May/June 2021
Vol. 34, No. 3

CRB

CONCRETE REPAIR BULLETIN

POST-TENSION SYSTEM EVALUATION AND REPAIR

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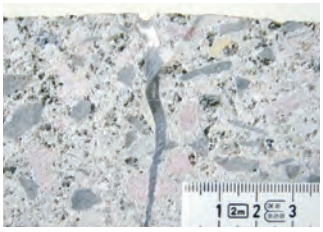

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ON THE COVER: Removing concrete around existing post-tension tendons—Post-Tensioning System Modification at Gateway Tower 2, article by Nancy Tamay and Chris Hill, page 18.

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FEATURES

DEPARTMENTS

NOTE FROM THE EDITOR

This issue of the *Concrete Repair Bulletin*, themed "Post-Tension System Evaluation and Repair," features technical articles about a Case Study of the University of Missouri Hospitals and Clinics Parking Garage Repairs, the Post-Tension System Modification at Gateway Tower 2, and the Assessing and Repair of a Fire Damaged Post-Tensioned Parking Garage.

ICRI has completed the 2021 Virtual Spring Convention and plans are moving ahead for the remainder of 2021. Hopefully, as the vaccine rollout continues, we may be able to gather in person for the Fall Convention and chapter meetings in the near future. Please continue to send your chapter events and updates to Dale Regnier.

I hope you are all having a great start to 2021 and I look forward to seeing you at future ICRI conventions and chapter meetings!

Jerry Phenney
RAM Construction Services
Editor, Concrete Repair Bulletin

The International Concrete Repair Institute is the leading resource for education and information to improve the quality of repair, restoration, and protection of concrete. Visit www.icri.org.

PRESIDENT'SMESSAGE

Future Forward—Embracing a Brighter Tomorrow


ELENA KESSI


ERIC HAUTH

In November, *Rolling Stone* magazine published **14 Invaluable Lessons Business Leaders Learned During the Pandemic** (https://www.rollingstone.com/culture-council/panels/lessons-business-leaders-learned-during-pandemic-1095153). The article touched on themes that reach across our ICRI demographic.

While the list is more comprehensive, it could be condensed into three fundamental ideas:

1. People are always our most important asset.
2. Change is necessary, not just inevitable.
3. Leadership matters, now more than ever.

In the previous edition of the CRB, we highlighted a number of initiatives ICRI has taken to push ahead during the pandemic. We are committed to ensuring that our organization comes out of this difficult time even better positioned to meet the needs of our members—and attract more members in the months and years ahead.

We are proud to report that, so far, ICRI has weathered the storm about as well as we could have hoped. We continue to develop and launch new products to serve the industry. We have streamlined some of our processes to operate more efficiently. We have operated within budget, setting the stage for stronger growth in the months ahead.

This brings us to lesson 1, above: Great people separate great organizations from good ones. So, we would be hugely remiss if we did not start this article with the biggest possible ***thank you*** to the many great people serving as volunteers on ICRI's technical and administrative committees throughout the most difficult period in memory.

Volunteers serving on our committees are the heart and soul of ICRI, contributing their time, talent, and energy to make ICRI and the concrete repair industry better. In many ways, they have not missed a beat, and, with the widespread use of Zoom, the committees are doing more than ever to advance the technical and administrative work of ICRI. This is the spirit that makes ICRI such a special and resilient organization. We could not be more grateful for this remarkable commitment.

As we write this article, ICRI is set to launch the 2021 Virtual Spring Convention—our third virtual convention since the start of the COVID-19 pandemic. It is hard to believe that the last time ICRI was able to bring our members together in person was over one and a half years ago at the Fall Convention in Philadelphia! When the ICRI Board of Directors had to make the difficult decision to cancel our 2020 Spring Convention scheduled for Vancouver, BC, none of us thought then that we would still be virtual more than a year later.

Thankfully, innovation and science have led to a rapid development and deployment of life-saving vaccines that let us glimpse a future when we can return to a new normal. We say "new normal" because we all know that a crisis of this magnitude has changed the world in many ways and that we cannot just return to the world that existed in late 2019.

But a new normal that brings us back together safely is finally on the horizon!

We are especially excited to announce that in April, the ICRI Board of Directors approved a recommendation of the Conventions Committee to return to a live convention this Fall in Minneapolis! The Fall Convention will mark a return to the connections and fun that ICRI is known for.

The new normal not only means that we need to consider how best to maintain safe conditions; it also means building on the lessons learned from virtual and distance-based work over the past year. For example, ICRI is exploring "hybrid" models that enable live convention opportunities as well as virtual opportunities to reach an even broader audience. Through the successful video product demos shown at the Fall and Spring Virtual Conventions, we are excited to announce that ICRI will soon offer a year-round video "Buyers Guide" platform featuring product demos from our member companies. This represents another great example of an innovation that grew out of the challenge of the pandemic.

No doubt you have also begun thinking a lot about what "new normal" means to you, your company, and your employees/team members.

As we continue to move forward, what lessons from the pandemic should we never lose sight of and carry forward? As the only association focused on the concrete repair industry, ICRI seeks to embody the same spirit of adapt-

ability, resiliency, and perseverance of our members. So, together, let us challenge each other to put into focus the positive side of the new normal.

Thank you for your ongoing commitment to and membership with ICRI during this challenging time. We cannot wait to get back together this Fall and share our insights in person once again. In the meantime, we will keep building toward a brighter future!

Sincerely,

Elena Kessi
2021 ICRI President

Eric Hauth
ICRI Executive Director

ICRI CONCRETE REPAIR PROJECT AWARDS 2021

29 Years of Recognizing Outstanding Concrete Repair, Restoration, and Preservation Projects

New This Year— ICRI Safety Awards!

The ICRI Safety Awards have been created to promote and support a culture of safety in the concrete repair industry—believing that all incidents and injuries can be avoided.

The ICRI Environmental Health and Safety Committee has created this award as a method of recognizing industry safety best practices, celebrating leaders in the industry, and sharing those best practices so others may learn and employ.

The committee will present awards in each category, as well as awards for the size of the company in each category, and finally, an overall award for each category.

Award Categories:

- Contractor
- Engineer/Architect
- Manufacturer/Supplier

ICRI CONCRETE REPAIR SAFETY AWARD 2021

Deadline for entries is Thursday, July 1, 2021, 5:00 pm CDT
There is no entry fee in 2021

Eligibility: This program is for ICRI members and includes contractors, engineers, and manufacturers/suppliers. Members with an employee fatality in 2020 are ineligible.

For complete Project and Safety Awards rules visit: https://www.icri.org/page/awards-home

Project Award Entries Now Accepted.

- Submit your Project Award entry by June 1, 2021 and pay an entry fee of $250.
- Submit your Project Award entry between June 2 and July 1, 2021 and pay an entry fee of $300.
- Complete rules can be found at www.icri.org/page/awards-home.

CATEGORIES

High-Rise

Historic

Industrial

Longevity

Low-Rise

Masonry

Parking Structures

Special Project

Sustainability

Transportation

Water Systems

WOMEN IN ICRI

Highlighting the difference-makers—the women in the International Concrete Repair Institute

ICRI CONCRETE REPAIR WOMEN

Natalie Faber
MM Systems Corp

Concrete, Construction, Careers —The 3C Program

ICRI's Rocky Mountain Chapter has started a new internship/mentorship program—3C—for local high school students who are currently enrolled or about to graduate. We, like everyone in our industry, identified a need for more skilled labor and education opportunities within the concrete repair trades. Contractors, engineers, manufacturers, and distributors were polled and all quickly offered an overwhelming amount of support and interest.

The Rocky Mountain Chapter is partnering with local organizations like Denver Children's Home and Boys Hope Girls Hope, which assist these young adults through high school when foster families are not available or their local education path is not best suited for their academic track. Each of these organizations recognized the parallel and opportunities for their students and are working with us to recruit members into the program. Each internship is paid and additionally, we aligned with a local university to offer counseling support from current graduate students working on their psychology Master's to our interns as they work through their respective internships.

ICRI international has supported us from the beginning and is helping spread the word to chapters across the U.S. Bringing life back to the trades and passing along the current skill set of the labor and professional industries is the future of our organization and skilled workers. We currently have an incredible talent pool within our organization and the 3C program facilitates the growth and education reflected in our vision statement.

If you want to learn more about adopting the program for your local chapter, contact Natalie Faber at N.faber@mmsystemscorp.com or 816.838.2746.

Catherine Miguelez Leonard
Western Specialty Contractors

Catherine Miguelez Leonard

One of the biggest benefits of ICRI is the ability to connect with others in our industry, including students looking to network with potential future employers. Catherine Miguelez Leonard was a New Jersey Institute of Technology (NJIT) student when she participated in her first technical meeting with the Metro New York Chapter of ICRI, and quickly made connections that helped jump-start her post graduate career.

"When I joined ICRI 4 years ago, I never thought that I would be looking back from where I am today nor on the impact ICRI would, and continues to, have on my journey.

"At NJIT, I was involved in multiple extracurriculars; however, none matched the wealth of opportunities that ICRI provided. Through ICRI, my college partook in monthly dinners hosted by the organization, which proved to be an invaluable asset for me and my peers. More than the instruction, insights, and opportunities to network was the exposure to such an exceptional and accomplished group of caring professionals. They served not only as a resource for guidance but as an example and affirmation of the career that I chose to pursue.

"Due to the networking opportunities I was provided by ICRI, I was able to obtain a successful internship that led to a career after graduation. I can say, without equivocation, that the path I've traveled has been clearer, my footing firmer, and the friends and colleagues more substantive because of ICRI. Looking back, I would not want it any other way."

About the CIM Program: Recognizing the need for people with enhanced technical, communication, and management skills, the Concrete Industry Management (CIM) program was developed in 1996 at Middle Tennessee State University. Since then, the program has expanded to the New Jersey Institute of Technology, California State University—Chico, and Texas State University. Beginning in the fall of 2021, South Dakota State University will be the fifth university participating in the program.

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Advantages:

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- VOC and LEED-compliant, low odor and fast cure time

MiraFlex XL is a cementitious, fabric- reinforced, waterproofing membrane system engineered for exterior pedestrian traffic applications.

MIRAFLEX II

Where to use:

- Interior/Exterior over occupied space
- Mixed-use, residential and commercial
- Over plywood and concrete substrates

Advantages:

- Monolithic, seamless protection – waterproofing membrane
- One-hour fire rated over plywood (ICC ESR 1714 listing)
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- Wide array of slip resistant textures, colors and finishes

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MIRACOTE

TACTALK


MARK NELSON

TAC GOALS FOR 2021—CREATE A TECHNICAL CHAIR TRAINING PROGRAM

The second of our four TAC goals in 2021 is to create and publish a training program for ICRI Technical Committee Chairs. Such a program is necessary to provide practical support to our volunteers who make the choice to chair a technical committee. Under the direction of ICRI TAC member Ashish Dubey, USG Corporation, we were able to create such a program.

The ICRI Chair Training Program PowerPoint is located on the main Technical Committee page on the ICRI committee workflow management site, Causeway. In that same location, you can find the ICRI Technical Committee Manual (TCM) which details in great length all of the technical information required to run an ICRI technical committee meeting. Acting as the chair of a committee meeting can be intimidating, especially for those who have never had to run a committee meeting. We hope this training program provides a simple vehicle to bring a new committee chair the basic knowledge required for this volunteer role.

The two main purposes of the ICRI Chair Training Program PowerPoint are:

1. to summarize those meeting leadership rules and responsibilities found within the TCM; and
2. to address the soft skills required to run a meeting. How do you start a meeting? How do you entertain motions? When do you have a quorum? What items can be voted upon during the meeting without a quorum?

All of these practical issues are covered within this program.

