November/December 2018
Vol. 31, No. 6

CONCRETE REPAIR BULLETIN

A Bimonthly Publication of the International Concrete Repair Institute

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ICRI
2018

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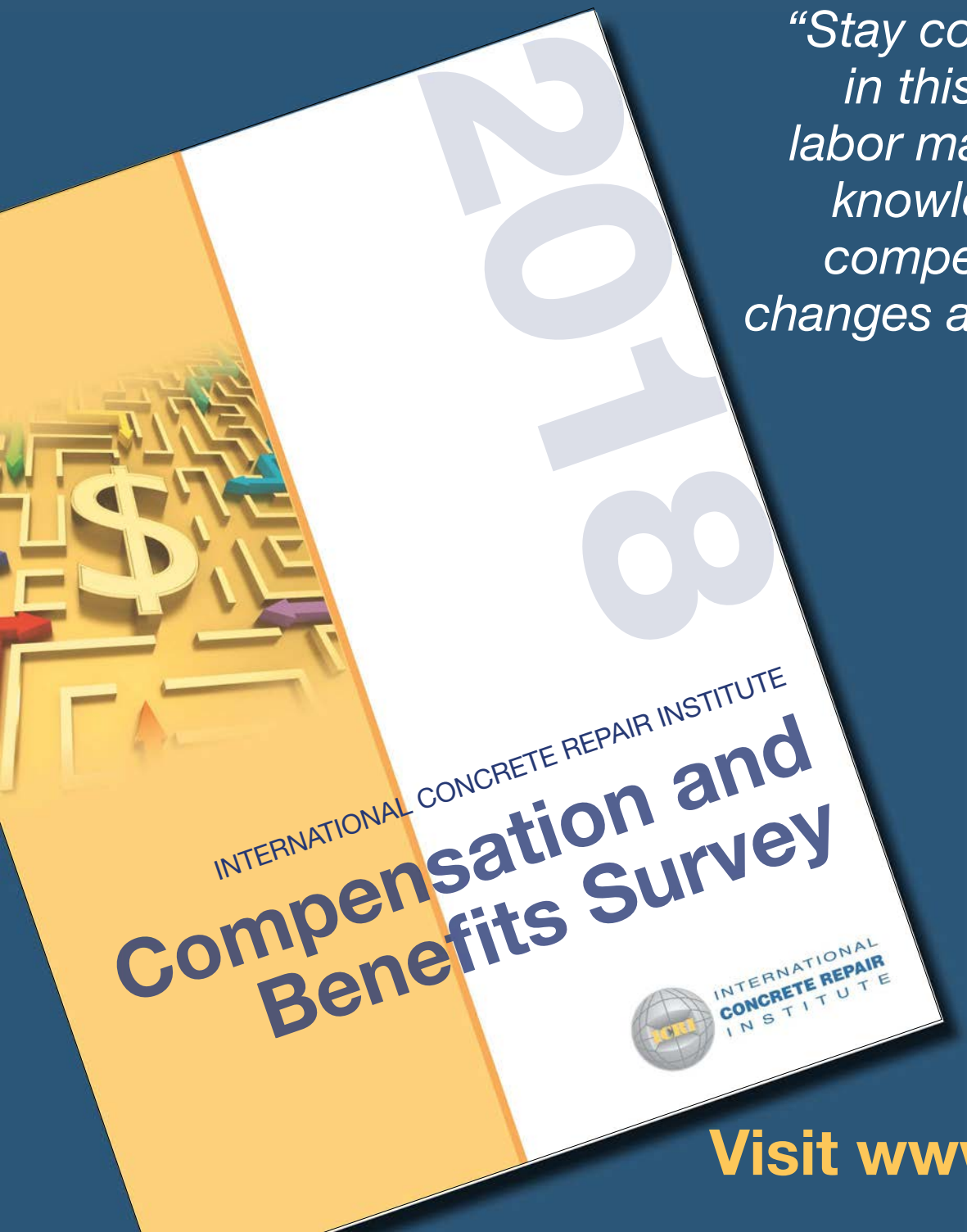

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INTERNATIONAL CONCRETE REPAIR INSTITUTE

ON THE COVER: 2018 ICRI Project of the Year—The Edison Battery Building. See page 15 for the full article.

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FEATURES

DEPARTMENTS

NOTE FROM THE EDITOR

The ICRI year is rapidly ending. The upcoming year will be one of change for ICRI with many new programs, guideline updates and other changes taking place. It will start out with the Annual ICRI Kick-off Party. On the national level, this year's festivities are being held at the Chateau Paris at Paris Las Vegas Hotel in Las Vegas on January 21, 2019. Stay tuned for more updates as the year starts!

This issue is a wrap-up of the 2018 Fall Conference in Omaha and the Annual ICRI Project Awards. Stories will highlight the 2019 Project of the Year, Project of the Year Finalists and other projects from around the world that were found to have merit.

I hope you have all had a successful and safe construction season!

Jerry Phenney, Editor, CRB
MAPEI Corporation

CRB EDITORIAL DEADLINES

March/April 2019 Issue—January 2, 2019
Theme: *Resiliency: Above and Beyond Concrete Restoration*

May/June 2019 Issue—March 1, 2019
Theme: *Corrosion*

July/August 2019 Issue—May 1, 2019
Theme: *Strengthening*

September/October 2019 Issue—July 1, 2019
Theme: *Waterproofing with Aesthetics: Making it Dry and Appealing to the Eye*

PRESIDENT'S MESSAGE

Thank You, Merci, Gracias!


RALPH C. JONES

This is the last *Concrete Repair Bulletin* issue of the year, so it is also my last President's Message of the year.

Over the last year we have talked about several new initiatives that ICRI has started. We have discussed the new Women in ICRI group, the Young Professionals of ICRI task group and the new Global Task Force. We have discussed the new Membership Committee and discussed how our membership is worldwide. We have also talked about the Secretariat and the dozens of new initiatives that are being developed and advanced in ICRI.

These are only a few of the exciting new things ICRI has undertaken this year. In addition to all of the new initiatives that are being developed, ICRI has continued to do what it has consistently done for 30 years; Promote best practice in concrete repair. Our technical committees have continued to develop and update meaningful technical documents. The Technical Activities Committee (TAC) has continued to review and guide the development of technical content for the organization. The Administrative Committees have continued to make sure the organization operates fiscally responsibly and provides activities that promote ICRI's image in a positive manner.

To operate a volunteer organization such as this requires a tremendous amount of support and effort from its members. Everything is not accomplished by the Executive Committee and the members of the Board of Directors. It takes tremendous dedication and work by its volunteer members. Without the support of all of the members of this organization, ICRI could not be successful and meaningful to the concrete repair industry.

I must take this opportunity to thank many people. To my fellow Executive Committee members, thank you for your support, friendship and hard work. To the Board of Directors, thank you for your diligence, your dedication to ICRI and the spirited discussion on important issues. To TAC and all of the technical committee members, I thank you for sharing your knowledge with the industry and for your dedication and hard work to improve concrete repair methods.

To the Past Presidents of the last 30 years, thank you for your leadership and direction to bring ICRI to the point we are today. To all of the administrative committee members, thank you for keeping the organization running smoothly, and to the staff of ICRI, thank you for all of the hours of behind-the-scenes work and direction.

It is impossible for me to thank everyone that deserves recognition in a letter such as this. There are just too many people who make meaningful contributions to ICRI. Later in this edition of the *Concrete Repair Bulletin* (pg. 46) you will see a personal thank-you to the hundreds of members that have contributed to a successful year for ICRI. Some have contributed at the national level, some have contributed at the chapter level and some have contributed at both levels.

In closing, I want to offer my most sincere thanks to all of you who have contributed to the success of ICRI over the last year and all of the kind words of encouragement I have received from so many people. It has been my honor to serve as President of ICRI this year. Thank you!

It has certainly been an exciting time to be the president of ICRI.

Ralph C. Jones, PE
2018 ICRI President

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"Chorus" a marble mosaic by multimedia artist Ann Hamilton, New Your City

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As part of the design of the new station, a white, monochromatic marble mosaic by multimedia artist Ann Hamilton was integrated into its architectural design and aesthetically linked to the adjacent World Trade Center Transportation Hub. Commissioned by Metropolitan Transit Authority Arts & Design, "CHORUS" spans a total of 4,350 square feet across the walls of both platforms and comprises small marble tesserae forming a white-on-white surface for text from the 1776 Declaration of Independence and the 1948 United Nations Universal Declaration of Human Rights. The piece has been valued at more than $1 million.

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TACTALK

The Future of Concrete Repair

FRED GOODWIN

One of my favorite sayings is "Do unto your future before your future does unto you." Like many other things, this is true of concrete repair. Another way of saying this is, "The most successful concrete repair is the one never done." I cannot find attribution for either of these quotations, but nevertheless they are true, so I will lay claim to them.

Concrete is the most durable man-made construction material. One could argue that masonry from natural stone has a longer history (think of the pyramids), but this is taking an existing material and adapting its use by joining pieces together. The oldest concrete structures that I can find are a floor from Yiftahal, Israel, that has been dated to around 8000 BC,[1] followed by cisterns from Syria[2] estimated to have been constructed about 6500 BC, then by Lepensky Vir[3] in Serbia from 5600 BC. Concrete usage became more widespread from about 3000 BC in Egypt, Assyria, Babylon, and China, but the most famous concrete structure is likely the Pantheon in Rome, built around 120 AD.[4] All of these early concretes consisted of natural pozzolans, sometimes mixed with calcined lime, sand, and stone. Modern Portland cement's invention is credited to Joseph Aspdin, who filed a patent on his material in 1824.[5] With such a history of durability, then why do we have so many issues with today's concrete?

Reinforcement in concrete using steel is usually thought to have begun with a French gardener, named Joseph Monier, wanting to improve his concrete flowerpots, eventually resulting in several patents and his invention featured at the 1867 Paris Exhibition.[6] Steel reinforcement improves the tensile strength of reinforced concrete, has a similar coefficient of thermal expansion, and is passivated in the highly alkaline environment of concrete. Although compatible with concrete, this is when many of our modern construction problems began. Thermodynamically, steel will rust and when it does, the expansive oxide formation expands internally in the concrete causing cracking and further corrosion. Corrosion of reinforcing steel is by far the biggest durability issue for reinforced concrete structures.[7] Furthermore, the evolution of early strength development in cement manufacture is also thought to contribute to a greater likelihood of cracking in concrete.[8] The combination of cracking and reinforcement corrosion in concrete along with the concept of deferred maintenance has significantly contributed to the deteriorated state of our infrastructure.[9]

While many of our members make their living from concrete repair, the success of many concrete repairs remains less than satisfactory, as indicated in both the U. S. Army Corps of Engineers (USACE) study REMR-CS-2[10] listed in Vision 2020[11] as well as the CONREPNET[12] study from the Building Research Establishment (BRE). If one were to compare concrete repair to a visit to the doctor's office, then typically concrete is repaired when cracks appear, often with rust staining from corrosion. This is analogous to a visit to the emergency room or perhaps even hospice care. The medical profession long ago realized that it is much more cost-effective to proactively address health issues through preventative care than to wait until the patient is in distress.[13] Likewise, when one purchases an automobile, it comes with an inspection schedule and maintenance plan.[14]

A maintenance plan for concrete repair is discussed in ACI 562-16, *Code Requirements for Assessment, Repair, and Rehabilitation of Existing Concrete Structures and Commentary* and anticipated maintenance is required in the selection of repair materials and methods.[15] A companion document has recently been approved by the American Concrete Institute (ACI), ACI 563-18, *Specifications for Repair of Structural Concrete in Buildings,* it should be published shortly. ACI 563 states that maintenance requirements are to be submitted along with shop drawings to the Architect/Engineer. Progress is slowly being made in acceptance by the industry of these documents, but their requirements and concepts will greatly improve and standardize our industry.

Going into greater detail for repairs, ISO 16311-1, *Maintenance and Repair of Concrete Structures– Part 1: General Principals* presents the framework and general principles for maintenance and repair of all kinds of existing concrete structures including un-reinforced and reinforced concrete, prestressed concrete and steel-concrete composite structures, or their structural members.[16] ISO 16311-2 describes general requirements and procedures for the assessment of concrete structures.[17] ISO 16311-3 specifies repair and prevention design principles, and strategies for defects and ongoing deterioration including: a) mechanical actions, e.g. impact, overloading, movement caused by settlement, blast, vibration, and seismic actions; b) chemical and biological actions from environments, e.g. sulfate attack, alkali-aggregate reaction; c) physical actions, e.g. freeze/thaw, thermal cracking, moisture movement, salt crystallization, fire, and erosion; d) reinforcement corrosion; and e) original construction defects that remained unaddressed from the time of construction.[18] ISO 16311-4 gives requirements for substrate condition before and during application, including structural stability, storage of materials, the preparation and application of products and systems for the protection and repair of concrete structures, including quality control and qualifications of personnel, maintenance, health and safety, and the environment.[19] These documents are relatively unknown in the repair community yet provide a wealth of guidance about repair strategies.

So where is the Concrete Repair Industry going in the future? Trends likely to develop include increased use of robotics beginning with inspection, then surface preparation. Robotics will develop around risky tasks (such as accessing difficult portions of the structure with

drones or climbers) and evolve into better investigative techniques. Imagine a crawling/climbing robot equipped with ground penetrating radar (GPR) to detect reinforcement locations and delaminations that can measure resistivity of the concrete as it goes along, while also providing a photographic record or even provide corrosion mapping with connectionless electrical pulse response analysis (CEPRA).[20] Robots also do not have to operate as separate units, they can link and interactively "swarm" to rapidly collect data.[21] Lasers are already beginning to be explored for surface preparation to minimize dust and operate as a non-contact surface removal application, and there is no need for a secondary medium that contributes to waste streams.[22]

New materials also have promise. Geopolymer binders and other alkali activated binders can provide advantages over conventional Portland cement such as reduced CO2 footprint, higher temperature resistance, and rapid hardening.[23] Advancements in polymers continue to provide better chemical resistance for coatings and especially exciting developments in "engineered cementitious composites" (ECC) for mortars and concrete that can provide ductility to our current binders producing multitudes of very fine cracks instead of one big crack when loaded to failure and Fiber-Reinforced Polymer (FRP) grid-concrete composites.[24,25] Both ECC and FRP grids have the potential to eliminate conventional steel reinforcement which solves the corrosion issue discussed previously. The developments in self-healing concrete are also very exciting.[26] The concrete repair industry has little to worry about for an easy solution to reinforcing steel corrosion as there is more than enough rusting rebar to keep everyone employed for the foreseeable future.

The quantity of concrete (or at least cement production) is increasing more rapidly than the world gross domestic product (GDP) and

Continued on page 6

Continued from page 5

rapidly accelerating as our standard of living improves. (Fig. 1 and Fig. 2 [27, 28, 29]) In my opinion, the concrete repair industry needs to evolve into a real profession, rather than remain as an auxiliary to new concrete construction. The most excitement in civil engineering is towards new construction, yet the volume of existing concrete is much greater than new construction and as previously pointed out, our infrastructure continues to deteriorate. We need to convince the owners and specifiers that protection and maintenance of concrete is a better investment over the life cycle of a structure than waiting for rust coming out of cracks.[30] ■

***Fred Goodwin** is chair of the ICRI Technical Acivities Committee (TAC)*

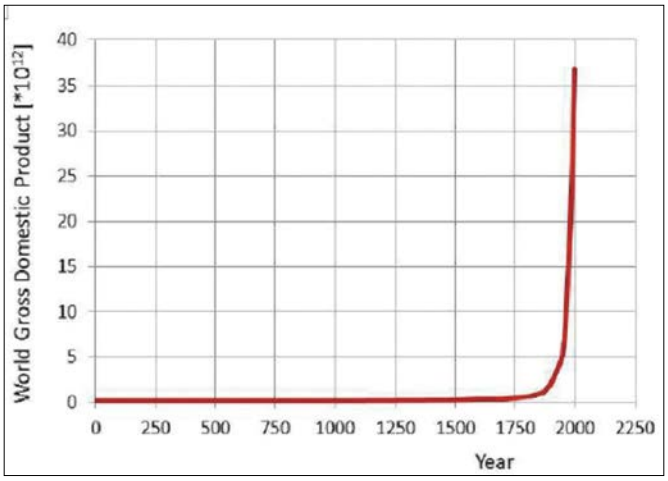


Fig. 1: World Gross Domestic Product growth since 1 AD (CE)[27, 28, 29]

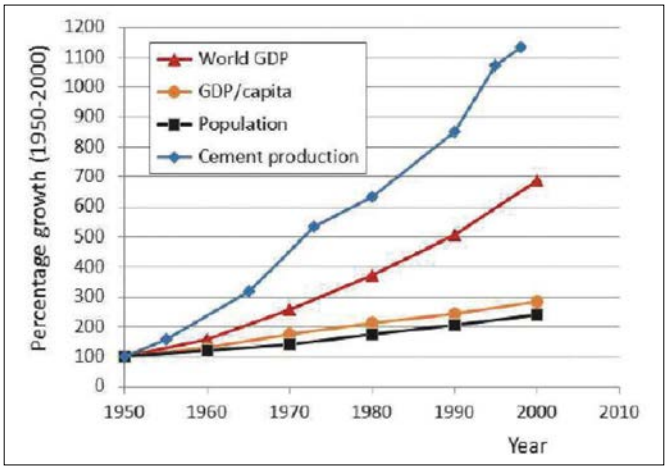


Fig. 2: Percentage growth of World GDP, GDP per capita, world population and cement production in the second half of the 20th century[27, 28, 29]

References

[1] A. Ronen, A. Bentur, I. Soroka, "A Plastered Floor from the Neolithic Village, Yiftahel (Israel)," Paléorient Année, 1991, 17-2, pp. 149-155, https://www.persee.fr/doc/paleo_0153-9345_1991_num_17_2_4559

[2] B. Mason, "Principles of Geochemistry," John Wiley and Sons, New York, 1966, p. 160. As cited by J. Davidovits http://nabataea.net/cement.html

[3] R. Buueckner, P. Lambert, "Assessment of historic concrete structures," pp 75-86C.

[4] D. Moore, "The Roman Pantheon: The Triumph of Concrete," MARC/CCEOP, University of Guam Station, 1995.

[5] E. C. Eckel, "Portland Cement Materials and Industry in the United States," Volume 522, U.S. Government Printing Office, 1913.

[6] T. Hartford, "50 Inventions that Shaped the Modern Economy," Penguin, 2017, p. 262.

[7] K. R. Larsen, "Corrosion Effects on the Durability of Reinforced Concrete Structures," Materials Performance, NACE International, Houston TX, Nov. 2015. http://www.materialsperformance.com/articles/material-selection-design/2015/12/corrosion-effects-on-the-durability-of-reinforced-concrete-structures

[8] R. W. Burrows, "Concrete Durability: Is American Portland cement inferior to European cement?" Concrete Construction, Hanley Woods Media, Washington DC, Nov. 2012. https://www.concreteconstruction.net/how-to/materials/concrete-durability_o

[9] Infrastructure Report Card, American Society of Civil Engineers, Baltimore, MD, https://www.infrastructurereportcard.org/

[10] J. McDonald, R. Campbell, "Technical Report REMR-CS-2 The Condition of Corps of Engineers Civil Works Concrete Structures," Department of the Army, Waterways Experiment Station, Vicksburg, MS, 1985 http://wri.usace.army.mil/remr/technical_reports/concrete/REMR-CS-2.pdf

[11] Vision 2020, A Vision for the Concrete Repair Protection and Strengthening Industry, SDC, American Concrete Institute, Farmington Hills, MI, 2004 www.concrete.org/Committees/GetAgendaMinutes.aspx?DocID=11138

[12] CONREPNET Outputs Issue 3, May 2004, Building Research Establishment (BRE), BRE Watford, Bucknalls Lane, Watford, Herts, WD25 9XX http://projects.bre.co.uk/conrepnet/pdf/newsletter3.pdf

[13] Public Health, Houston, TX, https://www.publichealth.org/public-awareness/preventive-care-schedule/

[14] Car Care Council, Bethesda, MD http://www.carcare.org/car-care-service-schedules/general-service-schedule/

[15] ACI Committee 562, "Code Requirements for Assessment, Repair, and Rehabilitation of Existing Concrete Structures and Commentary," ACI 562-16, American Concrete Institute, Farmington Hills, MI, 2016 https://www.concrete.org/store/productdetail.aspx?ItemID=56216&Language=English&Units=US_Units

[16] ISO 16311-1:2014, "Maintenance and repair of concrete structures—Part 1: General principles," International Organization for Standardization, Geneva, Switzerland, 2014, pp 19 https://www.iso.org/standard/56144.html

[17] ISO 16311-2:2014, "Maintenance and repair of concrete structures—Part 2: Assessment of existing concrete structures," International Organization for Standardization, Geneva, Switzerland, 2014, pp 44 https://www.iso.org/standard/56499.html

[18] ISO 16311-3:2014, "Maintenance and repair of concrete structures —Part 3: Design of repairs and prevention," International Organization for Standardization, Geneva, Switzerland, 2014, pp 22 https://www.iso.org/standard/56500.html

[19] ISO 16311-4:2014, "Maintenance and repair of concrete structures—Part 4: Execution of repairs and prevention," International Organization for Standardization, Geneva, Switzerland, 2014, pp 49 https://www.iso.org/standard/56501.html

[20] A. Fahim, P. Ghods, O.B. Isgor, M.D.A. Thomas, "A critical examination of corrosion rate measurement techniques applied to reinforcing steel in concrete," Materials and Corrosion Wiley Online Library, 2018, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim https://onlinelibrary.wiley.com/doi/abs/10.1002/maco.201810263

[21] "Autonomous artificial swarms of robots could enable new approaches for search and rescue missions, construction efforts, environmental remediation, and medical applications," Wyss Institute, Harvard University https://wyss.harvard.edu/technology/programmable-robot-swarms/

[22] L. YI, "Surface glazing of concrete using a 2.5 kW high power diode laser and the effects of large beam geometry," Optics & Laser Technology, Volume 31, Issue 8, November 1999, pp 583-591, https://www.sciencedirect.com/science/article/pii/S0030399200000037

[23] Wikipedia, Geopolymer concrete https://en.wikipedia.org/wiki/Geopolymer_cement

[24] V.C. LI, "On Engineered Cementitious Composites (ECC), a Review of the Material and Its Applications," Invited paper, Journal of Advanced Concrete Technology, Vol. 1 No. 3, Nov. 2003, Japan Concrete Institute https://www.jstage.jst.go.jp/article/jact/1/3/1_3_215/_pdf

