November/December 2022
Vol. 35, No. 6

CRB

CONCRETE REPAIR BULLETIN

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ON THE COVER: The 2022 ICRI Project of the Year Award Winner: Mount Umunhum Radar Tower, Page 14.

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FEATURES

DEPARTMENTS

NOTE FROM THE EDITOR

The end of the year is rapidly approaching, and winter is now upon us in the Northern Hemisphere. Hopefully, our members will continue to stay busy over the winter months. The ICRI Fall Convention was held at the InterContinental Buckhead Hotel in Atlanta. The event was a success, and an exciting time was had by all the attendees.

Once again, ICRI members sent a wide variety of projects for review and consideration for the annual ICRI Project Awards. This issue of the *Concrete Repair Bulletin* highlights all the award winners and the Project of the Year.

We are continuing to look for authors and articles for the *Concrete Repair Bulletin*. Topics and Article Guidelines are available on the Resources Tab on the ICRI website. Please make sure you submit your chapter's upcoming events to Dale Regnier and remember to check the ICRI website for the schedule of upcoming events.

I hope you all continue to have a safe Holiday Season and am looking forward to everyone having a great start to 2023!

Jerry Phenney
Editor, *Concrete Repair Bulletin*
RAM Construction Services

PRESIDENT'S MESSAGE


JOHN MCDOUGALL

Ray Charles may have said it best: "Georgia on my mind." Georgia is definitely on my mind lately. As I headed to Atlanta and the 2022 ICRI Fall Convention, it brought me back to my first National Convention in 2007 in Atlanta and walking into the clubhouse at Stone Mountain Country Club for the Chapter Golf outing. I was young(er), new(ish), and surrounded by the industry's best men and women I had read about in the CRB, seen at a local chapter meeting as a presenter, or heard about through ICRI networks. No sooner had I walked in, I was greeted with a smile and a handshake from Mark DeStefano.

He didn't know me, and I didn't know him, but he made the effort to make me feel welcome. Through the course of those four days in Atlanta, I was welcomed into the ICRI world, sat in on a few committee meetings and met contractors, designers, and materials professionals from across North America. Looking back, that introduction to ICRI has been the most rewarding and beneficial meeting of my career.

I hope someday to have the same impact on a late 20s young professional that Mark and ICRI have had on me. I encourage each of you to look around the next Chapter Social, Convention First Timers Social, or look around the sales counter at your local distributor and find that young professional who just needs an introduction into ICRI and the limitless opportunities it presents. You—and they—will be better for it.

Looking back through my time as President in 2022 makes me smile. Over the past year, we have seen growth in several key areas, but more importantly we have laid the foundation for significant growth in 2023 and beyond. We have refined our international chapter model to streamline the process, removing some of the roadblocks and working with international colleagues to promote the mission, vision, and resources of ICRI in countries beyond North America. That effort has led to a new affiliate chapter in Mexico and work underway to form a new Latin America affiliate, an effort championed by some great ICRI colleagues in Panama.

To drive our growth across all areas of ICRI, we are investing in new staff resources to support our certification and membership efforts. This will fuel the certification efforts Dale Regnier has been leading, including recent classes across the U.S. and Canada and many more to come in the next 18 months.

ICRI leadership recognizes that we need the right technology solutions to meet member needs and power our growth. A major effort at the forefront for ICRI, behind the scenes, is a full evaluation of our technology needs, not just for today but for the coming years. Eric Hauth, our esteemed Executive Director, is leading a project to evaluate our current technology and build a roadmap to meet our near-term and long-term goals. It's time to ensure that these critical pieces of our Institute are robust and not a roadblock. Our goal is to allow for seamless membership updates, tracking of webinars, chapter meetings, registrations, learning opportunities, and all things ICRI easily accessible across your devices.

As I look to pass the gavel to Pierre Hebert, I know our institute is in good hands. Pierre, the Executive Committee, Board of Directors, TAC Chair Committee Members and Staff are committed to the mission of ICRI—providing education, certification, networking, and leadership to improve the quality of repair, restoration, and protection/preservation of concrete and other material systems.

Thank you for your continued support of ICRI. It's been an honor to serve as your 2022 ICRI President.

Humbly yours,

John McDougall
ICRI 2022 President

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ICRI Mission: ICRI provides education, certification, networking, and leadership to improve the quality of repair, restoration, and protection/preservation of concrete and other material systems.

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TACTALK

ICRI TAC GOALS FOR 2022


MARK NELSON

Last January, ICRI TAC announced the following four goals for 2022:

1. implement Technical Committee Chair Training Program;
2. increase local chapter member involvement in national technical committees;
3. create ICRI Technical Committee "sell sheets"; and
4. improve Causeway Committee page structure.

Thanks to some great support and much effort, we were able to move forward with all four goals. Regarding the first goal, the Technical Committee Chair Training task group kicked off the training program with a mock committee meeting at the Fall Convention led by Fred Goodwin. Thanks to Fred for agreeing to run the meeting, and also thanks to Dave Fuller for leading the task group. The next two goals were eventually combined into one effort. We were able to create the first versions of Technical Committee sell sheets which are currently being distributed at local chapter events with the hope of getting more local chapter members involved in our national technical committees. Finally, we started the process to better organize our online technical committee pages. Simplifying the technical committee leadership and participation process will provide committee members with a much more enjoyable experience.

End of TAC Chair Term

The end of 2022 will bring a conclusion to my three-year term as ICRI TAC Chair. Thank you to all of the technical committee members, chairs, and TAC members who thanklessly support the ICRI technical committees. Special thanks to the previous TAC Chair, Fred Goodwin, for your guidance and friendship over the years. On January 1, Matt Sherman will take over as TAC Chair and Liying Jiang will move up to TAC Vice-Chair. I am sure they will provide great leadership to the ICRI technical committees for years to come.


MATT SHERMAN


LIYING JIANG

ICRI Technical Committee Chairs

Following is a list of the ICRI Technical Committee Chairs. If you want to become more active in ICRI and the repair industry, please feel free to contact them directly to learn more about their committees.

