

Evaluation of Older Reinforced Concrete Buildings



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UC Berkeley

Holiday Inn testbed



Collapse of concrete buildings

Sidesway

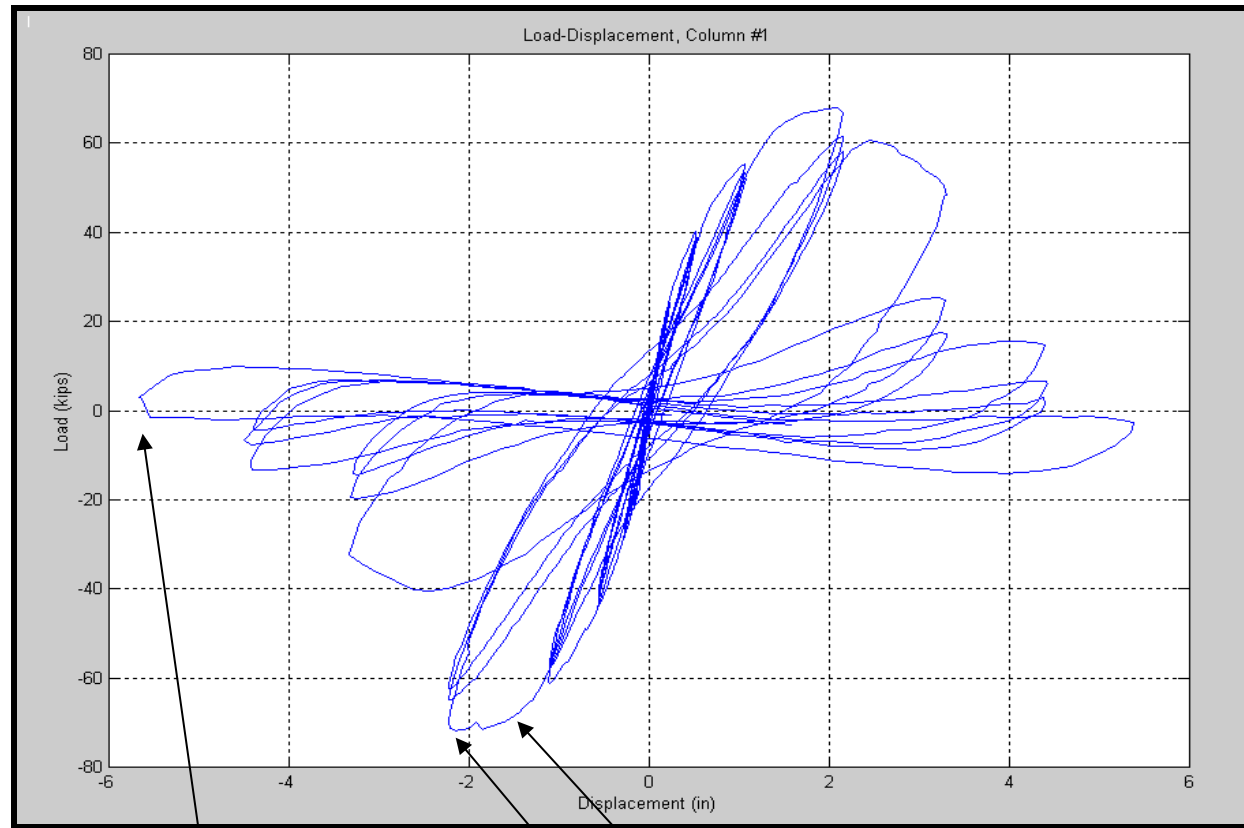


Axial



Izmut, Turkey, 1999