[25] F.A. Tavarez, L.C. Bank, M.E. Plesha, "Analysis of Fiber-Reinforced Polymer Composite Grid Reinforced Concrete Beams", ACI Structural Journal, Vol. 100 Issue 2, pp 250-258, American Concrete Institute, Farmington Hills, MI, https://www.concrete.org/publications/internationalconcreteabstractsportal/m/details/id/12489

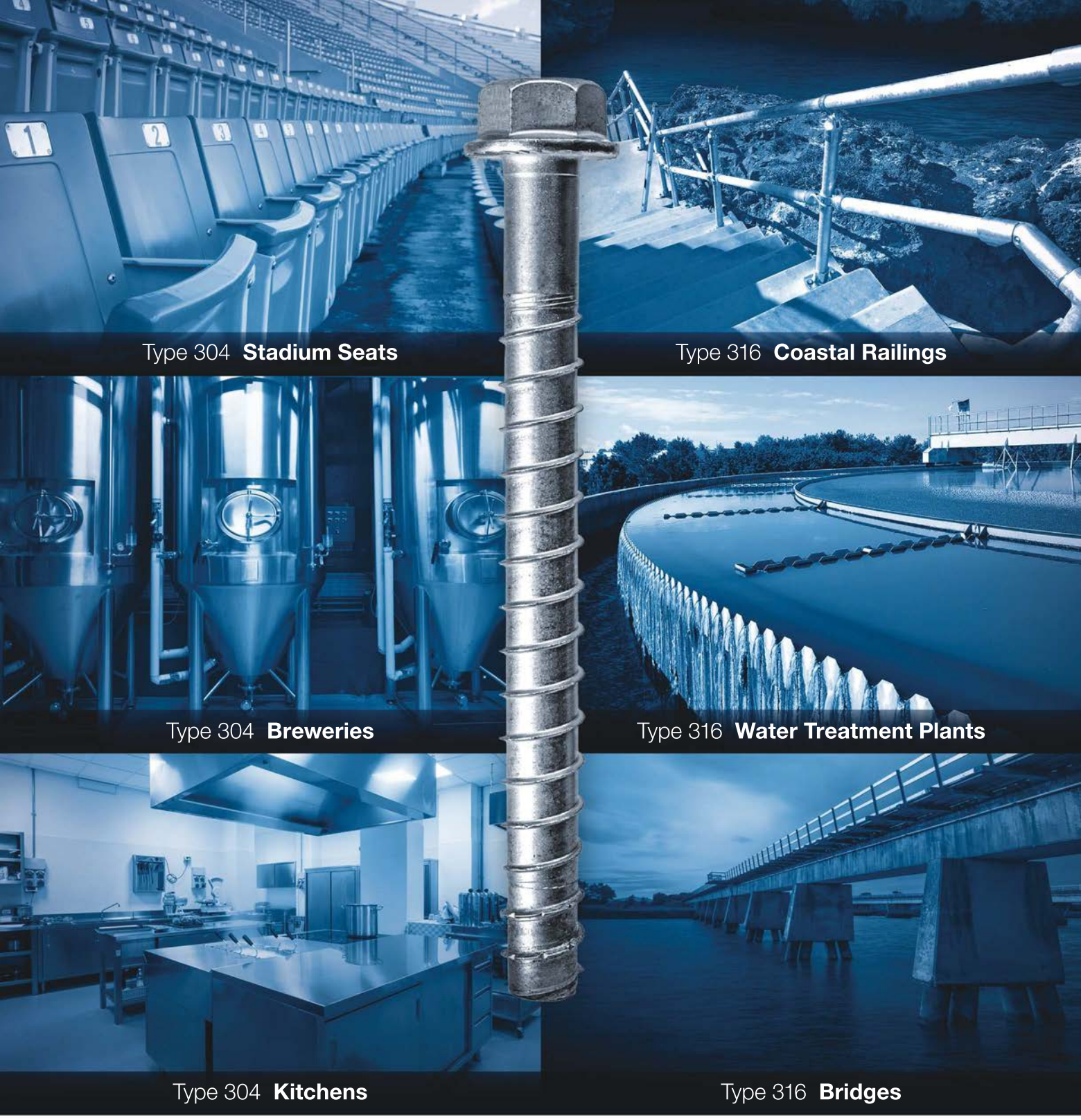
[26] S. Deb, "Self-Healing Concrete," The Masterbuilder, July 2012, pp 202-206, MB Publishers Pvt. Ltd., Chennai, TamilNadu 600008 India, https://www.masterbuilder.co.in/data/edata/Articles/July2012/202.pdf

[27] K. Takewaka, Y. Kaneko, "Maintenance of Concrete Structures and its Future Strategy," Japan Society of Civil Engineers (JSCE) – Korean Society of Civil Engineers (KSCE) Concrete Committees' Joint Seminar 2006, JSCE Concrete Committee, Yotsuya 1-chome, Shinjuku-ku, Tokyo, JAPAN 160-0004, http://www.jsce.or.jp/committee/concrete/e/newsletter/newsletter07/KSCE_Takewaka.pdf

[28] M. Roser, "Economic Growth," Our world in data https://ourworldindata.org/economic-growth, (consulted in 2017)

[29] K. Van Bruegel, "Modeling in the Service of Sustainable Construction," Delft University of Technology, Keynote Address, 72nd RILEM Week Proceedings, 2018, Delft, Netherlands.

[30] K. Van Bruegel, "Circularity: A new avenue for mitigating the footprint of ageing infrastructure?" Proc. 9th International Symposium on Cement and Concrete (ISCC 2017), Wuhan, 2017



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SECRETARIATUPDATE

RICK EDELSON

In the September/October issue of the *Concrete Repair Bulletin*, Mark Nelson focused on the submittal of ideas, especially from those who cannot attend our national conventions. All ideas are important, and we encourage everyone to get involved. Thus far in 2018, we have had 13 ideas submitted with many of them becoming initiatives. Some of these have been concerning the operation of ICRI and others involving technical committee activities.

This month I will focus on something entirely different. As chair of the Secretariat (each Secretariat member performs the chair duties for one year), the Executive Committee has asked me to also chair the Coordination Committee. So, what is, and who are the members of the Coordination Committee? As stated on the ICRI website, "the Coordination Committee is made up of the current president-elect and the sitting TAC chair as vice-chairs, all ICRI administrative committee chairs, all ICRI technical committee chairs, and members of the technical activities committee. This committee is designed to facilitate harmonization of document development and committee operation process between ICRI committees." The board members, the executive committee members, the Secretariat, and staff also participate on this committee. We meet six times per year—a month before each convention, at each convention, and a month after each convention.

The Coordination Committee is neither a technical nor an administrative committee. It is a conglomeration of the chairs of all ICRI committees with the goal of exchanging

information on the status of all committee activities within ICRI. We have a master table showing all committee initiatives with milestones and project completion dates. Its purpose is to allow our administrative committees, especially marketing and education, as well as our staff, to plan for dissemination of ICRI products to the repair industry.

So, what does this mean for ICRI? Remember seeing this graphic of the four pillars of the strategic plan? By coordinating the work of all Committees, we are tying the four pillars together.

This also completes a picture. First, one of you, our members, has an idea. The Secretariat guides the idea through ICRI, and when the idea comes to fruition through a coordinated effort, our four pillars of the strategic plan shine through. ■

***Rick Edelson** is an ICRI Secretariat, member of the Technical Activities Committee (TAC), and past-president of ICRI.*

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PROJECT AWARDS
ICRI
2018


PROJECT OF THE YEAR


Finalist (Longevity)


Finalist (Special Projects)

2018 PROJECT OF THE YEAR
HISTORIC CATEGORY

The Edison Battery Building

WEST ORANGE, NJ
SUBMITTED BY SIKA CORPORATION

The Edison Battery Building

The Edison Storage Battery Complex is located on a single city block in the town of West Orange, New Jersey. These factory buildings are the last surviving structures of Thomas Edison's industrial complex and were the defining buildings in the town from the 1880s to 1970s. This industrial complex comprised of four buildings became the epicenter of industrial development at the turn of the century. It is also remembered as the mainstay for Thomas Alva Edison's activities as one of the greatest American inventors and marketer of his self-created new technologies and inventions.

Fig. 1: Edison's industrial empire in West Orange, NJ (Credit: The New York Times, Dec. 21, 2017)

HISTORY

Thomas Edison moved to West Orange in 1886. The following year, Edison built a new laboratory complex on what he believed would be a perfect site for an industrial complex. From 1906 to 1914, Edison built a one-million square foot (92,900 square meter) industrial complex (Fig. 1). Of the many buildings, the Battery Building was made entirely of reinforced Portland cement and steel. Few people in our industry would know how much Thomas Edison believed in concrete as a building material. Concrete structures became the material of his choice for all buildings

that were built as a part of his industrial empire. In his words for concrete as a building material,

"Wood will rot, stone will chip and crumble, bricks disintegrate, but a cement and iron structure is apparently indestructible. Look at some of the old Roman Baths. They are still as solid as when they were built."

- Thomas Edison

Fig. 2: Inside the Edison Battery Building (Credit: The New York Times, Dec. 21, 2017)

Fig. 3: From an iconic structure to a dilapidated building

Fig. 4: Existing building façade prior to repairs

The complex has 14 ft (4.3 m) and 16 ft (4.9 m) ceiling heights with thousands of openings consisting of "oversized" multi-panel industrial windows. The pinkish-tan structure is utilitarian in nature, made of unadorned reinforced concrete with column and beam construction. The lack of ornamentation reinforces the mass and solidity of the building. The longest façade stretches 635 ft (194 m) and the columns are evenly spaced at 15 ft (4.6 m) on center.

The Edison Battery Building was a manufacturing facility for alkaline storage batteries for light delivery vehicles, automobiles, railroad signals, industrial applications and mining equipment (Fig. 2). Edison practiced what he preached. It is a well-known historical fact that Thomas Edison preferred direct current over the more popular electric current. The Battery Building, prior to renovations starting in 2016, had elevators and lighting running off the original direct current system.

The Battery Building ceased operation in 1965. Today, the Battery Building is on the National Register of Historic Places, the New Jersey Register of Historic Places, and designated locally by the Township of West Orange as a historic site.

PROBLEMS THAT PROMOTED REPAIRS

Weathering over the last 100 years had taken its toll on the Edison Battery Building, and being vacant for the last decade did not help the cause (Fig. 3). From spalling concrete, corrosion due to the lack of concrete cover over reinforcing steel, cracking, leaking joints, and unsuccessful concrete repair attempts over the years, the 130,000 sf (12,075 sm) concrete façade of this iconic structure was in a dilapidated condition (Fig. 4), a direct result of an aging structure and lack of adequate maintenance of the building. The building, however, was in good structural condition.

RESTORATION OBJECTIVE

The Edison Battery Building was to be repurposed to a boutique residential building, including luxury lofts with a fitness lobby, swimming pool and sky lounge overlooking the NYC skyline with the following objectives:

- the building had to be restored to its original look;
- the look should be contemporary and historical; and
- the look should appear fresh and new as it would when built the first time.

The Edison Battery Building restoration project was part of the complete Edison Village Downtown Redevelopment project, developed over a ten-year period. This redevelopment plan was originally adopted in 2003. The scope of the entire project was to redevelop Block 66, Lots 1, 5 and 7 (the "Edison Battery Building") and to construct:

- 334 residential rental units;
- 16,000 sf (1485 sm) of retail space;
- approximately 31,700 sf (2945 sm) of amenity support space;
- parking structure containing approximately 635 parking spaces; and
- public infrastructure (e.g. roads, utilities, sidewalks).

RESTORATION PROGRAM

Concrete Spall Repairs

Hand-Applied Repairs

Repair areas that were 1 in (25 mm) or less in thickness used a single component, hand-applied non-sag mortar. The repair area was mechanically prepared with a chipping hammer and saw cuts completed to define the repair perimeter (Fig. 5). A Concrete Surface Profile (CSP) 5-6 was achieved to make sure that adequate preparation was performed for the repair material to bond to the parent concrete.

Additionally, a bonding agent was used to supplement the mechanical bond, and the reinforcing steel was protected with the same material. A total of 2,500 sf (232 sm) of the façade was repaired using this technique.

Fig. 5: Hand-applied repair

Form and Pour Repairs

Deeper spalls were repaired with the form and pour technique, and were primarily performed to repair the window sills (Fig. 6). Concrete preparation was completed in accordance with the guidelines of the International Concrete Repair Institute. Prior to forming up the area, the steel was cleaned and primed and the concrete was coated with a reinforcement protection coating. A form and pour, flowable concrete mix was poured in the forms which were stripped after seven days. In very few cases where the depth of the concrete was very deep, rebar splicing was done to make sure that the repair areas were tied to the original spiral bar. A total of 7,500 sf (697 sm) of the façade was repaired with this technique.

Fig. 6: Form and pour repair

Crack Repairs

Cracks on the building were initially identified for repair with epoxy. However, after determining that most of the cracks were non-moving, cracks were saw cut into rectangular joints and repaired with the same non-sag mortar used for spall repairs. This procedure would ensure that the crack repair lines would not show through the final finish on the façade. Some cracks were repaired with gravity fed resin or crack injection.

Leveling Coat

The concrete façade had to be leveled to prepare the surface with a parging material. A factory proportioned polymer modified material was used to parge the entire 130,000 sf (12,075 sm) of the façade (Fig. 7). The leveling material was instrumental in getting the concrete to a finish on which a waterproofing acrylic coating could be successfully used.

Fig. 7: Section of the building that received a parge coat

Façade Coating

After the leveling coat, a waterproofing coating was installed for aesthetics and protection (Fig. 8). A coating with crack bridging was selected to coat the entire building façade. To meet the requirements of the historical commission, a textured base coat was selected to cover the blemishes and maintain some of the look of the old concrete. No less than twenty color samples were installed on the building as mock-ups for approval by the historical commission. The selected final color, Capitol Tan, also happened to be the first color that was installed as a sample.

Fig. 8: Finished exterior with the iconic Edison water tower in the background

Fig. 9: New windows on building

Fig. 10: Roof of the Edison Battery Building before construction

Window Replacement

A specialty contractor was contracted to duplicate the large 10 x 4 ft (3 x 1.2 m) and 8 x 4 ft (2.4 x 1.2 m) windows that defined the façade of the structure. An exact replica in design that could meet the new energy standards was the target of the project team. New extrusions were created to match the original as approved by the West Orange Historical Preservation committee. This target was achieved and a total of 2450 windows were replaced (Fig.9). The perimeter caulk color had to be matched to the original construction. A single component silicone factory tinted custom green color was used to caulk all perimeter joints.

Roof Replacement

A Thermoplastic Polyolefin (TPO) single-ply roofing system was selected to replace the existing roof (Fig. 10). The roofing scope of the work totaled 70,000 sf (6500 sm).

REPAIR PROCESS EXECUTION

For quality assurance, a third-party oversight consulting firm was engaged to keep track of progress and make recommendations to the project team on unforeseen conditions during repair. This control helped deliver quality repairs with recommendations that were adequate for non-standard details. This iconic structure was restored in 30 months and completed on time and on budget (Fig. 11).

Fig. 11: The Edison Battery Building before repairs (a) and after repairs (b)

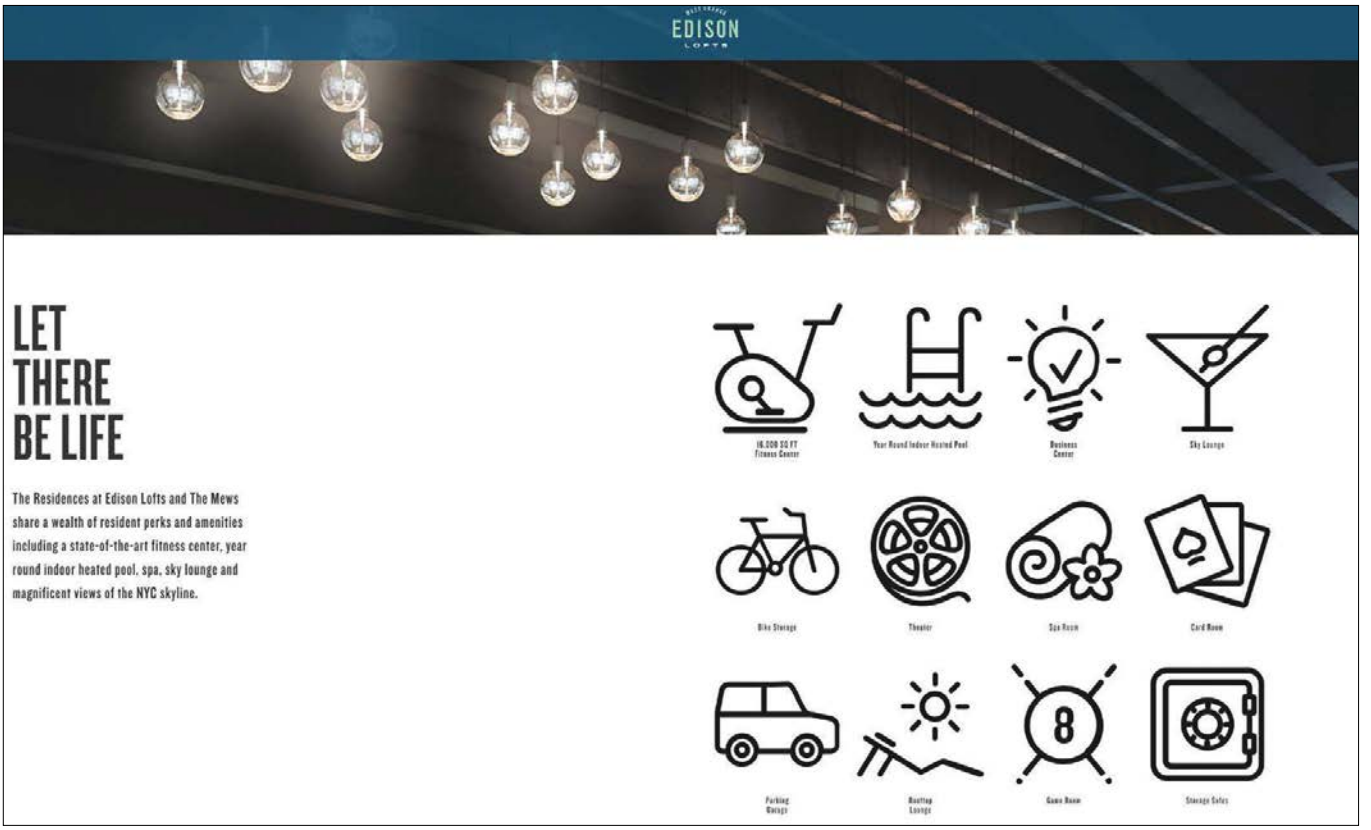


Fig. 12: From a structure that defined human civilization in the 1900s, to a residence building that will define the living space in the 21st century (Credit: edisonlofts.com)

CONCLUSION

We are living in times where an exponential rise of direct current batteries is being observed in many machines that we operate on a daily basis. What Thomas Edison believed a century ago is starting to come to some form of reality in a full circle. Not only that, the choice of his construction material also proved to be accurate. He believed in concrete and with minimal maintenance, the structure that he built is now being repurposed for a state-of-the-art housing project (Fig. 12)—sustainability and preservation at its best. Thomas Edison may have discovered sustainability and the relevance of concrete repair before our times.

The concrete repair industry stands tall and proud of being able to restore and repurpose an iconic structure built by an American legend. Sustainability continues to be a trend-setting word in today's world and what the concrete repair industry is able to achieve, few other industries would be able to match the impact that this industry is able to deliver, time and again. ■

Acknowledgements

Information in this article has been obtained from the following sources:

1. U.S. Department of the Interior National Park Service & Condos
2. New York Times article by Ronda Raysen, published April 15, 2016

The Edison Battery Building

SUBMITTED BY
Sika Corporation
Lyndhurst, NJ

OWNER
DGP Urban Renewal
Bloomfield, NJ

PROJECT ENGINEER/DESIGNER
Prism Construction Management
Bloomfield, NJ

REPAIR CONTRACTOR
Eastern Concrete Restoration
Stevensville, MD

MATERIALS SUPPLIERS/MANUFACTURERS
Airguard Windows
Astoria, NY

Sika Corporation
Lyndhurst, NJ

AWARD OF EXCELLENCE

FINALIST - 2018 PROJECT OF THE YEAR
LONGEVITY CATEGORY

Smithfield-Liberty Helix Ramp Rehabilitation

PITTSBURGH, PA

SUBMITTED BY CARL WALKER CONSTRUCTION, INC.

Fig. 1: Smithfield-Liberty Helix Ramp

The rehabilitation of the Smithfield-Liberty Parking Garage was undertaken in 1997 and, over 20 years later, the structure exhibits no additional deterioration (Fig. 1). Exposed to several hundred cars each day, this critical structure was rehabilitated using materials and methods designed and installed to provide a long-term service life. The success of the project is best evidenced by the fact that no additional structural repairs or rehabilitation have been required since the work was completed. The design and construction processes used to complete this project in the late 1990s is a testament to the longevity that the project has enjoyed. Based on its current state of performance, it is expected that the ramp will likely experience another 20-year extension of service life without the need for any significant attention.

HISTORY

Originally constructed in 1964, the helix ramp of the Smithfield-Liberty parking garage in downtown Pittsburgh, Pennsylvania, is six levels of post-tensioned concrete slab with perimeter knee walls cantilevered from a conventionally reinforced concrete cylinder. The post-tensioning system for the structure is composed of solid bar reinforcing encased in a grouted conduit. The solid bars have plates at each end to provide compressive force transfer into the slab. The primary visible distress of the structure was exposed, corroding post-tensioned bar anchor plates at the perimeter of the ramp. This circular ramp provides the only means of exit from the top six levels of the attached seven-story parking structure, so it was decided that conventional rehabilitation project delivery methods would not work for this rehabilitation.

EVALUATION AND DIAGNOSIS

In late 1996, an evaluation of the helix ramp was performed to establish the cause of the observed distress in the structure. The evaluation included a condition assessment of the structure to record visible surface defects including cracks, spalling, and exposed corroding steel elements (Fig. 2); concrete material testing including petrographic analysis, concrete compressive strength testing, acid-soluble

chloride ion testing, and carbonation testing; corrosion testing, including electrical continuity testing, half-cell potential testing, corrosion rate testing, and reinforcing steel location and cover measurements; a review of existing structural drawings; and a thorough structural analysis.