In addition to running meetings, the ICRI Chair Training Program PowerPoint also helps the technical committee chair with the responsibilities between the actual meetings. The program details how to initiate a ballot, how to interact with TAC, and who from ICRI is assigned to support the chair when he or she has any questions regarding the process.

All of these practical items are covered in the program in order to help make the experience of volunteering as an ICRI technical committee chair as enjoyable and transparent as possible. My hope is that each individual ICRI member has the opportunity to expand into a leadership role within our technical committees. Thanks again to Ashish, along with Fred Goodwin and the other members, who helped put this program together.

ICRI TECHNICAL COMMITTEE CHAIRS

- **Liying Jiang**, *Jensen Hughes*
  Committee 110
- **Paul Farrell**, *Carolina Restoration & Waterproofing*
  Committee 120
- **Jeff Carlson**, *Consulting Engineers Group*
  Committee 130
- **Michael Saulnier**, *Pegasus Painting & Waterproofing*
  Committee 130
- **Vincent LaPointe**, *SIMCO Technolgies*
  Committee 160
- **Charles Mitchell**, *SK&A*
  Committee 210
- **David Rodler**, *SK&A*
  Committee 210
- **Peter Haveron**, *Texas Concrete Restoration*
  Committee 310
- **Mark Kennedy**, *Simpson Strong-Tie*
  Committee 320
- **Tarek Alkhrdaji**, *Structural Technologies*
  Committee 330
- **Jason Coleman**, *Wiss, Janney, Elstner Associates, Inc.*
  Committee 410
- **Jorge Costa**, *Durability, Inc.*
  Committee 510
- **Eric Muench**, *Sika Corporation*
  Committee 710

ATTEND A TECHNICAL COMMITTEE MEETING

You can become a leader, too. All of the leaders above started by attending a technical committee meeting. Each ICRI member has the opportunity to join and participate in ICRI technical committees. You can attend a meeting by simply asking the Technical Committee chair for an invitation to the next virtual meeting.

You can find the schedule for upcoming meeting dates on the ICRI website. As always, if you want to join an ICRI technical committee, please feel free to contact me directly at mnelson@nelsontesting.com.

Mark Nelson *is chair of the ICRI Technical Activities Committee (TAC).*

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SECRETARIAT UPDATE


JOHN McDOUGALL

Within most volunteer-led trade associations, there is one common theme: consistency, year-over-year predictability and continuity. This has both positive and negative outcomes—members generally know what to expect from their association and change is at times painfully slow. The Secretariat role was implemented less than 18 months from the first brainstorming session where we debated the best fitting nomenclature for a seated committee.

That is among the most dynamic shifts I have seen in almost 20 years of working with associations. The underlying principle that brought us to the Secretariat was to remove roadblocks. We removed roadblocks to create the role, and the role is to remove roadblocks. Currently, we are further developing the roles and responsibilities within the group to increase engagement from our members, reduce the workload of the Secretariat members, and continue to remove roadblocks.

The work of the Secretariat is catalogued in our workflow management database, Causeway, It houses every idea submitted, with updates on each of them. No ideas are discarded, especially those that are not initially pushed forward for development. No idea is a bad idea; it is, however, common for an idea to be presented at a time where the workload has filled our pipeline and adding more ideas to the flow would result in several initiatives being under-serviced. Hence, the indexing and storage of all ideas. When the pipeline frees up, we will review and breathe life back into an old idea if it meets the goals and we can properly support it.

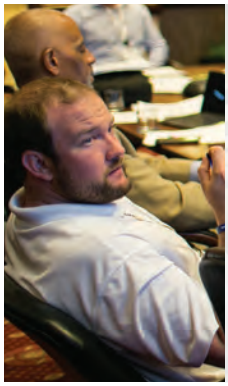
Causeway allows ICRI commitee members to collaborate from across the globe, work on shared documents, host calendars and agendas, and even manage the voting for

motions made at the committee level. This has significantly increased the efficiency of all our committees, and allows the Secretariat to walk initiatives through the various stakeholders and influencers within ICRI's committee structure. Without Causeway, we would be pushing everything out in emails, using various cloud storage services, and not have centrally located storage for our documents and discussions.

If you would like to learn more about Causeway and how it helps ICRI and the Secretariat manage the work of ICRI, please feel free to reach out. We are always seeking to identify roadblocks, remove them, or navigate around them. If you would like to get involved in the workflow with the Secretariat, please reach out to me via email and we will find a way for you to get involved. The door is always open for volunteer work. If you have a passion for a specific topic within the ICRI spectrum, we will find a way to support it.

My email is johnmcdougall27540@gmail.com. We are always looking to help you be more engaged in ***your*** association.

John McDougall *is ICRI President-Elect, Secretariat Chair, CSRT certified, and Past President of the ICRI Carolinas Chapter.*



Volunteer

The success of the International Concrete Repair Institute and its work in the industry depends on a strong, active volunteer force. As a member of ICRI, you are invited to participate in the meetings and projects of any ICRI administrative or technical committee. All are volunteer-led and depend on your expert contributions.

ICRI's volunteer program strives to create an environment that is friendly and welcoming. As an ICRI volunteer, you work closely with volunteer leaders and ICRI staff—active parts of each committee, who are available to assist you to answer questions about how ICRI operates, and to help you be the most effective volunteer possible.

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Jacob Borgerson, CSRT-Grade 1, Wiss, Janney, Elstner Associates, Inc.

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CONCRETE REPAIR
CERTIFICATION

Learn more at **www.icri.org**

Contact:
Dale Regnier
Program Director
daler@icri.org

INTERNATIONAL CONCRETE REPAIR INSTITUTE

5-PART WEBINAR SERIES CONTINUES

Moisture in Concrete Floor Slabs—Friend or Foe?

What You Don't Know about Moisture in Concrete Floor Slabs Can Cost You

A 5-Part Webinar Series. Moisture-related problems with floor coverings and coatings are a serious and costly issue. Each year the direct and indirect costs associated with such problems amount to billions of unplanned dollars. In this 5-part webinar series, experts in the field of moisture in concrete, testing, mitigation, and repair will share information and experience in a ground-up approach to the causes and solutions to such problems. ***Even if you missed Parts 1-3, the Webinars have been recorded for on-demand access.***

Part 1—February 17	*Where Does Moisture in Floor Slabs Come From?* Presenter: Peter Craig, FICRI, FACI, CCSMTT
Part 2—March 17	*The Role Concrete Plays in Floor Slab Moisture* Presenter: Scott Tarr, PE, FACI, CCSMTT
Part 3—April 14	*Floor Slab Moisture Testing Methods* Presenter: David Paal, CCSMTT, CCHSFI, CWFI
Part 4—May 12	***Floor Slab Moisture Mitigation*** Presenter: Peter Craig, FICRI, FACI, CCSMTT
Part 5—June 2	***Moisture in Concrete Floor Slabs: Panel Discussion and Q&A Session*** Panelists: Adam Bakeman, Peter Craig, David Paal, Scott Tarr

Visit www.icri.org for details.

Rising from the Flames: Assessing and Repairing Fire Damage to Post-Tensioned Parking Garage

by Stephen Lucy and Billy James

Fig. 1: Completed parking garage

Designed to fulfill the parking needs of two downtown Dallas hotels, the parking garage at 1712 Commerce Street in Dallas was under construction when it caught fire. The 10-story structure was constructed of cast-in-place concrete with one-way post-tensioned slabs and post-tensioned beams. During construction, a fire was set inside the structure by vagrants. That fire grew into a three-alarm blaze, causing significant damage and posing a considerable obstacle to completing construction on schedule. Despite extensive damage, the scheduled completion was only delayed by 30 days, and the garage opened for use in Spring 2019 (Fig. 1).

THE FIRE

The three-alarm fire occurred in the early morning hours of September 27, 2017 (Fig. 2). At the time, drilled pier foundations had been installed, one above-ground level had been substantially completed, and formwork and reinforcing steel was in place to construct the east half of Level 3. The engineer visited the site a few hours after the fire was extinguished to review the interior of the structure in the immediate area of the fire (Fig. 3). Although there was serious damage to formwork, there were no initial signs of displacement or significant distress in the structure itself. The engineer briefly entered the structure to determine if there was damage to the tower crane, as that would pose an immediate risk. The base of the tower crane, located three bays east of the fire, had smoke damage but no observable damage to the steel structure or to the rubber insulation of the main power cable.

The fire was located on the first floor near the southwest corner of the building. Vagrants had ignited a stack of foam insulation, which also encompassed the wooden formwork trusses and plywood beneath the second floor. Vertical steel formwork shoring remained but horizontal aluminum beams were deformed and, in some locations, had melted into puddles on the floor (Fig. 4 and 5), indicating that the fire had reached temperatures over 1200°F (650°C). Wooden form-

Fig. 2: Flame intensity as the parking garage burned


Fig. 3: Fire is extinguished

work trusses were burned to varying degrees and much of the plywood was burned, but the plywood did serve to protect portions of the concrete structure.

INITIAL DAMAGE OBSERVATIONS

During initial observations, significant concrete spalling was observed on the undersides of the Level 2 beams and slabs, and on some side faces of beams and columns adjacent to the fire location. On the soffit of the Level 2 slab directly above the fire, the spalling exposed two pairs of stressed post-tension strands. Extensive spalling of the concrete surface was also observed on the slab-on-grade beneath the fire location and on the vehicular ramp located due east of the fire.

Northeast of the fire, the ramp opening to the second floor was covered with formwork and reinforcing steel. During the fire event, the opening functioned like a chimney: concentrating the flow of heat and flames, resulting in damage to the floor framing at the edges of the opening.

Adequate concrete cover provides protection for embedded steel and post-tensioning elements in concrete structures. In this case, it appeared the concrete cover had performed its intended function. Because the structure itself remained stable with no signs of displacement or significant distress, the engineer recommended the contractor be allowed to begin cleanup operations, with the provision to provide shoring in designated locations.

TESTING AND DAMAGE EVALUATION

At the west half of the Level 2 floor in the vicinity of the fire, the post-tension tendons had been stressed but the strand tails had not been cut. These projecting strand tails had been exposed to the flames and some of the post-tension anchor encapsulations were slightly melted (Fig. 6). To initially assess the heat impact to the post-tensioned strands, the post-tensioning subcontractor attempted to perform liftoff tests on five of the strands that had been exposed to flames. Of the five, three of the strands broke during stressing at the point where the stressing jack was connected.


Fig. 4: Melted framework resulting from the intense heat of the flames

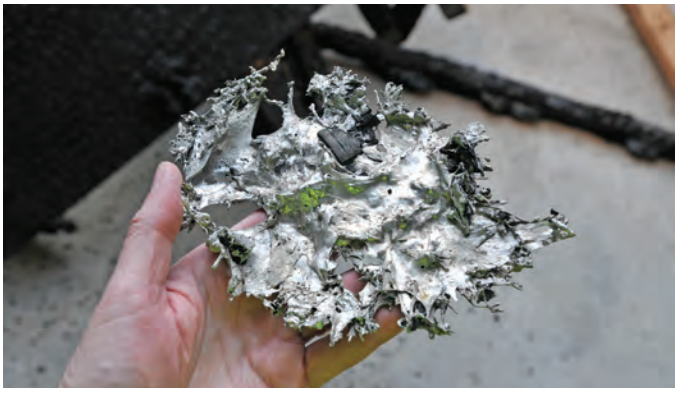
Fig. 5: The fire burned hot enough to melt the aluminum shoring system


Fig. 6: Ramp slab with melted post-tension encapsulation

Fig. 7: Initial post-tensioned strand testing

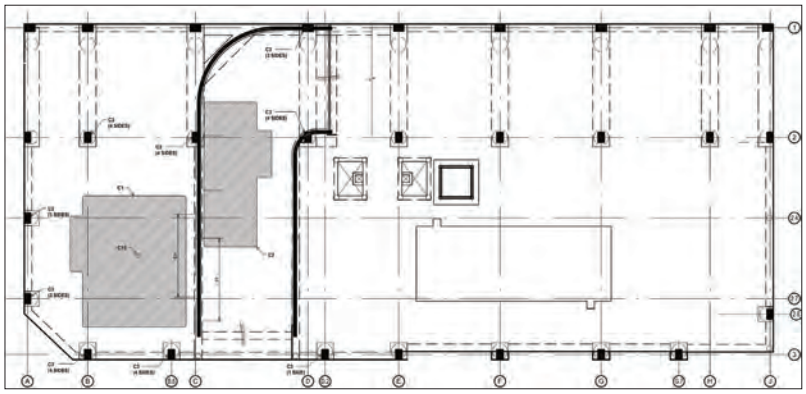

Fig. 8: Slab repairs at Level 1

After the results from the initial post-tension testing, the engineer recommended that the areas of the garage with obvious fire-related damage be removed and rebuilt, under the assumption that this approach would be the most expeditious method of getting the structure completed and placed into operation. However, the owner's insurance company required that additional testing be performed on the damaged structure before they would consider the proposed removal/replacement option.

