OVERSTRENGTH OF 3D FULLY MODELED RC SHEAR WALL BUILDINGS

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The 2010 Chile earthquake exceeded the design accelerations but little damage was observed. Just 2% had severe damage.
One undamaged building was selected to study its overstrength.

Non-linear model developed in Perform-3D (CSI)

- 1 vertical element per story
- 2 vertical elements per story

Shear wall element

Steel Bar/Tie/Strut element
“Evolution” of pushover analysis from linear to fully non-linear models

- (1) = Linear elastic
- (2) = (1) + Non-linear walls $\Omega = 5.5$
- (3) = (2) + Regularization $\Omega = 5.3$
- (4) = (3) + Eff. shear stiffness $\Omega = 4.8$
- (5) = (4) + Non-linear columns $\Omega = 4.4$
- (6) = (5) + Non-linear beams $\Omega = 4.3$
- (7) = (6) + P-\(\Delta\) $\Omega = 4.2$
- (8) = (7) + Steel buckling $\Omega = 4.2$
Effect of soil-structure interaction

\[ \Omega = 3.4 \]
Large drift values in upper stories, but due mostly to rotation.

Maximum drift ratio [m/m]

-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Story number

0.002 0.003 0.004 0.005 0.006

Maximum drift ratio [m/m]

deformation drift = 0.001
rotation drift = 0.005

Total drift

total drift = 0.006
Come see my Poster!

Today Poster Session:

- **Time**: 5:15 – 7:00 pm
- **Room**: Pasadena (Exhibit Hall)
- **Poster location**: Number 035

Research sponsor:
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