After evaluating the results, the cause of the distress in the structure, consisting of delamination and spalling with exposed reinforcing steel, was determined and three primary causes for the observed distress were identified:

1. The distress recorded on the top of the ramp slabs was determined to be caused by high chloride ion levels in the lower five levels of the six-level ramp. On these levels, chloride contents exceeding the threshold amount necessary to induce corrosion of the reinforcing steel were found in the top 2.5 in (64 mm) of the slab.
2. The distress observed on the underside of the ramp slabs was caused by cracking at old repair areas in the top slab.
3. For the deterioration occurring on and below the concrete knee walls, insufficient concrete cover on the steel reinforcing and plates was identified as the cause of the distress.

SOLUTION ANALYSIS

Solutions were developed to address the causes of distress in consideration of alternative service life expectations.

Chloride Ion Content

To address the chloride ion content problem with the ramp slabs, removal and replacement of the top 2.5 to 3 in (64 to 76 mm) of the concrete floor slab was selected to offer a long-term service life expectation. This solution represented a potential structural problem, however, given that the slab was post-tensioned. Prior to being able to recommend that the top portion of the slab be removed, a structural analysis was necessary to determine the post-tensioned reinforcing forces on the original slab section, the reduced slab section (once the top portion of the slab was removed), and the final slab section (with the original slab and new topping slab). Upon completion of the analysis, it was determined that the top slab section could be removed if the perimeter of the ramp was shored and supplemental post-tensioned cables were added to the final cross-section (Fig. 3 and 4).

Supplemental Post-Tensioned Cables

The requirement for the supplemental post-tensioned cables influenced the decision to recommend a high quality conventional concrete material with a compressive strength of 6,000 psi (41 MPa) to closely match the existing concrete strength. In addition, the use of a shrinkage-compensating admixture was recommended to minimize cracking in the new topping slab.

Underside Slab Condition and Water Infiltration Problems

To address the underside slab condition and water infiltration problems, conventional partial-area repairs were recommended

Fig. 2: Original slab edge deterioration

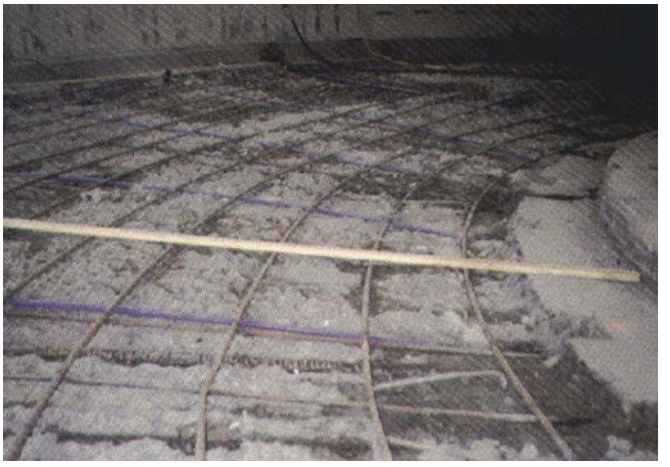


Fig. 3: Demolished ramp slab surface with supplemental post-tension reinforcing installed throughout central cylinder

Fig. 4: Exposed post-tensioned tendon anchor heads at central cylinder

in conjunction with the application of a hybrid polyurethane fluid-applied membrane with epoxy wear course and specialized aggregate on the ramp top surface. The repair material recommended for the underside slab repairs was a polymer-modified cementitious material to facilitate use of the form-and-pump repair technique (Fig. 5 and 6). The repair material was selected to have compressive stiffness characteristics that closely matched that of the existing concrete. This was necessary to provide uniform compressive stress distribution throughout

Fig. 5: Slab edge soffit demolition and formwork

Fig. 6: Slab edge formwork and shoring

Fig. 7. Completed slab soffit repair with integral drip edge

the concrete slab when stressing supplemental post-tensioned reinforcement.

Concrete Cover Issues

To address the concrete cover problem on the post-tensioned reinforcing anchor plates on the perimeter of the ramp, a new concrete cap was installed to provide suitable cover for the plates. In addition, a drip edge was provided to prevent water from running down the underside of the ramps (Fig. 7). Although this repair detail reduced the depth of the reveal at the slab perimeter, the architectural appearance of the ramp was not significantly changed. To address the concrete cover problem on the existing reinforcing steel in the knee walls (Fig. 8), the repair areas were slightly over-built to obtain suitable concrete cover on the reinforcing steel.

REHABILITATION

The repair solutions described above were incorporated into the contract documents and issued for bidding by experienced repair contractors. The successful bidder was awarded the contract in the summer of 1997 and the work was immediately scheduled to be completed in under 10 weeks during the summer to coincide with the garage's off-peak season.

Garage Ergonomics

Prior to beginning repairs, the traffic in the garage required re-routing as the helix was the only means of exit for the upper levels of the garage and closing the garage was not an option. After considering alternate scenarios to solve this dilemma, a solution was developed to convert the one-way traffic flow into two-way traffic. To accommodate the two-way traffic on the upper six levels, turn around areas were established on alternating levels to facilitate cars changing direction. Although the turnaround areas resulted in a reduction in parking spaces, the traffic flow was not significantly hampered and the disruption to patrons was minimized.

Fast-Tracked Construction

Once parking traffic was re-routed, the helix ramp was closed, and construction commenced. Given the aggressive construction schedule and limited work area, methods to expedite the repair process were implemented. The primary time-saving measure utilized during the rehabilitation was hydrodemolition, which is a process utilizing water under very high pressure (about 10,000 psi [69 MPa]) to demolish concrete (Fig. 9). This method was used in lieu of conventional jackhammers to remove the top section of chloride-contaminated concrete on the ramp slabs and resulted in significant time savings.

Completion

Following industry standard concrete repair practices and incorporating state-of-the-art materials, the rehabilitation of the ramp was completed on schedule. One of the most important reasons for the success of the project was that the process involved experienced parties for identifying and addressing the causes of the distress in the structure and developing and implementing a repair approach aimed at providing a long-term service life extension.

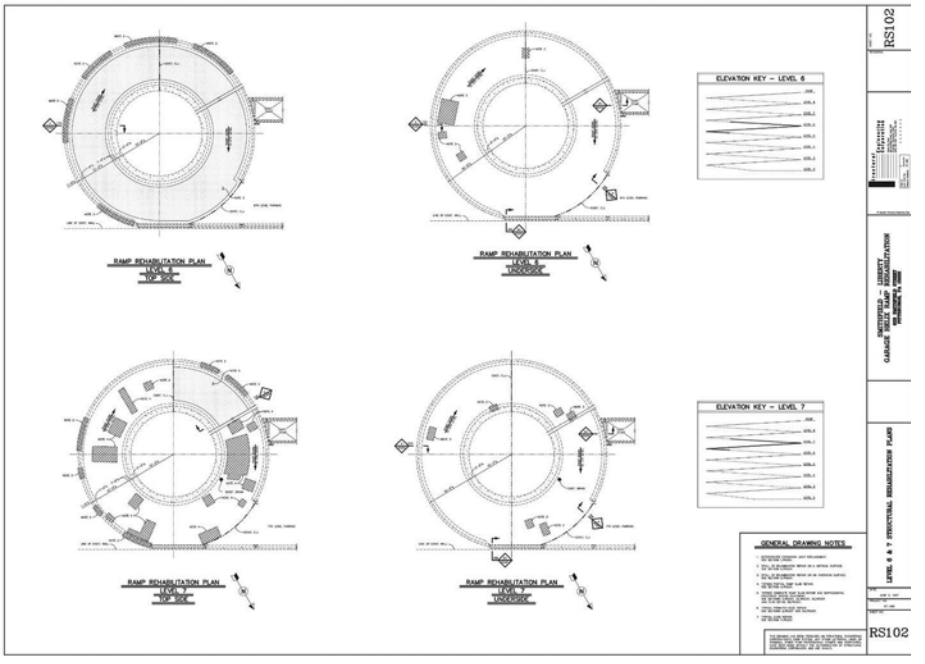
Fig. 8: Knee wall vertical repair demolition

Fig. 9: Hydrodemolition of upper concrete layer at ramp slab

PAST, PRESENT & FUTURE

Prior to implementing the rehabilitation described above, a previous repair of the helix ramp had been undertaken. Partial-area repairs completed during that project were found to be deteriorated at the time of the condition assessment performed in 1996.

Given this situation, the concern becomes whether past repair methods and materials addressed the cause(s) of the distress in the structure. Unfortunately, past evaluation and testing techniques fall short of the standards today. The lack of specialized knowledge about the corrosion process and practice of engaging an inexperienced contractor are primary reasons that past repairs are more prone to premature failure than repairs completed today.



Project Drawing

Today, knowledge in the field of concrete structures and corrosion mechanisms is steadily growing through experience and research. Experienced contractors are more prevalent, as are experienced engineers and material specialists. Present day materials and products are being produced to provide a higher quality product. It is expected that these trends toward more specialized experience and product quality will continue.

Although it is difficult to predict the future of concrete rehabilitation, the continued expansion of knowledge and experience in the field is all but guaranteed. Continued research should expand the understanding of the corrosion process and corrosion control mechanisms. This, in turn, will lead to the development of materials and products that can better control the corrosion process and facilitate longer lasting concrete repairs. ■

Smithfield-Liberty Helix Ramp Rehabilitation

SUBMITTED BY
Carl Walker Construction, Inc.
Pittsburgh, PA

OWNER
Pittsburgh Parking Authority
Pittsburgh, PA

PROJECT ENGINEER/DESIGNER
Atlantic Engineering Services
Pittsburgh, PA

REPAIR CONTRACTOR
Carl Walker Construction
Pittsburgh, PA

MATERIALS SUPPLIER/MANUFACTURER
BASF
Cleveland, OH

AWARD OF EXCELLENCE

FINALIST - 2018 PROJECT OF THE YEAR
SPECIAL PROJECTS CATEGORY

Goedehoop Collieries Block 7 Project

SOUTH AFRICA

SUBMITTED BY KRYTON INTERNATIONAL, INC.

Fig. 1: View from the top of the shaft during the site inspection. The extreme water ingress points are evident all the way down the ventilation shaft. The base of the ventilation shaft was filled with water for 35 years.

BACKGROUND

South Africa has a long history when it comes to mining. It is an industry that forms the backbone of the South African economy. The client of this project has been a key catalyst to help create a stronger, safer, healthier, and more sustainable South Africa since 1917.

One of the key requirements in mining is to ensure adequate ventilation in a mine, and provisions are made for suitable airways for the air to flow down the mine to the working areas. The primary ventilation system consists of an intake (downcasts) through which the fresh air passes to the mine workings, and an exhaust (or upcasts) where the air passes after having been ventilated. Any interference with the ventilation system would have an impact on operations and safety.

The Goedehoop Colliery Block 7 mine ventilation downcast shaft is approximately 200 ft (60 m) deep and was constructed in the 1980s. The shaft consists

Fig. 2: Major water penetration points were blasting masses of water 12 in (300 mm) wide across the 23 ft (7 m) diameter of the shaft. The extreme pressure of the water was causing damage to the shaft structure and made the repair a very dangerous project.

of a segmented ring liner arrangement with an interlocking joint connection between the different shaft segments. The shaft had experienced the ingress of water over the last 35 years with a notable increase in the last couple of years through the joint interface, posing potential unsafe conditions, flooding, and deterioration to the existing concrete shaft liner (Fig. 1). The excessive leakage was pumped out on a daily basis as part of a routine operation which was required for the normal running of the mine.

Over the years, the underground water levels increased, exacerbating the potential for significant leakage and flooding of the mining levels. Early in 2017, the underground build-up of water broke through the concrete ventilation shaft, allowing excessive water penetration into the mine, threatening the safety of the miners.

A solution to the excessive water penetration into the shaft (approximately 1850 gallons [7000 liters] per minute) was required. If the excessive water penetration solution failed, it was inevitable that the affected shafts woud close. The ingress pressure of the water was immense, shooting water torrents approximately 12 in (300 mm) wide across the 23 ft (7 m) diameter shaft (Fig. 2). Numerous water ingress points occur along the full depth of the shaft, with the primary water ingress area located between 62 and 82 ft (19 and 25 m) below ground level. Being a ventilation shaft, there was no access to these areas, which therefore required the manufacture and installation of elaborate custom-made access equipment for both personnel and equipment.

A solution to the ingress of water from the positive to negative path (from outside the shaft into the shaft opening) was required. In addition, there was no access to the positive side (being underground). Even after extensive panel tests by various contractors, none were able to apply a product that could withstand the immense negative pressure exerted by the water in the mine shaft.

After an in-depth site evaluation, it was noted that the mine was under approximately 65 ft (20 m) of water and the repair of a water penetration point at this level posed many difficulties and risks. Numerous tests were carried out to ascertain the best procedures to access the mine, to investigate the concrete damage below water level, and to confirm structural integrity and safety.

THE SOLUTION

The scope of work focused on the main water ingress points which were in urgent need of concrete repair, jointing, and surface waterproofing. It was critical that the entire structure be correctly rejuvenated, repaired and waterproofed using crystalline technology, which has a proven success record in similar case studies worldwide for the past 40 years.

The very first obstacle to overcome was access down the 23 ft (7 m) diameter shaft riddled with leaks. After numerous discussions and on-site tests, the appointed access company devised a cradle system to safely lower workers into the shaft (Fig. 3). The cradle also needed to be stabilized against the sides of the shaft to reduce movement for the work at hand.

The inspection and preparation of the site were imperative for this project. A borehole had to be sunk to the depth of the major water ingress and camera equipment sunk into the borehole to accurately investigate the ingress from the positive side. A scan of the concrete in the affected areas by ground penetrating radar (GPR) equipment was conducted to ensure that the safety and integrity of the structure was still intact.

With information gathered by visuals, a swelling waterstop had to be introduced to the positive side to reduce the water flow to a manageable condition (Fig. 4 and 5). In order to prepare the site for the application of crystalline waterproofing products, the damaged sections of concrete had to be cleaned and prepared using dustless sandblasting and ultra-high pressure cleaning. Concrete cutting machines and chisels were used to chip chases along the entire length of all water ingress points, construction joints and cracks. Running water was stopped by the use of a rapid-setting hydraulic cement and a swelling waterstop (Fig. 6). Chased cold joints were filled with a repair grout (specially mixed dry-mix).

Fig. 3: Access to the shaft was a huge safety and logistical concern. The access specialists were able to supply a custom-built cradle to lower workers into the shaft. This cradle was anchored to the sides of the shaft to ensure no movement during the high-pressure cleaning and sandblasting.

Fig. 4: Swelling waterstop being tested with shaft water vs tap water.

Fig. 5: The waterproofing specialists tested the swelling waterstop on the ingress points to ensure the waterstop would swell to its maximum capacity to alleviate water pressure to continue with the crystalline leak repair system.

Fig. 6: Using a rapid-setting hydraulic cement and a swelling waterstop, the waterproofing specialists were able to successfully contain the flow of water to a single access point, thus making the water more manageable.

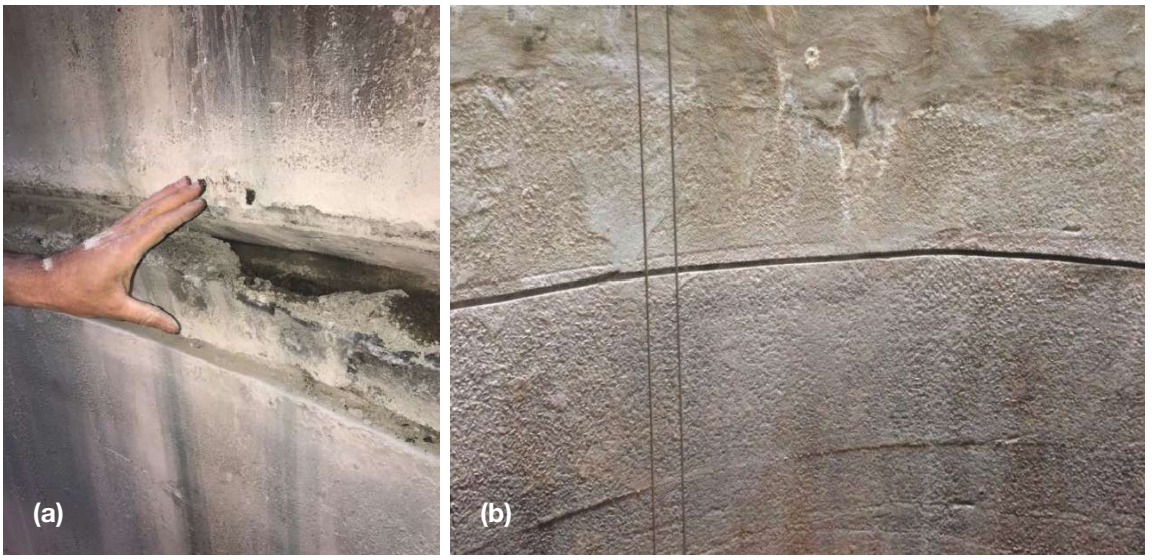


Fig. 7: After the water was fully contained using a rapid-setting hydraulic cement and a swelling waterstop, the surface area was prepared and a crystalline repair grout (a) and crystalline surface waterproofing (b) applied.

Fig. 8: View from the bottom of the shaft once the project was complete

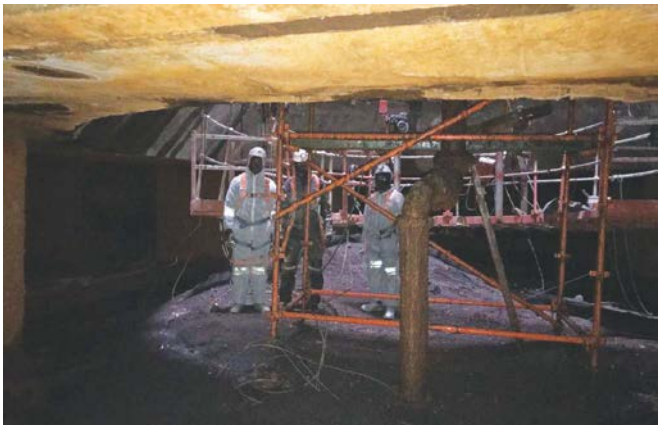


Fig. 9: The base of the shaft had not been seen or dry for over 35 years. This was the first time that workers were able to stand at the base of the shaft.

Waterproofing crystalline surface-applied cementitious concrete compounds were applied to the surface in a slurry form in accordance with manufacturer's specifications (Fig. 7). The application over the entire surface of the concrete structure resulted in the growth of crystals throughout the concrete mass preventing any further water or air ingress into the concrete, thus transforming the concrete itself into a waterproof barrier.

The growth of these crystals into the concrete and subsequent waterproofing of the concrete will retard any further deterioration of the concrete structure from water ingress and will therefore substantially lengthen the lifespan of the structure. The overall result is a safe, dry and usable structure (Fig. 8 and 9). ■

Goedehoop Collieries Block 7 Project

SUBMITTED BY
Kryton International, Inc.
Vancouver, BC, Canada

OWNER
Anglo American Coal
South Africa

PROJECT ENGINEER/DESIGNER
Semane Consulting Engineers
Johannesburg, Gauteng, South Africa

REPAIR CONTRACTOR
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MATERIALS SUPPLIER/MANUFACTURER
Kryton International
Vancouver, BC, Canada

AWARD OF EXCELLENCE

PARKING STRUCTURES CATEGORY

Baltimore Garage Restoration

DETROIT, MI

SUBMITTED BY PULLMAN SST, INC.

Fig. 1: Baltimore Parking Garage after repairs and showcasing a new exterior mural

OVERVIEW

Built in 1964, the Baltimore Garage is a 270,000 sf (25,084 sm) split-level button head post-tensioned (PT) garage located in Detroit's New Center neighborhood (Fig. 1). With recent revitalization of the area, including a new light rail system and construction of the Detroit Pistons practice facility, there was an influx of activity and demand for parking. New owners of the garage recognized the renewed demand and solicited design-build proposals to address years of deferred maintenance, improve the appearance, and quickly bring the restored parking to market.

The parking structure has five elevated PT concrete slabs, each approximately 60 ft (18 m) wide and 615 ft (188 m) long, with the length divided by a central expansion joint and two intermediate construction joints on each side of the expansion joint. Each slab is supported by 26 precast single-tee beams spaced at 25 ft (7.6 m). The 27 unbonded slab tendons consist of eight ¼-in (6.4 mm) diameter button headed wires, anchored at the ends of each slab and at the construction joints. Lack of maintenance at the construction joints and expansion joint allowed water and deicing salts into the slab concrete causing corrosion to unbonded tendon and anchorage hardware.

EXISTING CONDITION

The 52-year-old PT one-way slab and beam structure exhibited structural degradation, damage and under-reinforced elements, ranging in severity from immediate safety hazards to modest aesthetic concerns. The structure's PT concrete design included minimal bonded slab reinforcing steel to supplement the primary structural support provided by the slab PT tendon system, and increased the significance of the failures of the slab PT tendons. The conventionally reinforced concrete in the structure was also significantly deteriorated. The cast-in-place ramps were in poor condition with approximately 25% of the concrete floor surfaces having corrosion related damage. Extensive concrete spalling and exposed corroded reinforcing steel was visible at the underside of ramp slabs. The slab-on-grade levels were in fair condition, but some sections had up to 12 in (305 mm) of settlement. Widespread corrosion-induced deterioration was evident on concrete columns and haunches (Fig. 2). Column haunch deterioration reduced tee stem bearing at several locations that required several stories of shoring to grade. Corrosion of shallow reinforcing steel and abandoned embedded conduit caused less structurally significant damage, but produced unsightly near-surface concrete deterioration throughout the parking deck. Poor drainage and failed expansion joints and sealants significantly contributed to the concrete deterioration. Additional scope included lighting, signage, handrail replacement or repair, and upgrades to the finishes.

SLAB AS-BUILT CONDITION, ASSESSMENT AND DESIGN

The PT slabs were investigated using the drag-chain method to identify areas of concrete delamination, and scanned using ground penetrating radar to locate PT tendons. Unsound concrete regions were excavated for inspection, and it was discovered that tendons were frequently severely corroded at, or near,

the end and intermediate anchorages. Section loss of each wire in a tendon was measured, and the in-situ tension in each wire was evaluated using the screwdriver penetration testing method.

The assessment, conducted simultaneously with initial repair construction, identified a much larger number of severely corroded tendons than indicated by the preliminary visual assessment (Fig. 3). Initial structural analysis also indicated less 'add tendon' reinforcing of the end spans than provided by current design practice. This condition increased the number of slab PT repairs.