A testing lab was retained to extract sixteen (16) cores from the concrete structure to perform petrographic analysis of the concrete. At the Level 2 slab soffits, located above the main section of the fire, the analysis indicated that the surface of the concrete was damaged by heat exposure for a depth of 0.3 to 0.5 in (8 to 13 mm). In addition, surface cracking was observed slightly beyond the surface where the concrete had spalled. Very little carbonation was found in the cores, so it was theorized that concrete that might have carbonation had spalled off.

The post-tension supplier was asked to test additional strands that were potentially affected by the fire event (Fig. 7). Forty-four (44) strands were identified, approximately 25 percent of the strands in the area damaged by the fire. Of the first fifteen (15) strands tested, one broke during stressing. The engineers theorized that the strand tails that projected out from the building were subjected to more heat, and thus, potentially more damage the farther they projected from the face of the building. The stressing jack being used for the testing was gripping the strands 12 in (300 mm) or more from the face of the building in this potentially damaged zone. To obtain more accurate test results, a different subcontractor was utilized to test the strands with different stressing equipment, capable of gripping the strands closer to the surface of the concrete. After all the strands were tested using this new equipment, only one broke out of the forty-four (44) strands tested.

BUILDING CONSTRUCTION COMMENCES

Testing indicated that the in-place structure was not damaged as extensively as first believed and it was agreed that the damaged structure could be repaired and construction resume. The engineer performed an extensive photographic survey of the building to document the full scope of repairs necessary and repair drawings and specifications were prepared to identify the work. The contractor elected to keep the Level 2 structure shored and resume construction on the upper levels.

As is typical of most concrete construction, reshoring of the existing framing levels was required to facilitate construction of upper floors. This initially necessitated the placement and maintenance of shoring within the area of repairs. Therefore, only after the completion of the Level 6 deck was it possible to remove reshoring at Level 2 and commence implementation of the repairs.

REPAIR PROGRAM

Proposed repairs included surface repairs of heat-damaged concrete at columns, beam and slab soffits, and beam and wall side faces. Unsound concrete at and adjacent to spalled areas of concrete was removed in accordance with ICRI 310.1R[1] and 310.2R[2] and repaired using polymer-modified repair mortar. At a portion of the Level 1 slab, which was to be used for retail space, it was determined that structural repairs were not required and surface repairs were sufficient to receive architectural floor materials. The owner decided to remove and replace the spalled section of the on-grade ramp at the entrance into the parking structure as this section of the ground floor was exposed to view (Fig. 8).

At the Level 2 slab that was directly over the fire, where two pairs of post-tension strands were exposed by spalling, it was determined that the slab be removed and replaced (Fig. 9). Prior to demolition, all post-tensioned strands in the slabs were de-tensioned. Any heat-damaged strand sheathings and encapsulation systems were repaired during this reconstruction. In addition, during slab removal, additional sheathing was damaged and required repair (Fig. 10), and two strands were damaged and required replacement. Because the main supporting post-tensioned beams remained stressed during repairs, designated areas of the slabs supported by the beams were removed and replaced in se-

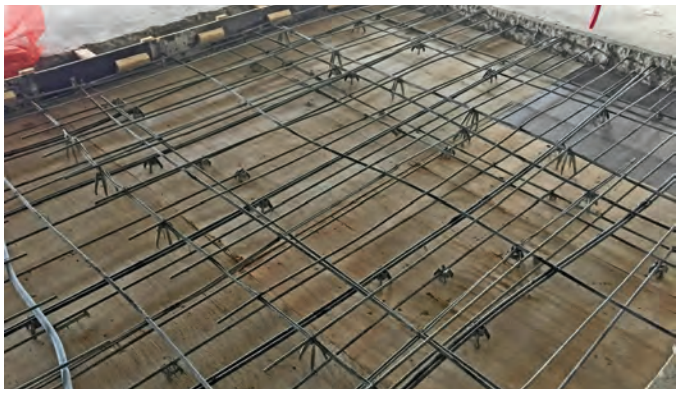
Fig. 9: Reinforcing for Level 2 slab replacement


Fig. 10: Post-tension strand damage after slab removal

quence. This was done to maintain sufficient load on the beams to prevent overstressing due to existing post-tension strand forces.

The ramp slab up to Level 3 required special consideration due to the contractor's proposal to resume construction before repair work was complete. The portion of ramp slab that cantilevered from the Level 2 structure to a proposed construction joint in the ramp was significantly damaged by the fire and the chimney effect mentioned previously. The sheathing on the strands and the encapsulation system at post-tension anchors had melted and extruded out of the strand stressing pockets. Removal and replacement of this was most direct if the work was done prior to continuing construction on the upper parking levels. However, to expedite the construction restart and regain valuable time in the overall construction schedule, the replacement of the existing damaged structure was delayed. The engineer developed a technical solution and construction sequence that incorporated new construction joints and specified the placement of new post-tension strands to be installed adjacent or overlapped with existing strands, enabling stressing of the strands after the infill replacement slab was constructed.

CONCLUSION

Garage construction resumed in April 2018. Once construction reached Level 6 and reshores were no longer required to extend to Level 2, repairs began in August 2018. The concrete structure of the garage was completed September 2018 (Fig. 11), very close to one year after the fire. Although the completion of construction was delayed approximately 90 days, primarily due to the testing mandated by the insurance company, the overall project schedule was only delayed by one month and the garage at 1712 Commerce Street was opened for use in Spring 2019.


Fig. 11: Top level of parking garage is complete

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2. ICRI 310.2R, *Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair*, International Concrete Repair Institute, St. Paul, MN, 2013, 48 pp.

Stephen H. Lucy, PE, is the CEO for JQ Engineering where he is actively involved in forensic testing, preservation efforts, and facility analysis. Over nearly three decades, Steve has built a significant portfolio of projects with varying project delivery methods, guiding clients through all stages of a project, from inception to completion. Steve currently serves on the advisory councils for Texas A&M University's College of Engineering and the Department of Architectural Engineering and is a distinguished graduate of A&M's Zachry Department of Civil and Environmental Engineering. Steve is an honorary member of the Texas Society of Architects and the Dallas Chapter of the American Institute of Architects.

Billy James, PE, is an Associate at JQ Engineering and has a diverse background in structural engineering and project management spanning over 40 years. His comprehensive knowledge and experience through a wide variety of projects including testing, forensic investigation, restoration, commercial, government, and institutional clients, give him the depth of expertise to serve as the quality assurance and quality control technical reviewer for the firm. Billy earned his Bachelor of Science degree in Architectural Engineering from the University of Texas at Austin.

Post-Tensioning System Modification at Gateway Tower 2

by Nancy Tamay and Chris Hill

Fig. 1: Gateway Towers 1 and 2 near completion (photos courtesy of Baker Concrete Construction)

When it comes to constructing a new building onto an existing structure, several complications and opportunities will always come into play. Such was the case for Gateway Tower 2 located adjacent to the local transportation center in Stamford, Connecticut. This nine-story building with nearly 300,000 sf (27,870 sm) and 4 levels of combined podium parking was selected to be the new Corporate Headquarters for Charter Communications. The plan called for the construction of two new 15-story buildings on top of an existing parking garage. The new development was expected to reshape the office market in Stamford. Construction at the Gateway Harbor Point site started in September 2018 with Tower 1, and the structural build out of Tower 2 was recently completed in March 2021.

Building two new structures (Fig. 1) on top of an existing post-tensioned parking deck can cause many issues. When the project's critical path ran through a multi-level connection terrace and subsequent slab openings down to the basement of the existing garage, all eyes fell on the post-tension system modifications required for the project.

POST-TENSIONING SYSTEM

Many high-capacity buildings, such as parking garages, apartment buildings, sports stadiums, and water treatment plants, use post-tensioning systems in their structural design. Post-tensioning (PT) is an active reinforcement system that creates internal forces to support loads acting on the structure in ways that traditional mild steel reinforcement cannot provide. The use of PT reinforcement results in reduced slab thickness with reduced deflections and cracking. Additionally, longer spans can be achieved, and better durability is expected because of the reduced cracking.

Unbonded PT systems are commonly used in commercial building applications throughout North America. These PT systems use steel strands contained within plastic sheathing (tendons) that are laid out in different directions and placed prior to pouring the concrete slab. Bundled groups of PT tendons typically mimic beam locations in one-way slab systems and are known as banded tendons. PT tendons running perpendicular to the banded tendons are normally spaced evenly throughout the structure and referred to as uniform tendons. After the concrete is placed and cured to an acceptable level (typically 75-80 percent of the design compressive strength of concrete), the tendons are stressed. The internal post-tensioning forces provide uplift to the slabs and place the majority of the slab section under compression, thereby allowing the concrete compressive strength to be efficiently utilized, and limit potential cracks under service load. Hydraulic jacks are used to apply the tension force at the end of each tendon in the slab. The strands stretch out or elongate with a force of 33,000 pounds-force (33 kips) per tendon. If done improperly or if it fails suddenly, a typical four tendon band would release significant force that can cause serious damage. Thus, the installation and modification of a PT structural system is a crucial part of any scope and requires experience and a good understanding of safety and structural stability concerns.

PT systems installed in concrete slabs have several components, and knowing the layout of each component is key to successful repair or modification of the system, especially if renovations and new loading are involved. PT tendons within the concrete slabs must be located prior to starting the modification work, either using ground penetrating radar (GPR) or X-ray equipment combined with traditional methods of providing exploratory excavations in the slab at locations away from dangerous PT anchorage and stressing zones. The tendon locations are then marked, and the number and layout of PT tendons are determined. As tendons are extremely dangerous when under stress, they must be de-tensioned prior to any PT slab modification. Once the system is de-tensioned, the PT element will no longer function as designed. Therefore, adequate shoring must be in place underneath the work area to support the concrete slab while the tendons are being worked on. Otherwise, proper phasing of the PT modification work should be considered to minimize overstress and potential failure of the slab during PT modification.

PT MODIFICATION PROGRAM

The new elevator/staircase location between the two new buildings at Gateway Towers 1 and 2 (Fig. 2) required the de-tensioning, re-profiling, and re-tensioning of the PT tendons at the new openings. The new openings and corresponding PT modification work had to be conducted on the Plaza, P1, P2, P3, and P4 levels, with a modified core area of roughly 1,350 sf (125 sm) per floor. The modified core area (Fig. 3) would eventually contain four elevators, one staircase, and a lobby/waiting area, getting the future occupants of the buildings from their cars to their desks in comfort and style.