- **Liying Jiang**, *Structural Technologies*
  Committee 110—Guide Specifications
- **Paul Farrell**, *Carolina Restoration & Waterproofing*
  Committee 120—Environmental Health and Safety
- **Marthe Brock**, *Master Builders Solutions USA*
  Committee 130—Contracts, Warranties, and Agreements
- **Vincent LaPointe**, *SIMCO Technologies*
  Committee 160—Life Cycle and Sustainability
- **Charles Mitchell and David Rodler**, *SK&A*
  Committee 210—Evaluation
- **Peter Haveron**, *Texas Concrete Restoration*
  Committee 310—Surface Preparation
- **Joshua Lloyd**, *SGS-TEC Services, Inc.*
  Committee 320—Concrete Repair Materials and Methods
- **Tarek Alkhrdaji**, *Structural Technologies*
  Committee 330—Strengthening and Stabilization
- **Jason Coleman**, *Wiss, Janney, Elstner Associates, Inc.*
  Committee 410—Masonry
- **Jorge Costa**, *Durability, Inc.*
  Committee 510—Corrosion
- **Eric Muench**, *Sika Corporation*
  Committee 710—Coatings and Waterproofing

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

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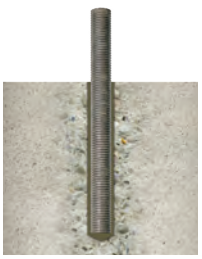

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CERTIFICATIONUPDATE

CSMT PROGRAM GROWS IN CANADA

The ICRI Concrete Slab Moisture Testing (CSMT) Program has been primarily available through programs in the United States, with a number of technicians attending classes in the U.S. even though they are from outside the U.S.. In October 2022, ICRI teamed up with the National Floor Covering Association (NFCA) in Canada to start a series of CSMT programs in Canada. The first of these programs with NFCA was conducted October 5 and 6, 2022 in Edmonton, Alberta, Canada at the Alberta Carpenters Training Centre in Edmonton. Twelve Canadians, members of NFCA, made the journey to Edmonton to participate in the CSMT class with instructor Adam Bakeman.

The winners of the drilling contest that accompanies the testing for ASTM F2170 during the CSMT demonstration and workshop are (left to right) Brad Pinter (3rd place), Graeme Rosen (1st place), and Chris Maskell (2nd place)

ICRI CSMT instructor Adam Bakeman is seen here with the first combined ICRI/NFCA class as he presents the demonstration and workshop portion of the class. All 12 attendees passed and the CSMT Technician listing page on the website will soon see a number of new certified Canadians

NFCA and ICRI will be working together in the future to offer more CSMT programs in other cities across the Canadian Provinces. Special thanks to Chris Maskell, NFCA's CEO, and Lee Segall, Marketing & Communications Manager at NFCA for all their hard work launching this program with their Canadian colleagues. Check the ICRI website in 2023 to see when and where the collaborative effort will be presented again.

If your company or your chapter wishes to schedule a CSMT Program, please contact Dale Regnier, daler@icri.org, and provide him with contact information for the point person who will be in charge of coordinating the event, the proposed exam location, and potential date(s).

WOMEN IN ICRI

SPOTLIGHT— Zelina Johnson

by Michelle Nobel

ZELINA JOHNSON

Zelina Johnson is a structural engineer at Klein & Hoffman in Chicago. She currently serves on the ICRI Convention Committee and the Women in ICRI Committees, and is a member of TAC.

Zelina is part of the structural rehabilitation division of Klein & Hoffman. She has 18 years of experience in building modifications and rehabilitation, concentrating on concrete structures. She has done field investigations, condition assessments, identifying material testing requirements, analysis, design development, development of construction documents and specifications, and handling bidding and services during construction. She specializes in rehabilitating concrete structures such as parking garages and sidewalk vaults.

Zelina is originally from South Dakota. She moved to Illinois in the early 1990s. She went to school at the Illinois Institute of Technology and received a degree in Civil Engineering with a Master's in Structural Engineering. She worked as an intern doing condition assessments for dams. She started her career in non-destructive testing for an engineering firm specializing in above-ground storage tanks. Zelina's first job was doing condition assessments on standard and movable bridges in Chicago for Parsons Brinkerhoff.

She has been in the building arena for the last 17 years, working on buildings of all kinds and is currently working on a project involving revitalizing twin apartment towers for upscale rentals.

Zelina married into a blended family and has two stepsons and a daughter. Her husband is a mechanical engineer. In her free time, she enjoys golfing, gardening, wine, and time with her family. She comes from a large family and enjoys traveling back to the Dakotas to visit friends and family, and one day she hopes to retire there.

I had the pleasure of getting to know Zelina at an ICRI convention a few years ago. Recently, we went to the ICRI Chicago Chapter's Chicago Cubs versus Colorado Rockies game at Wrigley Field. We have also met up outside of ICRI to spend time together. I consider Zelina a great friend and look forward to seeing her at ICRI events and beyond!

Women in ICRI is comprised of women and men working to foster greater inclusion of women throughout the concrete construction industry through networking events, industry outreach and mentoring.

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2022 PROJECT OF THE YEAR

SPECIAL PROJECTS CATEGORY

Mount Umunhum Radar Tower

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Mount Umunhum Radar Tower

HISTORY OF "THE CUBE"

High in the Santa Cruz Mountains, deep in the Sierra Azul Open Space Preserve, lies the fourth highest peak in California: Mount Umunhum. Located in Santa Clara County, Mount Umunhum—Ohlone for "Resting Place of the Hummingbird"—provides spectacular views spanning from the Pacific Ocean all the way to the Sierra Nevada mountains.

Sitting atop this peak at an elevation of 3,490 feet (1,064 meters) is one of the more unusual buildings in the area—the Mount Umunhum radar tower, affectionately referred to as "The Cube" or "The Box." Completed in 1962, this 85-foot-tall concrete landmark housed an 85.5 ton AN/FPS-24 radar that was used to scan for hostile aircraft in the area during the Cold War (Fig. 1). This was a part of the larger Almaden Air Force Station, that operated from 1958 to 1980. At its peak, 120 Air Force personnel and their families lived at this station that was a self-contained community consisting of over 88 buildings including homes, a gym, garages, and a bowling alley.

In 1980, the base was closed as satellites made the technology used at the top of Mount Umunhum obsolete. The 120-foot-wide orange and white checkered radar dish on top of "The Cube," that had slowly turned 24-hours-a-day for decades was finally decommissioned. Pieces were either reused in other bases or scrapped.

The base sat empty for the next 6 years until the property was sold to the Midpeninsula Regional Open Space District in 1986 for $260,000. At this point, the District insisted that the Department of Defense pay to remove all of the existing and now unused buildings, but were met with resistance. The two government groups remained in a standoff for the next 31 years while the base remained locked up and off-limits to the public, slowly becoming a crumbling relic full of lead paint and asbestos.