Stages of column response

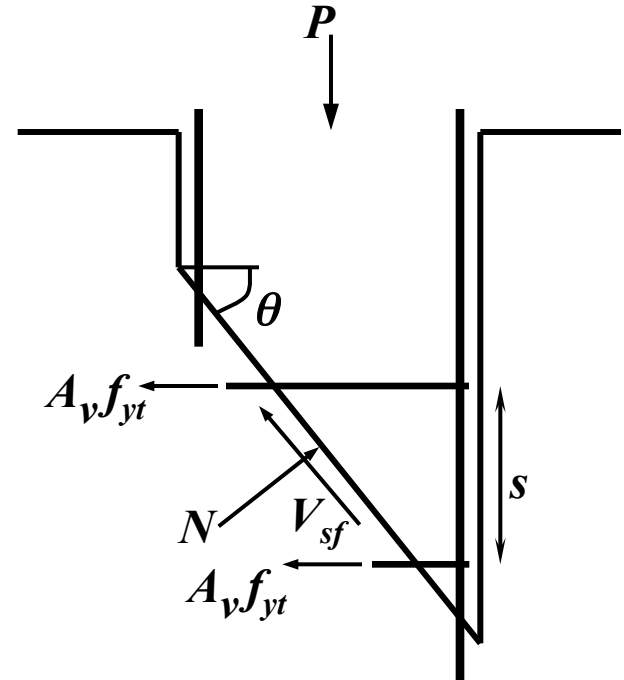


Axial failure

Flexural yield

Onset of shear failure

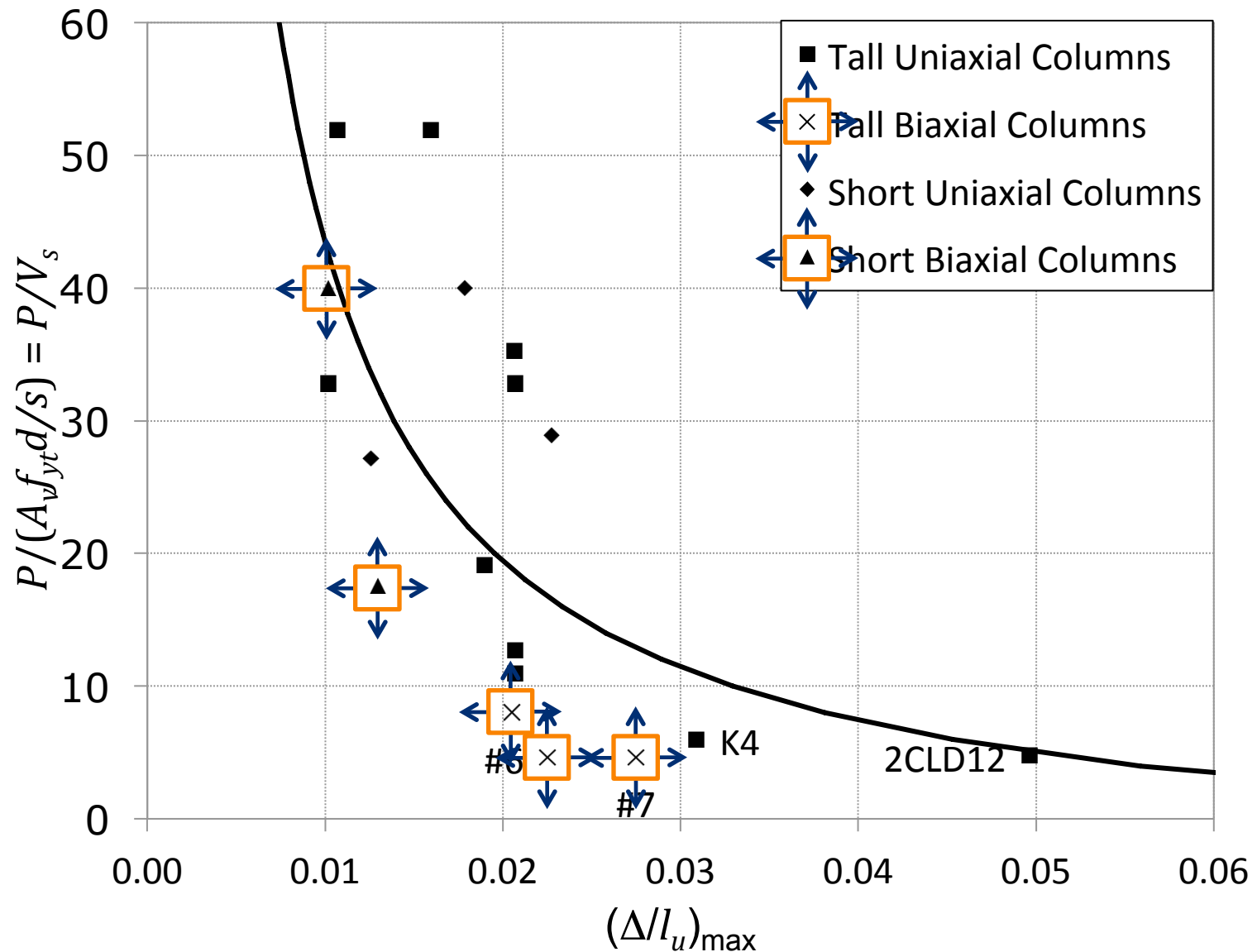
Axial failure model



Test Specimens



Column axial failure model



Joint failures