To locate the uniform and banded tendons, an on-site PT investigation and layout was provided for the parking garage that identified the location of the tendons from the original construction in 2014. Uniform tendons ran north to south, and the banded tendons ran west to east. The challenge (as with most as-built conditions) was that PT cables were not always in the same location as per the drawings.

The initial step on site was to use GPR to identify the exact tendon locations and amount in each direction in the slab. The GPR method determined the location of reinforcing steel bars, PT tendons, and other metallic embedded items within the slab on all five levels. Beyond locating steel reinforcement and PT, GPR helped determine the likely depth that the tendons existed within the concrete slab. Localized concrete removal was utilized to confirm the findings of the GPR scans.

PLAZA LEVEL AND P1

Before starting the work, specific procedures and materials needed for the PT modification were established and discussed. Shoring and working platforms (Fig. 4) were installed on each level to support the elevator/staircase openings and the construction of a new core through the podium.

Fig. 2: Gateway Towers 1 and 2 during early construction—PT modification opening shown through the first two levels connecting Tower 1 (already constructed) and Tower 2 (starting concrete frame) (photo courtesy of Baker Concrete Construction)

Fig. 3: Gateway Towers 1 and 2 at mid-construction—new core wall construction on the plaza deck between the two new towers (photo courtesy of Baker Concrete Construction)

Fig. 4: Shoring, pocket demolition and other PT modifications on Level P1 with the Plaza Level already open above—note number of stressing pockets in the slab

The Plaza Level posed major challenges as this floor had a greater slab thickness compared to the other concrete slabs. The detailed demolition of this 12 in (300 mm) thick slab took more time than expected.

Concrete was delicately removed around the tendons (Fig. 5) to avoid damage to the plastic sheathing and the strands in both the uniform and banded tendons. If damage occurred, additional repair work would be required, adding time to the project schedule. Site safety and structural stability limited the number of PT tendons that could be de-tensioned at any point in time, with no more than ten (10) tendons de-tensioned per day. Banded tendons were de-tensioned (Fig. 6) in alternating stages to distribute the load equally, while the others were still under load.

Per the structural engineer, any damage to existing, mild steel reinforcement in the slab needed to be avoided as the reinforcement would help ensure the continuity of the new slab. Once the tendons were fully exposed on both sides, new PT anchorage details were installed. As the tendons were de-tensioned and cut no less than 4 ft (1.2 m) from the proposed edge, they were spread apart, re-profiled, and the anchorage was cast at the new slab edge with individual pockets using encapsulated anchors.

The encapsulated anchors were then secured with hairpin-like steel bars (Fig. 7), preventing bursting of the slab edge when the re-tensioning was performed with a hydraulic jack. The slab edge and new pockets were formed and poured with rapid-set mortar that quickly gained high-early strength. Then, each tendon was stressed to 33 kips with measured elongation ranging from 2.5 to 6 in (65 to 150 mm) depending on the residual, unmodified length of PT remaining in the slab. Each tendon was logged into a data sheet indicating the date that each tendon was stressed for inspection purposes, meeting the standard QA/QC criteria for the PT system.


Fig. 5: Removing concrete around existing PT tendons on the Plaza Level

The overall duration of the Plaza Level PT modification was approximately three (3) months. The weather was a factor, as there were days with snow, heavy rain, and low freezing temperatures in December through March that would not allow forming back the pockets. In addition to the weather, the early stages of the COVID-19 pandemic caused serious adjustments to the workflow and directly impacted the early ability to work as construction rapidly adjusted to the new normal.

LOWER LEVELS

On the four remaining levels, the slab thickness was 8 in (200 mm) compared to the 12 in (300 mm) slab thickness on the Plaza Level. These floors included more banded tendons to be modified as there were four corner columns on each side of the proposed elevator/staircase opening location. These column locations did not affect the PT modification work on the Plaza Level because the opening was slightly smaller. Because banded tendon layouts tend to mimic beams, these column locations contained a greater number of PT tendons that required modification.

Considering that the additional tendons would delay the schedule, work was performed on alternate floors so that the investigation work and locating the uniform and banded cables could be accelerated. In addition, the modified banded tendons had to be swept around existing corner columns. These tendons needed as much time as possible in the schedule to avoid impacting the overall duration. A significant amount of concrete removal also had to be completed, as multiple bands of tendons required significant slab areas to be demolished immediately adjacent to the columns to accommodate the new PT anchorages (Fig. 8).

After considerable review, it was determined that the most efficient and safe way to avoid creating wider openings and sweeping the tendons around the column was to remove the existing columns, and modify the core layout to later support these slabs. Removing the columns allowed the PT modification and the overall scope of work to move forward much faster than a typical re-design, review, and bid procedure may have allowed.

Other site conflicts included working around the existing shoring that had been installed to support the floor slab while the existing PT was released and work was being performed on levels above. At several locations, the shoring tower legs fell on or between areas that required concrete demolition. At the top of the working platform, plywood sheets trapped the concrete demolition debris, so the debris would constantly have to be removed by hand, creating additional time and costs. Despite all these challenges, the

Fig. 6: Controlled de-tensioning of existing PT tendons on Level P2

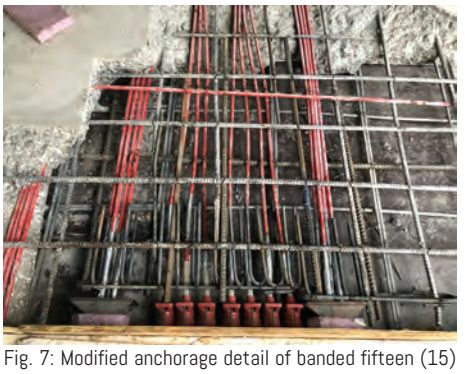


Fig. 7: Modified anchorage detail of banded fifteen (15) tendon bundle at new end anchor location

Fig. 8: Modified anchorage detail at column interface

PT modification work was successfully completed, and subsequent core re-build was completed on budget and ahead of schedule.

CONCLUSION

Working with PT tendons requires detailed planning, investigation, and execution to establish a safe working environment. The danger of working around PT systems that hold thousands of pounds of force is real. This is especially true in structural modification projects where the existing PT system is already under tension, and the precise locations of the PT system may not be located as shown on the project drawings.

At Gateway Tower 2, an overall quantity of 515 tendon modifications with 172 anchorage pockets was a challenging assignment to complete in 5 months. The great communication among the project team and coordination with other trades working on the project showed that there were alternative ways to move forward in a time-crunching schedule. Design-build delivery helped push a tight schedule forward and move a project through hurdles that could typically derail critical scopes of work.

PT System Modifications at Gateway Tower 2

OWNER
Charter Communications
Stamford, CT

GENERAL CONTRACTOR
Building & Land Technologies (BLT)
Stamford, CT

CONCRETE CONTRACTOR
Baker Concrete Construction
Monroe, OH

SPECIALTY CONTRACTOR
STRUCTURAL
Hawthorne, NJ

PT SPECIALIST
Structural Technologies
Columbia, MD

ENGINEERS
EDI [A/E]
New York, NY

Thornton Tomasetti [Structural]
New York, NY

Nancy Tamay is a Project Engineer with STRUCTURAL out of the Hawthorne, NJ branch. She has 5 years of construction industry experience ranging from formwork design to concrete repairs and building strengthening / modification. With STRUCTURAL, Nancy has been involved in a number of key new-construction and adaptive re-use modification projects at Gateway Tower 2 and 860 Canal Street, both in Stamford, CT. She currently is working on repair and strengthing projects on the West Point Military Academy Campus and across the NY Metro region.

Chris Hill is Director of Concrete Solutions for the Strengthening Operations team of STRUCTURAL Technologies. He is a recognized leader in the concrete strengthening and repair industry and has spent the past decade working on the restoration and modification of many contemporary and historic structures. Chris is based out of New York with international experience leading the STRUCTURAL offices in the Middle East. He is involved in local chapters of ICRI, ACI, and CIB; and works to train the industry through both engineering-focused and hands-on presentations.

Structural Repair and Protection of University of Missouri Hospitals and Clinics Post-Tensioned Parking Garage

by Chris Ball

Fig.1: University of Missouri Health Care Patient and Visitor Parking Structure (MUHC Garage)

The University of Missouri Health Care Patient and Visitor Parking Structure (MUHC Garage) is a 448 car, four-level structure located in Columbia, Missouri (Fig. 1). The MUHC Garage is the gateway to vital health services for hundreds of daily patients and visitors for the Health Care Facility while also serving as the hub for service providers, security and maintenance personnel, and students.

The parking garage, built in 1986, is a cast-in-place post-tensioned beam and slab structure consisting of three elevated post-tensioned decks over a slab-on grade level. The post-tensioning tendons are plastic push-through type (stuffed) which are susceptible to having voids in the anti-corrosion grease.

Understanding the vital role of the structure to the University and the community, MUHC staff was immediately concerned upon discovering a broken post-tension tendon protruding from the underside of an elevated deck (Fig. 2). MUHC promptly retained a structural engineering firm to investigate the exposed tendon, determine the cause of the failure, and develop a long-term repair strategy.

INVESTIGATION AND RECOMMENDATIONS

An investigation and condition assessment were completed in 3 phases:

Phase 1

Investigation: The initial investigation occurred at the location of the original tendon eruption (Level 1 North Bay) and included invasive inspections for further tendon breaks, live anchor condition at the expansion joint, and screwdriver penetration tests at mid-span (Fig. 3). The penetration test involves wedging a flathead screwdriver between the individual wires which make up the strand. Screwdriver penetration can only be achieved if one or more wires are broken.

Results: 43 perccent of the 39 tendons tested were broken, and moderate to severe corrosion of the live anchors was observed due to leaking expansion joints.

Phase 2

Investigation: With significant tendon problems detected including visible corrosion noted at grout pockets (Fig. 4 and 5), extensive forensic testing of representative sample areas was conducted to verify tendon condition at the remaining four expansion joint locations. The testing included post-tension corrosion evaluation as indicated by the level of moisture inside the tendons (Fig. 6). A structural analysis of Level 1 using IBC 2012[1] (40 psf [1.9 kPa] live load) was completed along with visually inspecting and sounding the concrete decks.

Results: 80 percent of the 40 anchors inspected exhibited moderate to severe corrosion damage. Chloride profile testing indicated levels exceeding 400 ppm at 1 in (25 mm) depth, a level considered sufficient to initiate corrosion for high strength steel under stress, which can be more susceptible to corrosion than conventional rebar. Corrosion potential testing along the expansion joints indicated 30 percent of the anchorage areas had high probability of active corrosion (< -350 mV vs copper-copper sulfate electrode [CSE]) and only 25 percent of locations were passive (> -250 mV vs CSE). A large majority of the 64 tendons tested had excessive moisture, sufficient to initiate and maintain corrosion activity in the tendons.

Phase 3

Investigation: Based on results in Phase 2, all remaining slab tendons were inspected for strand condition and moisture content.

Results: A total of 27 out of 497 tendons that were exposed had broken or missing strands at the test locations. Sixty-five (65) percent of tendons were determined to be in good to fair condition. However, 62 percent had missing or degraded grease (Fig. 7) and 98 percent had excessive moisture levels.

Assessing the severity of the corrosion problem, the cause of the advanced degradation was identified. A gutter system had been installed below leaking expansion joints. This gutter system trapped debris, moisture, and chlorides from deicing compounds beneath the failed joints, established a corrosive environment at the post-tensioning anchors, creating an entry point for moisture into the tendons. Maintaining the long-term serviceability of the MUHC garage would require both repairing existing structural problems (which would worsen over time) and addressing the corrosion problem that was causing the deterioration.

