



REINFORCED CONCRETE BUILDINGS

Session Moderators

Mike Mehrain, URS Corporation and John Wallace, UCLA

January 16-17, 2014 - University of California, Los Angeles

Progress Initiators

- 1933 Long Beach Earthquake
 - Field Act, passed by on April 10, 1933.
- 1940 El Centro earthquake
 - Recorded ground motion
- 1971 San Fernando earthquake
 - Modern building design provisions
 - Ductile moment frame
- 1994 Northridge earthquake
 - Seismic rehabilitation of older buildings

Northridge – New RC Buildings

- Gravity Systems



- Floor Diaphragms



Northridge – New RC Buildings

■ ACI 318 Changes

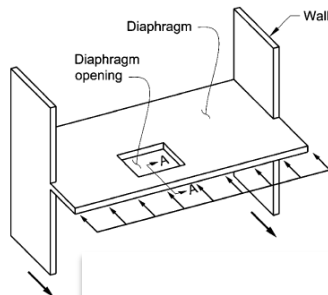
21.13 — Members not designated as part of the seismic-force-resisting system

21.13.1 — Scope

Requirements of 21.13 apply to frame members not designated as part of the seismic-force-resisting system in structures assigned to SDC D, E, and F.

21.11.3 — Seismic load path (Diaphragms)

21.11.3.1 — All diaphragms and their connections shall be proportioned and detailed to provide for a complete transfer of forces to collector elements and to the vertical elements of the seismic-force-resisting system.



ACI 318-11
ACI 318R-11

**Building Code Requirements for
Structural Concrete (ACI 318-11)
and Commentary (ACI 318R-11)**

An ACI Standard
Reported by ACI Committee 318



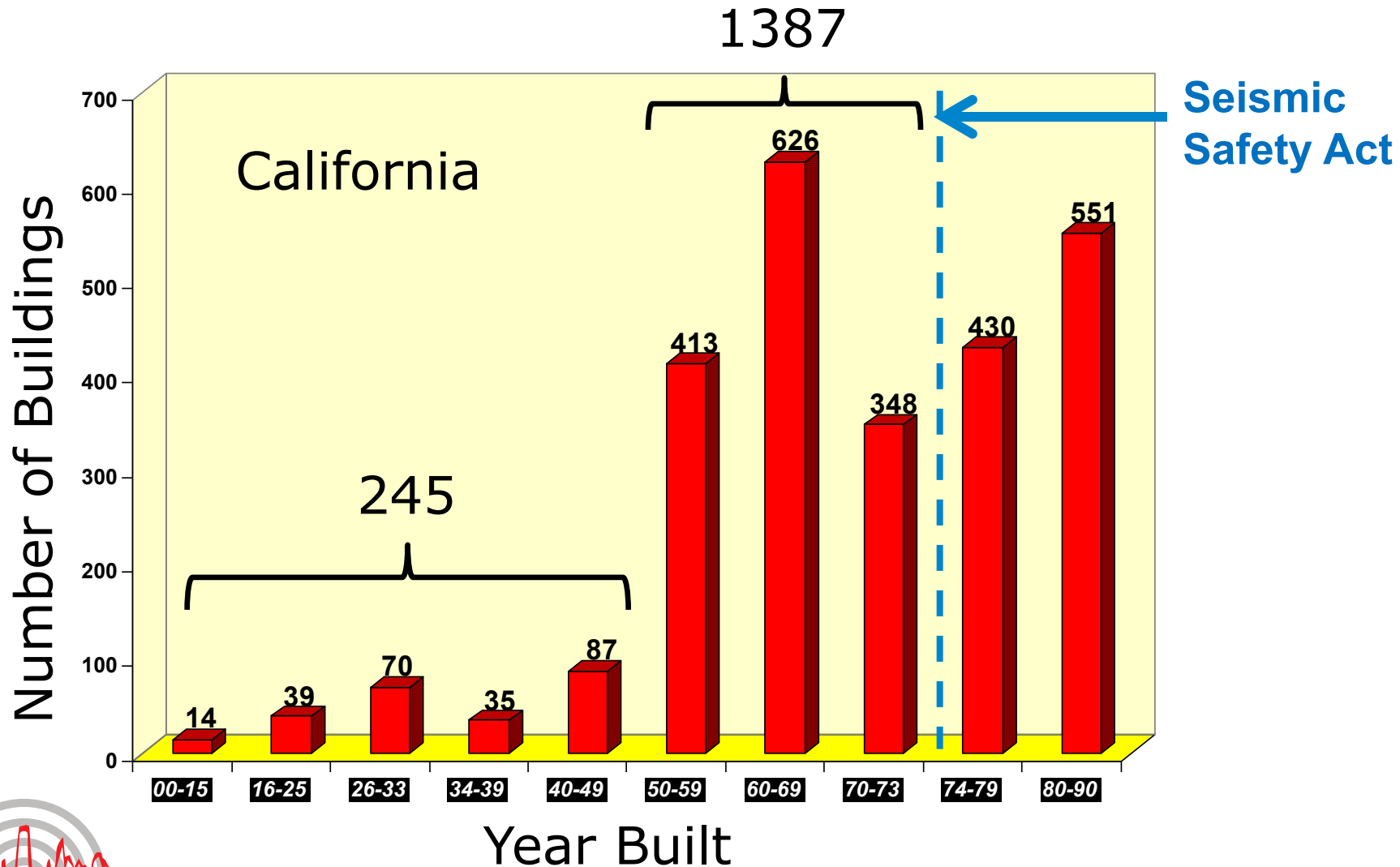
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Existing (Older) RC Buildings

- Observed poor performance
 - Bullock's Department Store - Northridge
- Poor performance & substantial risk (loss of life)
- Magnitude of the problem
 - Gravity systems in newer buildings (< 1997)
 - Buildings constructed prior to the mid-1970's



Hospital (Acute Care) Facilities



Consequences of Collapse

- Christchurch Earthquake of Feb 2011
 - 185 deaths (half from one RC building collapse)



CTV (1986)



PGC (1963), Pyne Gould (1963)

Today's Session: Older RC Buildings

■ Part I

- Retrofit projects in the Los Angeles area
- Five presentations (SB-1953, four firms)
- Application/Evolution of FEMA 273/356 and ASCE 41

■ Part II

- Forward looking - Future risk reduction
- Concrete Coalition, NEES Grand Challenge
- Applied Technology Project 78

■ Part III

- Panel Discussion

Panel Discussion

- A key outcome of the Symposium is to develop a White Paper summarizing recommended next steps to achieve regional (LA) and California state-wide earthquake resilience drawn from the meeting topics and discussion.
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