This stalemate finally came to an end in 2009 when the Midpeninsula Regional Open Space District, with the aid of federal funding, removed 3,000 cubic yards (2,294 cubic meters) of hazardous materials, including fuel storage containers and PCB transformers, as well as deconstructing 13,680 tons of concrete, asphalt, wood, and other materials to finally open the area up to the public.

VETERANS UNITE

On September 18, 2017, access to the summit was re-opened giving way to cars, bikers, and hikers to enjoy the views from the surrounding areas. The radar tower itself was still in desperate need of repair and full access was not available to the public.

Unfortunately, the summit access was relatively short-lived. In November 2017, flakes of paint and concrete debris found on the ground adjacent to the radar tower tested positive for lead and asbestos, respectively. The area surrounding the radar tower, including the pathway to the east summit, was closed off to prevent public access due to potential health and safety concerns (Fig. 2). In June 2018, all remaining paint was removed from the exterior of the building and further testing identified asbestos in some exterior concrete patching materials (Fig. 3). The complete demolition of the tower had been briefly entertained in 2016 but protests led by Air Force Veterans and historic preservationists convinced the Santa Clara County Board of Supervisors to list the structure on the County Heritage Resource Inventory, providing official historic status.

A local engineering and architecture firm developed the contract documents and specified everything from the roofing to the rebar protection, patch materials, and wall coating system. Engineers and architects initially performed an assessment of the radar tower including the interior, the exterior walls, and the roof. This included use of an aerial lift for access to the exterior walls and the use of an unmanned aerial system (drone) for high-resolution imagery of portions of the building where access was difficult. The exterior concrete walls were surveyed to identify areas with deteriorated concrete. The interior of the walls had experienced water intrusion due to the porosity of the concrete. The roof system was also evaluated. Interior hazards, such as abandoned floor openings and damaged stair handrails, were identified. A hazardous materials consultant sampled and tested materials to develop an abatement plan.

Fig. 1: Original photo of the radar tower with the radar still operational

Fig. 2: Radar tower prior to asbestos remediation

Fig. 3: Elevation showing existing substrate at old patching attempts

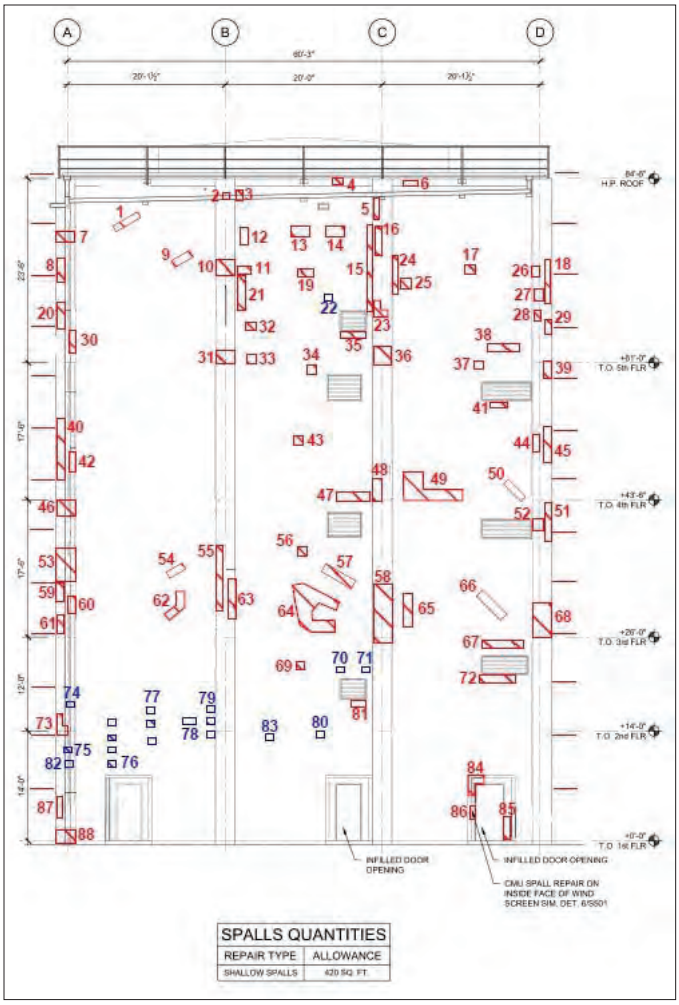

Fig. 4: East elevation mock-up showing initial repair areas for both shallow and deep repairs


Fig. 5: Entire building scaffolded prior to repair work

Based on the results of the evaluation, the engineer worked with the District to develop a comprehensive repair approach with goals of allowing safe access for the public to the area around the radar tower, safe access inside the building and on the roof for park personnel, mitigation of water intrusion through the roof and the exterior walls, and restoration of the historic appearance of the exterior. Design of the repairs took into consideration the extreme weather conditions at the site, including potential winds exceeding 100 mph (161 kph).

It wasn't until 2021 that the Mount Umunhum Radar Tower Repair Project was opened for bids. According to the Midpeninsula Regional Open Space District, recent assessments had identified needed repairs to address roof integrity issues, water and wildlife intrusion, site safety, the presence of hazardous materials, and spalling concrete and deteriorating rebar. The goal was to provide long-term repairs over a 1-year contract that would allow for re-opening of the summit area immediately adjacent to the Radar Tower to public access. The estimated cost of these repairs totaled $1.8 million (Fig. 4).

A local restoration contactor performed the concrete repair work that made up the bulk of the scope of the concrete restoration (Fig. 5). The first hurdle was the logistics of working on the top of a mountain. As mentioned, the peak of Mount Umunhum is at almost 3,500 feet (1,067 meters) in elevation and the roads leading to the top are difficult for even some cars, let alone the heavy equipment and machinery needed to perform the full scope of work (Fig. 6). The first step was debris removal and demolition, and this meant dumpsters had to be brought on site. The semi-full dumpsters needed to be hauled back down the steep incline constantly, as there were significant weight constraints due to the grading of the roads. An extreme example of how this affected the contractor was that almost all vehicles used regularly on site (including personal vehicles) had to have their brakes replaced after the job was completed due to the heavy use throughout the project.