REPAIR PLAN

With the investigation complete, it was determined that voids between the sheath and strand and a lack of protective tendon grease allowed water and chloride ingress

Fig. 2: Erupted post-tensioned tendon discovered March 2013

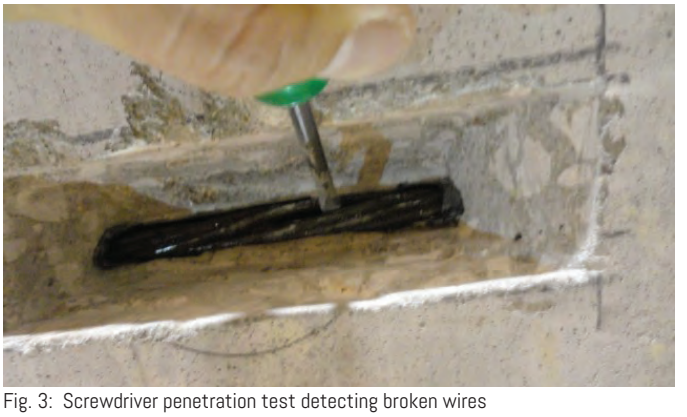


Fig. 3: Screwdriver penetration test detecting broken wires

Fig. 4: Corrosion at slab grout pockets

Fig. 5: Corrosion at beam end grout pockets

Fig. 6: Post-tension corrosion evaluation procedure (moisture test)

Fig. 7: Severe corrosion and degraded grease

Fig. 8: Post-tension splicing with center stressing chuck

from the failed expansion joints. After completing a 20-year life cycle cost analysis, a repair strategy was finalized that included the following items:

- Repair damaged concrete and masonry;
- Replace all live stressing anchorages at the expansion joints and 20' of strands in bays adjacent to expansion joints;
- Install galvanic anodes in repairs;
- Repair 25 broken tendons and replace 3,000 ft (915 m) of monostrand tendons;
- Replace all expansion joints and re-caulk horizontal and vertical construction joints;
- Apply heavy duty traffic-bearing membrane to all levels; and
- Employ post-tension cable drying to all slab tendons, and after internal tendon moisture was reduced to acceptable levels, follow with the post-tension grease injection process.

PROJECT DELIVERY

With a comprehensive structural repair plan designed, it was decided to restore the structure in two phases. Given the volume of work, a compressed schedule, and the technical nature of the repairs, substantial involvement by the structural engineer (including prequalification of the specialty repair contractors) was critical to deliver a successful project. The first phase was completing structural repairs from May to September 2014. After the repairs were complete, the post-tension tendon drying and grease injection process was completed between August 2014 and January 2015.

For the structural repair phase, the owner faced the hard decision of phasing the work to maintain an operational garage. The owner chose to close the entire garage for the massive repair scheme, recognizing that maintaining an operational garage would increase the repair cost, extend the project duration, and create potential safety risks for patients and visitors.

A closed garage also allowed replacement of existing garage systems to be added to the project. The Owner elected to install new LED lighting systems, updated dry fire sprinkler systems, new paint, and a new exterior canopy system covering the walkways between MUHC buildings.

The owner determined that the MUHC Garage must be repaired and returned to service before students return for classes. This restricted the post-tension repairs to just 91 calendar days, with the remainder of the work to be completed within 206 calendar days. The Engineer-established contractor pre-qualifications and aggressive schedule ensured that the owner would contract with a highly experienced post-tension repair team who was up to the task.

STRUCTURAL REPAIRS AND WATERPROOFING

The primary focus of the structural repairs was to re-establish

the integrity of the elevated post-tension slabs. The immediate task was to replace 206 live stressing anchorages at the 4 failed expansion joints. The existing anchorages and new fully encapsulated anchorages would be reinstalled. This replacement would require installing various lengths of new tendon as well. Secondly, 29 tendon breaks throughout the garage also required location, splicing, and re-stressing (Fig. 8). To round out the complete structural repair, all columns, walls, beams, and overhead concrete delaminations would be repaired following guidelines published by the International Concrete Repair Institute (ICRI).

The selected contractor focused all pre-construction efforts on the scheduling and coordinating of the multiple scopes of work planned for every garage level. The preliminary schedule was established so each trade started at the top of the garage and worked down to the entrance on Level 1. The contractor's goal was to turn over 100 percenet of the garage on the required opening date. Achieving this goal would require meticulous manpower organization to perform the post-tension repairs on each level within 3 weeks.

The post-tension repair method was to "lock off" the tendon lengths that did not require repair and maintain the structural capacity of the level still tensioned while the end anchors were replaced. This method limited the required shoring which in turn kept valuable areas of the garage open for other repairs to be performed simultaneously.

Once the post-tension repairs were completed (Fig. 9), the cause of those problems was eliminated to ensure an extended service life for the structure. The failed expansion joints and gutter systems on each level were removed and replaced with watertight elastomeric winged expansion joints. Following the replacement of the joints, a heavy-duty vehicular traffic waterproofing membrane was installed to protect the repaired slabs from further moisture and chloride intrusion (Fig. 10). This protection included a pedestrian membrane in stairs, a slab-on-grade deck coating, and re-striping to conform to current Americans with Disabilities Act (ADA) standards.

POST-TENSION CORROSION MITIGATION

After the post-tension repairs were complete, the corrosion mitigation process began. The scope of work was to complete the post-tension cable drying and install new anti-corrosion grease to protect the tendons from future corrosion.

On each of the 421 tendons to be dried, input and exit ports were installed using custom designed shut-off drills such that the post-tensioned strand would not be inadvertently damaged. Manufactured dry air was then transported to each tendon through temporary piping (Fig. 11) and passed through the tendon under controlled flow and pressure. The exhaust was monitored at the exit port until it was determined that all bulk water and moisture from the grease and the interior spaces of the 7-wire strand had been reduced to sufficient levels.

The post-tension cable drying criteria for moisture content was based upon previous studies performed for the National Research Council Canada (Fig. 12).[2] Prior to the post-tension cable drying, the tendons were in a Wet 3 condition with moisture content greater than 0.7 percent with several of the tendons holding bulk water. After the post-tension cable drying process was completed, 98 percent of the cable groups were classified as Dry 1 with moisture content less than 0.3 pervent. The remaining cables, classified as Dry 2 with less than 0.7 percent moisture, typically have airflow restrictions, possibly caused by built-up corrosion.

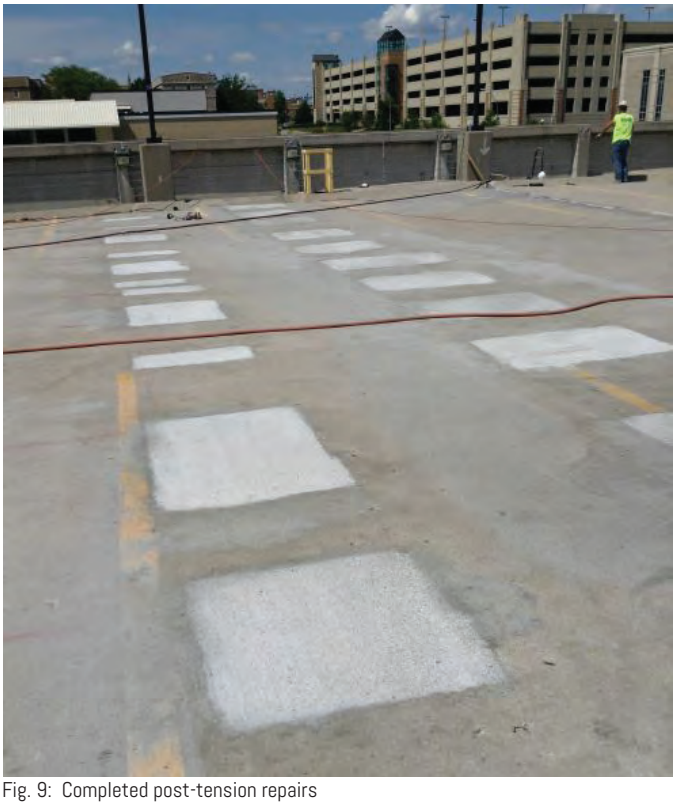


Fig. 9: Completed post-tension repairs

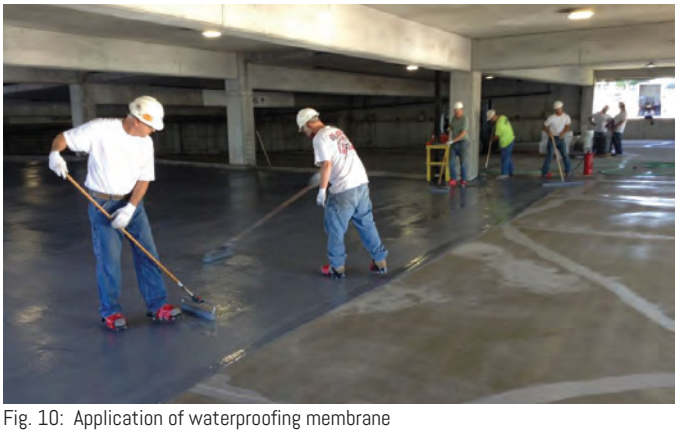


Fig. 10: Application of waterproofing membrane

Fig. 11: Manifold system and input air ports for post-tension cable drying

Corrosion Evaluation Testing Classification:

	Classification Code	Potential for Corrosion	Moisture Content
	1	Low (Dry)	< 0.3%
Dry	2	Moderate (Moist)	0.3% to 0.7%
Wet	3	High (Wet)	> 0.7%

Fig. 12: Potential for post-tension corrosion based on moisture content

Fig. 13: Post-tension grease injection

Fig. 14: Post-tension grease at grout pockets

After the post-tensioned cable drying process was completed, new anti-corrosion grease was placed in the individual tendons to eliminate any existing voids and to improve the corrosion resistance of the post-tension system (Fig. 13 and 14).

UNFORESEEN CHALLENGES

Pre-construction planning was essential to the success of the project and meeting the aggressive schedule. Missing the opening date was not an option, but as with most restoration projects, there would be many unforeseen conditions and circumstances requiring flexibility.

Repairs were keeping pace with the preliminary schedule—but at 26 calendar days remaining before the deadline, it was recognized that simply completing the post-tension repairs would not be sufficient. The owner determined that parking needs would require completion of all garage repairs and coatings before opening all 4 garage levels.

The entire project team had to combine efforts to find collective solutions and accelerate production for the remaining 5 weeks. Twenty-one (21) severely deteriorated end anchors were uncovered that required replacement with only 10 days remaining prior to the deadline. On the opening day deadline, the traffic coating and striping on all 4 levels were completed, the fire suppression systems were finished, and the new LED lighting was operational—all items necessary to opening the MUHC Garage for patient and visitor parking.

SUMMARY

The MUHC Parking Garage Repair project is an excellent example of how an experienced and cohesive project team can work together to overcome obstacles and find mutually beneficial success while facing difficult circumstances. The keys to the success of the project included an owner with a long-term outlook, a comprehensive condition assessment to determine the extent and magnitude of the corrosion problem, innovative project design to repair the current structural problems and mitigate the possibility of future widespread corrosion problems, an experienced team of qualified engineers and contractors, and innovative project delivery to meet owner requirements.

ACKNOWLEDGEMENT

The author would like to acknowledge Ralph C. Jones, PE, with Structural Engineering Associates, Inc. as Principal-in-Charge for the project.

REFERENCES

1. IBC 2012, International Building Code, International Code Council, Washington, DC.
2. Report A8061C, *Effectiveness of the CPE Method for Evaluating Unbonded Post-tensioned Tendons – An Evaluation Report, Institute for Research in Construction*, National Research Council Canada, Ottawa, ON, April 14, 1997.