To develop an economic repair plan (as construction was continuing), the slab concrete was cored and tested to determine the in-situ concrete compressive strength instead of using assumed values. Then, an elasto-plastic finite element analysis was conducted for the slab. This advanced analysis utilized moment redistribution within the indeterminate structure, resulting in a more accurate (higher) calculated capacity of the structural system than provided by typical simplified elastic examination methods. Based on the results from the advanced investigation, 234 critical corroded tendon locations in the slabs were repaired to provide sufficient capacity to support the required loads (Fig. 4). This more precise repair plan saved the owner almost US $1.2 million.

SINGLE-TEE BEAM AS-BUILT CONDITION, ASSESSMENT AND DESIGN

A total of approximately 130 precast single-tee beams are used to support the five elevated parking slabs. These beams are typically reinforced with eight ½-in (12.7 mm) diameter straight bonded prestressed strands and two draped twenty-wire unbonded post-tensioning tendons. The unbonded PT tendons exit the beam ends above the beam flange (within the concrete topping), where they connect to threaded anchorage rods that extend through the reinforced concrete columns to anchor at the outer face of the column. This anchorage system allows negative bending moment to develop at beam ends and provides structural integrity at the beam-to-column connections. The unbonded tendon ends and anchorage rods at the beam ends were encased within a shallow grout pocket, which were typically found to be cracked and debonded from the substrate (Fig. 5).

Unsound grout pockets in the beams were opened for inspection, and the unbonded wires were often found to be severely corroded, with a large proportion of wires completely failed. In-situ deflections of the beams were measured to correlate the condition of the tendons to the measured deflections of the beams. Based on the developed correlation, sound grout pockets at beams that exhibited a measured deflection exceeding the developed critical deflection threshold were opened for inspection, as well as beams that were next to slab drains (i.e. likely often exposed to ponding water), and beams that were located to adjacent distress. As a result, emergency shoring was provided for 20 beams and a total of 32 beams were repaired due to significant tendon section loss. The beam repair design was subject to multiple constraints, including structural integrity requirements at beam-column connections, fire-protection, and construction accessibility

Fig. 2: Existing condition discovered at an interior column

Fig. 3: Many beams were observed to have completely corroded through tendons

Fig. 4: Placement of new PT anchors

Fig. 5: (a) Many grout pockets on the roof were delaminated and some had vegetation growing, and (b) Grout pocket after concrete removal and cleaning

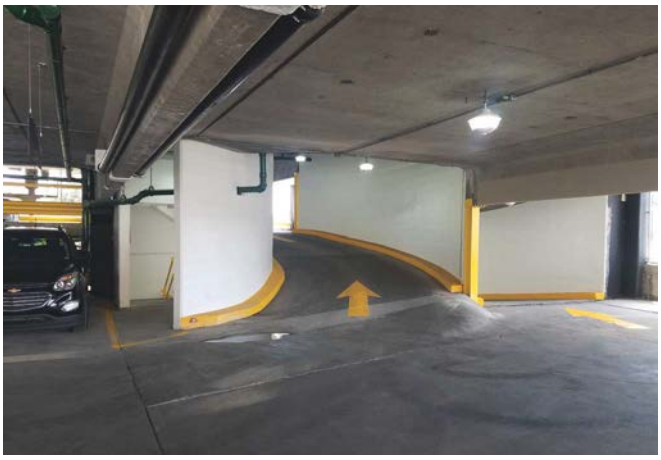

Fig. 7: Ramp and staircase area at end of construction

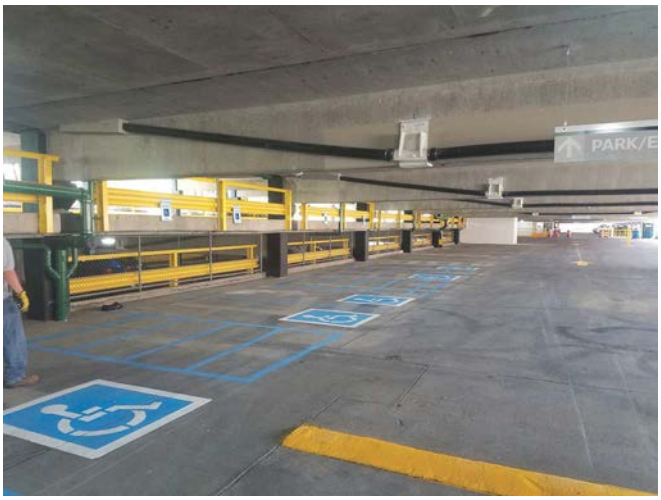

Fig. 8: Completed repairs to beams and columns, updated drainage system, and painting observed during final project walkthrough

Fig. 6: External PT beam repair prior to running tendons through conduit

constraints, along with financial and scheduling concerns. Evaluating many repair options, it was decided to abandon the existing failed tendons and replace them with two external draped tendons (each consisting of four 0.6-in [15.2 mm] diameter strands) placed symmetrically on both sides of the beam web. The new external tendons were connected to the existing threaded anchorage rods and post-tensioned from the top side (Fig. 6). The external tendons were also embedded in HDPE conduits that were fully grouted to comply with fire-resistance requirements. To further extend the life of the beams and structure, the water management system was repaired to ensure no standing water would occur on the concrete deck. To protect the existing and newly installed PT tendons, waterproof membranes were installed over anchorage zones.

DESIGN-BUILD SUCCESS

The Baltimore Garage is a showcase of what the design-build process can accomplish when the team collaborates effectively (Fig. 7 and 8). Upon award of the project, construction started concurrently with the design phase. The design-build team successfully displayed the ability to provide turnkey engineering support using the elasto-plastic finite element analysis to determine the minimum number of repairs needed to sufficiently support the deck. This process uncovered the need for over double the amount of PT slab and beam repairs than originally anticipated; however, it only added six weeks to the project. ■

Baltimore Garage Restoration

SUBMITTED BY
Pullman SST, Inc.
Trenton, MI

OWNER
The Platform Group
Detroit, MI

PROJECT ENGINEER/DESIGNER
Wiss, Janney, Elstner Associates, Inc.
Bingham Farms, MI

REPAIR CONTRACTOR
Pullman SST, Inc.
Trenton, MI

MATERIALS SUPPLIER/MANUFACTURER
Structural Technologies
Columbia, MD

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AWARD OF EXCELLENCE

PARKING STRUCTURES CATEGORY

The Phoenician Resort—Post Tension Garage Repair

SCOTTSDALE, AZ

SUBMITTED BY TADJER-COHEN-EDELSON ASSOCIATES, INC.

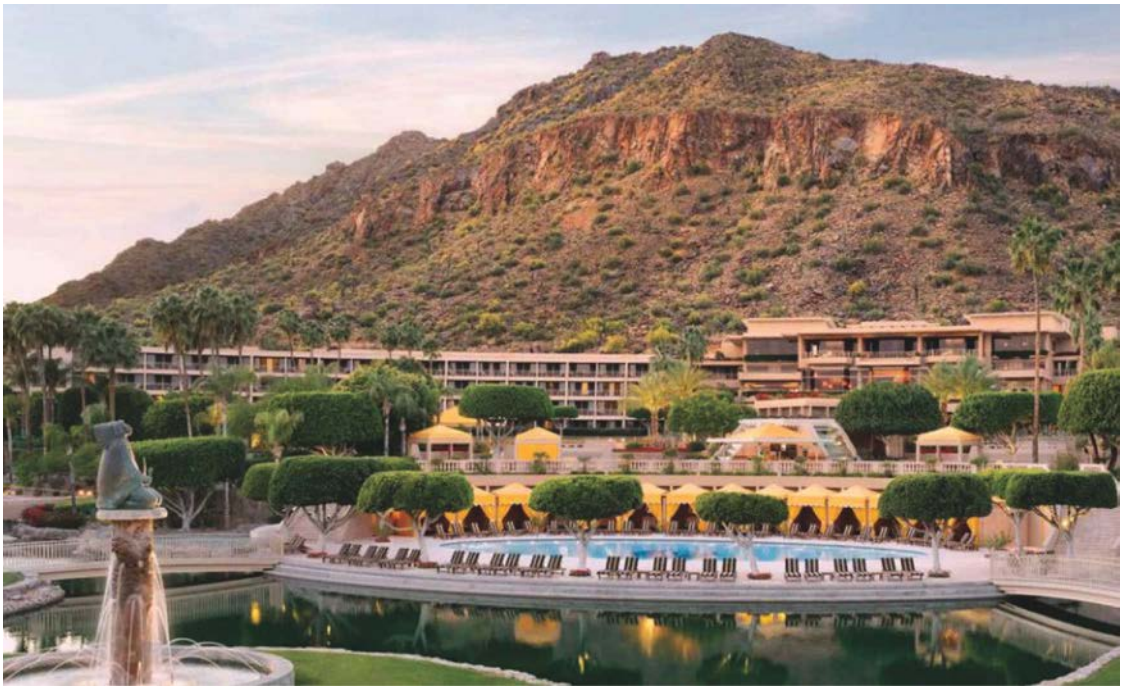

Fig. 1: Phoenician Resort

PROPERTY OVERVIEW

The Phoenician Resort is a luxury resort located in Scottsdale, Arizona. The property is situated on 250 acres (101 hectares) at the base of Camelback Mountain (Fig. 1). The resort was opened in 1988 and is approximately 30 years old. The property contains 643 guest rooms, 11 restaurants, 9 swimming pools, spa facility, 16 tennis courts and a 27-hole golf course. In plan, the main hotel consists of two large curved structures with a connecting segment near the midpoint and low-level ballrooms between the buildings. The hotel is oriented facing in the southwest direction with the nearby Camelback Mountain on the north side. The main hotel buildings are primarily conventionally reinforced concrete structures supported on a foundation containing a combination of grade beams, pilasters, spread footings, foundation walls, and columns and walls bearing directly on bedrock.

GARAGE STRUCTURE

A single-level subgrade parking garage is located below the hotel with the south side of the garage extending beyond the main hotel structure (Fig. 2). The segment that extends in front of the main building has an elevated post-tension concrete slab above the parking level with approximately 6 ft (1.8 m) of soil, landscaping and event space concrete pads above the buried slab. The post-tension slab is 15 in (381 mm) thick, approximately 62.5 ft (19 m) wide and runs the length of the crescent shaped building—approximately 900 ft (274 m). The post-tension cables are 0.5 in (12.7 mm) diameter, monolithic, unbonded cables consisting of seven (7) wire strands wrapped in plastic sheathing. The center segment below the restaurant extends almost to the nearby swimming pools. On the south end of the garage, the post-tension slab is supported on a 10 in (254 mm) wide reinforced concrete foundation wall that extends to the bedrock below the garage. On the north end, the post-tension slab is supported by concrete beams and columns along the expansion joint.

EXISTING CONDITIONS

Prolonged water migration into the subgrade garage caused deterioration of post-tension components and conventionally reinforced concrete beams, columns and foundation walls in the structure. While the desert

climate in the Scottsdale area generates low annual rainfall, the landscaping irrigation system deposits water above the garage on a regular basis. Leakage occurred along the south end of the structure where the stressing end of the post-tension slab bears on the foundation wall. Leakage also occurred along the expansion joint prompting the hotel staff to install a network of collecting pans and drain lines below the garage ceiling to alleviate water stains on cars and dripping water on hotel guests below. The garage started experiencing ruptured post-tension tendons and large cracks on the bottom surface of the slab in recent years.

CONDITION SURVEY

The structural issues prompted an engineering condition survey to evaluate the subgrade garage structure with findings used to develop a repair program. The survey included visual examination of the entire garage structure with exploratory openings within the overburden above the garage in order to ascertain the condition of the concealed structural and water resisting components. An exploration pit at the south end of the garage exposed a portion of the stressing end of the post-tension slab and top of the foundation wall. At this location, the existing surface-adhered "peel and stick" cold-applied sheet membrane was debonded and beyond its useful service life. The membrane conditions allowed water to reach and corrode the stressing anchors. Water also traveled within the protective sheathing causing corrosion and subsequent rupture of the post-tension tendons that was observed in the garage below (Fig. 3).

An exploration pit at the north end of the garage exposed the expansion joint. The same type of sheet membrane was revealed, exhibiting similar conditions. Spalling concrete was observed on the large concrete beams and columns directly below this leaking expansion joint.

REPAIR PROGRAM

A repair program was developed to address garage leakage and restore structural components to their intended original integrity. The most concerning aspect was determining the extent of deterioration that had already occurred to concealed post-tension components. Assessing the entire slab edge and stressing anchors could not take place without removing 6 ft (1.8 m) of overburden and existing waterproofing for the entire length of the structure. The original structural drawings were reviewed to understand the layout and quantity of tendons. The repair program required ongoing evaluation and repair determination during the construction phase, which was scheduled for summer of 2017 to coincide with the replacement of the swimming pools and spa facility at the hotel. The repair program consist of three main components: stressing end repairs, expansion joint repairs, and concrete repairs to members within the garage.

Stressing End Repairs

The project included removal of overburden to expose the stressing end of the slab and foundation wall (Fig. 4). The existing debonded sheet membrane and grout pockets were removed for engineer assessment of the stressing anchors, and components were repaired accordingly (Fig. 5). Corroded anchors required slab openings, locking off the existing tendon, replacement of the anchor, splicing

Fig. 2: Overhead view of subgrade garage

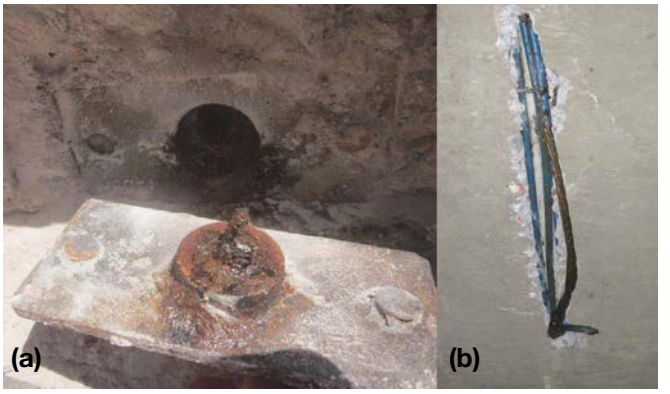

Fig. 3: (a) Corroded post-tension anchor, and (b) Ruptured tendon

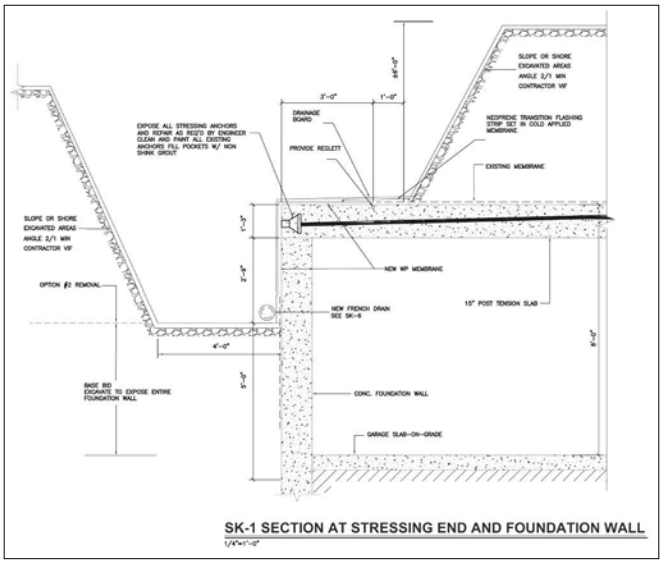

Fig. 4: Section detail at stressing end and foundation wall (repair drawing)

Fig. 5: Post-tension repairs in progress (stressing end)

Fig. 6: New membrane and flashing along the expansion joint and building wall

Fig. 7: Foam blocks and backfilling in progress after completion of waterproofing repairs along the expansion joint

Fig. 8: Completion of repairs with new landscaping in front of the hotel building

to the existing tendon, placing concrete, stressing, and placing new non-shrink grout at the stressing pockets prior to installing new hot applied reinforced membrane on the slab and foundation wall. By the end of the project, over 1,000 stressing anchors were exposed, evaluated and 364 repairs required. Due to the reconstruction of the adjacent swimming pools and spa facility, space to excavate and store soil was limited. In addition, storing soil above the garage utilizing shoring was not feasible due to the hotel using the garage for parking. Therefore, the excavation and repairs had to be performed in four consecutive phases.

Expansion Joint Repairs

This component included removal of overburden to expose the expansion joint and dead end of the slab adjacent to the main hotel building. The existing membrane and joint seals were removed for engineer assessment of the slab and identification of required repairs. A new sloped concrete topping and drainage system were installed to reduce water on the expansion joint. The drainage system included drain pipe cleanouts in the drain piping below the slab and extensions above the drains to allow regular maintenance and clearing at the landscaped area.

The waterproofing repairs included new expansion joint seals and looped flashing sheets over the joint, and hot applied reinforced waterproofing membrane and counter flashings at the slab and building wall (Fig. 6). Upon completion of waterproofing repairs, a drainage layer, expanded polystyrene (foam) blocks, and a 2.5 ft (0.8 m) layer of soil were placed over the slab (Fig. 7). The foam blocks were used to reduce the load on the structure and provide easier access to the expansion joint for future serviceability.

PROJECT CHALLENGES

Various challenges were addressed during the repair project and included restraints from site conditions, strict schedule requirements for completion within a four-month period, the magnitude of repairs, scope complexity, and unforeseen conditions. The completed project is shown in Figure 8. ■

The Phoenician Resort—Post Tension Garage Repair

SUBMITTED BY
Tadjer-Cohen-Edelson Associates, Inc.
Silver Spring, MD

OWNER
Host Hotels & Resorts, Inc.
Bethesda, MD

PROJECT ENGINEER/DESIGNER
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Silver Spring, MD

REPAIR CONTRACTOR
Complete Property Services Inc.
Tampa, FL

MATERIALS SUPPLIER/MANUFACTURER
Henry Company
El Segundo, CA

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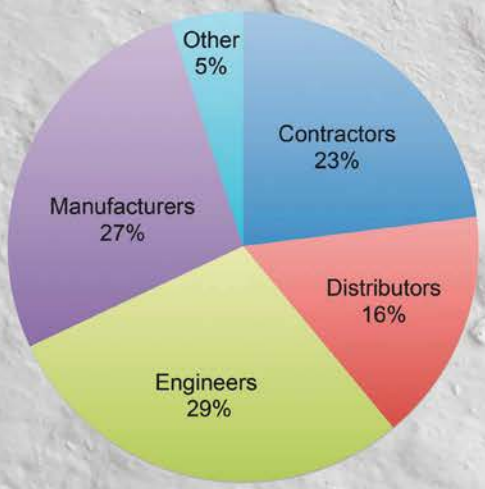

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AWARD OF MERIT

HIGH-RISE CATEGORY

The Philadelphian

PHILADELPHIA, PA

SUBMITTED BY SIKA CORPORATION

The Philadelphian, completed in 1963, is a massive condominium near downtown Philadelphia. There are 21 floors with 1.3 million sf (120,774 sm), making this the largest single-building condominium in Pennsylvania. There are 776 units with 656 balconies. There are also two swimming pools, ground floor retail space and a parking garage. The beams, columns, slabs and balconies are reinforced concrete. The façade consists of marble cladding on floors 1 and 2 with brick and CMU backup on the remaining floors.

The owner has done a good job maintaining this building. In 2013, a façade inspection indicated cracks and concrete spalls in some of the balconies, eyebrows and columns. Further evaluation of the balconies indicated the handrails were structurally deficient due to post pockets containing gypsum grout. This dramatically increased the scope of work.

Alarms sounded when a 6 in (152 mm) cube of concrete from a balcony edge fell from the ninth floor onto the loading dock roof.

The project scope included balcony repairs, handrail strengthening, and balcony waterproofing. Work started in the spring of 2016. The size of the project required numerous swing stages with work performed on all elevations simultaneously. Another significant scope increase resulted when old, poorly completed repairs became loose during concrete removal and surface preparation. Several balconies required full shoring during repairs. The project took 3 years to complete. Thorough quality assurance and quality control happened throughout the project. Sequencing this large project with many drops required excellent owner coordination. A full system of concrete repair and protection completed to high industry standards will ensure long-lasting durable repairs. Brand new balconies and waterproofing along with completely restored handrails will enable the owners to enjoy this space for many years to come.

The Philadelphian

SUBMITTED BY
Sika Corporation
Lyndhurst, NJ

OWNER
The Philadelphian Owners Association
Philadelphia, PA

PROJECT ENGINEER/DESIGNER
Simpson Gumpertz & Heger
New York, NY

REPAIR CONTRACTOR
Joseph Dugan, Inc.
Erdenheim, PA

MATERIALS SUPPLIER/MANUFACTURER
Sika Corporation
Lyndhurst, NJ

HISTORIC CATEGORY

Old St. George Church

CINCINNATI, OH

SUBMITTED BY SSRG, STRUCTURAL SYSTEMS REPAIR GROUP

AWARD OF MERIT

Constructed by renowned architect Samuel Hannaford, Old St. George Church has been a fixture in Cincinnati for over 140 years. In 2008, a three-alarm fire charred its façade and forced the removal of its iconic steeples. After the fire, the church remained empty for years. Through the efforts of Crossroads Community Church, the church once again became a place of worship in August 2016.

The restoration consisted of 24,000 sf (2230 sm) of exterior elevation cleaning, full re-pointing of brick masonry, stone repair, and the replacement of nearly 2,500 deteriorated bricks. Challenges included accessing the 100 ft (30 m) tall south bell towers and effectively removing the carbon buildup on the façade. A 150 ft (46 m) boom lift and citric-based gentle restoration cleaner was used to restore both charred towers. The carbon buildup melted away, leaving the historic façade shining through.

The project also included the repair and reinforcement of both the friary and chapel roof by installing significant steel and wood to the structure. Reinforcement of the heavy timber trusses posed significant challenges that were met with creative solutions, completing the work quickly and cost effectively.

Reaching consensus on repair materials, assemblies, and the cleaning process was one of the earliest challenges in the project. The project team met several times a week in the first six weeks to review cleaning products, brick samples, mortar samples, stone samples, and multiple mock-ups. Cleaning mockups were conducted using over 10 different products throughout the façade to see which would be most successful at removing the heavy carbon buildups from the fire damage as well as at field locations unaffected by the fire. Two products were selected to be used at the different locations.

