chamber to test the weather tightness of building skin (glazing, roof etc)
- Testing fire resistance of compartments and penetrations after seismic events

Thank you!

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