Along with the limitations of capacity and transportation was the lack of water on site. The city water that once ran to the base was no longer in service, so a new water meter and hydrant had to be installed miles down the road for use during preparation and construction. Totes of water had to be continuously transported and filled for use on the job for items like pressure washing the concrete substrates, mixing patch materials, and dust control.

REPAIR SCOPE CHANGES FOR THE WIN

The original repair areas identified on walls of the radar tower included approximately 400 square feet (37 square meters) of deep spall repair and 1,000 square feet (93 square meters) of shallow spall repair that initially consisted of rock pockets from original construction along with damage from the initial remediation work. Once the surface preparation was completed, it became apparent that of the

total 21,000 square feet (1,951 square meters) of façade on the Tower, about 75% of the concrete was not suitable for direct application of the specified elastomeric coating, far more than the original 1,000 square feet (93 square meters) in the scope (Fig. 7). Originally a cementitious skim coat was reviewed for use over the majority of the façade—but ended up getting rejected due to the prohibitive costs added to the project due to material, labor, and logistics.

After much discussion among the owner, engineer, and contractor, it was agreed to accept a change order to remove the shallow spall repair and add an additional 200 square feet (19 square meters) to the deep spall repair scope. In lieu of a cementitious skim coat, the contractor mocked up four options with different variations of acrylic primer, acrylic knife grade filler, and acrylic topcoat (Fig 8). The options varied the number of coats of the elastomeric topcoat with the use of the acrylic patching compound. Adhesion testing was performed on all mock-ups according to ASTM C3359 and only systems that resulted in 4A or above were included for final evaluation. In the end, it was determined to go with a single coat of primer, one coat of the elastomeric topcoat followed by the knife grade filler, and a final coat of elastomeric topcoat. This provided the best compromise between cost, aesthetics, and durability. It limited much of the additional preparation and labor that would have been needed for the cementitious option and provided a fully waterproof, crack bridging façade coating system to withstand long-term weathering on top of Mount Umunhum. The final topcoat color was chosen with the aid of the local historical preservationists and was custom tinted to match the federal color specification (Fig. 9).

ADDITIONAL REPAIR CHALLENGES

Additional work done to restore the radar tower included full roof replacement along with about 30 linear feet of eyebrow replacement. This was formed and poured with a fluid, polymer-modified cementitious mortar and included new hook bars for the patches.

Throughout the entire project, it was very clear to anyone on site to be extremely vigilant for local wildlife in the area. Because the building and surrounding areas had been left untouched for so many years, rattlesnakes were a real threat on site. Luckily, due to an overabundance of caution, there were no incidents recorded.

ALL'S WELL THAT ENDS WELL

Now a very popular destination for hikers, bikers, and those looking for a view, the entire area was also granted as an easement to the Amah Mutsun tribal band, direct descendants of the Ohlone Native American people, from whom the mountain got its name, allowing them to garden and hold ceremonies on the mountaintop. With the massive contribution by local government, the Mount Umunhum Radar Tower and surrounding areas have been preserved for generations to visit and enjoy (Fig. 10). The familiar landmark that can be seen from not only the entire South

Fig. 6: Extremely steep road leading to the Radar Tower was the only way up or down

Fig. 7: Area of façade after initial surface preparation showing deep spalls and new construction defects

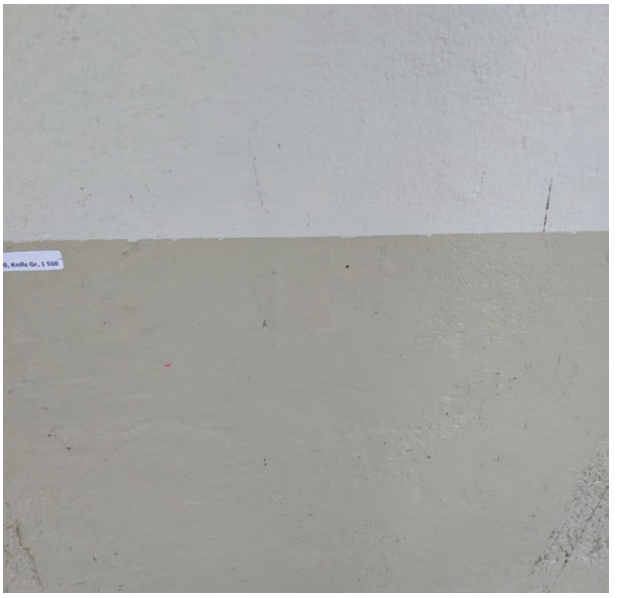

Fig. 8: Final mockup chosen for repair scope change

Bay, but from flights into and out of San Jose, represents a very tumultuous time in our Nation's history and is very important to respect and commemorate the service of the veterans who kept guard over America's West Coast for the generation after the devastating attack on Pearl Harbor. This 8-story monolith will be a lasting reminder of the first line of defense on the Pacific Coast. Having seen many Russian planes among the blips on the radar, without this instrumental structure and the men and women who served there, the Bay Area may not have been the same as it is today.

Fig. 9: Final portrait of the side of Mount Umunhum Radar Tower

Fig. 10: Mount Umunhum Radar tower from the front

Mount Umunhum Radar Tower

SUBMITTED BY
Sika Corporation
Lyndhurst, NJ

OWNER
Midpeninsula Regional Open Space District
Los Altos, CA

PROJECT ENGINEER/DESIGNER
Wiss, Janney, Elstner Associates, Inc.
Emeryville, CA

REPAIR CONTRACTOR
PULLMAN SST
Benicia, CA

MATERIALS SUPPLIER/MANUFACTURER
Sika Corporation
Lyndhurst, NJ

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FINALIST—2022 PROJECT OF THE YEAR

SPECIAL PROJECTS CATEGORY

The Aquarium of Genoa, Italy—Concrete Repair and Corrosion Mitigation

GENOA, ITALY

SUBMITTED BY VECTOR CORROSION TECHNOLOGIES

The Aquarium of Genoa, Italy

INTRODUCTION

In the old port of Genoa. Italy, lies Europe's third largest Aquarium. The Aquarium of Genoa was inaugurated in 1992 on the 500th anniversary of the discovery of America by Columbus. The aquarium is the most visited structure of its kind in Italy. The site, now one of the most popular destinations in the City of Genoa and the region of Liguria, was redesigned by famed architect Renzo Piano. The aquarium contains over 600 animal and 200 vegetal species including sharks, sawfish, penguins, and dolphins.