University of Missouri Hospitals and Clinics Post-Tensioned Parking Garage

OWNER
University of Missouri Health Care
Columbia, MO

PROJECT ENGINEER/DESIGNER
Structural Engineering Associates, Inc.
Kansas City, MO

REPAIR CONTRACTOR
John Rohrer Contracting Company, Inc.
Kansas City, KS

POST-TENSION (TESTING AND DRYING) SUBCONTRACTOR
Vector Construction, Inc.
Cedar Rapids, IA

MATERIAL SUPPLIERS/MANUFACTURERS
Jacor Contracting, Inc.
Kansas City, MO

Vector Corrosion Technologies
Tampa, FL

BASF Corporation
Shakopee, MN

Neogard Corporation
Dallas, TX

J. Chris Ball is Senior Vice President of Vector Corrosion Technologies, a provider of innovative solutions used to repair and extend the service life of concrete structures. Chris has over 25 years of experience in concrete repair and corrosion protection technologies. A member of ICRI, ACI, and NACE, he is currently Chair of the ACI E706 Concrete Repair Education committee and has published numerous papers on repair and protection technologies.

The International Concrete Repair Institute (ICRI) is the leading resource for education and information to improve the quality of repair, restoration, and protection of concrete.

CONCRETE REPAIRCALENDAR

MAY 12, 2021
Moisture in Concrete Floor Slabs – Friend or Foe? Part 4 of 5
Website: **www.icri.org**

JUNE 2, 2021
Moisture in Concrete Floor Slabs – Friend or Foe? Part 5 of 5
Website: **www.icri.org**

JUNE 7-10, 2021
2021 World of Concrete, Las Vegas, NV
Website: **www.worldofconcrete.com**

OCTOBER 2021
2021 ICRI Fall Convention
Minneapolis, MN
Website: **www.icri.org**

INTERESTED IN SEEING YOUR CONCRETE INDUSTRY EVENT LISTED HERE?

Events can be emailed to editor@icri.org. Content for the July/August 2021 issue is due by June 1, 2021 and content for the September/October 2021 issue is due by August 1, 2021.

INDUSTRYNEWS

BUILDING SEISMIC SAFETY COUNCIL AWARDS BUILT ENVIRONMENT LEADERS FOR PUBLIC SAFETY STEWARDSHIP

Celebrating the 40th anniversary of the Building Seismic Safety Council, the National Institute of Building Sciences recently recognized the leaders who have provided significant direction to the BSSC mission, contributing to its success.

The council has coordinated the efforts of federal agencies, the building industry, and thousands of subject matter experts to develop 10 editions of the National Earthquake Hazards Reduction Program Recommended Seismic Provisions. These recommendations have served as the foundation of the nation's seismic standards and model building codes.

BSSC Leadership Award Recipients
The BSSC Leadership Award recognizes individuals and organizations that have provided significant leadership to BSSC's mission of enhancing public safety by fostering improved seismic planning, design, construction and regulation in the building community. The award is bestowed to those who have distinguished themselves in technical positions, in leadership, and as leaders in government and private engineering organizations.

BSSC Excellence Award Recipients
The BSSC Excellence Award recognizes individuals who have made a significant difference in advancing seismic design and construction and improving the safety and economic viability of building systems. Whether it is for significant code change provisions or the advancement of engineering and building science, or long time of outstanding service, the BSSC Excellence Award is bestowed to those driven to protect the health, safety and welfare of the public.

For more information and a list of winners visit https://www.nibs.org/index.php/news/building-seismic-safety-council-awards-built-environment-leaders-public-safety-stewardship

NIBS MITIGATION SAVES RESEARCH HIGHLIGHTED DURING HOUSE HEARING ON MITIGATION

The National Institute of Building Sciences Natural Hazards Mitigation Saves 2019 Report recently took center stage, during a mitigation hearing on Capitol Hill.

The House Committee on Transportation and Infrastructure Subcommittee on Economic Development, Public Buildings, and Emergency Management held the hearing, "Building Smarter: The Benefits of Investing in Resilience and Mitigation," on March 18.

Mitigation Saves represents the most comprehensive benefit-cost analysis of natural hazard mitigation, from adopting up-to-date building codes and exceeding codes to the upgrade of utility and transportation infrastructure.

Testimony by Velma Smith, a senior officer with the Flood Prepared Communities Initiative for The Pew Charitable Trusts cited Mitigation Saves, which is produced by the NIBS Multi-Hazard Mitigation Council.

For more information on the report visit nibs.org/projects/natural-hazards-mitigation-saves-2019-report.

NIBS NAMES BIM PROGRAM STEERING COMMITTEE MEMBERS

The National Institute of Building Sciences has announced the built environment leaders who will serve on the National BIM Program Steering Committee.

The NIBS BIM Council began the launch phase for the U.S. National BIM Program in March, when Salla Eckhardt, Director of Transformation Services with Microsoft, was named chair of the National BIM Program Steering Committee.

Lakisha A. Woods, CAE, President and CEO of NIBS, said it is important to establish a structure that broadly engages diverse stakeholders.

The National BIM Program Steering Committee members are:

- Salla Eckhardt (Chair), Microsoft
- Sandra Benson, Amazon Web Services
- Angel A. Dizon, III, U.S. Department of State
- Jason Fairchild, U.S. Army Corps of Engineers
- Michael Kennerly, Iowa Dept of Transportation
- Hannu Lindberg, DPR Construction
- Paul Audsley, NBBJ
- Luciana Burdi, Massachusetts Port Authority
- Will Sharp, PE (NE, IA), HDR
- Jagannath Mallela, PhD, WSP
- Katherine Petros, Federal Highway Administration
- Charles G. Hardy, AIA, CCM, Public Building Service
- Russ Manning, Ph.D., LEED AP, CRL, CEFP, Kaiser Permanente

For more information visit nibs.org

INTERESTED IN SEEING YOUR NEWS IN THIS COLUMN?

Email your 150-200 word industry news to editor@icri.org. Content for the July/August 2021 issue is due by June 1, 2021 and content for the September/October 2021 issue is due by August 1, 2021. ICRI reserves the right to edit all submissions.

CHAPTER ACTIVITIES

NORTH TEXAS SCHOOLED ON EPOXY/URETHANE INJECTION

In a virtual meeting held on February 18, 2021, the North Texas Chapter went to school on the two types of injection used on concrete structures. Scott DiStefano from Sika Corporation presented a comprehensive review of the repair materials and techniques used to repair cracks and joints in concrete structures.

Two-component epoxies conforming to ASTM C881, Types IV or V, which can be injected under pressure or gravity fed into wider cracks, are bonding adhesives that are used to "glue" the cracked concrete back together in structural applications. They are heat-generating, thermosetting resins that are very rigid when cured. Various epoxy resins have differing viscosities. Very low viscosity resins are used to repair tight cracks, while higher viscosity resins can be injected or gravity fed into wider cracks. Scott described the different inject ports that can be used, along with installation techniques for surface preparation, and spacing of the injection ports. Plural component injection pumps are used on larger jobs, while manufacturers provide dual cartridge material that utilizes static mix heads to blend the two components together just prior to injection into the crack. For gravity fed applications, the use of concrete dust from the surface preparation operation can be added to the top of the epoxy to help hide the crack. Super-low viscosity resins can also be used in "flood-coat" application where the cracks are too numerous to inject individually.

Leaking cracks that are non-structural are most often sealed using chemical grouts based upon polyurethane chemistry. Scott described the differences between hydrophobic and hydrophilic polyurethanes, and the typical ports and pumps used to install the material. Installation techniques were presented, including drilling holes at a 45-degree angle on each side of the crack to intersect the crack at the mid-depth of the concrete structure, and the use of soaked oakum rope or open-cell backer to pack into the face of wide cracks or leaking joints.

CHAPTER CROSSOVER TROUBLE

Georgia Chapter member Kevin Davenport, decked out in his Clemson colors, paid a visit to Texas and met up with ICRI Past President Mark LeMay, bedecked in his Notre Dame attire, to enjoy an 80° day on the golf course. The Clemson grad birdied the last two holes to win the "Battle of the Birdies." No doubt, a rematch is already in the works.

Rivals and Friends (left to right): ICRI Past President Mark LeMay and Georgia Chapter member Kevin Davenport

ICRI CONCRETE REPAIR CHAPTERS

ICRI has 39 chapters, including two student chapters, in metropolitan areas around the world. Chapters hold technical presentations, educational meetings, symposia, and local conventions on repair-related topics.

Chapters also provide an outstanding opportunity to meet and build relationships with repair specialists in your area. In addition to the technical meetings, chapters also host golf outings, social evenings, dinner cruises, and other networking events.

ICRI**CHAPTER**NEWS

CHAPTER CALENDAR

Many ICRI chapters have canceled or postponed events due to the ongoing pandemic. Check with individual chapters by visiting their chapter pages for any exceptions, as this is a fluid situation that may have changed after this publication went to print.

BALTIMORE-WASHINGTON
May 6, 2021
SPRING GOLF TOURAMENT
Westfields Golf Club, Clifton, VA

CAROLINAS
June 3, 2021
ANNUAL GOLF TOURNAMENT
Grandover Resort, Greensboro, NC

CENTRAL FLORIDA
June 17, 2021
CHAPTER TECHNICAL MEETING
Topic: Sealants
Houligan's, Daytona, FL

August 19, 2021
AXE THROWING EVENT
Location: TBD

CHICAGO
September 2, 2021
LEE SIZEMORE MEMORIAL GOLF OUTING, and Scholarhip Fundraiser
White Pines Golf Club, Bensenville, IL

DELAWARE VALLEY
May 7, 2021
SPORTING CLAY SHOOT
Lehigh Valley Sporting Clays, Coplay, PA

GEORGIA
May 10, 2021
SPRING GOLF TOURNAMENT
Heritage Golf Links, Tucker, GA

METRO NEW YORK
May 27, 2021
WEBINAR
Topic: Rising from the Dead

June 1, 2021
ANNUAL FISHING TRIP
Location: TBD

MINNESOTA
June 11, 2021
BAGS TOURNAMENT
Urban Growler, St. Paul, MN

July 20, 2021
GOLF SCHOLARSHIP FUNDRAISER
Bunker Hills Golf Club, Coon Rapids, MN

NEW ENGLAND
May 19, 2021
JOINT TECHNICAL MEETING
Joint Meeting with ACI Chapter
Topic: Petrography

September 27, 2021
ANNUAL GOLF OUTING
Turner Hill Golf Club, Ipswich, MA

NORTH TEXAS
May 14, 2021
7TH ANNUAL SPORTING CLAY CLASSIC
Dallas Gun Club, Lewisville, TX

PITTSBURGH
May 4, 2021
WEBINAR
Topic: ACI's Adhesive Anchoring

July 16, 2021
CHAPTER GOLF OUTING
Bird's Foot
Freeport, PA

ROCKY MOUNTAIN
May 20, 2021
VIRTUAL LUNCH AND LEARN
Speaker: Jack Whitworth

June 2021
VIRTUAL LUNCH AND LEARN
Speaker: Jim Anderson

July 2021
VIRTUAL LUNCH AND LEARN
Speaker: Ed Nagel

SOUTHEAST FLORIDA
May 14, 2021
ANNUAL GOLF TOURNAMENT
Jacaranda Golf Club, Plantation, FL

INTERESTED IN SEEING YOUR CHAPTER NEWS & EVENTS LISTED HERE?

Chapter News & Event Deadlines

JULY/AUGUST 2021
Deadline: May 10, 2021

SEPTEMBER/OCTOBER 2021
Deadline: July 10, 2021

NOVEMBER/DECEMBER 2021
Deadline: September 10, 2021

Send your Chapter News by the deadlines to Director of Chapter Relations
Dale Regnier at daler@icri.org.

WWW.ICRI.ORG

CHAPTERS COMMITTEE CHAIR'S LETTER

MICHELLE NOBEL
Chapters Chair

Another day in Paradise! Famous words often said in Florida, just not in March and most of April, for most Floridians. To us, it means spring break, snowbirds, and traffic!