Old St. George Church

SUBMITTED BY
SSRG, Structural Systems Repair Group
Cincinnati, OH

OWNER
Crossroads
Cincinnati, OH

PROJECT ENGINEER/DESIGNER
Model Group
Cincinnati, OH

REPAIR CONTRACTOR
SSRG, Structural Systems Repair Group
Cincinnati, OH

MATERIALS SUPPLIER/MANUFACTURER
Western Hills Building Supply
Cincinnati, OH

AWARD OF MERIT

INDUSTRIAL CATEGORY

Delayed Coking Unit Chute Slab Repair & Protection

SUBMITTED BY STRUCTURAL GROUP

Delayed coking units are critical in oil refineries. These units sit on large reinforced concrete tabletop structures that support large vessels. A common configuration of these structures includes an angled chute slab that conveys processed coke from the drum to a collection area. Many coking units have utilized steel plates to protect the chute from repeated impact of hot coke product.

Over years of operation in this intense environment, the coking unit in a refinery in the United States was experiencing deterioration of both the steel plates and the approximate 64 x 33 ft (20 x 10 m) x 3.5 ft (1 m) thick concrete chute slab. After a comprehensive condition assessment, testing showed cracks and warps in the coking unit due to expansion of the embedded steel anchors for the plate. Although minor repairs were made in the past to the plates, an innovative floating plate design replaced the carbon steel plates with stainless steel and removed the embedded anchors. Moving the new 40,000 lb (18,145 kg) stainless steel slide plates into their final position on the chute slabs was the most complex portion of the project. Due to the overhead restrictions of the coking unit, the moving and lifting was engineered to be executed in multiple phases. This method also allowed the steel plates to expand and contract separately from the concrete and be easily removed during future concrete inspections and/or plate replacement.

A detailed plan was developed to perform the repairs and plate installation in a short duration turnaround. With an emphasis on performing the work safely, this was the first repair of its kind and has proven to significantly lengthen the service life of the unit. After one year of operation, the plates were tested and showed no major deterioration.

Delayed Coking Unit Chute Slab Repair & Protection

SUBMITTED BY
Structural Group
Anaheim, CA

OWNER
Anonymous

PROJECT ENGINEER/DESIGNER
Brindley Engineering
Lisle, IL

REPAIR CONTRACTOR
Structural Preservation Systems, LLC
Anaheim, CA

MATERIALS SUPPLIER/MANUFACTURER
Structural Technologies, LLC
Columbia, MD

INDUSTRIAL CATEGORY

Evaluation and Repair of Natural Draft Cooling Tower

MID-ATLANTIC REGION OF US

SUBMITTED BY WISS, JANNEY, ELSTNER ASSOCIATES, INC.

Constructed in 1974, a 400 ft (122 m) tall reinforced concrete hyperbolic shell natural draft cooling tower in the Mid-Atlantic region of the United States began exhibiting concrete deterioration after approximately a decade of service. Over time, the deterioration progressed, including large areas of concrete delamination and spalling at the shell exteriors, areas of concrete delamination at the shell interiors, and cracking and corrosion staining in the supporting X-columns.

Beginning in 2006, structural and materials engineers performed multiple condition assessments of the tower to characterize deterioration mechanisms, assess structural integrity, and develop repairs to meet owner-defined repair objectives, including a 25-year service life extension —all while maintaining the tower in an operationally ready state throughout construction. Condition assessment of the cooling tower was challenging due to its size, geometry, and operational constraints, but careful investigation provided critical knowledge to effectively characterize its structural health and plan an aggressive repair strategy.

Evaluation of concrete properties, corrosion rate, and desired repair objectives were considered in the decision to utilize impressed current cathodic protection (ICCP) and galvanic cathodic protection (GCP) as part of the repair program that included an engineered demolition, rebuild of the upper one-third of the tower, and localized concrete repairs of the lower two-thirds. The ICCP system is comprised of 48 individual zones, each with four embedded reference electrodes to monitor the polarization of the steel reinforcement. Three types of ICCP systems were used at different sections of the shell, including over 4,300 discrete titanium suboxide ceramic tube anodes, mixed metal oxide-coated titanium ribbon mesh anodes, and over 6 miles of ribbon mesh anode.

Despite significant technical challenges due to the scale of the structure and deterioration, the design-build project was completed without any lost-time injuries, and the in-place cathodic protection systems remain operational and remotely monitored for performance.

Evaluation and Repair of Natural Draft Cooling Tower

SUBMITTED BY
Wiss, Janney, Elstner Associates, Inc.
Northbrook, IL

OWNER
Anonymous

PROJECT ENGINEER/DESIGNER
Wiss, Janney, Elstner Associates, Inc.
Northbrook, IL

REPAIR CONTRACTOR
International Chimney Corporation
Williamsville, NY

MATERIALS SUPPLIER/MANUFACTURER
Vector Corrosion Services
Tampa, FL

AWARD OF MERIT

INDUSTRIAL CATEGORY

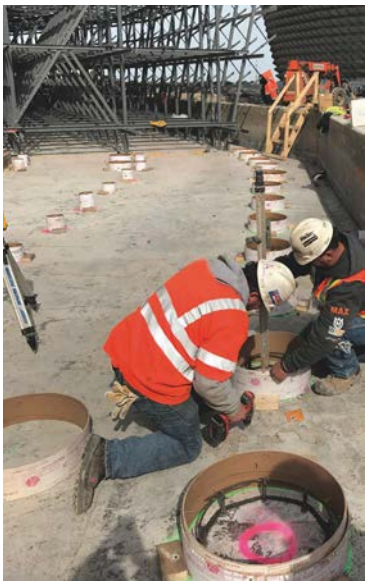
Innovative Repairs Preserve 40-Year-Old Cooling Tower at Coal Creek Power Station

UNDERWOOD, ND

SUBMITTED BY VECTOR CONSTRUCTION INC.

Coal Creek Station operates two late 1970s vintage generators with three mechanical draft cooling towers, each 42 ft (13 m) high and 225 ft (69 m) in diameter. After 40 years of use, cooling tower #91 was showing its age. If the entire cooling tower was demolished and rebuilt, it would be very costly and require a long downtime.

Fall of 2016, the tower was shut down for one week to inspect and pre-plan an efficient shutdown the following May. A visual inspection and sounding survey was conducted to identify defects, estimate quantities of repair, develop a repair strategy, and to create a detailed project schedule.



Accordingly, an extensive restoration and rebuild of the cooling tower was planned during a 6.5 week shutdown in May 2017. Rebuilding the cooling tower required the following steps: 1) Demolition of the exterior lumber and sheet metal structure, 2) Concrete rehabilitation, and 3) Installation of the new field-erected exterior fiber-reinforced polymer (FRP) structure.

To preserve the structure, the concrete repair scope of work included:

- Delaminated and spalled concrete removal at beams, columns and walls and replacement with high performance concrete;
- Type 1A alkali-activated embedded galvanic anode installation to mitigate repair accelerated corrosion;
- Precast concrete joint repair and waterproofing;
- Removal of severely deteriorated precast concrete beams and replacement with new beams constructed with high performance concrete;
- Vertical joint repair between the cold-water basin wall and the flume wall;
- Epoxy injection to bond and seal cracks;
- Installation of new reinforced concrete pedestals into the cold-water basin and trench to support the new FRP structure; and
- Installation of epoxy coating on hot water basin and vertical directional fins.

Innovative Repairs Preserve 40-Year-Old Cooling Tower at Coal Creek Power Station

SUBMITTED BY
Vector Construction, Inc.
West Fargo, ND

OWNER
Great River Energy
Underwood, ND

REPAIR CONTRACTOR
Vector Construction, Inc.
West Fargo, ND

MATERIALS SUPPLIERS/MANUFACTURERS
Knife River Materials
Bismarck, ND

Ergon Armor
Jackson, MO

LONGEVITY CATEGORY

Sunshine Skyway Bridge

TAMPA BAY, FL

SUBMITTED BY SIKA CORPORATION

The Sunshine Skyway Bridge is one of the most recognized structures in the United States. With its signature bright yellow stay cables, the bridge resembles a sailboat, with its towers holding up the triangular sails across Tampa Bay.

At the time of construction, it was the longest bridge in the world that has a cable-stay main span. The overall length is 5.5 miles (8.9 km), the main span is 1,200 ft (366 m), and the vertical clearance is over 190 ft (58 m). Built at a cost of US $244 million, it opened to traffic in 1987. The current cable stay bridge is a replacement for the previous steel, cantilevered truss bridge that was tragically struck by a freighter back in 1980 when a 1,200 ft (366 m) span collapsed into Tampa Bay, killing 35 people. It took seven years before a signature replacement bridge could be built.

The Sunshine Skyway Bridge is comprised of the main span, the high level approach, and the low level trestle spans. Shear cracking was observed during routine inspections of the trestle span girders. Repairs included epoxy injection of all cracks having a width exceeding 0.012 in (0.3 mm), repairing spalls, and filling uneven surfaces with a leveling mortar and all bugholes and smaller cavities with an epoxy paste. A clear protective sealer was applied to protect the concrete further from moisture and chloride intrusion. It was also determined that the deficient girders needed to be structurally strengthened to carry additional loads and a carbon fiber system was installed.

Despite difficult working conditions as a result of having to work off a barge, often under very hot and humid conditions, the project was a success. The repairs were made underneath the bridge without having to take out even one lane of traffic during the entire process.

Sunshine Skyway Bridge

SUBMITTED BY
Sika Corporation
Lyndhurst, NJ

OWNER
Florida Department of Transportation
Tallahassee, FL

PROJECT ENGINEER/DESIGNER
SDR Engineering Consultants, Inc.
Tallahassee, FL

REPAIR CONTRACTOR
Intron Technologies, Inc.
Jacksonville, FL

MATERIALS SUPPLIER/MANUFACTURER
Sika Corporation
Lyndhurst, NJ

AWARD OF MERIT

AWARD OF MERIT

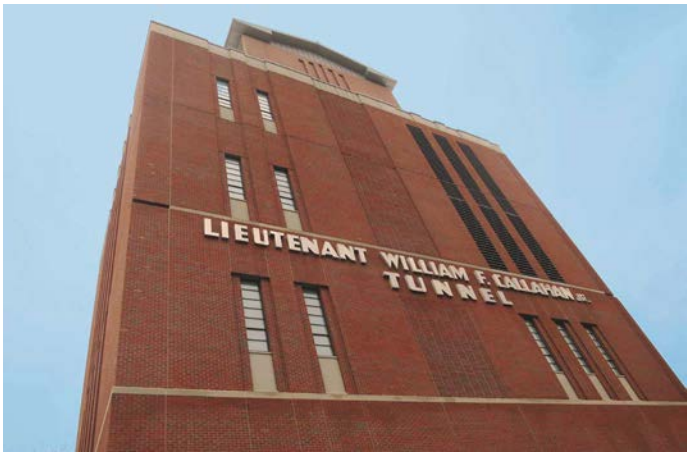
MASONRY CATEGORY

Façade Rehabilitation of Callahan Tunnel Vent Building #13

BOSTON, MA

SUBMITTED BY SIMPSON GUMPERTZ & HEGER, INC.

The Callahan Tunnel Vent Building #13 is a four-story building constructed around 1961. The building is approximately 98 ft (30 m) high, with story heights of approximately 23.5 ft (7.2 m). The building is situated directly above, and provides ventilation for, the Callahan Tunnel located beneath Boston Harbor. The building structure consists of concrete slabs supported by concrete-encased steel framing. The original building enclosure consisted of composite masonry walls with an inner wythe of cinder-block masonry extending from floor to floor, and an outer wythe of clay-brick masonry extending the full height of the building.



In 2009, a section of brick masonry at the west façade fell off the building, prompting a condition assessment of the façade that included visual and 3D laser scanning surveys. In general, the exterior masonry walls exhibited signs of distress to varying degrees, such as outward bowing, cracking, and water infiltration.

Two general alternatives to rehabilitate the façade were evaluated: repair/stabilization and replacement. The replacement option was selected and schematic designs and cost estimates prepared for the various replacement options. Brick veneer with reinforced CMU walls was selected as the replacement option. New reinforced concrete curbs were constructed at the base of the CMU backup wall and dowelled into the existing concrete slab with vertically slotted steel inserts to provide vertical adjustability for the relieving angles. New hot-dip galvanized steel relieving angles were installed to vertically support the new brick veneer. Due to the large story heights, high-lift grouting techniques were used for the new CMU wall. Concrete repairs were performed at the deteriorated concrete encasements. A new brick masonry veneer was constructed matching the original architectural jogs in the façade and preserving the aesthetics of the original façade to match the surrounding historic brick masonry buildings.

Facade Rehabilitation of Callahan Tunnel Vent Building #13

OWNER
Massachusetts Department of Transportation Highway Division
Boston, MA

PROJECT ENGINEER/DESIGNER
Simpson Gumpertz & Heger Inc.
Waltham, MA

REPAIR CONTRACTOR
G.V.W. Incorporated
East Boston, MA

MATERIALS SUPPLIER/MANUFACTURER
Costa Brothers Masonry
Fairhaven, MA

ARCHITECT
Fennick McCredie Architecture LTD
Boston, MA

SPECIAL PROJECTS CATEGORY

Jardin de Chine (Montréal Botanical Garden): Restoration of a Thematic Garden

MONTRÉAL, QUEBÉC, CANADA

SUBMITTED BY MAPEI, INC.

AWARD OF MERIT

The Jardin Botanique de Montréal (Montréal Botanical Garden) is considered one of the most important botanical gardens in the world, thanks to its collection of more than 20,000 different types of plants and cultivars, 10 greenhouses and 30 thematic gardens open to the general public. The garden extends over an area of 185 acres (75 hectares) and, in 2008, was officially designated a National Historic Site of Canada.

More than 20 years after it was first created, the Jardin de Chine needed to be restored, starting with the roofs of the buildings in the garden. The same artisans who created the original garden in the 1990s returned from China to help with the restoration work. The schedule for the restoration work had to be strictly adhered to, so a great deal of importance was given to choosing the products used. Fast-setting properties, ease of application, plus the ability to withstand Quebéc's harsh winter weather conditions were key selection criteria. The project included reconstructing areas of the roofs and garden walls, repairing and setting terracotta tiles on the roofs and providing a protective coating.

Specifically, the roofs were rebuilt by applying a 1 in (25 mm) coat of a fiber-reinforced one-component repair mortar, resistant to tensile loads and abrasion, directly on the metal sheeting of the roofs. Terra-cotta tiles imported directly from China were then installed over the surface using a medium-build, two-component, polymer-modified and fast-setting mortar. The jutting gutters around the roofs, typical of Chinese architecture, were installed in some of the roof areas as well as the border tiles, using rapid and extremely-rapid setting and medium-build mortars. Finally, a high-yield acrylic finish coat was used to decorate and protect the surfaces.

Jardin de Chine: Restoration of a Thematic Garden

SUBMITTED BY
MAPEI, Inc.
Laval, Quebéc, Canada

OWNER
Ville de Montréal-Space for Life-Montréal Botanical Garden
Montréal, Quebéc, Canada

PROJECT ENGINEER/DESIGNER
Beaupré Michaud et Associés
Montréal, Quebéc, Canada

REPAIR CONTRACTOR
Independent Installers from China
China

MATERIALS SUPPLIER/MANUFACTURER
MAPEI, Inc.
Laval, Quebéc, Canada

AWARD OF MERIT

WATER STRUCTURES CATEGORY

Historic Dam Structural Repairs

NORTH CAROLINA

SUBMITTED BY PREMIER CORROSION PROTECTION SERVICES, INC.

The project was to repair a 325 ft (99 m) long concrete walkway at a 95-year-old dam that had serious concrete spalling and numerous cracks throughout its entire surface. Upon mobilization and further inspection, it was found that many of the structural components were in need of immediate repair. These components consisted of both transverse and lateral beams, structural buttresses, as well as the underside of the walkway itself. The underside of the walkway had multiple areas of overhead concrete spalling, failure of arch support, as well as failure at three concrete beams. One of the four main buttresses had significant cracking transversing the entire buttress.

The physical aspects of this project were challenging due to confined spaces, the severity of the structural damage, and strict environmental regulations. The contractor completed surface preparation for the slab repair in accordance with ICRI Guidelines for concrete repair. Additional reinforcing for the beams was provided using carbon fiber, which was installed in stirrup fashion at all the beam-ends. The cracks in the buttresses were filled with epoxy. Carbon fiber "anchors" were dowelled and embedded with epoxy into the adjacent wall and splayed over the side of the buttress, giving the carbon fiber-reinforced polymer (CFRP) a "mechanical anchor." CFRP was then installed over the anchors and wrapped over the four sides of the buttress. Upon completion, two coats of Class 5 coating were applied. New forms where installed along the sides of the walkway as well as the sides of the beams and archway. The archway was placed from the top with dowels extending into the slab.

The repair and strengthening of this 95-year-old dam will ensure many more years of use. This project was completed with no accidents or recordable incidents, and on time and under budget.

Historic Dam Structural Repairs

SUBMITTED BY
Premier Corrosion Protection Services, Inc.
Tampa, FL

OWNER
Duke Energy
Hayesville, NC

PROJECT ENGINEER/DESIGNER
B2 Engineering
Cherry Hill, NJ

REPAIR CONTRACTOR
Premier Corrosion Protection Services, Inc.
Tampa, FL

MATERIALS SUPPLIER/MANUFACTURER
MAPEI Corporation
Deerfield Beach, FL

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- CONVENTIONS/EVENTS
- ONLINE MEMBERSHIP DIRECTORY
- CONCRETE REPAIR BULLETIN

CONTACT ICRI

651-366-6095 info@icri.org

A Personal Thank-You from the ICRI President

Thank you to everyone who has made a contribution to ICRI during the last year. As 2018 ICRI president, I have been amazed by the dedication and contributions made by the hundreds of members of our organization. I have attempted to assemble a list of the members that have made a contribution to ICRI this past year. As you see, the list is extensive. If I have overlooked anyone, please forgive me.

You can each know that your efforts have contributed to advancing the concrete repair industry and concrete repair technology. These efforts improve concrete repair for everyone: the clients we work for, the society that utilizes the structures we repair, and each of us that is involved in the repair industry. Our efforts yield results well beyond the limits of our own cities, states and countries.

I trust you will continue in your dedication to ICRI and the concrete repair industry.

Thank you.
Ralph C. Jones PE, ICRI President 2018

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Bob Hill – Secretary
Dan Watkins – Treasurer
Jon Hunger – Past President
Vince Beyer – Director
Kevin Higgins – Director
Sean Murphy – Director
Billy Rose – Director
Neil Savitch – Director
Lincoln Swineford – Director

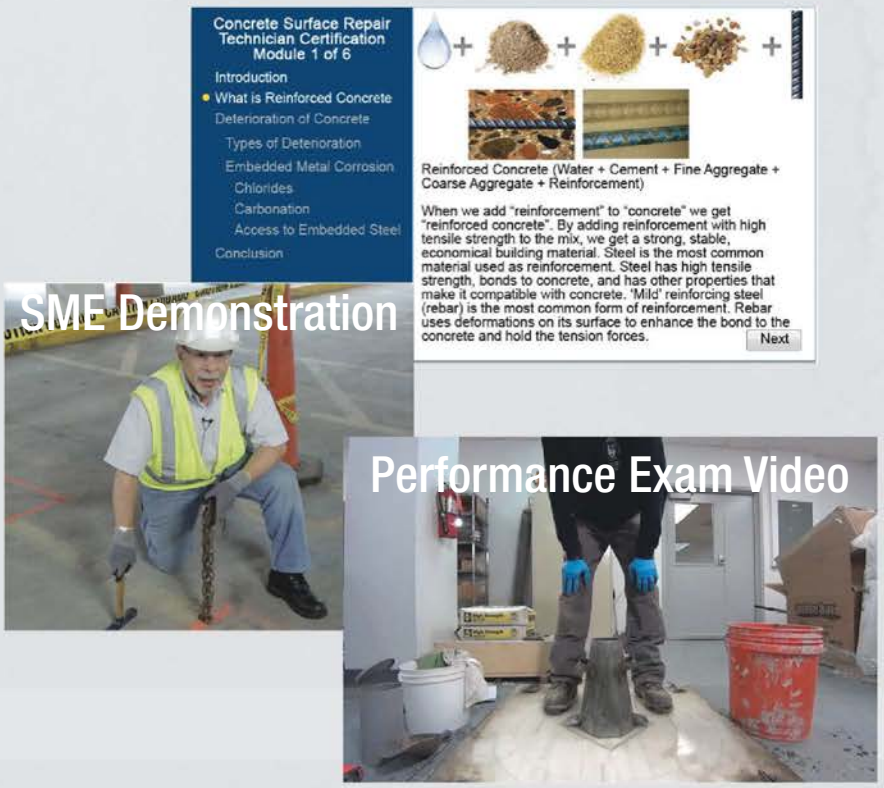
ICRI Committees

Taking part in ICRI committees gives you the opportunity to play a vital role in the direction of the repair and restoration industry, and ICRI as an organization. Whether your interests are in organizational marketing or technical aspects of the industry, ICRI has a committee to fit your talents.

- **Administrative committees** report directly to the ICRI Board of Directors. These committees lay the groundwork for the organization and work to ensure its continued growth and success
- Participation on **Technical committees** and subcommittees increases your knowledge in almost every area of concrete repair and restoration, and enables you to stay on the leading edge of best industry practices.

All committees meet in person twice a year at the ICRI Spring and Fall Conventions and all are open to anyone to attend. Visit www.icri.org for more Information on ICRI committees.

Certification Program Development Resulting from Industry Demand and Code Language



- Competency-based program using current best practices for training and evaluation
- Includes five online training modules, an online knowledge exam, and performance exam (video recorded or live at an on-site location)
- Qualifies individual to perform pre- and post-placement inspections and testing

The International Concrete Repair Institute offers certification as a…

Concrete Surface Repair Technician

CERTIFICATION PROGRAM
ICRI

Your qualification in concrete surface repair!

Visit www.icri.org for more information on this certification program.

