Engineering 101 for Contractors

What All Construction Personnel Should Know to Maintain Structural Safety and Avoid Construction Defects on Job Sites

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During new construction, repairs or modifications to concrete structures, it is important that contractors focus on structural safety issues. Given the speed at which projects are being completed today, a basic understanding of the fundamental concepts of how reinforced concrete is designed is critical for contractors to complete projects successfully.

Ironically the contractor - who is responsible for ensuring that a structure is built safely and per specification- may not possess the fundamental information required to easily recognize structural issues. Having a basic understanding of these concepts is critical. Unfortunately, these topics relate to the principles of structural engineering - subjects that are not typically taught at a practical level so that they can be understood if you are not a structural engineer.

By presenting these concepts in a basic manner geared for contractors, attendees of this seminar will leave with a general understanding of how reinforced, post tensioned and precast concrete structures are built - simply put "Engineering 101 for Contractors." The presentation is not for the purpose of making structural decisions, but more to recognize issues, know when to bring them to the engineer's attention and avoid delays.

Interested attendees are typically Project Management, Preconstruction, Estimators, Safety personnel and Field Superintendents.

This presentation is intended to:

- Ensure the designed structural capacity is achieved during construction
- Prevent structural damage or failure during construction
- Avoid costly back charges and delays
- Understand the strengthening techniques available for repairs, if needed

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THE SEMINAR AGENDA INCLUDES:

General overview of how reinforced concrete is designed for:

- Conventionally reinforced concrete
- Post-tensioned concrete
- Precast concrete

What are the typical outward signs of structural distress in concrete?

- Understanding typical cracking types, patterns and causes
- Finishing defects

What happens on a jobsite that may effect the structural capacity of reinforced concrete?

- Missing, misplaced or damaged reinforcement
- Low strength concrete
- Voids/honeycombs and cold joints
- Improper staging of construction materials and shoring
- Cutting new penetrations
- Post tensioning installation errors, damage and repair options

Practical strengthening techniques to add or restore structural capacity if problems arise:

- Externally bonded carbon fiber composites- FRP
- External post-tensioning
- Adding additional concrete – section enlargement of beams, columns and bonded slab overlays
- Techniques for strengthening new slab openings and penetrations
- Grouting repairs for voids and honeycombs

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