



Volume –19, Issue – 5, May 24, 2017

June Half Day Seminar Announcement

Topic: Techniques and Design Considerations for Strengthening of Existing Concrete Structures (4 PDH's)

Tarek Alkhrdaji, PhD, P.E. will present the design strategies, techniques, materials and design concepts used for strengthening concrete structures. The use of each technique will be illustrated through actual case studies. The major topics will be 1. Factors affecting the performance or capacity of reinforced concrete; 2. Strengthening with externally bonded FRP systems and 3. Conventional strengthening techniques for cases where FRP is not viable. A more in depth course description is attached.

Speaker: Mr. Tarek Alkhrdaji, PhD, P.E.

Mr. Tarek Alkhrdaji, PhD., P.E. is the Vice President of Engineering for Structural Technologies. He is an expert in structural repair and rehabilitation of concrete structures with focus on the evaluation, design, planning and execution of full-scale load testing of structures to assess existing condition and evaluate the performance of repairs. He specializes in a wide-range of strengthening techniques, including bonded FRP plates, rods and fabric, external post-tensioning, enlargement, span shortening and bonded steel shapes. Dr. Alkhrdaji has written more than 40 papers and articles on strengthening of structures including buildings, bridges, silos, tanks and concrete pipes.

Date: June 15, 2017

Location: San Jose Country Club

7529 San Jose Boulevard, Jacksonville, Florida 32217

Time: Sign-up/ Breakfast 7:45 am
Program 8:15 am – 12:00 noon

Cost: Members-\$120.00/Non-Members-\$150.00 (No shows will be billed)
Students can attend the meeting for free or have breakfast for only \$20.00 (Please indicate if you plan to have breakfast when you make your reservation)!

Please RSVP by noon on June 13, 2017 so we can reserve your seat.

Contact: Oksana Spears at 904-860-1875 or E-mail Oksana at Oksana.spears@gmail.com

Techniques and Design Considerations for Strengthening of Existing Concrete Structures

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There are many reasons that create the need for structural strengthening of concrete structures. They include construction and design errors, increase in live load, new code requirements, low concrete strength, voids created during concrete placement, new penetrations and prevention of progressive collapse from blast loads.

The analysis and techniques for upgrading concrete structures is somewhat of a "scientific art" that has been practiced for many years it has evolved into a complex science that requires a blend of engineering, material science and construction perspectives. Strengthening projects may utilize traditional materials such as conventional cement-based and steel materials as well as advanced composite materials (FRP's) that are commonly used for aerospace applications. The techniques used to design and install these materials for upgrade applications are not common to the engineering and general construction industry which can make strengthening projects even more challenging and more complex than new design/construction projects.

This presentation will describe the design strategies, techniques, materials and design concepts used for strengthening concrete structures. The use of each technique will be illustrated through actual case studies.



Factors affecting the performance or capacity of reinforced concrete

- New Loads - change in use
- Construction or design errors
- Missing, misplaced or damaged reinforcement
- Voids or Honeycombs created during concrete placement
- Cutting of new penetrations that affect existing reinforcement
- Low strength concrete



Strengthening with externally bonded FRP systems

- Typically used forms
- Installation techniques and QA/QC
- Design Concepts per ACI 440 2R-08 and ICC (AC125)
- FRP Limitations and strengthening limits



Conventional strengthening techniques for cases where FRP is not viable

- External and Internal Post Tensioning
- Section enlargement and bonded overlays
- Supplemental steel supports and span shortening

Tarek Alkhrdaji, PhD, PE is Vice President of Engineering at STRUCTURAL TECHNOLOGIES.

Dr. Alkhrdaji has experience in structural repair and strengthening and full scale load testing of concrete structures. He has been involved in more than 450 projects involving structural repair and strengthening and has written more than 40 papers and articles on strengthening of structures including buildings, bridges, silos, tanks and concrete pipes.

Dr. Alkhrdaji is an active member of ACI Committee 437 (Strengthening Evaluation), ACI 562 (Repair Code) and is the past Chair ACI 440F (FRP Strengthening). He is a member of American Society of Civil Engineers (ASCE) and the International Concrete Repair Institute (ICRI).

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Case studies to cover various types of projects that will display the strengthening of both new and old structures, including two designed by **Frank Lloyd Wright** - Fallingwater and the Guggenheim in NYC.

Structural Group is firmly committed to its ongoing mission of making new and existing structures stronger and last longer. Through its companies, Structural Group delivers turnkey solutions that integrate technology, engineering, and construction. Structural Group provides specialty contracting services through STRUCTURAL, and state-of-the-art proprietary products and engineering support services through STRUCTURAL TECHNOLOGIES.