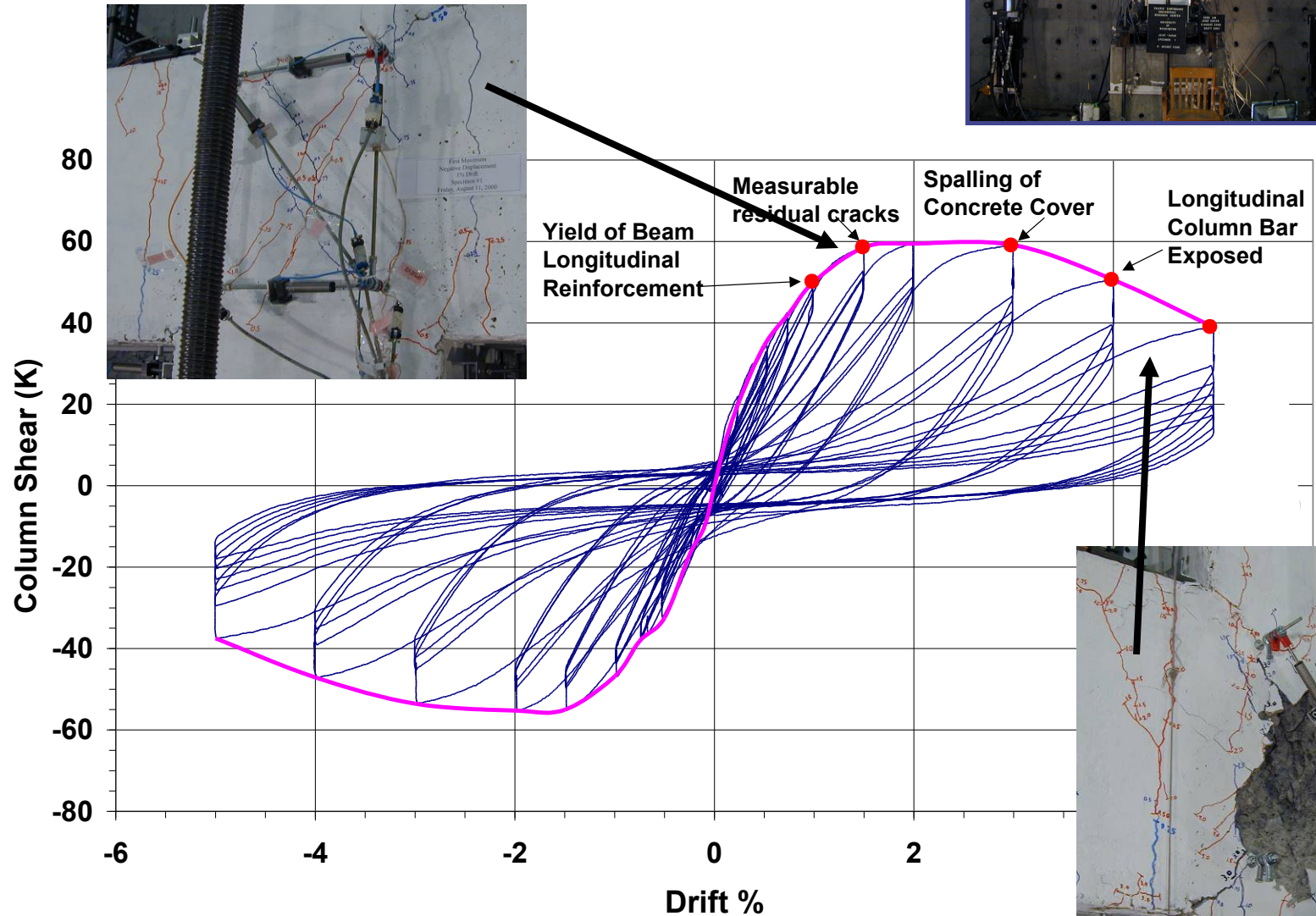


Chi-Chi, Taiwan, 1999

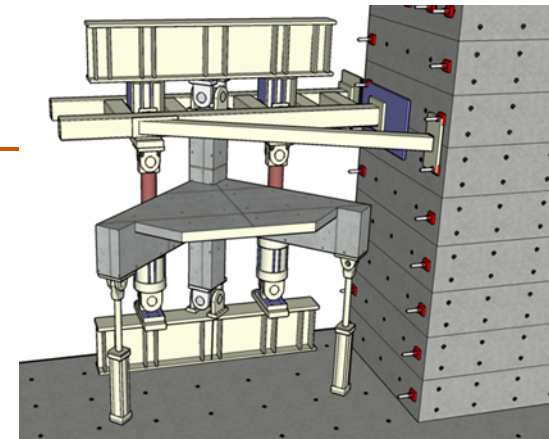
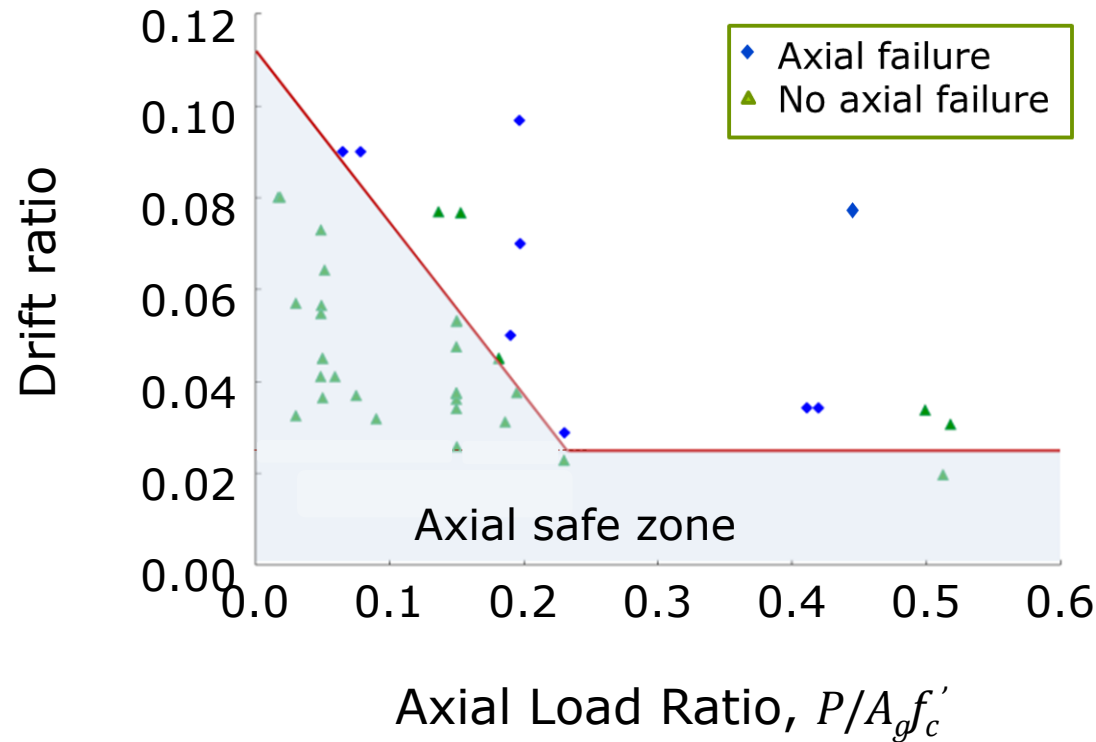


Northridge, 1994

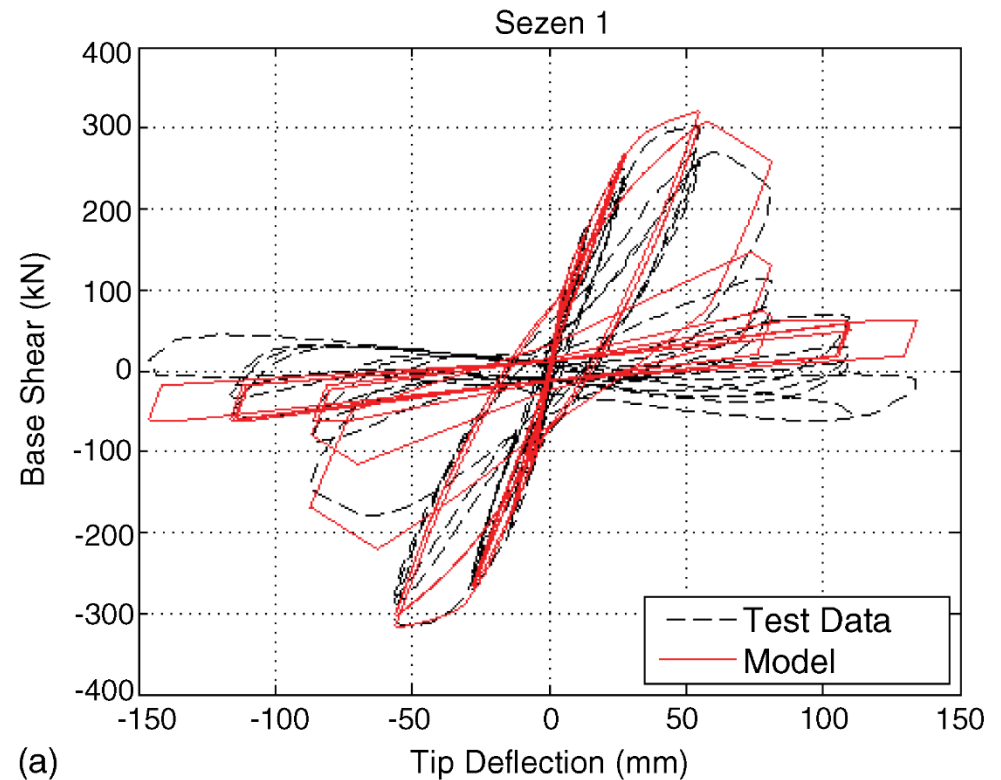
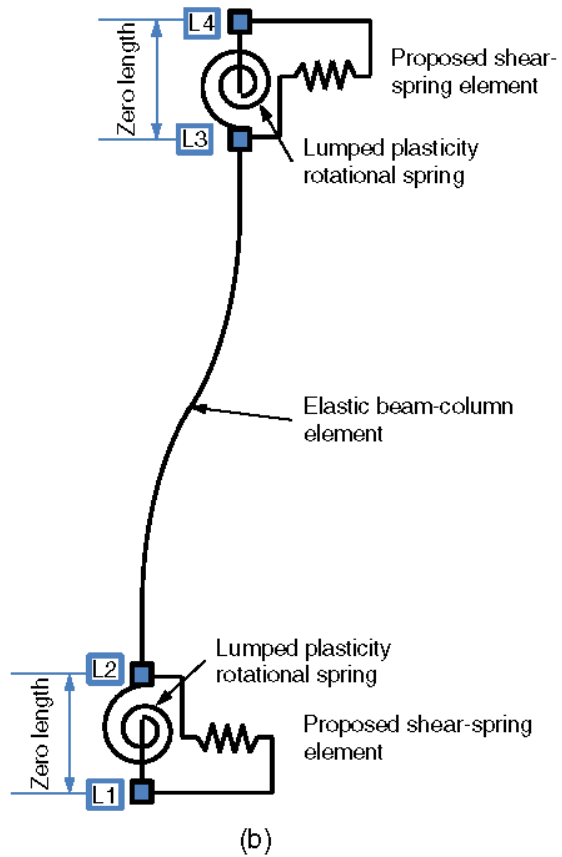
Interior joints