Under the supervision of a local engineer specializing in structural repair and renovation and a prominent Italian University, a specialty concrete repair and renovation contractor was engaged to execute the necessary repair works. The scope included concrete repairs, waterproofing, and corrosion protection for two of the three main sea life tanks (Fig. 1).

THE STRUCTURE

While the entire Genoa Aquarium footprint contains 70 tanks and 4 open-air pavilions, the focus of the work completed in 2020-2021 revolved around only three specific tanks (V1, V2, and V3). All three tanks have a similar construction of a reinforced concrete slab with associated walls, columns, and beams that for V1 support a large glass panel viewing platform on two levels (Fig. 2).

The total area considered during Phase 1 was 1,300m² (14,000ft²) with 970m² (10,500ft²) identified as having an elevated risk of corrosion. Due to the nature of the tanks, chloride exposure from sea water has been consistent throughout its life. While a concrete waterproofing system was present, it was clearly not sufficient to prevent accelerated deterioration due to chloride induced corrosion (Fig. 3).

CORROSION OF REINFORCING STEEL IN CONCRETE

While this is an interior structure, its aim is to mimic the sea environment for the marine life. As such, the level of chloride in contact with the concrete structure was considerable. This, coupled with the generally elevated temperature of Italy, resulted in high corrosion risk. (Fig. 4).

A durable repair scheme can be achieved if the underlying corrosion problem is completely addressed by the repair design such as in the case of total reconstruction. If the concrete is repaired and significant portions of the original concrete are to remain in place, the corrosion issue may not have been fully addressed and corrosion may continue or initiate/accelerate adjacent to repaired areas. This phenomenon is known as patch-accelerated corrosion or the halo-effect.

CLIENT REQUIREMENTS

Before the project moved forward, the owner had several requirements including:

- No impressed current cathodic protection would be allowed for fear of causing harm to the aquarium's marine life
- A minimum of 20 years of protection
- Minimal removal of concrete
- Long-term monitoring

CONDITION ASSESSMENT

To support the project, a structural engineering firm with experience in concrete forensics and rehabilitation design embarked upon a comprehensive test regimen to determine the cause and extent of the concrete damage. The engineer quantified the amount of concrete damage, amount of concrete cover over the reinforcing steel, the depth of carbonation, and chloride content profile and performed a half-cell corrosion potential evaluation (Fig. 5).

The visual and delamination survey uncovered that the structure was suffering from concrete cracking, spalling, large delaminations and loss of reinforcing steel. Damaged areas were marked on the structure and quantified for estimating purposes.

Chloride profile testing indicated that the level of chloride at the depth of the steel was up to 20% by weight of cement (Fig. 6). This clearly illustrates the waterproofing membrane did not prevent saltwater contact with the concrete surface during its service life. These elevated levels of chloride contamination combined with the high humidity and temperature were the main cause of the steel corrosion.

Corrosion potential mapping was also carried out in each tank to better understand the level of corrosion risk. Corrosion potentials more negative than -350 mV were recorded indicating a high level of corrosion risk and high levels of moisture.

After the evaluation was conducted, 970 m^2 (10,500 ft^2) of concrete was identified as having an elevated corrosion risk (75%).

In summary, the damage to the concrete structure was strongly influenced by the environment to which the concrete is exposed. Variability in corrosion risk was seen and the structure was subdivided into logical zones with

Fig. 1: Aerial view of the three main sea life tanks being restored, V3, V2, V1 (left to right)

Fig. 2: Shark tanks in need of rehabilitation due to reinforcing steel corrosion

Fig. 3: The waterproof coating was unable to prevent chlorides from penetrating deep into the concrete

Fig. 4: Example of reinforcing steel corrosion and concrete deterioration

Fig. 5: Condition assessment included a corrosion potential

Fig. 6: Concrete cores were extracted for chloride and carbonation testing

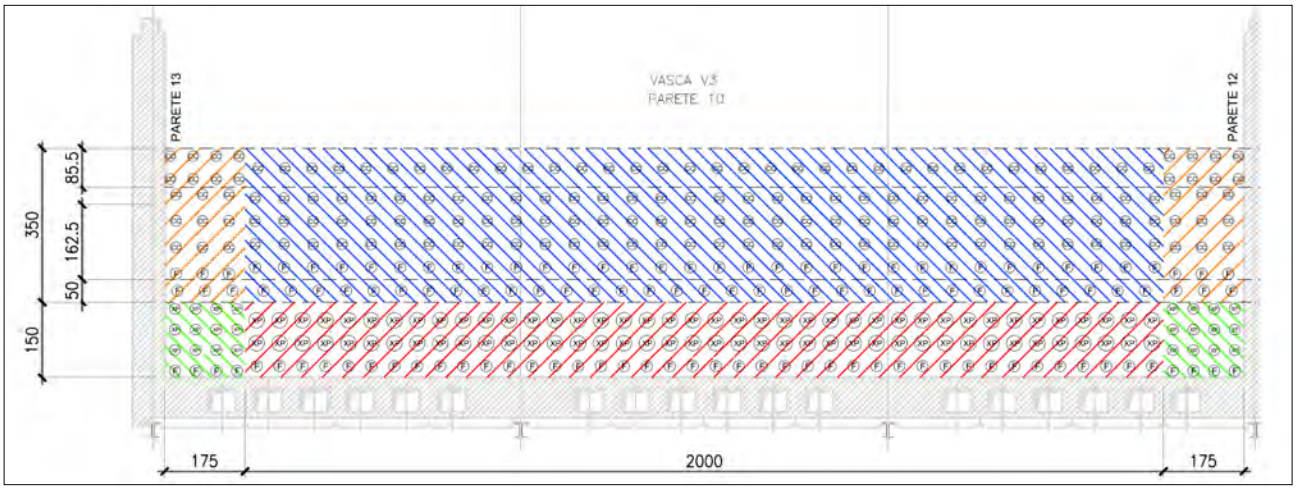

Fig. 7: Corrosion risk zones identified by analysis of the condition assessment

similar levels of damage and corrosion risk (Fig. 7). This was then used to determine both the method of repair and long-term corrosion protection techniques.

REPAIR DESIGN CHALLENGE

During the initial stages of the project, Impressed Current Cathodic Protection (ICCP) was not considered due to the level of risk and the long-term requirements of the structure. Concerns were raised regarding the electro-magnetic fields generated by such a system on the marine life. As limited studies were available on this perceived risk, a galvanic solution was preferred to manage the longer-term corrosion risk that remained.