As a cocktail waitress in college, I dreaded March and April. I worked at Calico Jack's at the Adams Mark Hotel on Clearwater Beach. It's since been imploded for a movie and recreated as the Opal Sands Resort, but I remember the sounds of Rick James' "Super Freak" and Human League's "Don't You Want Me," which was a song about a waitress in a cocktail bar, and it seemed fitting at the time. Though the bar would have so many people that you could hardly move, most of the people were broke college kids, so it didn't mean more tips. Like many things in life, and as the saying goes by Elbert Hubbard, "When life gives you lemons, make lemonade!" We did as best as we could to get through it because we knew there were better days ahead.

Speaking of better days, it's official! There will be an in-person convention this Fall. It will be in Minneapolis, Minnesota, and I think I speak for everyone when I say I'm looking forward to this like never before!! It'll be like going to your first convention all over again. ICRI will send out details soon, so stay tuned and get excited for the 2021 ICRI Fall Convention in Minneapolis! I can't say enough how we all need this to get back to some normalcy in life.

If you're looking for a committee to join, the Women in ICRI Committee is always looking for a few good women. While we may have different jobs, we have the common goal of supporting other women in our industry. It's uplifting and exhilarating to meet and work alongside these incredible women. So, please join us and make your voice heard. If you would like to join Women in ICRI, reach out to Tara Toren-Rudisill, TTorenrudisill@ThorntonTomasetti.com, Monica Rourke, MRourke@mapei.com, or me at mnobel@mapei.com.

I want to remind everyone that ICRI continues to support the ACI 562 Repair Code adoption efforts on both the national and chapter levels. Recently, the ACI 562 Repair Code was adopted in Florida. It became effective at the end of 2020. Thanks to the efforts of the Central Florida Chapter for providing a support letter and testimony from David Poulter, Central Florida Chapter Director, and First Florida Chapter Treasurer, for support of the code change proposal. Also, the Carolinas Chapter provided a letter of support, and ICRI President-Elect John McDougall provided testimony to the NC Building Council for the proposed code change in North Carolina. The NC Building Council is recommending approval to the existing NC Building Committee later this year. Furthermore, the Virginia and Oklahoma Chapters are pursuing code adoption efforts in their states. Efforts are also occurring in Pennsylvania and South Carolina. Please stay tuned for more local support opportunities.

There is a lot of information in the Certification/Education tab on the ICRI.org website. Make sure you stop by to learn about the CSRT program, CSMT program, webinars, training, tips on the learning center, and all that ICRI has to offer.

Dates to mark on your calendar:

- World of Concrete 2021—June 7-10, 2021 in Las Vegas, Nevada
- World of Concrete 2022—January 17-20, 2022 in Las Vegas, Nevada

For other chapter events, visit: https://www.icri.org/events/event_list.asp

Keep on the lookout for announcements from ICRI about the 2021 ICRI Fall Convention. Reach out to ICRI staff, the Executive Committee, or any ICRI leader for help.

In the intuitive words of Søren Kierkegaard, "Life can only be understood backwards; but it must be lived forwards." Let's look forward to the future when we can be together again!

Please be safe, be kind, and I will see you all in the Fall!

Sincerely,

Michelle Nobel
2021 ICRI Chapters Committee Chair
MAPEI Corporation

2019/2020 ICRI Personal Awards & Recognition Presentation Videos

FELLOWS

2020 CHAPTER OF THE YEAR AWARD

Retirements

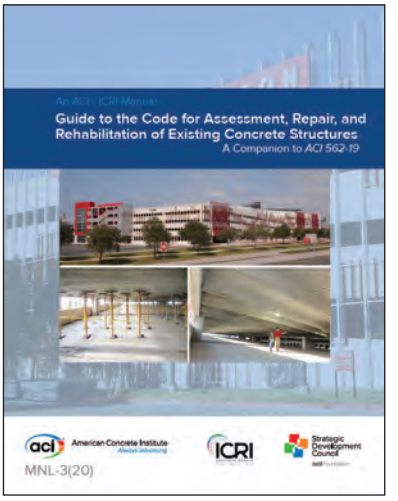
PASSING THE GAVEL

40UNDER40

View at www.icri.org

Now Available...

New ACI/ICRI Guide to the Code for Assessment, Repair, and Rehabilitation of Existing Concrete Structures



The American Concrete Institute (ACI) and International Concrete Repair Institute (ICRI) have published an updated *Guide to the Code for Assessment, Repair, and Rehabilitation of Existing Concrete Structures, A Companion to ACI 562-19*. This guide provides the licensed design professional with the knowledge, skill, and judgment to interpret and properly use ACI 562-19, *Code Requirements for Assessment, Repair, and Rehabilitation of Existing Concrete Structures* and provides insight into the use and benefits of the code for contractors, material manufacturers, building owners, and building officials.

This updated guide features three main components:

1. Chapter guides for providing clarity and understanding of the relevant portions of ACI 562-19.
2. Appendix B provides an overview of the new standard ACI 563-18, “Specifications for Repair of Concrete in Buildings.”
3. Project design examples illustrating the process of carrying out a concrete building assessment, repair, rehabilitation, or strengthening project from inception through completion.

New features of the updated guide include an appendix addressing specifications with examples and clear definition of the responsibilities and scope of the repair, rehabilitation, or strengthening. The guide also includes three new design examples and five updated design examples guiding the licensed design professional through the code provisions of actual concrete repair projects.

The new guide in printed format is available in the ICRI bookstore and as a bundle with the ACI 562-19 publication. ACI 563-18 is also available. Visit https://icri.ce21.com/Page/learning-center-store-11507 for details.

ASSOCIATIONNEWS

AMERICAN CONCRETE INSTITUTE HONORS OUTSTANDING CONTRIBUTIONS TO THE INDUSTRY

The American Concrete Institute (ACI) is pleased to recognize several professionals, groups, and companies for their outstanding contributions and dedication to ACI and the concrete industry. The 2021 honorees include the induction of Honorary Members, ACI's highest honor, which recognizes persons of eminence in the field of the Institute's interest, or one who has performed extraordinary meritorious service to the Institute. The following six individuals were inducted as Honorary Members:

- Anne M. Ellis
- William L. Gamble
- Kenneth D. Hansen
- Venkataswamy Ramakrishnan
- Sami H. Rizkalla
- Gajanan Mahadeo Sabnis

Awardees were recognized at the ACI Virtual Concrete Convention, March 28-April 1, 2021.

Learn more about all awards presented at concrete.org.

CONCRETE FOUNDATIONS ASSOCIATION RESPONDS TO PENDING SHORTAGE OF FORM TIES

The Concrete Foundations Association (CFA)—the leading organization serving as the voice of cast-in-place contractors—has announced an industry-wide effort to mitigate the pending shortage of steel form ties across the North American markets.

According to James Baty, executive director of the CFA, the shortage of steel form ties is not only reducing production capacity for contractors, it is also threatening to create a temporary shutdown in construction, which would result in the inability to maintain the high demand of the current record housing market.

The CFA has developed a coalition of key industry stakeholders including the National Association of Home Builders (NAHB) with several meetings already this month to gather facts related to the situation and to begin identifying plausible solutions. The goal of these meetings was to discern rumor from fact as well as preparing the building industry for the impact of the shortage, while identifying steel industry and possible government assistance.

One of the key concerns at this point is making sure that shortcuts aren't taken in the building process because of the shortage. Deviating from proven industry methods may compromise the structural integrity of the forming system and put worker safety at risk.

While some additional production is proposed by steel mills committing to increases of the roll stock required to stamp the ties domestically, it will likely be the end of second quarter or early third quarter for the market to realize the temporary impact of the increased supply. Likewise, the timing of imported inventory into the U.S. market remains challenged and the potential impact will not likely offer much relief until mid-second quarter.

2020 ASA OUTSTANDING SHOTCRETE PROJECT AWARDS

The American Shotcrete Association (ASA) is proud to announce the recipients of its 2020 Outstanding Shotcrete Project Awards.

The winners were selected by an awards committee comprised of shotcrete professionals who dedicated their time and invaluable expertise.

The 2020 Outstanding Shotcrete Project recipients include:

Outstanding Architecture | New Construction Project
Las Olas Corridor Improvements—Shade Canopy—Fort Lauderdale, Fla.

Outstanding Infrastructure Project
Davis Barracks Chiller Plant Wall—West Point, N.Y.

The Outstanding International Project
The Kaitif Skatepark—Christ Church, Barbados

Outstanding Pool & Recreational Project
Barges Golf Carts and Shotcrete—Bald Head Island, N.C.

Outstanding Repair & Rehabilitation Project
Park Avenue Tunnel Rehabilitation—New York, N.Y.

Outstanding Underground Project
Poe Tunnel—Parkhill, Calif.

Honorable Mentions

- Chilhuahuan Desert, El Paso Zoo—El Paso, Texas
- Grotto Pool—Corolla, N.C.
- Hale Park Skatepark—Wenatchee, Wash.
- The Sherwood Residence—Greenwich, Conn.
- South Wastewater Treatment—Baton Rouge, La.

For more information, visit www.shotcrete.org.

ARAMCO AND ACI ANNOUNCE NEW CENTER OF EXCELLENCE FOR NONMETALLICS IN BUILDING AND CONSTRUCTION

Aramco and the American Concrete Institute (ACI) announce the launch of NEx: A Center of Excellence for Nonmetallic Building Materials to develop and promote the use of nonmetallic materials in the construction sector.

Based at ACI World Headquarters, NEx will focus on accelerating the use of nonmetallic materials and products in construction, leveraging ACI's role as a world-leading authority and resource for the development, dissemination and adoption of consensus-based standards for concrete design, construction and materials.

The Center plans to expand its scope to include the use of nonmetallics in other construction materials, such as composite cladding, asphalt and soil. The Center looks to draw additional partners from leading academic institutions, industries, technical societies, standard bodies, manufacturers and professionals.

To learn more about how NEx is advancing nonmetallics and to get involved, visit nonmetallic.org.

ACI FOUNDATION RAISES OVER $1 MILLION FOR SCHOLARSHIPS, RESEARCH, AND TECHNOLOGY

Through generous donations from ACI members and the concrete industry, more than $1 million has been raised for the ACI Foundation.

Jeffrey W. Coleman, President of the American Concrete Institute (ACI) announced the challenge to raise $1 million in October, 2020, during his term as president. To date, over $1,320,000 has been generously contributed to the ACI Foundation.

The ACI Foundation promotes progress, innovation, and collaboration in the concrete industry through strategic investments in research, scholarships, and ideas.

For more information visit ACIFoundation.org.

ACI FOUNDATION FUNDS RESEARCH PROJECTS

The ACI Foundation's Concrete Research Council (CRC) selected eight research projects to receive grants this year. The ACI Foundation is committed to progress in the industry by contributing financially to necessary and worthy research.

The following research projects will receive funding from the ACI Foundation:

- Standard Critical Chloride Threshold Test Variability due to Material Sources

- Stress-Strain Analysis of BCSA Cement for Structural Applications
- Chloride Desorption Isotherms of Cementitious Systems Exposed to Low-pH Environments
- Core Compressive Strength and Elastic Modulus Measurements of High-Strength Concrete
- Transverse Reinforcement Requirements for UHPC columns
- Development of FRP Retrofit Guidelines for Deficient Reinforced Concrete Horizontal Lateral Force Resisting Systems
- Shear Behavior of Macro-Synthetic Fiber-Reinforced Concrete Minimum Design Requirements for Insulated Concrete Form Wall Systems

CRC seeks concrete research projects that further the knowledge and sustainability of concrete materials, construction, and structures in coordination with ACI Technical Committees where possible.

For more information visit ACIFoundation.org.