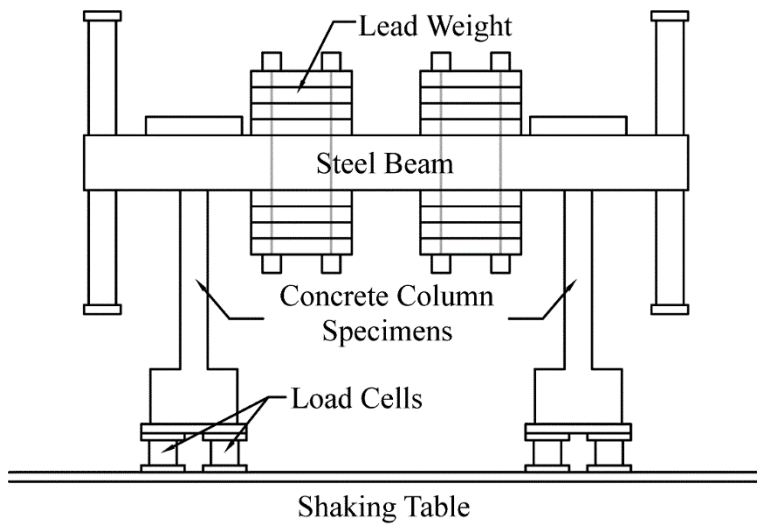
Exterior joint axial failure



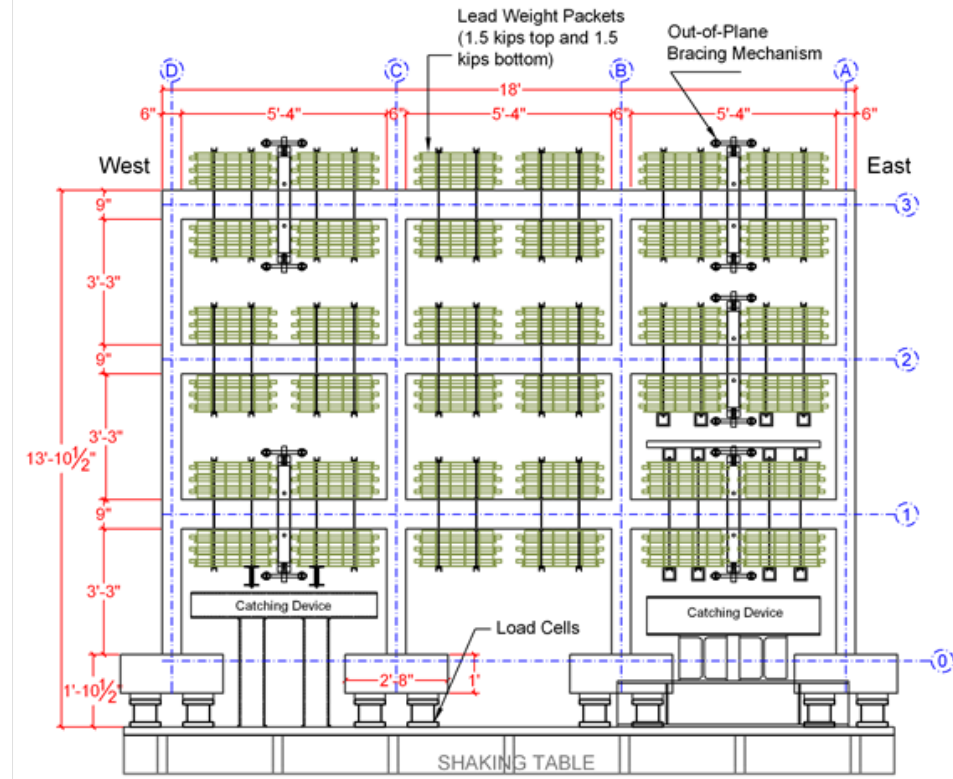
Analytical modeling



Shaking table tests

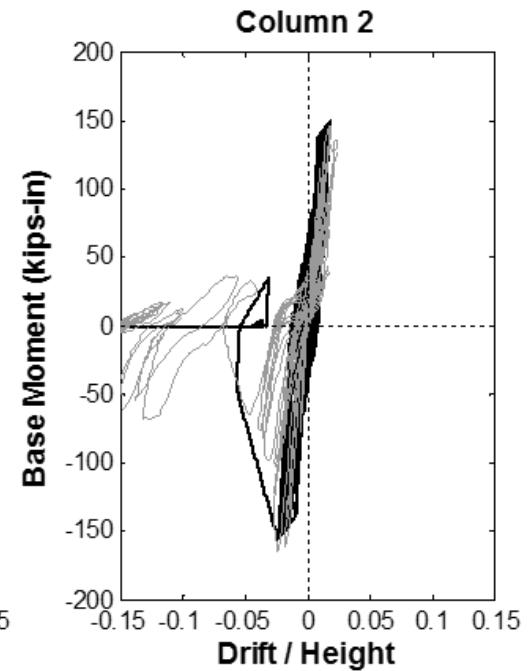
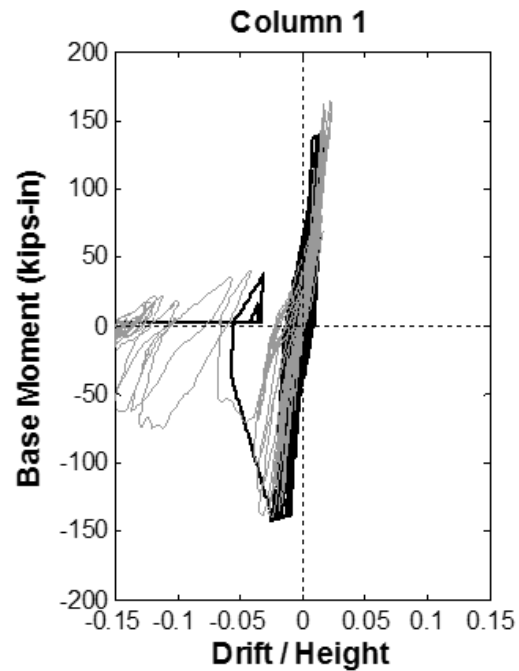
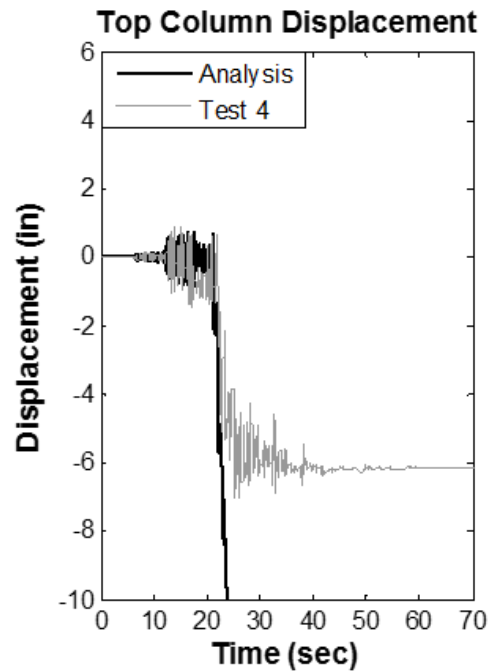
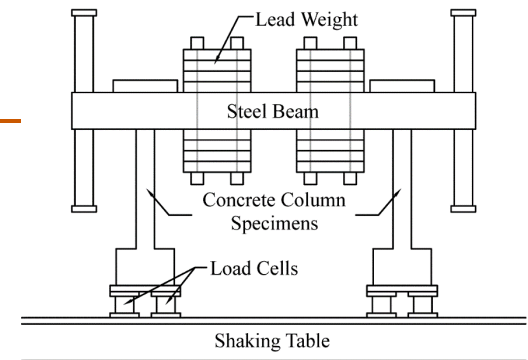