To satisfy all project stakeholders, the engineer and the corrosion specialist developed a plan that combined long-term protection to areas of concrete that were repaired and implemented additional corrosion protection measures in areas of concrete that were still structurally sound but had elevated corrosion risk. By pursuing this approach, a service life extension of 30 years was possible with the addition of a new waterproofing system.

CORROSION MITIGATION

After evaluating the pros and cons of the various corrosion mitigation options, embedded anodes were determined to be the most practical and cost-effective solution to preserve the Genoa Aquarium.

Three different types of embedded anodes were used to provide protection to the shark tanks. Discrete galvanic anodes provide protection by harnessing the difference in potential between the anode metal (zinc) and the embedded reinforcing steel. When the two metals are connected, protective current flows through the concrete in the same way a battery functions. The protective current radiates from the embedded anode to mitigate active corrosion.

Type 1A embedded galvanic anodes were connected to exposed steel in concrete repairs to prevent patch-accelerated corrosion in areas directly surrounding the repair. Type 2A embedded galvanic anodes were placed into drilled holes in sound concrete to control corrosion before concrete corrosion induced damage occurs. Unlike ICCP, there is no external power required that reduces long-term monitoring and maintenance costs.

A third anode type was also utilized. Two-stage anodes utilize an internal battery for an initial burst of protective current to address active corrosion then autonomously switches to galvanic protection for long term maintenance when the voltage of the battery drops.

REPAIR, DESIGN AND EXECUTION

Taking all of these design factors above, the protection of the various tanks was broken down into zones based upon corrosion risk, steel density variation and repair method.

The first 1.5 m (4.9 ft) of the wall up from the floor had the highest amount of concrete deterioration. The concrete in this area was fully removed to expose the first layer of steel reinforcement. Type 1A discrete galvanic anodes at a


Fig. 8: Tank wall repairs with type 1A embedded galvanic anodes

Fig. 9: Tank wall repairs and cathodic protection being installed

Fig. 10: Type 2A galvanic anode being installed into sound concrete in upper section of tank walls

Fig. 11: Galvanic anodes attached to concrete overlay steel in tank floor

spacing of 3 per m² were included within these repairs to provide long term protection and achieve a 30-year design life (Fig. 8). After the anodes were installed, the concrete was reinstalled with a high-quality repair mortar (Fig. 9).

The next half-meter, up to the 2.0 m (6.5 ft) elevation had a high corrosion risk and high steel density. The two-stage anode was deemed to be the best and most economical option in this zone.

The remaining top 3 meters of concrete walls, up to an elevation of 15 m (40 ft) had the least amount of damage and corrosion risk. In this zone, Type 2 embedded galvanic anodes were selected and were proactively installed into drilled holes on a grid pattern (Fig. 10).

The concrete floors of the tanks illustrated significant steel cross-sectional loss. As such, the repair design utilized a reinforced concrete overlay consisting of new steel and a concrete layer. To protect the steel that remained with the old chloride contaminated concrete, two-stage anodes were installed into the base concrete. Type 1A embedded galvanic anodes were also attached to the new reinforcing steel in the overlay to provide cathodic prevention due to the likely risk of recontamination over time (Fig. 11).

Once repaired, all concrete elements received a marine grade waterproof coating to limit future moisture and chloride contamination (Fig. 12).

SUMMARY

The Genoa Aquarium, a major tourist attraction in Italy, was suffering from chloride-included corrosion after 30 years in service. A unique and cost-effective approach to service life extension was executed in 2020-2021. Four different types of galvanic and two-stage low voltage ICCP/galvanic anode systems were utilized based on the amount of concrete damage and the level of corrosivity. The anode systems were all designed to achieve a 30-year life, more than the 20-year service life extension defined in the tender documents. This overall approach would have been difficult or maybe impossible without an owner with a long-term outlook and a comprehensive assessment of the tanks.

Fig. 12: Waterproof coating applied to mitigate future contamination

The Aquarium of Genoa, Italy—Concrete Repair and Corrosion Mitigation

SUBMITTED BY
Vector Corrosion Technologies
Winnipeg, Manitoba, Canada

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Porto Antico di Genova, spa
Genoa, Italy

PROJECT ENGINEER/DESIGNER
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FINALIST—2022 PROJECT OF THE YEAR

WATER STRUCTURES CATEGORY

DC Water Aerial Sewer Crossing at the National Arboretum

WASHINGTON, DISTRICT OF COLUMBIA

SUBMITTED BY STRUCTURAL TECHNOLOGIES

DC Water Aerial Sewer Crossing at the National Arboretum

BACKGROUND

The District of Columbia Water and Sewer Authority (DC Water) owns and operates a variety of aerial sewer lines throughout Washington, D.C. One sewer line crosses over Hickey Run Creek, located within the environmentally sensitive boundaries of the National Arboretum. Built in 1905, the aerial sewer crossing, 51 inches (130 cm) in diameter, spans 58 feet (18 m) across the creek. The consequence of failure at the Hickey Run Aerial Sewer would be catastrophic to the environment and highly disruptive for those who enjoy the National Arboretum.

Over the past decade, field inspections reported repeated incidents of erosion of the Hickey Run Creek embankment due to increasing rainfall, leading to serious structural deficiencies that threatened the integrity of the aerial sewer crossing (Fig. 1). In July 2019, a single, record-breaking rain event altered the course of the stream bed and severely compromised the sewer foundation. The upstream abutment had spalled concrete and along the embankment, crews discovered an eroded void beneath the footer (no pile) and the exposed backside. Evaluation of the concrete fractures along the sewer indicated more severe tensile overstress than previously recorded. Based on the structure's condition and the increased threat of rainfall in the area, DC Water took immediate steps to mitigate the potential impact of continued erosion of the embankment around the compromised structure.

APPROACH

In lieu of a planned capital project, DC Water recommended emergency repair and secured special approval from the Department of Energy & Environment for a "permitting later and urgent repair first" approach. DC Water opted for a sole source procurement selection given its positive

experience with the general contractor on a project with similar scope and the need for a technically feasible solution that could be implemented immediately.

DC Water engaged key stakeholders early in the process to develop a convergent understanding of the project's scope and emergent nature. With this, all parties were able to provide input, propose project constraints, and form a relationship with the project team prior to project start.

