Post-Earthquake Repairs, Part 1
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External Post-Tensioning
• External post-tensioning (EPT) is an effective method for strengthening and repair of existing structures.
• Used in concrete, steel and wood structures
• Increases strength and reduces deflection

Seismic Repairs
• Has been used to repair many structures which have been damaged in earthquakes
• Our firm completed repairs on more than 20 buildings damaged in 1994 Northridge earthquake in So. California.
• Techniques for seismic repairs similar to other types of repairs

Punching Shear Damage in 2-Way Slab (Northridge Earthquake)
**Advantages**

- Applies large beneficial loads with minimal headroom.
- Substantially weightless - no impact on existing columns, footings and seismic system.
- Can be adjusted to avoid existing HVAC and mechanical systems. Rarely requires any changes to existing systems.
- Can be installed without disrupting building function.

** Loads **

**One-Way Slabs **

**Beams and Girders **

**Two-Way Slabs **
“1. Steel columns and all [members] of primary trusses”

- 1.6.2 - Perlite or vermiculite gypsum plaster over self-furring metal lath wrapped directly around column, lapped 1” and tied at 6” intervals with 0.049” (No. 18 B.W. gage) wire.

**Minimum Protection**

- 2-hour
  - 1” cover
- 3-hour
  - 1-3/8” cover
- 4-hour
  - 1-3/4” cover

**EPT with “Aesthetic” Fire Proofing**

**Coring – Roto-Hammer**

**Coring - Larger Holes**

**Stressing Tendons**
EPT is a powerful method for strengthening existing buildings.

Applications:
- Design errors (increases flexure and shear strength)
- Occupancy change (increased live load)
- Damage
  - Corrosion
  - Seismic
- Weightless
- No disruption to existing utilities
- Can generally be executed while building remains in service

Thank you!!!