(a) Single-story model

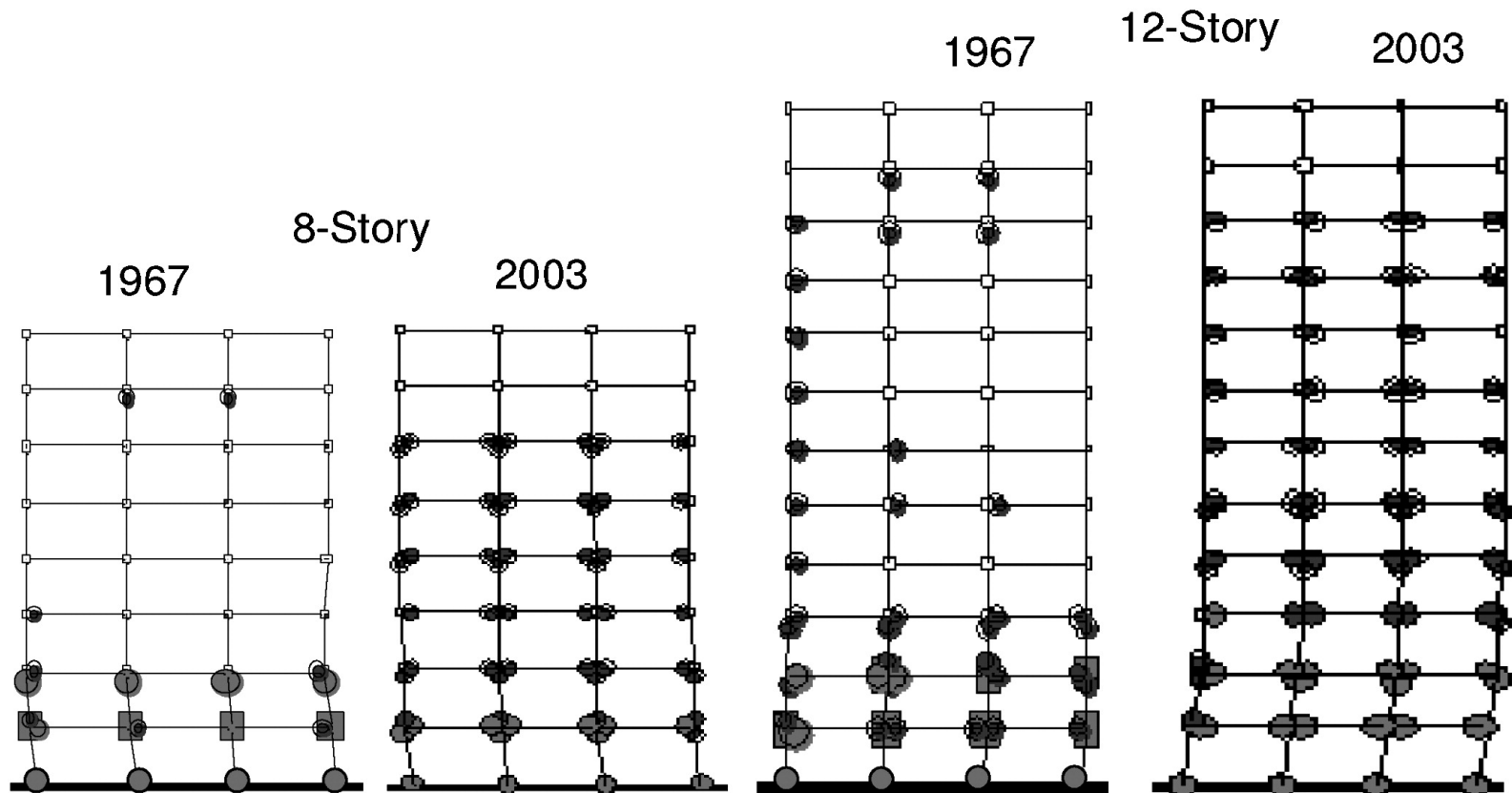


(b) Multi-story model

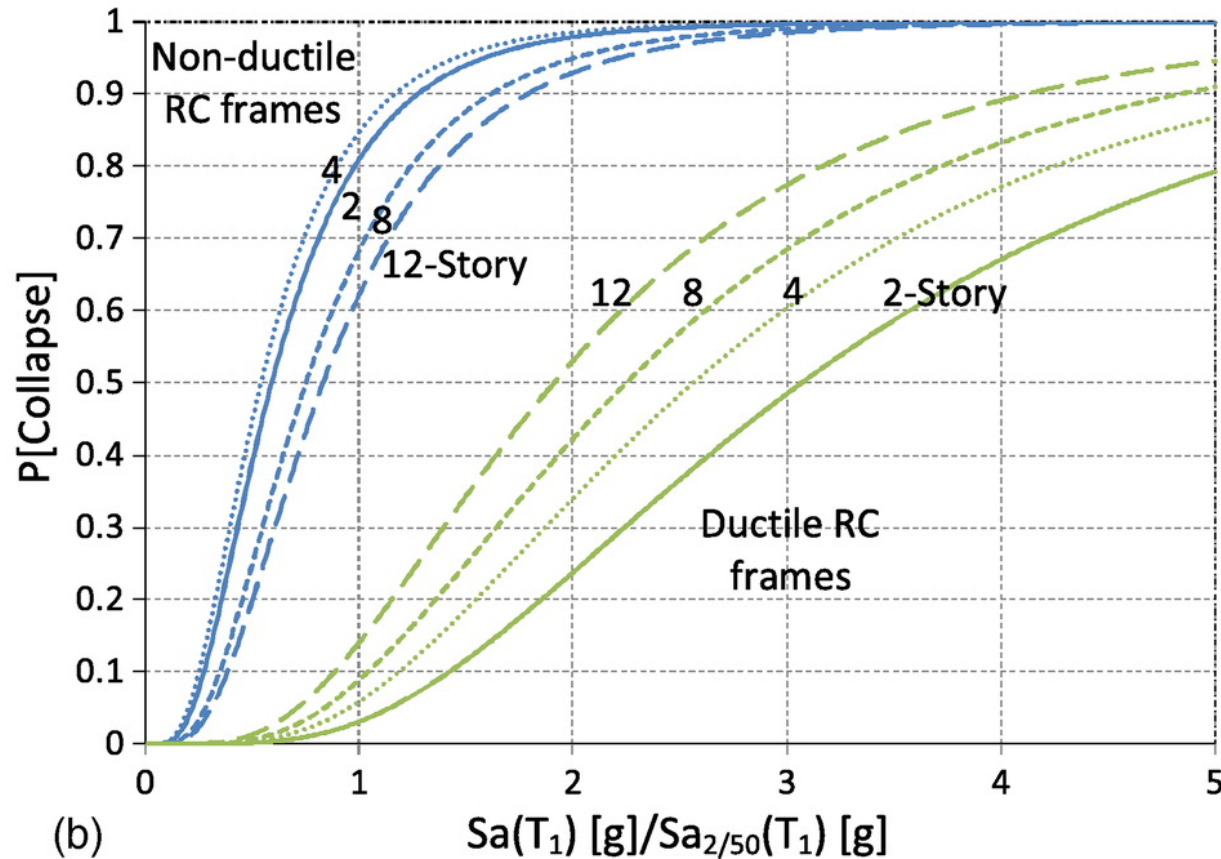
Analysis vs experiment



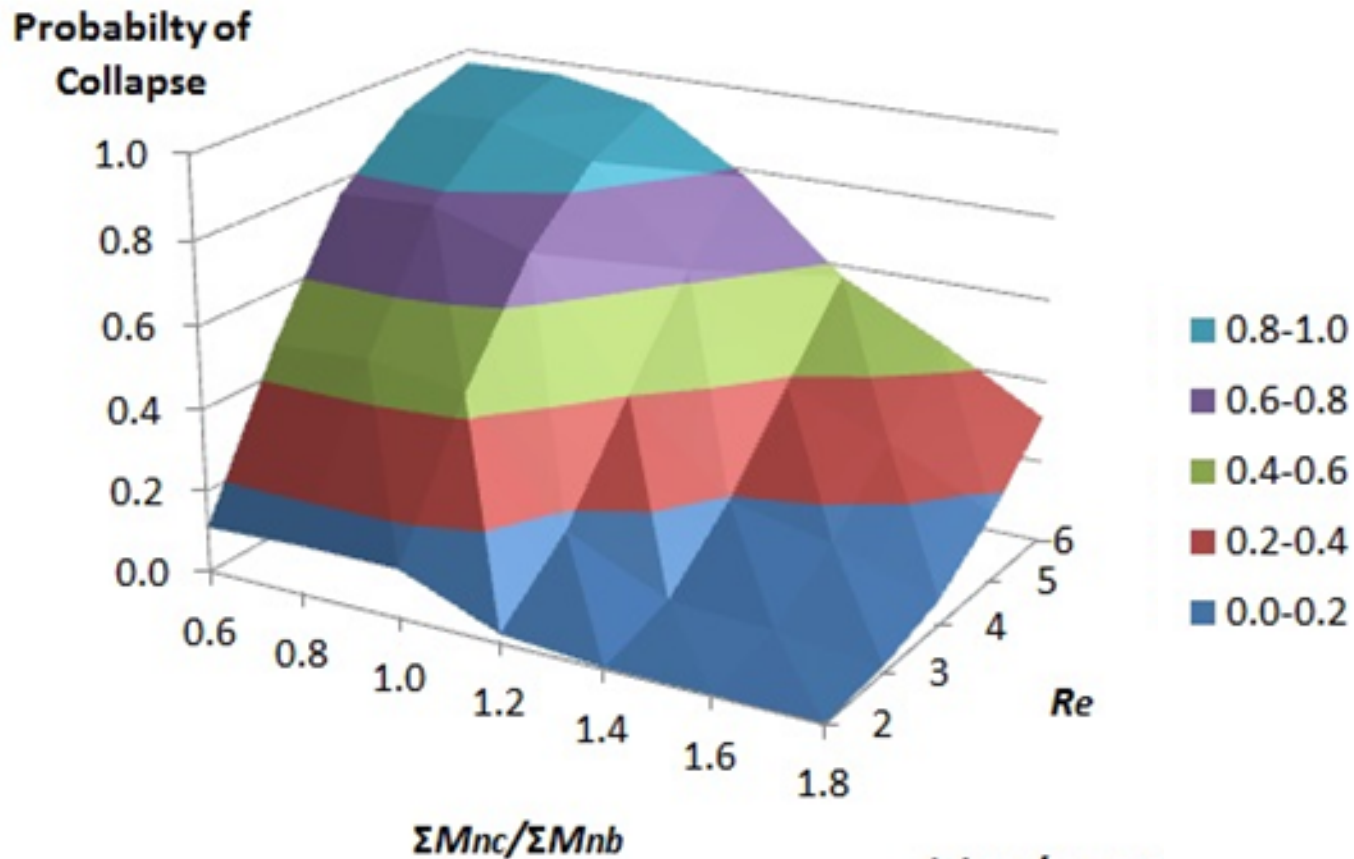
Building studies



Building studies