CARY S. KOPCZYNSKI ELECTED PRESIDENT OF AMERICAN CONCRETE INSTITUTE

The American Concrete Institute (ACI) announces its 2021-2022 president, vice president, and four board members.

Cary S. Kopczynski has been elected to serve as president of the Institute for 2021-2022, Antonio Nanni has been elected ACI vice president for a two-year term, and Charles K. Nmai is now the Institute's senior vice president. Additionally, four members have been elected to serve on the ACI Board of Direction, each for three-year terms: Michael C. Brown, Anthony R. DeCarlo Jr., John W. Gajda, and Kamal H. Khayat.

THE ACI FOUNDATION'S 2021-2022 FELLOWSHIP AND SCHOLARSHIP RECIPIENTS

The ACI Foundation announces its 2021-2022 fellowship and scholarship recipients. The ACI Foundation is a non-profit subsidiary of ACI that promotes progress, innovation, and collaboration in the concrete industry through strategic investments in research, scholarship, and ideas.

All Fellowship recipients receive a $10,000 (USD) educational stipend (Falconer fellowship receives $15K); paid travel expenses and attendance fees to two ACI conventions; and assistance in finding an industry mentor. All Scholarship recipients receive a $5,000 (USD) educational stipend.

The ACI Foundation is pleased to support students who will become the industry's future designers, engineers, construction managers, and contractors. Since the inception of the Foundation's Fellowship program in 2008, the ACI Foundation has provided financial support, mentorship, and internship opportunities to nearly 220 students.

Information about each fellowship and scholarship is available at ACIFoundation.org

ACI HIRES ADDITIONAL RESOURCE CENTER MANAGER, ANNOUNCES OPENING PROGRAMS IN SOUTHERN CALIFORNIA

The American Concrete Institute (ACI) Resource Center opened on May 1, 2021, in San Bernardino, CA, USA. To carry out and facilitate programming and further access to ACI knowledge, the Institute recently hired Sarah Mauri as Resource Center Manager. Mauri will lead the effort at the Southern California Resource Center, offering regularly scheduled and on-demand certification programs, educational seminars, and hands-on training.

Please visit concrete.org/socalresourcecenter for updates and further announcements.

SCA ANNOUNCES 2020 SLAG CEMENT PROJECT OF THE YEAR AWARDS

The Slag Cement Association (SCA) is proud to announce the recipients of its 2020 Slag Cement Project of the Year Awards.

Sixteen construction projects from across the United States were chosen to showcase the broad applications of slag cement and its impact on creating more durable and sustainable concrete. Two research projects on slag cement use are also being honored in this year's program.

2020 Slag Cement Project of the Year Awards Construction Award Winners include:

- Akron Hazel Storage Basin (CSO Rack 10 & 11) Slag Cement: Lehigh Hanson, Award: Durability
- Avon Park Air Force Range – Juliet Ramp & Airfield Pavements—Slag Cement: Argos, Award: High Performance
- The Blonde Apartments at 8th and Main—Slag Cement: Skyway Cement Company, Award: Green Design
- Chesapeake Beach Resort & Spa Parking Garage—Slag Cement: Lehigh Hanson, Award: Architectural
- Columbus Zoo and Aquarium - Adventure Cove—Slag Cement: St. Marys Cement, Award: Architectural
- CSVT River Bridge—Slag Cement: Lehigh Hanson, Award: Durability
- Jamestown Municipal Airport Runway and Taxiway Paving Project—Slag Cement: LafargeHolcim, Award: High Performance
- Kew Gardens Interchange —Slag Cement: Lehigh Hanson, Award: High Performance
- Lake Tillery Bridge Rehabilitation Project —Slag Cement: LafargeHolcim, Award: Innovative Applications
- Lakeland Linder - Site Prep for Intermodal Center—Slag Cement: Argos, Award: Durability
- The Lumen at Playhouse Square—Slag Cement: LafargeHolcim, Award: Green Design
- Nucor Steel of Florida—Slag Cement: Argos, Award: Innovative Applications
- One Manhattan Square —Slag Cement: Sustainability, Award: Lehigh Hanson
- Pittsfield Charter Township Planning Commission Development—Slag Cement: St. Marys Cement, Award: Innovative Applications
- Potomac River Bridge/I-81 Widening and Replacement—Slag Cement: LafargeHolcim, Award: High Performance
- Upper Sandusky Water Reclamation Facility—Slag Cement: St. Marys Cement, Award: Durability

2020 Slag Cement Research Award Winners include:

- Sustainability of Concrete in the Pacific Northwest Hilary Chaimov, Oregon State University
- Innovative Application of Slag in Improving Sustainability, Flexibility, and Cost in Thin Panels Arash Rahmatian, University of Houston-Downtown

For more information visit slagcement.org.

ACI HOSTING 2021 PROFESSORS' WORKSHOP VIRTUALLY

The American Concrete Institute (ACI) will be hosting the 2021 Professors' Workshop virtually on July 19-21, 2021. This event, sponsored by the ACI Foundation, is designed to provide instructors in civil engineering, architecture, architectural engineering, materials science, and construction management programs the latest tools and teaching techniques to effectively engage students in courses that cover structural concrete design, construction, materials, and pavements.

For more information regarding registration and scheduling or to read testimonials from past workshop attendees, visit concrete.org/events/professorsworkshop.

PEOPLE ON THE MOVE

JASON COLEMAN JOINS WISS, JANNEY, ELSTNER ASSOCIATES IN PHILADELPHIA

Wiss, Janney, Elstner Associates, Inc. (WJE) is pleased to announce that Jason A. Coleman has joined the company as a senior associate in Philadelphia. He has more than 20 years of structural engineering experience that includes the design, evaluation, and repair design of numerous historical and contemporary building facades, concrete parking garages, and existing structures. Mr. Coleman's experience includes masonry, concrete, steel, wood, and building envelope systems. He is a Rope Access Lead Technician and has been a guest speaker at numerous professional organization events.

"We are excited to have Jason join our team in the Philadelphia office and elevate the level of service we can offer our clients," said Tom McMullan, principal and unit manager of WJE's Philadelphia office. "His knowledge and commitment to the industry are sure to enhance WJE's strong foundation as a leader in the market."

Most recently, Mr. Coleman served as Director of Restoration with O'Donnell & Naccarato Structural Engineers. He is a licensed professional engineer and a registered structural engineer and currently serves on the Board of Directors for the International Concrete Repair Institute and the Delaware Valley Association of Structural Engineers. Mr. Coleman also serves on technical committees for the American Concrete Institute focused on specifications for concrete repair.

JEFF SCARPELLI JOINS PROSOCO TO PROVIDE SPECIALIZED PRODUCT ENGINEERING SUPPORT

Jeff Scarpelli has joined PROSOCO as the Products Engineer for the company's anchoring systems and accessories. He brings nearly a decade of experience in the architectural and structural engineering industry to the role.

After graduating from the Milwaukee School of Engineering's Master of Science program, Scarpelli spent the last seven years working for Wiss, Janney, Elstner Associates (WJE) as a building enclosure consultant in their architecture group. He is also the founder of UAS Inspect, a freelance remote sUAS (drone) inspection company.

From his home base of Bloomingdale, Ill., Scarpelli will provide PROSOCO customers with technical and engineering support on façade stabilization projects and help develop and maintain PROSOCO's extensive line of anchoring products. In addition, he'll provide service to PROSOCO dealers, contractors and design professionals who rehabilitate, restore and renovate masonry, stone and concrete building structures as well as build new masonry buildings.

Scarpelli will work primarily with Brian Barnes, the business unit leader of PROSOCO's anchoring systems group, and under the mentorship of Steve Getz, the technical director for PROSOCO, who engineered most of the products in the PROSOCO anchoring systems group.

"One look at Jeff's résumé will tell you why we are so excited to have him join our team as a products engineer," said Barnes. "In a short period of time, he's earned a glowing reputation as an innovative problem-solver on façade stabilization projects all across the country. And on a personal level, he's just a great young man. We're very lucky to have his talents on the PROSOCO team where I'm confident he'll bring an incalculable value to project teams across the U.S. and Canada."

An active member of the Building Enclosure Council – Chicago (BEC), Scarpelli has specialized in the areas of façade assessment; repair and rehabilitation; roofing and waterproofing; stone testing; structural evaluation; and testing and instrumentation.

Some of his notable projects include the Wyoming State Capitol, Chase tower of Houston, Miami Dade County Courthouse, SC Johnson Wax, National Air and Space Museum, and the Salt Lake Temple.

INTERESTED IN SEEING YOUR NEWS IN THIS COLUMN?

Email your 150-200 word news to editor@icri.org. Content for the July/August 2021 issue is due by June 1, 2021. and content for the September/October 2021 issue is due by August 1, 2021. One (1) high resolution headshot/individual may be included. ICRI reserves the right to edit all submissions.

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EcoAir®422 has a high biobased content and does not require special disposal for typical use.*It is especially helpful for outdoor and marine applications where chemical waste disposal can be a problem.

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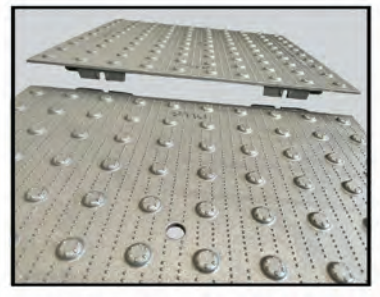
IRON-CLAD...CAST-IN-PLACE...ADA COMPLIANCE

New castiron all-weather tactile warning plates for visually impaired pedestrians deliver long-term durability and feature unique interlocking system.



Mar-Bal, Inc. launches their CastIron premium gray iron detectable warning plate. Made in the USA, this cast iron plate was developed to be installer friendly while meeting or exceeding ADA and DOT specifications for detectable warnings.

Designed for use in cold harsh climates with snow removal concerns, as well as entities desiring longer-term durability, the CastIron plates feature premium Class 35 grade gray iron strength–the highest level made in the USA. A unique “rib” design makes it lighter (45.0 lbs.) than standard competitive plates on the market – easier and quicker installation without sacrificing strength or rigidity.

Installations are further simplified by a central vent hole that releases trapped air, which also provides an even-set with no ensuing bubbles. Additionally, an advanced interlocking system fits easily and securely for perfectly aligned multiple-unit/adjacent plate installations.

For more information on Mar-Bal's line of DWS products please visit: www.detectable-warning.com

DOKA ANNOUNCES EVENTS, PRODUCTS FOR CONSTRUCTION SAFETY WEEK

Every day, we walk onto construction sites with one goal in mind: Get the job done safely. Doka, a world leader in formwork technology, plays a role in strengthening our industry’s safety culture and performance by developing safety solutions that support every single stage of the construction project.

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- Customized Safety Training.
- Jobsite Demonstrations.
- Open House Events.

Doka Safety Solutions:

- Falpro™: The mobile fall protection anchor point.
- Smart Edge: The safe edge protection and guardrail system.
- Protection Screen Xclimb 60: A full-perimeter enclosure system.
- Safety Net Fans: The ultimate debris net system for any building structure.
- Stair Towers: Convenience and safety on the construction site.

For more information on Doka Safety Solutions and educational opportunities, visit https://www.doka.com/us/.

CTLGROUP—ASTM E514: STANDARD TEST METHOD FOR WATER PENETRATION AND LEAKAGE THROUGH MASONRY

ASTM E514: Standard Test Method for Water Penetration and Leakage Through Masonry is a laboratory test method developed for a rapid assessment of a wall structure’s resistance to water penetration, while stimulating wind driven rain exposure. The test method evaluates penetration performance of laboratory fabricated masonry walls, coupled with products such as water repellents, sealers, stucco, and coating materials.

CTLGroup provides building envelope investigation, evaluation, remedial design, remediation, construction oversight, and litigation support services, which include masonry field evaluations and laboratory testing.

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