INTERNATIONAL CONCRETE REPAIR INSTITUTE

CONCRETE REPAIRCALENDAR

JANUARY 21, 2019
ICRI Kick-Off Party
In conjunction with World of Concrete
Chateau Paris at Paris Las Vegas Hotel
Las Vegas, Nevada
Website: **www.icri.org**

JANUARY 22-25, 2019
World of Concrete
Las Vegas Convention Center
Las Vegas, Nevada
Website: **www.worldofconcrete.com**

JANUARY 22-25, 2019
The International Surface Event (TISE)
Mandalay Bay Convention Center
Las Vegas, Nevada
Website: **www.intlsurfaceevent.com**

JANUARY 23-24, 2019
ICRI Concrete Slab Moisture Testing Certification
World of Concrete
Las Vegas Convention Center
Las Vegas, Nevada
Website: **www.worldofconcrete.com**

JANUARY 23-24, 2019
ICRI Concrete Slab Moisture Testing Certification
The International Surface Event (TISE)
Mandalay Bay Convention Center
Las Vegas, Nevada
Website: **www.intlsurfaceevent.com**

FEBRUARY 24-26, 2019
Shotcrete Convention & Technology Conference
Omni Amelia Island Plantation Resort
Fenandina Beach, Florida
Website: **www.shotcrete.org**

APRIL 8-10, 2019
2019 ICRI Spring Convention
Omni Hotel & Resorts Jacksonville
Jacksonville, Florida
Website: **www.icri.org**

INTERESTED IN SEEING YOUR EVENT LISTED HERE?

Events can be emailed to editor@icri.org. Content for the January/February 2019 issue is due by December 1, 2018 and content for the March/April 2019 issue is due by February 1, 2019.

CORRECTION September/October 2018 *Concrete Repair Bulletin*

On page 12, State of the Institute article, the Company Member Demographic pie chart was labeled incorrectly. Contractor was listed twice in the key and Engineers was left out. ICRI sincerely apologizes for this error.

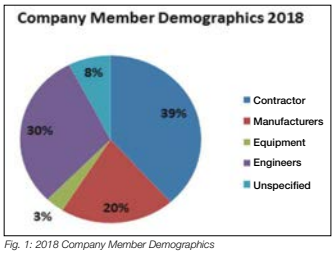


Fig. 1: 2018 Company Member Demographics

Become a CONCRETE REPAIR BULLETIN Author!

ICRI needs YOUR articles and ideas for upcoming themes!

2019 EDITORIAL SCHEDULE

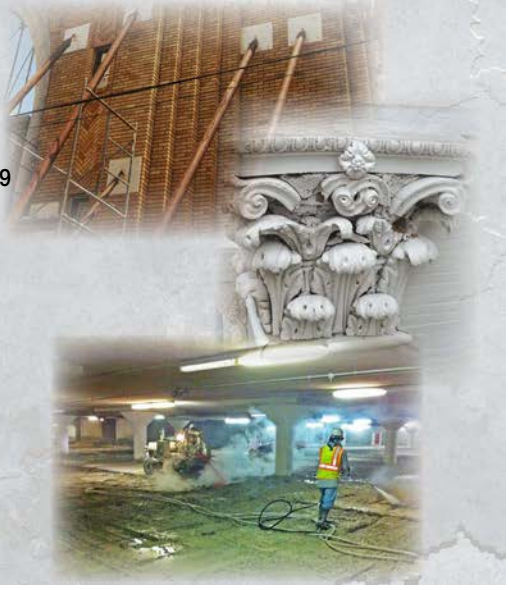
March/April 2019
Resiliency: Above and Beyond Concrete Restoration: Editorial Deadline: January 2, 2019

May/June 2019
Corrosion: Editorial Deadline: March 1, 2019

July/August 2019
Strengthening: Editorial Deadline: May 1, 2019

September/October 2019
Waterproofing with Aesthetics: Editorial Deadline: July 1, 2019

If you are interested in submitting an article for publication in the *Concrete Repair Bulletin*, please contact ICRI for more details and for a copy of our Publication Guidelines: (651) 366-6095 | www.icri.org



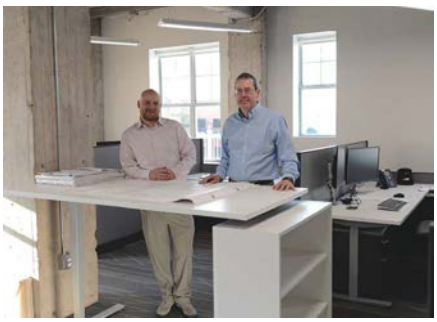
INDUSTRYNEWS

JQ ENGINEERING MOVES LOCAL OFFICE TO LUBBOCK'S LANDMARK PIONEER BUILDING

JQ announced that it has completed the relocation of its Lubbock office to new space located in the historic Pioneer Building in the heart of downtown Lubbock, according to JQ's CEO Stephen H. Lucy, P.E. The new office location is 1204 Broadway, Suite 204, Lubbock, Texas.

Originally built in 1925 as the Pioneer Hotel, the McDougall Companies bought the property in 2005 and completed major renovations in 2012. The 11-story building is now home to a pocket hotel, condominiums, restaurants and office space.

"We are excited to be in this historic and iconic building," says Lucy. "The mixed-use aspect of the property appealed to us very much and offers staff the ability to live, work and play in the same building if they so choose. When we were consulted as the structural engineer for the rehabilitation and redevelopment of the building, we were honored to work with the McDougall Companies," adds Lucy. "There is a lot of energy around this building and the larger downtown redevelopment taking place in the city."



JQ's project manager in the office is Brian Robertson, P.E., a Texas Tech University alumni who previously worked on the renovation of the building and is well-known within Lubbock and the larger West Texas community. Currently, JQ is working on the Agricultural Sciences Complex, West Texas A&M University, Canyon, Texas; New Lint Room, PYCO Industries, Lubbock, Texas; SPARTAN Transportation Additions and Renovation, Levelland, Texas (in design phase); and Frazier Pavilion Addition, Texas Tech University Alumni Association, Lubbock, Texas.

Says Lucy, "JQ is known for its expertise in preservation and renovation of historic properties, and we were pleased to be welcomed by the McDougall Companies whose renovation of this building is an excellent example of adaptive reuse that retains the historic Renaissance Revival style of architecture and blends it with the demands of today's market."

CONCRETE INDUSTRY MANAGEMENT PROGRAM SEEKS DONATIONS FOR 2019 AUCTION AT WORLD OF CONCRETE

The Concrete Industry Management (CIM) program—a business intensive program that awards students with a four-year Bachelor of Science degree in Concrete Industry Management—is seeking donations for their 2019 CIM Auction to be held at World of Concrete. The auction is scheduled for Wednesday, Jan. 23 at the Las Vegas Convention Center. The silent auction will be held from 11 a.m. to 1 p.m. and the live auction begins at 1 p.m.

"The proceeds from the 2019 CIM Auction will benefit the CIM National Steering Committee (NSC) and support the current CIM programs at Middle Tennessee State University, New Jersey Institute of Technology, Texas State University and California State University - Chico, the Executive MBA program, as well as help fund scholarships," said Mike Philipps, Chairman of the CIM Auction Committee.

Once again, the CIM Auction organizers are hoping for another record event in 2019. According to CIM Marketing Committee Chairman Brian Gallagher, the 2018 auction was the best ever, raising a record-breaking $1.1 million in gross revenue.

"The annual CIM Auction is a critical funding mechanism for the CIM NSC," said Gallagher. "We've been blessed with tremendous support from the concrete industry and the World of Concrete Show Management has been an amazing partner."

Previous auction items have included concrete mixer trucks, cement, skid steers, concrete saws, drills, mixers, vibrators, scaffolding, safety equipment, screeds, fiber transport systems, dust collectors, NDT equipment, decorative concrete tools, water meters, pumps, generators, training sessions, reference books, advertisements, laptop computers, mobile computers, sports memorabilia, sports travel packages, golf packages and vacation travel packages.

Those interested in making a donation should contact CIM Auction Committee Chairman Mike Philipps at mike.philipps@sandler.com or (832) 472-2314.

MAPEI JOINS AEC CARES 2018 ANNUAL PROJECT

On October 5, MAPEI partnered with the charity organization AEC Cares for "ProjectHouston," donating time and materials in order to help improve conditions at Santa Maria Hostel in Spring Branch, which is a neighborhood of Houston, Texas. Santa Maria Hostel is a residential addiction treatment and housing facility that is home to approximately 100 women and their children.

According to Nadine Scamp, hostel CEO, "The mission of Santa Maria Hostel is to empower women and their families to lead healthy, successful, productive and self-fulfilling lives. We provide a full continuum of care to meet each individual or family where they are on their recovery journey, from community-based prevention and intervention programs, to outpatient and residential treatment for substance use disorders, to long-term housing and recovery support."

Hit hard by recent hurricanes, the building and surrounding grounds were in need of their own recovery. Consequently, AEC Cares adopted Santa Maria Hostel as the program's 2018 "blitz build," a daylong building project. MAPEI has been a participating sponsor in every AEC Cares project since the first one in 2007. Mike Granatowski, MAPEI's

Director of Architectural and Commercial Projects, has been instrumental in organizing MAPEI's involvement with AEC Cares events. He described this year's project as "the most successful one yet. Working together over the course of one day, architects, engineers, contractors and manufacturers' representatives renovated the hostel's conference room, interior training area, dining room, children's playground, garden and green area. As always, it was a great day's work for a worthwhile cause."

In support of AEC Cares ProjectHouston, " MAPEI supplied 70 bags of Planiprep™ SC, our fiber-reinforced, cement-based skimcoating compound," Granatowski continued. "The Planiprep SC created a smooth, even floor surface in the interior rooms. The rapid-setting compound is perfect for use in a blitz-build installation, as flooring can be installed 30 to 60 minutes after application. And, when you only have one afternoon, speed and durability count."

Left to right, MAPEI's Steven Day, Mike Granatowski, Jennifer Kramer, Sean Leich, Victoria Hearn, James Bissler, and Scott Page took part in AEC Cares ProjectHouston on October 5, 2018.

Founded in 2011, AEC Cares is a 501(c)(3) non-profit organization composed of architects, engineers and contractors, as well as manufacturers' representatives who assemble teams of professionals once a year from the United States to donate time and products in order to renovate an at-risk facility. For more information, visit www.aeccares.com.

GSSI COLLABORATES WITH JAMESTOWN REDISCOVERY FOUNDATION

GSSI, the world leading manufacturer of ground penetrating radar (GPR) equipment, is continuing their partnership with the Jamestown Rediscovery Foundation. GSSI archaeologists Dan Welch and Peter Leach brought new GPR equipment to remotely sense what lies beneath Jamestown.

Jamestown—known for being the first permanent English settlement in the New World—will be commemorating the 400th-anniversary of the first representative government and arrival of the first Africans in 2019. To honor these two events, the Jamestown Rediscovery Foundation is excavating two sites where these events took place in 1619.

Last spring, Dan and Peter joined Senior archaeologist Dave Givens to help define the landscape of the first Africans. The Angela site, named after one of the first Angolans to arrive in 1619, is located in the "town" portion of Jamestown, a 40-acre landscape that remains largely unexplored. Located on National Park Service (NPS) property, the site consists of seven acres of garden, domestic quarters and storehouses all belonging to Angela's owner, wealthy Jamestonian Captain William Pierce. "Our goal is to define the lost 17th-century landscape in which Angela lived," said Givens. Archaeologists from GSSI, NPS and Jamestown Rediscovery conducted a GPR survey in part of the town, which was a huge success. "We found more than could be expected of the town," said Givens, "it was a needle in a stack of needles." The results of the survey not only clearly defined numerous buildings, boundary ditches, and post holes, but it also added critical information on how the town was laid out.

Building on the success of the work on the first Africans, Dan and Peter returned to Jamestown this summer to help solve a new problem: the site of the first General Assembly in the New World. This site is located inside the Memorial Church, a brick structure built over the original foundation in 1906. Under the floor of the modern church were at least three iterations of churches, all built on top of an original timber-framed structure constructed in 1617. It was in this church that the democratic experiment of representative government first met in 1619. The goal of the archaeologists is to define the 1617 church and the location where the

assembly met prior to the space being converted into a museum in the spring of 2019.

Dan and Peter brought a GPR system that isn't normally used in archaeology—the StructureScan Mini XT with the Palm XT antenna. The Mini XT is often used in the remote sensing of rebar, post-tension cables and conduits. This high-frequency GPR system was suspected to be able to give higher resolution of local areas in the church to define activity spaces related to the first representative government in 1619.

A specific part of this survey included burials located in areas that denoted high status. Jamestown records indicate that one burial of interest may be the remains of Sir George Yeardly. The StructureScan Mini XT and Palm XT were used to create high-resolution imagery of the skeletal remains prior to excavation. "This is the first time that we have imaged a human skeleton in such detail with GPR. It's a big deal because it's not supposed to be possible. I'm excited to see where this type of survey can be used in the archaeology and forensic fields," Leach stated. Following excavation of the remains, the FBI and Professor Turi King will conduct DNA tests on the teeth and skeletal remains. Jamestown Rediscovery will continue their research and archaeological dig of the site.

For more information on GSSI, visit www.geophysical.com.

INTERESTED IN SEEING YOUR NEWS IN THIS COLUMN?

Email your 150-200 word industry news to editor@icri.org. Content for the January/February 2019 issue is due by December 1, 2018, and content for the March/April 2019 issue is due by February 1, 2019. ICRI reserves the right to edit all submissions.

ASSOCIATIONNEWS

AMERICAN CONCRETE INSTITUTE LAUNCHES NEW SEMINAR SERIES

The American Concrete Institute announces the launch of a series of seminars hosted at ACI Headquarters in Farmington Hills, MI, USA, that will enable concrete industry professionals to receive valuable information on a variety of topics.

The seminars will allow attendees to earn PDHs/CEUs, an increasing requirement to retain PE status. Highly recognized speakers will offer face-to-face interaction, and free resources and referencing tools will be distributed for use both during and after the seminar.

The first seminar, "ACI 562: Assessment, Repair, and Rehabilitation of Existing Concrete Structures," was held October 30, 2018. The one-day seminar helped attendees learn how to use the ACI 562 code; learn about a design-basis code; and understand the different load combinations and reduction factors in ACI 562.

Upcoming public seminar topics include: Concrete Slabs-on-Ground; Troubleshooting Concrete Construction; and Troubleshooting Concrete Forming and Shoring. The seminars will be held at ACI Headquarters, in Farmington Hills, MI, USA. Learn more about ACI public seminars at concrete.org/education/publicseminars.

ACI FORMS COMMITTEE TO ADDRESS 3-D PRINTING

The American Concrete Institute announces the formation of a new committee whose mission is to develop and report information on three-dimensional printing (3-D) printing and additive manufacturing with inorganic cementitious materials.

Chaired by Scott Jones, ACI Committee 564, 3-D Printing with Cementitious Materials, aims to develop publications relating to additive manufacturing with cement-based materials. Publications would focus on impact and challenges, and another on construction applications. Further goals include collaborating with other ACI committees to disseminate additive manufacturing information and determining ways additive manufacturing may be integrated into the concrete community; collaborating with technical organizations to facilitate and coordinate information sharing; fostering discussion on research needs and challenges preventing additive manufacturing from wide adoption in the concrete construction community; and developing guidelines to evaluate materials and technology for additive manufacturing.

ACI will also host a webinar through ACI University on advancing the art of 3-D printing in concrete construction on November 13, 2018. Details at ACIUniversity.com. Learn more about ACI resources on 3-D printing at www.concrete.org.

ACI ANNOUNCES WINNERS OF ANNUAL EXCELLENCE IN CONCRETE CONSTRUCTION AWARDS

Viaduct Over River Almonte in Garrovillas de Alconétar, Cáceres, Extremadura, Spain, Awarded Highest Honor

The American Concrete Institute (ACI) announced the winners of the 2018 Excellence in Concrete Construction Awards, who were honored during the Institute's Concrete Convention & Exposition, October 15, 2018, in Las Vegas, NV, USA.

The highest honor was presented to Viaduct Over River Almonte in Garrovillas de Alconétar, Cáceres, Extremadura, Spain. This award is given annually to one project that demonstrates excellence in concrete innovation and technology and stands out above all other entries.

A new high-speed rail line is under construction between Madrid and the Extremadura, a western Spanish region bordering Portugal. The line will cross over the River Almonte on a 996 m (3270 ft) long viaduct—a concrete arch bridge with a main span of 384 m (1260 ft). Designed to carry 350 km/h (218 mph) rail traffic, the viaduct had to meet rigorous dynamic, serviceability, and safety criteria; and it required complex, staged calculations based on nonlinear material and nonlinear geometry behaviors. Nevertheless, it is aerodynamic and slender, largely due to key design features, including a four-legged arch configuration; 80 MPa (11,603 psi) high-performance concrete; an efficient erection method, with temporary towers and stays; and an innovative monitoring system.

The viaduct's 384 m (1260 ft) main span makes it the largest railway bridge in Spain and the world's largest concrete arch bridge for high-speed rail service. Its design combines structural efficiency, out-of-plane stability, improved response against cross wind effects, and aesthetics. The design is also environmentally friendly, as the bridge comprises durable materials, has been designed for expedient maintenance, and will include a bespoke barrier that will force birds to soar upward and above the overhead mast line. The bridge arch comprises high-performance, self-consolidating concrete. The complex

erection procedure required the development of singular construction devices. The bridge was constructed using a groundbreaking instrumentation and monitoring system that provides information regarding the behavior of the structure during construction and service.

The ACI Excellence in Concrete Construction Awards were created to honor the visions of the most creative projects in the concrete industry, while providing a platform to recognize concrete innovation, technology, and excellence across the globe. To be eligible for participation in the Excellence Awards, projects needed to be winners at a local ACI Chapter level and submitted by that Chapter or chosen by one of ACI's International Partners.

An independent panel of esteemed industry professionals judged projects and selected winners based on architectural and engineering merit, creativity, innovative construction techniques or solutions, innovative use of materials, ingenuity, sustainability, resilience, and functionality.

Additional winning projects were selected from among several possible categories, and included:

Decorative Concrete
1st Place: Roofing of the Montpellier-South of France TGV Station in Montpellier, Herault, France.

High-Rise Buildings
1st Place: Reston Station OB1 Tower in Reston, Virginia, USA.

Infrastructure
1st Place: Viaduct Over River Almonte in Garrovillas de Alconétar, Cáceres, Extremadura, Spain.

Low-Rise Buildings
1st Place: University of Iowa Visual Arts Building, in Iowa City, Iowa, USA.

Mid-Rise Buildings
1st Place: 1200 Intrepid Avenue in Philadelphia, Pennsylvania, USA

Repair & Restoration
1st Place: Provo City Center Temple in Provo, Utah, USA.

The winning project details can be found at ACIExcellence.org. Entries for the 2019 Excellence in Concrete Construction Awards are being accepted now through April 2, 2019. Visit ACIExcellence.org for more information.

AMERICAN CONCRETE INSTITUTE ANNOUNCES WINNERS OF PERVIOUS CONCRETE CYLINDER STUDENT COMPETITION

The American Concrete Institute announces the winners of its 2018 Pervious Concrete Cylinder Student Competition.

Teams were challenged to apply sustainability concepts and to use their knowledge of concrete mixture design by producing pervious concrete that balanced permeability and splitting tensile strength. Teams were additionally challenged to develop a mixture design that demonstrated cementitious efficiency; that is, maintaining the overall performance of the mixture with the lowest amount of cementitious material.

Cylinder Performance Category
1st Place: University of Sherbrooke (Canada)
Students: Cedric Gauthier, Philippe Dubois, Anthony Côté, Sebastien Cloutier, Raphael Gosselin, Antoine Lamontagne-Dalphond
Advisor: Ammar Yahia

Cementitious Efficiency Category
1st Place: Universidad Nacional de Ingeniería (Peru)
Students: José Miguel Yataco Huamán, Ronald Bryan Valderrama Castro, Junior Juan Carlos Ricaldi Estrella, Jhonnathan Franck Lazo Carhuaz, José Luis Ramos Delgado, Eduardo Raul Alarcon Bastidas, Jean Pierre Gomez Perez, Angel Fermín Román Jiménez
Advisor: Carlos Alberto Villegas Martínez

Winners of the Concrete Projects Competition were also announced at the ACI Convention.

Concrete Projects Competition
1st Place: The Effect of Rock Wool and Curing on Some Properties of Ferrocement Mortar
Authors: Aseel Sami Najaf and Safa Jasim Khudhair, University of Technology, Iraq
Faculty Advisor: Asst. Lecturer, Ziyad Majeed Abed

ACI is currently accepting applications for the Concrete Construction Competition and James Instrument NDT Competition. The Eco Concrete Competition and Mortar Workability Competition will be held at the next ACI Convention in Québec City, Québec, Canada, March 24-28, 2019.

For more information on ACI's Student Competitions, please visit concrete.org

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WOMEN in ICRI

"We empower one another by supporting and helping one another."

ADVANCE KNOWLEDGE

address barriers that may be controversial regarding growth and participation in policy making and industrial leadership

network

Recognize the challenges and successes of women who share a place in the concrete repair industry.

INTERNATIONAL CONCRETE REPAIR INSTITUTE

ICRI is pleased to offer this dynamic forum for its female constituents and members. If you are interested in participating in this forum, contact:

- Katherine Blatz, Katherine.blatz@basf.com
- Monica Rourke, Mrourke@mapei.com
- Gigi Sutton, gigij@icri.org

PEOPLE ON THE MOVE

KING CONSTRUCTION PRODUCTS GROUP APPOINTS TECHNICAL SALES ENGINEER (EIT)


JACKSON RAND

The King Construction Products group is pleased to announce the appointment of Jackson Rand to the position of Technical Sales Engineer (EIT). Jackson will be will be responsible for the promotion and technical support of the Construction Products line, primarily as it applies to the engineering community. He will also be retaining the responsibility for technical support and promotion of the Ultra-High Performance Concrete (UHPC) product line for Ontario.

Jackson started his career as a Summer Student with the King Paving & Construction group in 2012. After completing is Bachelor's Degree in Civil Engineering at Queen's University in May 2016, Jackson joined King's Engineering Services Team where he acquired a strong knowledge of many product technologies. During his time with Engineering Services, he also contributed to the development of several new products and gained significant field skills, working with customers on projects around the GTA.

MATERIALS EXPERT RETURNS TO CTL THOMPSON

Former Principal Engineer Jeffrey Groom returns to CTL as Senior Principal Engineer after gaining invaluable international experience.

Denver-based geotechnical engineering firm CTL|Thompson is welcoming back one of its former principals and one of Colorado's foremost materials experts, Jeffrey Groom. CTL, which operates one of the most sophisticated testing laboratories in the country, recruited Groom to provide his experience and expertise to its clients, mentor the firm's new generation of leaders and train future recruits to work in this highly technical environment.