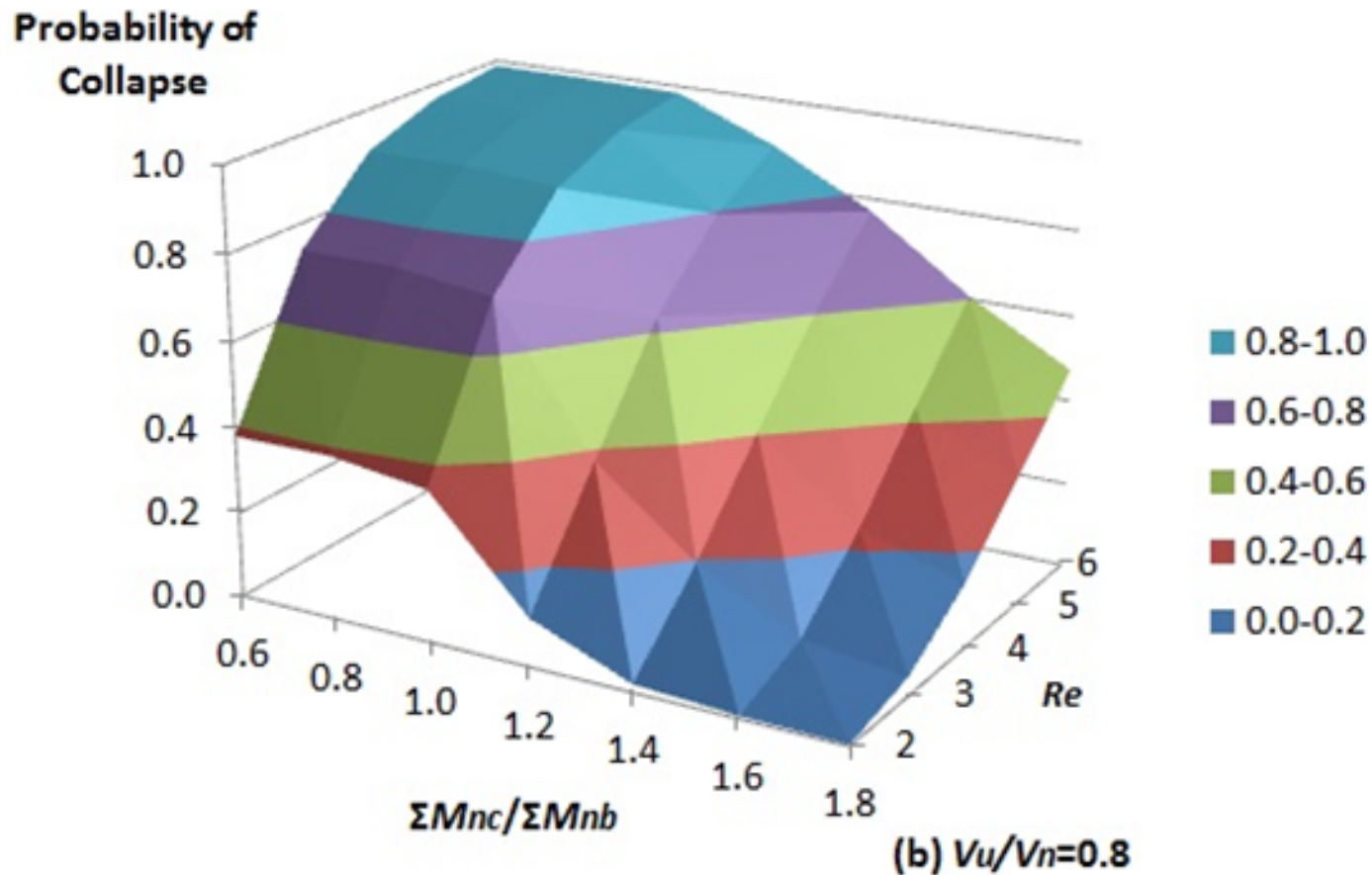


Buildings studies: $V_u/V_n = 0.6$

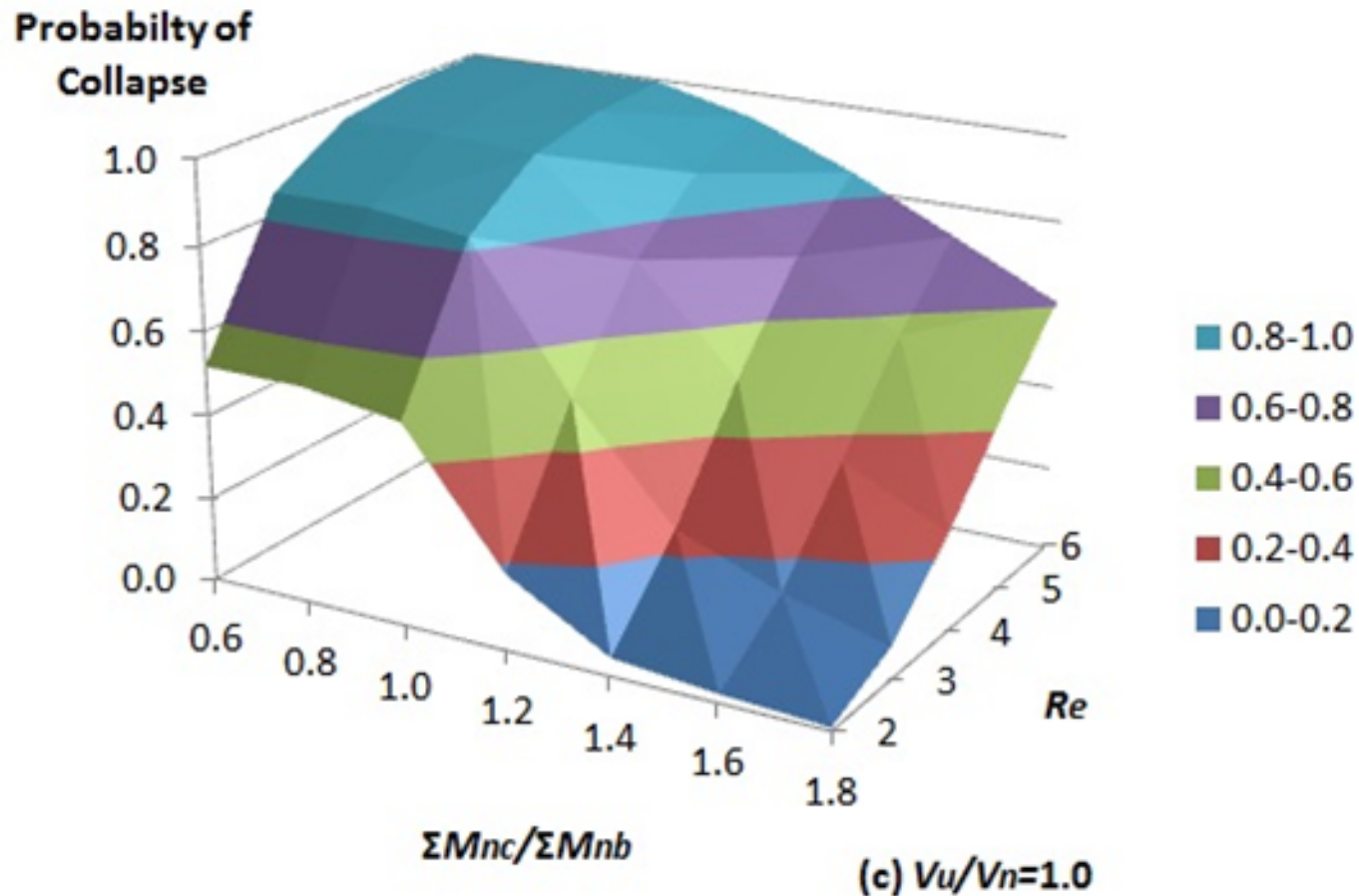


(a) $V_u/V_n = 0.6$

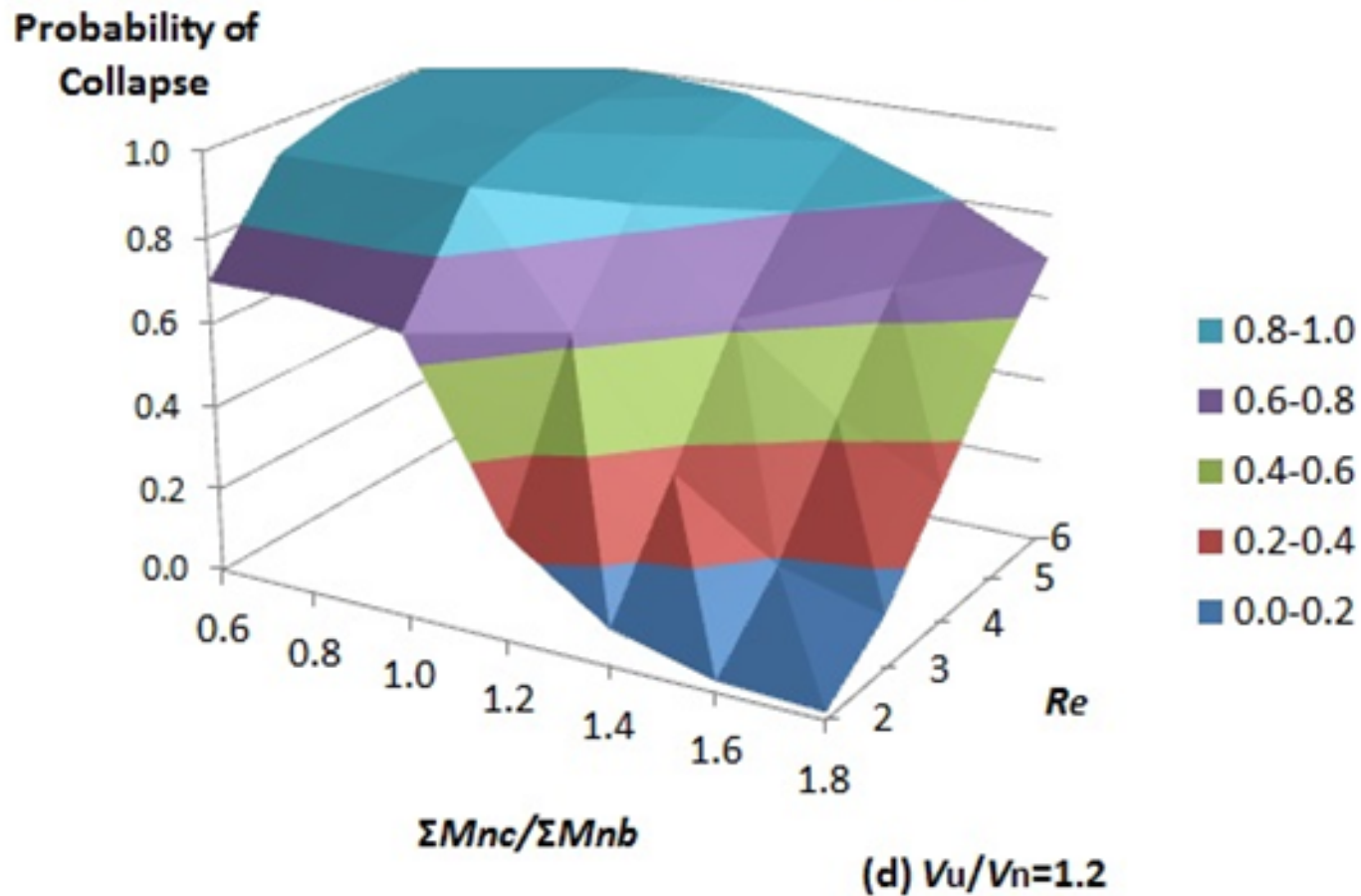
Building studies: $V_u/V_n = 0.8$