DC Water sole-sourced the design-build project to a general contractor with aerial sewer renovation experience and understanding of the unique constraints at the site, then brought on a designer to create a full design-build team. The entire team had previous aerial sewer restoration experience, along with other types of infrastructure repair and renewal, and provided a preliminary technical solution that was approved by DC Water prior to contract issuance.

The general contractor was engaged in the design process, providing critical feedback on construction challenges of technically feasible designs, which helped to develop the most practical solution that saved time and money.

The project team engaged in pre-planning sessions with DC Water to ensure that proposed repair solutions were constructible and in line with budget and schedule goals. During pre-planning and throughout construction, DC Water managed all coordination between the landowner and the permitting agency, while the general contractor managed all aspects of project delivery, which included oversight of subcontractors. As the planning process progressed, DC Water began to have concerns about the aerial sewer's structural integrity. To address these concerns, the design-build team began to prepare for advancement of the kick-off of field activities.

Acting on DC Water's concerns and the rapid start planning that took place, the team mobilized a month in advance of the contracted start date. Before repairs could begin, shoring had to be installed to support the structural members to be repaired. As part of the start-up, the team also had to implement the access plan that was aimed at managing high water levels and minimizing disruption to nearby National Arboretum research facilities.

Fig. 1: Severe weather events and significant surge flow precipitated the need for DC Water to implement an emergency design-build repair to address the aerial sewer's structural integrity

The repair scope included:

- access road construction
- set-up of environmental and safety controls
- installation of micropiles for stabilization of the existing foundation
- tying micropiles into new concrete enlargement of the foundation
- concrete repairs on the pipeline encasement
- installation of five (5) new concrete piers
- toe protection and embankment retrofit
- installation of carbon fiber-reinforced polymer (CFRP) on the pipeline encasement to strengthen the unsupported span overtop of the creek
- installation of glass fiber-reinforced polymer (GFRP) and topcoat for future corrosion protection
- implementation of land and natural resource management plan

COMMUNICATION

Information sharing took place through a communications plan developed by the design-build team. The plan established DC Water as the single-point-of-contact among key stakeholders and the team during project pre-planning. This was necessary because of the number of external stakeholders, and it streamlined communications by preventing multiple channels of conversations, reducing the risk of misinformation and/or redundant communication.

During the construction phase, communication was led by the project team and centralized to a platform accessible by all parties. Daily status updates were uploaded to inform all parties of the project's progress. The logs kept stakeholders and team members up to date on current project deliverables, challenges, and newfound conditions. It also allowed the team to submit requests for information outlining reasons for changes in scope and to transparently track the remaining balance of allowance.

CHALLENGES

The team encountered and overcame many challenges throughout the construction process and added value by successfully managing through them. For example, when the project team initially went on site, they identified higher-than-expected water levels in the stream. The work was adjacent to a critical United States Naval Academy research field and, at the time, the access roads necessary to complete the project had not been established. Another challenge was the original scope included building out a new foundation; however, site conditions made a typical concrete mix unsuitable for the application and the existing

Fig. 2: To provide support for the addition of new piers, a 20-inch-thick foundation was placed on the north and south side of the crossing. Five new concrete piers on piles replaced in-situ piers. New stand-alone piers were installed adjacent to the stream and designed to support the load of the existing piers should they deteriorate

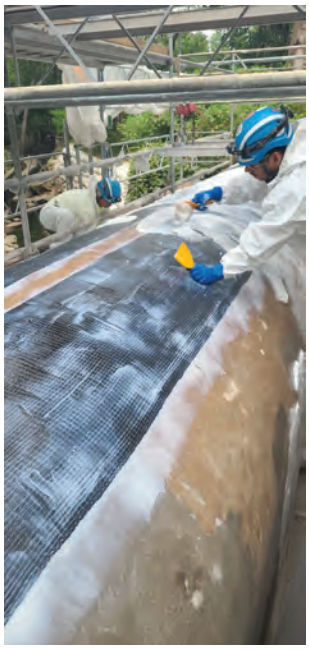


Fig. 3a: State-of-the-art CFRP and GFRP systems were installed to strengthen the unsupported span overtop the creek

Fig. 3b: Crews installed CFRP and GFRP systems on the exterior of the aerial sewer

substrate of the aerial sewer was found in detrimental condition.

To overcome these challenges, the team collaborated with project stakeholders and DC Water to find alternate solutions. The engineer of record and concrete supplier developed a special mix design and used a 200-ft boom truck to pump the concrete, first creating footing for emergency shoring (Fig. 2). The geometry of the structure made gunite the preferred approach to material placement, saving time and money in comparison to conventional concrete formwork. The team also utilized crack injection followed by CFRP to strengthen tension zones, which was less disruptive to the work area and structure than doweling in new reinforcement (Fig. 3a and 3b).

Additionally, new standalone piers were built next to the existing ones because they were not structurally sound. A custom containment was built to prevent construction materials from contaminating the stream, protecting the natural environment around the work site piers. The team also continuously adjusted micropile placements and design specifics as site constraints were identified (Fig. 4).

SAFETY AND QUALITY

Safety was designed into the project from start to finish. The team developed a project-specific safety plan to address personnel, environmental, and end use safety. The critical structural safety components of this project were addressed before work began to keep workers safe throughout the implementation phase. A pre-project site visit was performed to identify safety hazards, including potential for storm surges in an active stream, wildlife encounters, heat, and sudden embankment failure. Due to concerns over the pipe's structural integrity, the team installed emergency shoring to stabilize the structure.

Safety for the end-user and environment was also a significant consideration on this project. The team prioritized engineering controls that both increased worker safety and decreased disturbance to the environment (Fig. 5).

Proper quality assurance and quality control were paramount to the successful design and delivery of the project, and each member of the team had a track record of technical achievement, solution building, and high customer satisfaction with implemented projects. The approach to quality management followed DC Water's requirements, while also meeting with local codes.

RESULTS

The design-build approach created synergy throughout the project lifecycle, enhancing the team's ability to quickly react to and overcome changed field conditions without schedule delays. After over 5,000 manhours, the project was successfully completed on time, within the set budget, and with zero OSHA recordable incidents.