Groom previously worked at CTL for 21 years. He started as a staff engineer and rose quickly to become Vice President and Principal Engineer of CTL|Thompson Materials Engineers, Inc. He left in 2007 to gain additional international experience, after managing the firm's infrastructure projects for the Department of Defense in Diego Garcia —a tiny island in the Indian Ocean where bombers headed for Iraq and Afghanistan refueled—and on the Marshall Islands. For the past four years, Groom has worked on the island of Guam for GHD, Inc., managing government-funded infrastructure projects.

He returns to CTL as Senior Principal Engineer with specific oversight of the cement/fly ash/concrete materials engineering and testing laboratory.

A recognized expert in concrete and concrete aggregates, Groom helped create norms for national testing and specification of concrete and concrete aggregates for the American Society of Testing and Materials (ASTM). He is a recognized examiner for the ACI International Certification program and former president of the American Concrete Institute, Rocky Mountain Chapter. For the past 13 years, he has been a speaker at the World of Concrete and is a published author of journal articles in *Concrete Construction*, *Masonry Construction*, and the American Society of Civil Engineers' *Journal of Materials in Civil Engineering*.

ACI ANNOUNCES NEW MIDDLE EAST REGIONAL DIRECTOR

The American Concrete Institute is pleased to announce Ahmad Mhanna as the Institute's Middle East Regional Director.

In this new staff position, Mhanna will focus on ACI's comprehensive plan to increase knowledge-sharing throughout the Middle East. The great innovation occurring now in the region combined with ACI's 100-plus years of consensus-based knowledge is a partnership that will accelerate the advancement of the concrete industry globally.

Mhanna will assist in establishing and nurturing regional strategic relationships with members, chapters, companies, governmental bodies, educational institutions, partners, and other construction industry organizations. Mhanna will also build upon recent partnership agreements and increase ACI activity in the region.

Mhanna will be based at the ACI Middle East Regional Office, to be located in the Dubai World Trade Center, Dubai, United Arab Emirates.

An ACI member and civil engineer, Mhanna has wide-ranging experience in concrete and construction materials testing, analysis, and applications. Mhanna holds multiple ACI certifications and has served as an ACI Certification examiner.

Mhanna received his Bachelor's degree in civil engineering from University of Jordan, and an MS in Emerging Technologies for Construction from University of Naples Federico II, Italy. He also obtained an Infrastructure Renewal Engineering Certificate from University of Missouri-Rolla, MO, USA.

For more information on ACI's activities in the Middle East region visit concrete.org/MiddleEast.

INTERESTED IN SEEING YOUR PEOPLE IN THIS COLUMN?

Email your 150-200 word People on the Move announcements to editor@icri.org. Content for the January/February 2019 issue is due by December 1, 2018 and content for the January/February 2019 issue is due by December 1, 2018. ICRI reserves the right to edit the length of People on the Move submissions.

CHAPTER MEETINGS & EVENTS

BALTIMORE-WASHINGTON
November 1, 2018
OUTSTANDING REPAIR PROJECT 2018 AWARDS BANQUET
Maggiano's Little Italy
McLean, VA

December 6, 2018
2018 FALL TECHNICAL SEMINAR
CP&R's Headquarters Office
Baltimore, MD

CHICAGO
November 20, 2018
CHAPTER DINNER MEETING
Topic: FRP Strengthening Systems
Westwood Tavern
Schaumburg, IL

November 30, 2018
HOLIDAY SOCIAL
Location: TBA

DELAWARE VALLEY
November 13, 2018
NOVEMBER DINNER MEETING
Philadelphia Marriott West
Conshohocken, PA

FLORIDA FIRST COAST
December 13, 2018
CHRISTMAS DINNER
Coopers Hawk
Jacksonville, FL

FLORIDA WEST COAST
November 2, 2018
SPORTING CLAYS TOURNAMENT
Tampa Bay Sporting Clays
Land O Lakes, FL

GREATER CINCINNATI
November 19, 2018
CHAPTER MEETING
Topic: Union Terminal Overview
Cincinnati, OH

GULF SOUTH
November 29, 2018
JOINT CHAPTER MEETING
Meeting with SEAofAL
AGC Offices
Birmingham, AL

METRO NEW YORK
December 6, 2018
CHAPTER HOLIDAY PARTY
District Social
New York, NY

MID-SOUTH
November 7, 2018
FALL CHAPTER MEETING
Topic: Concrete Repair Presentation
Middle Tennessee State University
Murfreesboro, TN

MICHIGAN
November 8, 2018
ANNUAL MEETING FOR 2018
Topic: Concrete Surface Preparation
Speaker: Rampart Hydro Services
Motor City Casino
Detroit, MI

MINNESOTA
January 10, 2019
MEGA DEMO DAY
Topic: Moisture in Concrete
Cement Masons Local 633
Minneapolis, MN

NEW ENGLAND
December 11, 2018
CHAPTER HOLIDAY SOCIAL
Granite Links Golf Club
Quincy, MA

January 8, 2019
JOINT CSI EVENT
Topic: Avoiding Litigation on Construction Projects
Granite Links
Quincy, MA

NORTH TEXAS
November 15, 2018
MEMBERSHIP MEETING
Topic: Concrete Petrography
Presenter: Gerard Moulzolf, American Engineering Testing
Pappasito's Cantina
Dallas, TX

PACIFIC NORTHWEST
November 7, 2018
CHAPTER MEETING AND SOCIAL HOUR
McMenamins Six Arms
Seattle, WA

QUEBEC PROVINCE
November 1, 2018
ANNUAL DINNER CONFERENCE
Sheraton Laval
Laval, Quebec

SOUTH CENTRAL TEXAS
November 15, 2018
CHAPTER MEMBERSHIP LUNCHEON
NXNW Restaurant & Brewery
Austin, TX

"As someone relatively new to the concrete restoration industry, one of the very first things I did after starting my new job was join my local ICRI chapter. It immediately gave me access to best-in-class training documents (especially the ICRI Guidelines). ICRI also offered informational videos and a peer network that accelerated my knowledge and confidence out of the gate. I highly recommend membership to anyone new thinking about entering the field."

Jeff Konkle, MAK Construction Products Group

FOR UP-TO-DATE CHAPTER ACTIVITIES AND FULL DETAILS ON THOSE LISTED HERE, VISIT WWW.ICRI.ORG.

INTERNATIONAL CONCRETE REPAIR INSTITUTE

ICRI Young Professionals Mentorship Program

Are you a potential mentor?

Share your ideas on how your experience can benefit young professionals

Are you a potential mentee?

Share what you would like to learn from a mentor and where you feel you could benefit

ICRI is developing a Mentorship Program geared toward young professionals within ICRI to help build leadership skills and guide career growth. The program will involve activities and interactions at the National and Local Chapter level.

Get involved and help drive it forward.

Contact Elena Kessi, elena@aquafin.net, to get involved.

CHAPTER NEWS

NORTH TEXAS HOLDS 17TH ANNUAL GOLF CLASSIC

On a 90-degree, sunny, breezy afternoon, the North Texas Chapter held its 17th Annual Jesse Points Memorial Golf Classic at plush Waterchase Golf Club in east Fort Worth. The tournament is named for NTX Charter Member Jesse Points, who chaired the first 15 golf tournaments for the chapter before his passing in 2015. The hot Texas weather was equaled by some sizzling scores. Three team scores of 56 were not good enough to best a 20-under par score of 52 posted by the Euclid Chemical team of James and Jon Robbs, Nick Perry and David Rupley. Second place went to the Western Specialty Contractor team of Bob Scheelar, Josh Rinn, Teddy Williams, and Chris Blair. BASF's "A" team took home third-place honors, thanks to Patrick Jorski, Don Moore, Eli Babb and Shane Bryant. BASF's "B" Team (Eddie DeHaro, Tom Hart, Bobby Sansonetti, and Bill Daily), however, was not to be denied, coming in with the "Most Honest" score of 77, taking home the "Dead-Ass Last" trophy for the second year in a row.

Other winners included Chris Blair and Shane Griffin for their monster drives, and Bob Scheeler (2 holes), Brian Whited and Jason Ball for their closest-to-the-pin shots. Proceeds from the tournament fund the chapter's student scholarship program and the chapter's annual scholarship donation to the University of Texas Arlington's Civil Engineering Department.

North Texas Board Members Patrick Jorski, Pete Haveron and Stephen Grelle welcome the golfers prior to announcing the winners

Third Place BASF Team: Don Moore, Shane Bryant, Patrick Jorski, and Eli Babb

First Place Euclid Chemical Team: Jon Robbs, James Robbs, David Rupley, Nick Price

"Most Honest" BASF Team: Bobby Sansonetti, Eddie DeHaro, Bill Daily and Tom Hart (not pictured)

Second Place Western Specialty Contractor Team: Chris Blair, Josh Rinn, Bob Scheelar and Teddy Williams (not pictured)

ICRI Executive Committee members Elena Kessi (Secretary) and Mark LeMay (VP) join ICRI Board Members Gerard Moulzolf and Pete Haveron at the NTX Golf Classic

ICRI has 39 chapters, including 2 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.

SOUTHERN CALIFORNIA HOSTS TECHNICAL DINNER

The Southern California Chapter of ICRI held a technical dinner seminar at Steven's Steakhouse in Commerce, CA, on September 27, 2018. The theme of the event was Epoxy and Polyurethane Injections, When and Where to Specify and Use Each. There were a wide variety of attendees from Architects, Engineers, Contractors, to Manufacturers and Distributors. All attendees had a great time as well as learned much about this aspect of concrete repair that has much confusion. The evening began with the chapter honoring two of the founding members, Stephan Claus and Kevin Thomson, for their years of service.

Louis Kahn, PE, of Walter P. Moore kicked off the technical portion of the event. Mr. Kahn gave an engineer's approach to the differences between epoxy and polyurethane injections as well as the reasons to use one over the other as well as combinations of both. He then gave two separate profiles on projects. One in which epoxy injection was used and why that system was chosen. He followed that with a synopsis of a project utilizing polyurethane injections and the reasons why polyurethane was chosen.

The night's second speaker was Amir Bonakdar, Ph.D., PE. Amir gave an in-depth and detailed presentation on the features and benefits of various epoxy injection materials. He went into detail on some of the drawbacks to using epoxy injections as well as notable situations where it is not the preferred method of repair. The final speaker of the night was Jim Spiegel of Alchemy Spectec. Jim gave a wonderful presentation on polyurethane injection systems as well as touching on acrylic/acrylate systems and microfine cements. Jim explained the many differences in the different types of polyurethane injection materials.

The Southern California Chapter of the International Concrete Repair Institute would like to thank their generous sponsors Smalley & Co. and Aquafin, Inc. for their support, as well as all attendees. We look forward to seeing everyone at our next event.

The Southern California Chapter had a full house for presentations on epoxy and polyurethane injections at Steven's Steakhouse

TORONTO HOSTS SEMINAR ON STADIUMS

On Tuesday, October 9, 2018, the Toronto Chapter hosted a technical seminar on stadiums and public structures. At Steam Whistle Brewing, guest speaker Gabriel A. Jimenez, PhD, PE, from Walter P. Moore took the stage to help attendees understand and learn the best practices and discover key case studies in the rehabilitation and restoration of iconic stadiums and structures, such as the Rogers Centre. His main question: "Do you really know what keeps these structures in good condition, considering the modern requirements we all expect?"

Standing room only for the Toronto Chapter seminar on stadiums and public structures

GULF SOUTH HOSTS HISTORIC STRUCTURE PROGRAM

On September 13, 2018, the ICRI Gulf South Chapter had 43 people attend the End-of-Summer meeting titled "Restoration of Historic Birmingham Structures". Attendees enjoyed discussing various means, methods, and materials for executing lasting repairs to terra cotta, brick veneer, and structural concrete. Recent repair projects on the 95-year-old Pizitz building and the historic Rickwood Field in Birmingham, AL, were reviewed in this half-day meeting. It was a rare treat to have speakers with over 200 years' experience in brick, terra cotta, and concrete repair share their hard-earned knowledge of the industry. The meeting concluded with an engaging forum discussion of advantages/disadvantages of different means and methods than those presented by the speakers. We would like to thank our many sponsors: Coastal Construction and Grout Tech, who provided lunch and breakfast, HOAR Construction for offering their venue, and of course our table-top sponsors Sika, BASF, and Prosoco. We have an upcoming joint meeting with SEAofAL in Birmingham, AL, on November 29.

Attendees learned about lasting repairs to historic structures

METRO NEW YORK HOSTS ANNUAL GOLF EVENT

On Thursday, September 20, 2018, the Metro New York Chapter of ICRI hosted another sold out event with the 15th Annual Golf Classic at Cedar Hills Golf & Country Club in Livingston, New Jersey. The day started out as usual with registration, driving range and full brunch with Bloody Marys and mimosas before heading out on the course. At registration, attendees received golf balls, cigars and this year, Maui Jim sunglasses. The sun was in and out and the course was a bit waterlogged from previous rains, but everything was good. The dinner raffles consisted of iPads, Apple watches, Yeti coolers, Sonos surround sound systems, large screen HD TVs, etc. Our mainstays were still there with 1st place, 2nd place and Most Honest ("Rebar Award") awards and presentation of the "Concrete Cup". "Long Drive" and "Closest-to-the-Pin" were back with "50/50" and cigar rollers. We were also back this year with the "Beat the Ladies" challenge on one of the par three holes with a raffle for a large screen HD TV. New this year was our Long Drive Challenge with Mike "the Moose" Watson who has made four Long Drive Championship appearances. With a donation, you get to use the Long Drive Champion's drive as your drive and a chance to win a trip to Pebble Beach. No one won the $25,000 or other hole-in-ones this year, but they came close. All had a good day. It would not have been possible without the help and support of all the sponsors.

On the "Beat the Ladies," volunteers Lisa and Gina Antonucci are up for the challenge

Long Drive Pro Mike "Moose" Watson on the Long Drive Challenge hole

Warming up for the "Beat the Ladies" Challenge

Back for a repeat were the group from Skyline Restoration, including Stephan Andreatos, Rygo Foss, Doug Fenniman, and Jasen Gerrity taking home the coveted Concrete Cup again

The crowd at cocktail hour

Out on the terrace for a cocktail and cigar

QUEBEC HOSTS BASEBALL EVENT AND SOCIAL MIXER

On September 20, 2018, the Quebec Chapter hosted its Fall Chapter Happy Hour at the "LAB Comptoir à Cocktail" in Montreal. Participants enjoyed the LAB's various cocktails accompanied by appetizers and oysters. In addition, we would like to congratulate Mr. Serge Laporte of the Structsult Group who won the draw for a pair of tickets for the annual conference dinner. With more than 49 attendees, the event was a great success!

Before that, on August 22, 2018, the Quebec Chapter organized a networking event in Quebec City at the baseball stadium of the Quebec Capitales, CanAm Stadium. The rain stopped just at the right moment for the game and the attendees enjoyed beer and hot dogs in the Terrace Section before the game. The Capitales scored the winning run after a triple that was hit by James McCowen in the 8th inning. Final score was 4-3 in favor of the local team against the visiting Ottawa Champions.

Happy Hour attendees enjoyed a night at LAB Comptoir à Cocktail in Montreal

Baseball fans enjoyed the Quebec Capitales winning over the Ottawa Champions

GREAT PLAINS

My name is Jon Connealy, and I am the current President of the ICRI Great Plains Chapter, looking forward to seeing you in Omaha in November. I wanted you to know about a situation we recently had here in the Great Plains Chapter. You can hardly go a day without hearing or reading something about "the Millennials" these days, and generally it is something that talks about how they have a sense of entitlement, that they feel the world owes them more than they are getting. However, as one of the world's oldest Millennials (born on January 1 of the year the generation began) I have always had a bit of a chip on my shoulder about the negative view the world has on my slightly younger brothers and sisters in the Millennial Camp. As much as I'd love to spend time discussing all of the social, economic, and technological reasons for the differences in the generations—this isn't the time or place. I will, however, offer the following which serves as a validation of the good work we do at the Great Plains Chapter of ICRI and also the confirmation that the youth today are just fine. We just have to make an effort to highlight the good ones as much as we do the crummy ones.

Every year the Great Plains Chapter issues $4,500 in scholarships to college aged students enrolled in local institutions. In the past, we have targeted students in engineering programs at four-year colleges, but in future years we will also be offering these scholarships at trade schools that offer courses in the concrete trades. Carissa Moyna was one of the recipients of the 2018 Scholarships. She was kind enough to send our chapter a hand-written thank you note, shown here. We have invited Carissa to attend the Fall Convention in Omaha, as well as the other scholarship recipients, and if they are able to attend we plan to recognize them at the Thursday luncheon.

So there you have it! The next time you hear someone scoffing about the lazy, entitled Millennials—please inform that person that a Millennial is the President of the Great Plains Chapter of ICRI and another is as genuine and grateful as any generation prior. If we want our industry and organization to continue to flourish we will **eventually** need to embrace these youngsters, find a way to relate and take them under our wings. That way they can benefit from our experience as they take us into the **next** generation.

Dear Tom and ICRI Great Plains Chapter Scholarship Committee,

I am more than honored to be a recipient of this year's scholarship! Concrete has always been a part of my life with my dad's road construction company, but it has been especially with my summer internship. I am with a general contractor, Clark Construction, out in San Diego (where it never rained once while I was there) on a new student residence hall on the San Diego State University campus. I was fortunate to be on the project when it was in full force and the floors and walls of the 5-story building were being poured. I learned so much about concrete from a superintendent who had been with a concrete company for 30 years and I can now appreciate all the work that goes into forming, pouring, and stripping a deck to create a structurally-sound building. It is thanks to your support that I can continue to pursue and learn about all aspects of construction and civil engineering at Iowa State University and during the summer at my internships. I love what I am doing which is perfect motivation to reach my goal of owning a environmental engineering firm in my future. Thank you again for supporting my education and goals!

Sincerely,

Carissa Moyna

NORTHERN CALIFORNIA HOSTS SYMPOSIUM

The ICRI Northern California Chapter hosted a symposium on September 28, 2018, on "Repairs to Concrete Structures after Earthquake & Fire." This education, networking and social opportunity was hosted at the Cement Masons Training Center in Pleasanton, CA. Speakers included Tarek Alkhrdaji, PhD, PE, who gave a presentation titled "Assessment & Repair of Fire Damaged Concrete Structures;" Kent Sasaki, S.E., on "Assessment and Repair of Fire Damaged Post Tensioned Parking Garage;" and Ashok Kakade, PE, FASCE, FICRI, who gave a presentation on "Can the Concrete Structures be Saved after Devastating 2017 Sonoma Fire?"

Also included in the presentations were Ron Hamburger, SE, Senior Principal who gave his presentation on "A History of Building Code Development in California;" Aniket Borwankar, who presented on "Seismic Repair Using Fiber Reinforced Cementitious Matrix (FRCM);" and James Mendygral, PE, who talked about "Hybrid Coatings, Concrete Restoration, and Seismic Surprises: A California Case Study."

The Northern California Chapter Symposium included a number of technical presentations

Symposium attendees also had many opportunities to network and visit with exhibitors

Then they were treated to more networking and great food

NTX SCHOOLED ON CORROSION MITIGATION

The North Texas Chapter welcomed Jason Chodachek from Vector Corrosion Technologies to the September meeting at Pappasito's Mexican Cantina in Dallas. While attendees feasted on beef and chicken fajitas, Jason provided a wealth of information on how to determine the root causes of corrosion problems in reinforced concrete, and the non-destructive testing techniques that are available to check for corrosion. Jason also described several corrosion protection systems for reinforced concrete structures, including discreet and distributed anodes, pile jacket galvanic protection, and induced current corrosion protection (ICCP).

The second part of the presentation focused on the investigation and repair of post-tensioning systems. Several case studies were highlighted that showed evaluation methods and potential solutions including cable drying and grease injection.

Attendees enjoy a fajita feast and valuable networking time at Pappasito's Mexican Cantina

Jason Chodachek reviews the outline for his presentation

2019 CHAPTER NEWS DEADLINES

JANUARY/FEBRUARY 2019
November 10, 2018

MARCH/APRIL 2019
January 10, 2019

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

CHAPTER NEWS

CHAPTERS COMMITTEE CHAIR'S LETTER

MICHELLE NOBEL
Chapters Chair

We're in the final quarter of the year! For all of us, this is the last push for 2018. It is also time to start thinking about the holidays and all the good things that go along with them.

We had our ICRI Chapter Rountable in Philly, September 17-18. It was a very productive meeting with Baltimore-Washington, Connecticut, Delaware Valley, Metro New York, New England, Pittsburgh, Quebec and Toronto all in attendance along with members of the Executive Committee, Ralph Jones, President; Chris Lippmann, President Elect; Elena Kessi, Secretary; Brian McCabe, Region 3 Director; Jason Coleman, Member at Large; and ICRI staff Mike Levin, Executive Director; Dale Regnier, Chapter Director; and me.

We shared a lot of great ideas and thoughts on how to move the chapters forward and gain and retain new members. Kudos to the Toronto Chapter! I was impressed at the turnout at the Toronto events with it being such a new chapter. They've managed to create a buzz in their area that makes people want to come, learn and network at their higher-end events. I wish I was a little closer so I could attend one! Metro New York has proven that its annual golf tournament is second to none, and Baltimore-Washington is the steady ship that we can all learn from.

Thank you to all who attended; we all learn from each other. We also learned how ICRI supports every chapter.

ICRI supports chapters with:

- chapter web pages
- monthly chapter updates
- dues collection/monthly rebate check/deposit
- membership record keeping
- coverage in *Concrete Repair Bulletin*
- staff support—any question, any time
- guideline/publication discounts
- bulk *CRB* / publications
- additional resource for ***all*** chapters:
- template for a chapter program tracking sheet—date, topic, speaker, company, attendance
- template for a chapter calendar

Everyone should be taking advantage of these resources. It's something that's provided to us all by ICRI to help the chapters learn and grow.

The ICRI mission statement is, "The mission of the International Concrete Repair Institute is to be a leading resource for education and information to improve the quality of repair, restoration, and protection of concrete and other structures in accordance with consensus criteria."

That said, we all join and support this amazing organization to make it better and attractive for all of us. I leave every Chapter Roundtable with a new sense of excitement from the ideas that I've learned at every event. So make sure you plan to attend the ICRI Chapter Roundtables in your area—I promise you won't regret it!

Remember to turn in your chapter events so they can be listed on the ICRI website, and remember, wherever you may be traveling, check the ICRI website to see if there's an event in that area or reach out to the local chapter to see if they're having an event while you're in town. It's always great to see how other chapters run their meetings. Like I've said before, it's like global networking that takes networking to a whole new level!

