How to Repair, Modify, Maintain and Evaluate

Existing Post Tensioned Concrete Structures

Use of post tensioning systems in concrete structures started in the mid 1950's. By placing the concrete in compression, it increased its strength and many other benefits such as longer spans, less columns, thinner/lighter sections, reduced shoring/reshoring time, etc. which all offer both engineering and cost advantages.

Typical post tensioning prestressing steel, anchors, sheathing and protection systems have all dramatically changed since their inception. This presentation will discuss the evolution of these changes, the problems they created, repair strategies and the long-term solutions provided by the new encapsulated post tension systems that are used today.

Also presented will be modifications post tension slabs such as penetrations, typical damage and repair, means, methods and materials used to address these problems.

The above will be illustrated through actual case studies related to the following:

Common Problems with Post-Tensioned Concrete

- Deterioration from corrosion of tendons anchors and wedges
- Defects in construction, detailing and design
- Damage from cutting, chipping drilling and overloading post tensioned concrete
- New slab openings- large and small- for MEP, new atriums or stairs

Repair Strategies for Solving Common Problems with Post-Tensioned Concrete

- Exposed edges of slabs or beams
- Tendon low point repairs
- Tendon high point repairs
- Expansion and construction joints
- Total replacement of tendons
- Common post tension repair splicing, lock off and stressing components

Detailing, Construction Defects

- Improper placement or drape
- Missing or misplaced critical steel (bursting steel or hairpins)
- Improper stressing of tendon
- Damage to tendons from chipping, coring, sawing, drilling or concrete screws
- Improper cutting methods of excess tendon at anchor pocket after stressing

New Penetrations & Openings

- Analysis to determine effects of opening on adjacent bays
- Locating existing tendons in slab
- Strategies for lock off, full detensioning or sequenced detensioning of existing tendons at perimeter of opening

Post Tension Concrete Condition Assessment Process and Tools

- Strategies for review of current conditions, field testing and lab testing
- Structural and personal safety issues to be considered during post tension condition survey and repair