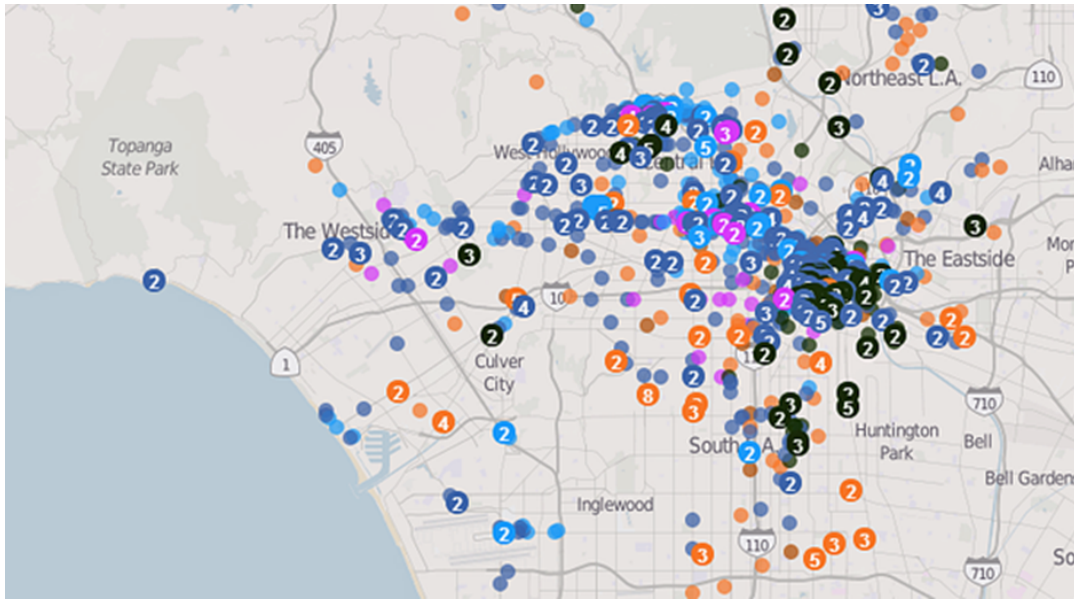
Building studies: $V_u/V_n = 1.0$



Building studies: $V_u/V_n = 1.2$



Implementation



Involvement

- ASCE 41 update
 - Comartin, Elwood, Lehman, Lowes, Matamoros, Moehle, Wallace
- ACI 369
 - Bireley, Elwood, Ghannoum (chair), Hassan, Lowes, Matamoros, Moehle, Sattar, Sezen, Wallace
- ATC 78
 - Holmes, Liel, Moehle, and several students

Then and Now



2016 PEER ANNUAL MEETING - BERKELEY, CALIFORNIA

Then and Now