If you're looking to become a qualified concrete surface repair technician, the Concrete Surface Repair Technician (CSRT) Certification Program, the Concrete Slab Moisture Testing Technician (CSMTT) Certification Program, and ACI 562-16 Repair Code and Guide Videos are training programs offered by ICRI. To find out more about these programs, please visit icri.org and go to the Education tab at the top of the page or contact the ICRI Office at (651) 366-6095.

The ICRI 2019 Kick-Off Party is at the Chateau Paris in Las Vegas on January 21, 2019. World of Concrete is at the Las Vegas Convention Center January 22-25, 2019 and the International Surface Event is in Las Vegas at Mandalay Bay, January 22-25, 2019. There's lots to do in Las Vegas at the end of January, so make plans to attend.

Please remember to always be careful, travel safe, and I'll see everyone in Phoenix for the next ICRI Chapter Roundtable!

Sincerely,

Michelle Nobel
2018 Chapters Committee Chair

Ralph Jones discussing an overview of ICRI to the Chapter Roundtable held in Philadelphia, Sept. 17-18

PRODUCTINNOVATION

SIMPSON STRONG-TIE INTRODUCES INDUSTRY-FIRST BRICK TIE CAPABLE OF COST-EFFECTIVELY CONNECTING VENEERS TO LIGHT-FRAME CONSTRUCTION ACROSS THREE-INCH AIRSPACES

Simpson Strong-Tie, the leader in engineered structural connectors and building solutions, introduces the new, high-performance BTH brick tie, a first-of-its kind, cost-effective product capable of connecting brick and stone veneers to light-frame construction across spans up to three inches, offering contractors and homebuilders an innovative solution to meet ever-increasing spacing requirements.

Masonry veneer, often consisting of full-dimensional brick and stone, is used widely for exterior cladding, facades, foundation facings and chimneys.

Fabricated from 22-gauge galvanized steel, the BTH brick tie is field-adjustable in two places and can be installed with either side facing up, providing strength and versatility across varied jobsite conditions and offering labor-stressed contractors a fast and simple solution. Additional BTH brick tie features and benefits include:

- Embossments for added strength when connecting wood framing and veneer across wider airspaces
- Tie ends embed in the mortar a minimum of 1 ½" and connect to the framing with a single 0.131" x 2½" nail
- Dual field-bendable zones allow for easy adjustment to airspaces within the 2"–3" range.

For more information about the BTH high-performance brick tie, including spacing tables and design schematics, visit strongtie.com/bth.

SIMPSON STRONG-TIE ANSWERS CONTRACTOR DEMAND FOR COMPREHENSIVE LINE OF OUTDOOR ACCENTS® STRUCTURAL CONNECTORS AND FASTENERS

Simpson Strong-Tie, the leader in engineered structural connectors and building solutions, has expanded its Outdoor Accents decorative hardware line to offer deck contractors, homebuilders and DIY experts a full collection of essential connectors and fasteners that bring both design elegance and structural strength to custom outdoor living structures.

To celebrate the complete line of load-rated hardware, Simpson Strong-Tie sponsored the first Outdoor Accents "Give It Your Best Shot" photo contest through Oct. 22. Anyone who has built an outdoor living structure using Outdoor Accents decorative hardware was invited to send in photos for a chance to win an outdoor TV, YETI cooler and Simpson Strong-Tie-branded items.

Introduced in 2016, the Outdoor Accents collection accommodates nominal and rough lumber sizes to provide designers and installers with maximum flexibility when planning and building custom outdoor structures. The patent-pending hex-head washer, when used with the structural screw, offers the look of a bolted connection with significantly faster and easier installation than through-bolting.

2018 additions to the Outdoor Accents line include joist hangers, gable plates, decorative side plates and new sizes of the popular APDJT joist tie, the APDTS3 Texas star and the APDMW56 decorative washer. All Outdoor Accents connectors and fasteners — including screws, post bases, strap ties and angles — are made from exterior-rated galvanized steel with a black powder-coat finish for corrosion protection.

A mainstay of Simpson Strong-Tie Outdoor Accents advertisements and brochures, the 10x10 pergola photograph has generated a steady stream of customer requests for building plans, which are now available for free download for 10x10 and 25x17 pergolas.

To learn more, visit strongtie.com/outdooraccents.

CORTEC® RELEASES BIOBASED ALTERNATIVE TO BANNED PAINT STRIPPERS

As more retailers pull toxic paint strippers containing methylene chloride and N-methylpyrrolidone (NMP) off the shelf, Cortec® stands ready to offer greener biobased alternatives that do not contain these toxic substances targeted by the voluntary ban.

EcoLine® 4320 and 4330 are heavy-duty, green chemistry paint strippers designed to remove coatings, inks, and resins from metals, concrete, and wood surfaces. They do not contain any EPA-listed cancer causing compounds or any California Prop 65 components that cause cancer, birth defects, or other reproductive harm. The products are formulated with renewable materials and recycled solvent. They contain 50% USDA certified biobased content and are qualified products under the mandatory federal purchasing initiative of the USDA BioPreferred® Program (for more information, go to http://www.biopreferred.gov).

EcoLine® 4320 and 4330 have a mild odor, are made with biodegradable materials, and are VOC compliant to the California Regulation for Reducing Emission from Consumer Products. They are non-flammable and do not

contain methylene chloride, NMP (n-methylpyrrolidone), chlorinated solvents, toluene, or acetone. Unlike methylene chloride-based products which dry quickly upon application, the relatively low volatility of EcoLine® 4320 and 4330 allows the products to stay on the surface to soften, penetrate, and remove the coating.

EcoLine® 4320 and 4330 paint strippers are effective on a wide variety of paints and can typically strip alkyds, acrylics, and urethanes in 15 to 30 minutes depending on the number of layers and the age of the coating. The products can easily remove permanent marker. EcoLine® 4320 and 4330 also contain a blend of corrosion inhibitor additives to prevent flash rust and tarnishing throughout the stripping process. This is particularly important when preparing a surface for recoating.

EcoLine® 4320 and 4330 come in two ready-to-use versions and can be applied via dipping, brushing, or rolling. EcoLine® 4320 is a liquid stripping product with high wetting properties for even spreading across coated surfaces. It can be used in dip tanks and on horizontal surfaces. EcoLine® 4330 is a gelled version that improves surface cling and dwell time for applications on large or complicated objects or vertical and overhead surfaces.

Cortec's new biobased paint strippers can be used to:

- Remove paint from metal surfaces such as tanks, pipes, equipment, and vehicles
- Remove paint from cementitious and masonry surfaces such as buildings, floors, and stairways
- Remove permanent marker ink

As safety concerns drive toxic paint strippers containing NMP and methylene chloride off the market, Cortec® is pleased to present safer and more environmentally responsible alternatives to do the job of paint removal.

To learn more about EcoLine® 4320 and 4330, please visit: https://www.cortecvci.com/whats_new/announcements/EcoLine_4320-4330.pdf

SIMPSON STRONG-TIE INTRODUCES FIRST HURRICANE TIE SPECIFICALLY DESIGNED FOR ENGINEERED WOOD AND HEAVY SNOW LOADS

Simpson Strong-Tie, the leader in engineered structural connectors and building solutions, has introduced the new H1.81Z hurricane tie, designed to provide stronger connections between heavy engineered wood rafters and wall top plates. Developed and tested to provide lateral resistance during seismic events, the H1.81Z is also ideal for roofs with heavy snow loads or connections where there are higher load demands on the structure.

The H1.81Z provides homebuilders, roofing contractors and remodelers a cost-effective solution for transferring loads from heavier laminated veneer lumber (LVL) roof systems and roofs subjected to higher snow loads.

The code-listed 1¾"-wide H1.81Z connector also installs with half the number of nails that would be needed for two single-sided twist straps, and it features a ZMAX® zinc finish to increase resistance to corrosion. Additional features of the H1.81Z include the following:

- Wider seat to fit 1¾" LVL rafters
- Ability to connect both side faces of the joist for better support
- Connector embossments to provide stiffness in crucial areas for improved performance
- Fastener holes sized to fit popular 0.148" x 1½" connector nails
- Flanges that can be installed facing inward or outward
- Adaptability — installation on either the outside or the inside of the wall is acceptable according to all LVL manufacturers' installation instructions

For more information about the H1.81Z hurricane tie, including spacing tables and design schematics, visit our product page.

SIMPSON STRONG-TIE INTRODUCES THE YIELD-LINK® CONNECTION TO REDUCE STRUCTURAL STEEL FRAMING COSTS

Simpson Strong-Tie, the leader in engineered structural connectors and building solutions, has introduced a new, precision-made Yield-Link connection to simplify and streamline structural steel connections made in the field, without compromising structural strength. The Yield-Link connection requires no field welding, resulting in reduced onsite labor costs, licensing fees and construction time for contractors who are already facing a massive shortage of skilled field welders. According to the American Welding Society, there will be 290,000 unfilled welding positions in the US by 2020 as construction demand continues to outpace the skilled labor market.

By eliminating field welding, the Yield-Link connection also removes the need for field weld inspections. And because beams can be designed without supplemental lateral bracing, fewer fabricated steel elements and field connections are required. With a smaller restricted zone, MEP coordination is eased.

The Yield-Link is designed to absorb forces in a seismic event, and as a bolted connection, it is easier to replace than welded beams and posts, greatly simplifying repairs following a natural disaster.

Software plugins and design support services are available to assist Designers, fabricators and erectors to incorporate

the Yield-Link connections into their designs and shop details.

The Yield-Link is a prequalified connection for steel special moment frames in ANSI/AISC 358-16 and is code listed in ICC-ES ESR-2802. For more information about Simpson Strong-Tie® Yield-Link technology, visit strongtie.com/yieldlink.

BOSCH GAS20-17AH WET/DRY DUST EXTRACTOR OFFERS PROFESSIONAL FUNCTIONALITY COMBINED WITH 300 CFM PERFORMANCE

With 17-gallon capacity and 300 CFM, this vacuum can handle the big concrete cutting and surface grinding applications.

The Bosch GAS20-17AH Wet/Dry Dust Extractor is an industrial-grade powerhouse with a maximum 300 CFM (cubic feet of air per minute) capacity that filters fine dust, coarse dirt and liquids. The GAS20-17AH boasts 17-gallon capacity, and auto filter cleaning with HEPA filter to provide a complete package in helping users move toward OSHA silica dust regulation compliance. Its auto filter-clean system activates every 15 seconds and the HEPA filter captures 99.97% of particles at 0.3 microns and larger.

The dust extractor features a high-performance 17.5-amp motor to maintain the maximum 300 CFM capacity. This is powerful dust extraction performance for heavy-duty applications, including concrete cutting and surface grinding with larger 7" and 9" grinders and up to 12" cut-off tools.

The Bosch GAS20-17AH Wet/Dry Dust Extractor meets the need for heavy-duty dust extraction for concrete cutting and surface grinding applications.

The Bosch GAS20-17AH Wet/Dry Dust Extractor automatic filter-cleaning system self-cleans the HEPA filter through reverse airflow every 15 seconds. This procedure ensures that the extractor is always working at maximum efficiency.

The large capacity Bosch wet/dry extractor has a water-level sensor to help preclude overfilling and a discharge hose for easy drainage. The easy-to-transport unit has sturdy metal castors designed to withstand jobsite terrain, a metal frame with a height-adjustable fold-down push handle for easy maneuverability. The unit features a dumping mechanism for emptying convenience.

The Bosch GAS20-17AH Wet/Dry Dust Extractor comes with a HEPA filter, a three-layer heavy-duty filter bag that helps protect the filter from abrasive materials and a 16 Ft. anti-static hose. Part of the Bosch PRO+GUARD™ system, the GAS20-17AH with HEPA filter helps users move toward compliance with the OSHA silica dust regulation. With its maximum 300 CFM, it is designed to handle concrete cutting and surfacing with large angle grinders.

An optional Y-Connect (sold separately) allows use of two tools at the same time, such as small (5" or smaller) angle grinders used in surface grinding or cutting concrete.

To learn more about the Bosch GAS20-17AH Wet/Dry Dust Extractor or to find a local dealer, visit www.boschtools.com.

SIMPSON STRONG-TIE REDESIGNS RCKW KNEEWALL CONNECTOR FOR GREATER CONCRETE AND STEEL ANCHORING VERSATILITY

Simpson Strong-Tie, the leader in engineered structural connectors and building solutions, has redesigned its popular RCKW rigid kneewall connector for cold-formed steel construction to provide a versatile, two-anchor option for contractors using 1/2"- or 3/8"-diameter concrete anchors, resulting in faster and more efficient installation. When higher loads are required, the RCKW can be combined with the RCKWS stiffener (sold separately) to provide additional capacity for maximizing overturning moment resistance.

Fabricated from heavy-gauge, G90 galvanized steel, the RCKW and RCKWS have three large holes allowing either a one-anchor solution at the edge or center of a slab or a two-anchor solution for applications requiring higher capacities at the center of the slab. The screw holes and anchor holes in the stiffener line up with those in the RCKW clip, making fastener and anchor installation a snap.

In addition, Simpson Strong-Tie has successfully tested the two-anchor solution with 3/8"-diameter anchors, suited for shallower-embedment applications such as fluted decks. Features of the RCKW system include:

- Unique small and large anchor-hole patterns permit anchorage to both concrete and structural steel.

- Stiffened anchorage leg flanges provide greater overturning moment resistance.
- Large anchor holes accommodate 1/2"-diameter Simpson Strong-Tie® Titen HD® heavy-duty screw anchors or Strong-Bolt® 2 wedge anchors.
- Additional smaller-diameter anchor holes enable attachment to structural steel with #12 self-drilling screws.
- RCKWS stiffeners can be secured to the RCKW clip with screws, optimizing resistance to overturning and rotational moments.

For more information about the RCKW system — including fastener pattern options, installation diagrams, and tables for allowable moment, rotational stiffness and allowable shear and tension loads for both concrete and steel applications — visit strongtie.com/rckw.

LIND EQUIPMENT INTRODUCES EFFICIENT, LABOR-SAVING LED TEMPORARY LIGHTING SYSTEM

Bye-bye stringlights. Hello industry-first: An integrated, adaptable lighting system poised to revolutionize the jobsite.

Lind Equipment—leaders in portable LED construction lighting—announces a redesigned LED Jobsite suite of products. The LED Jobsite now provides a complete system of temporary lighting that greatly increases efficiency on the jobsite and makes projects more profitable. By using LED Jobsite's integrated solutions, contractors can easily tackle even the most challenging jobsite lighting conditions.

To maximize the total light coverage across the jobsite, all products in the suite work together as one system. Together, these products are all built to exceed military-grade drop-test standards and have IP65 weatherproof ratings. In short, LED Jobsite lights will withstand any abuse the jobsite might throw at them, and it's now become an asset rather than a disposable.

The key to using the various LED Jobsite products together is pre-determined lengths of cable with daisy-chains and triple-tap outlets. The contractor can determine the best light for an application, and it can be daisy-chained into complex patterns throughout the jobsite.

LED Jobsite improvements do not stop with the suite integration. Lind updated many features on existing LED Jobsite products to create an improved experience by reducing the footprint, enhancing durability, and providing lower wattage to improve energy efficiency.

The exciting new product suite includes:

Beacon360 Blaze – The new Beacon360 Blaze is a powerful light with incredible versatility.

Beacon360 Trek – This is the little brother to our best-selling patented Beacon360 Blaze. The Beacon360 Trek casts light in 360˚ and upwards, while being spaced at 25 ft apart to provide light coverage up to 5 fc. At 60W, it provides 7,000 lumens of bright, white light.

Beacon360 Spark – An exciting new product, the Beacon360 Spark makes stringlights a thing of the past. Now a main circuit can be run throughout the hallways/corridors, and individual lights can branch off into individual rooms or in other directions as required.

LE-HB120 LED High Bay – One of the latest additions to the Beacon family is the LE-HB120 LED High Bay. This high bay is much smaller, more durable and even more energy efficient. It does not require an external driver—allowing it to be extremely light and compact. The LEDs provide 13,250 lumens to illuminate 2,500 sq. ft when mounted on a ceiling 20 ft high.

With the option now to connect all these products through pre-determined lengths of daisy-chained cable and triple-tap outlets, installation times can be drastically reduced, and flexibility can be increased, with the ability to create complex lighting patterns throughout the jobsite.

BLASTCRETE EQUIPMENT'S REFRACTORY PADDLE MIXER DELIVERS SPEED AND RELIABILITY

Blastcrete Equipment, LLC, a long-time manufacturer of shotcrete and gunite mixers and pumps, offers a Refractory Paddle Mixer that delivers fast mix times while working with mixtures that include aggregates up to a half-inch (13 millimeters) thick. The hydraulic machine mixes as much as 500 pounds (227 kilograms) of refractory castable in 1.5 to 2 minutes and performs well in form-and-pour jobs and other applications involving precast shapes, mortars and grouts.

The Refractory Paddle Mixer's oversized, heavy-duty, chain-and-sprocket drive system provides years of reliable use under harsh conditions. It also features a pair of easily accessible levers to control the hydraulic dump and operate the system in both forward and reverse.

Customers can pair the 1,900-pound (862-kilogram) machine with a variety of electric power options for safe indoor use and to meet global needs. Customers have their choice of three electric motors; a 10 horsepower (7.5-kilowatt) electric motor with starter disconnect, a 240- or a 480- volt, 60-hertz motor or a 380-volt, 50- hertz motor. Customers also can

choose to power the Paddle Mixer with a 14-horsepower Kohler gas engine.

The 4-foot-wide (1.2-meter-wide) Refractory Paddle Mixer's trailer features a single axle for easy towing, or it can be skid-mounted.

Customers can use the Paddle Mixer with Blastcrete's patented DustAway system, which consists of an innovative bulk bag design that attaches to the mixer to contain dust as the mixer fills. DustAway helps businesses meet OSHA crystalline silica dust regulations by controlling dust to within OSHA permissible exposure limits.

For larger refractory jobs, Blastcrete also offers a 1,000-pound refractory paddle mixer-pump, the RMX-5000, and a Refractory Pan Mixer that can mix as much as 2,200 pounds in less than two minutes.

For more information: www.blastcrete.com.

BOSCH GBA18V40 CORE18V 4.0 AH BATTERY OFFERS POWER AND RUNTIME OF FIRST-GENERATION PRODUCT IN SMALLER, LIGHTER PACKAGE

21700 Lithium-ion cell technology delivers the right power solution for heavy-duty cordless power tool applications

The only thing that can make increased battery power more attractive is putting all that additional performance in a smaller package. With the help of greater power efficiency found in 21700 Lithium-ion cell technology, Bosch has developed the GBA18V40 CORE18V 4.0 Ah battery to bring all of the capability of the original CORE battery into a smaller, lighter package. The new cell introduces much more active battery volume in a pack that's only slightly larger than the previous 20700 cell packs.

The Bosch CORE18V40 4 Ah battery is designed to make day-to-day work easier, particularly repetitive applications and overhead tasks. The Bosch design allows the power cells to be arranged in a single layer, which adds to a smaller and lighter battery.

Advanced Technology Cooling
Bosch CoolPack 2.0 technology advances the lifetime of the battery as well, delivering up to 135 percent longer life versus conventional batteries without CoolPack. Heat is the enemy of any battery and this design ensures heat dissipation is maximized thanks to a housing that completely encases each cell. The high-density polyethylene material and the proprietary design combine to pull heat away from the cells for better dissipation. In addition, the battery is designed without space gaps, which ensures any heat produced by the cells is not stored in the interior. Optimized cell connectors made of copper versus copper-coated galvanized steel offer lower resistance for increased power output over a longer period of time.

Bosch CORE18V batteries provide 100 percent compatibility with all 18-volt Bosch Lithium-ion tools and chargers. Bosch is developing high-power tools to take full advantage of CORE battery technology.

To learn more about the Bosch GBA18V40 CORE18V 4.0 Ah Battery or to find dealer information, visit www.boschtools.com.

PROSOCO RELEASES NEW RESTORATION CLEANER FOR MULTIPLE SUBSTRATES

ReVeal safely and effectively cleans masonry, stone and a variety of other architectural substrates.

A new restoration cleaner from PROSOCO simplifies the masonry cleaning process for buildings made with multiple materials and substrates.

Sure Klean ReVeal is formulated to clean atmospheric and carbon staining from most kinds of masonry and stone, including architectural concrete block, concrete, fired clay, granite, sandstone, slate and unpolished limestone, marble and travertine. It can also remove soiling and hard-to-remove deposits, such as white scum, from window glass, and is safe for use around most architectural metals. This feature nearly eliminates the need to specially protect and cover many other non-masonry substrates and materials during the cleaning process.

Not having to worry about covering windows was a big advantage for M-A Building & Maintenance when it cleaned the exterior of the Halle Building in Cleveland, Ohio, earlier this year.

Safer and less corrosive than conventional restoration cleaners based on hydrofluoric acid or ammonium bifluoride, ReVeal comes in liquid form, rather than a gel, facilitating a shorter dwell time that lets contractors finish the job faster.

Low-odor and non-fuming, ReVeal restores clarity to most common flush window glass that shows streaks and damage from pollution, and water run-down from adjacent building materials.

ReVeal is available in 1-gallons, 5-gallon pails and 55-gallon drums. It's compliant in all jurisdictions for sale and use. Always test to ensure desired results. For more information, visit prosoco.com.

INTERESTED IN SEEING YOUR PRODUCTS IN THIS COLUMN?

Email your 150-200 word product information to editor@icri.org. Content for the January/February 2019 issue is due by December 1, 2018 and content for the March/April 2019 issue is due by February 1, 2019. One (1) high resolution product photo may be included. ICRI reserves the right to edit all submissions.

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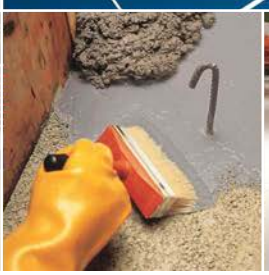

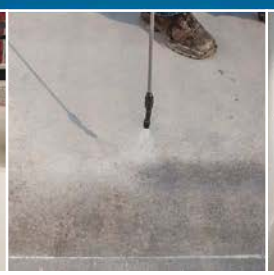

MAPEI offers a full spectrum of products for concrete restoration, waterproofing and structural strengthening. Globally, MAPEI's system solutions have been utilized for bridges, highways, parking garages, stadiums, building and other structures.

Visit www.mapei.com for details on all MAPEI products.

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