The Hickey Run Aerial Sewer Crossing project embodied several characteristics that contributed to enhancing the built environment and, in this case, enhancing the natural "unbuilt" environment at the National Arboretum (Fig. 6). The collaborative power of design-build delivery allowed the project to be successful. The need for the emergent

Fig. 4: Micropiles were installed to stabilize the aerial sewer's foundation and tied into the newly placed concrete enlargement of the foundation

Fig. 5: To prevent dust generation and potential contamination of the stream, crews used garnet mist blasting instead of sandblasting

Fig. 6: The left-side view of the completed aerial sewer crossing

Fig. 7a: A view of the aerial sewer from above, spanning across the Hickey Run Creek

Fig. 7b: The design-build approach allowed the team to collaboratively develop a multifaceted solution for the renewal of the five piers and pipe encasement

repair to the sewer crossing necessitated a high level of communication and collaboration throughout the entire project. Multiple stakeholders, anchored by DC Water, worked closely with the design-build team in a collaborative way.

Renewal of existing infrastructure, instead of replacement, is a pillar of sustainability, and the team delivered a design that will keep the sewer crossing in place and operating safely for years to come. Replacing Hickey Run would have had an exponentially-factored increase in the impact to the environment at the National Arboretum site. The developed solution was tailored to increase the sustainability of the built environment of the existing sewer asset and, in this case more importantly, the unbuilt environment and the beautiful natural surroundings (Fig. 7a and 7b).

DC Water Aerial Sewer Crossing at the National Arboretum

SUBMITTED BY
STRUCTURAL
Columbia, MD

OWNER
District of Columbia Water and Sewer Authority
Washington, DC

PROJECT ENGINEER/DESIGNER
Structural Technologies
Columbia, MD

REPAIR CONTRACTOR
STRUCTURAL
Elkridge, MD

MATERIALS SUPPLIER/MANUFACTURER
Structural Technologies
Columbia, MD

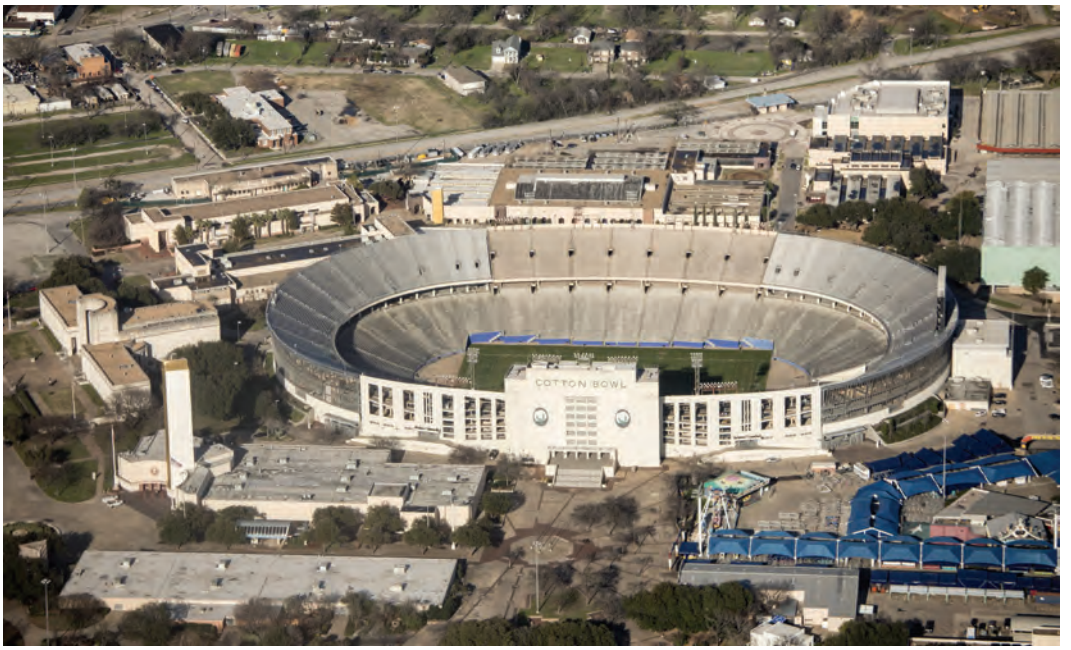
AWARD OF EXCELLENCE

LONGEVITY CATEGORY

Renovation of the Cotton Bowl

DALLAS, TEXAS

SUBMITTED BY JQ ENGINEERING, LLP



The Cotton Bowl

OVERVIEW

Located in the National Historic Landmark District known as Fair Park in Dallas, Texas, the first portion of The Cotton Bowl was constructed in 1930. The 46,200-seat stadium was known as "Fair Park Stadium," and, at the time, was the largest stadium in the South.

The original ("Lower") bowl was constructed on grade, with a grassy berm surrounding the stadium. It is thought that the original construction consisted of wood treads and risers, supported on concrete raker beams. At some point, the Lower Bowl was reconstructed in concrete cast on-grade, possibly in 1936, when Fair Park Stadium was incorporated into the Texas Centennial Exposition, the centerpiece for the celebration of Texas' first 100 years. That same year, Fair Park Stadium was officially renamed as "The Cotton Bowl."

INTRODUCTION

In 1948 and 1949, major expansions extended the lower level of seating by 17 rows, added plank-formed, cast-in-place concrete upper decks on each side, new cast-in-place concrete pedestrian ramps, lower and upper-level covered concourses and a new press box. This brought capacity of the Cotton Bowl to 72,000.

In 2006, as part of a unique and cooperative effort with the City of Dallas, the State Fair of Texas pledged $20 million to fund the first phase of the renovation of the Cotton Bowl. This phase included the removal and replacement of the seating, concrete repairs and waterproofing, a new scoreboard and video replay screen, and the design of the improvements scheduled for Phase II, to be funded by the City of Dallas. The concrete repair and waterproofing portions of the work began immediately upon completion of the Cotton Bowl Classic football game on January 1, 2007, and were completed in time for the opening of the State Fair of Texas and the annual football game between Texas and Oklahoma in September 2007.

CONDITION ASSESSMENT AND EVALUATION METHODS

The first step of the repair process involved performing a complete condition assessment of

the concrete surfaces. Years of moisture intrusion, coupled with a failure to provide adequate funding for maintenance and repair, had taken its toll on the oldest sections of the Cotton Bowl—the original "Lower Bowl." Cracks, spalls, and previous inadequate repairs were visible in virtually every section of the stadium. In addition, severely eroded steps in aisle ways and unevenness across expansion joints in the seating areas posed potential trip hazards for patrons. Unsealed expansion joints allowed water to penetrate into critical service areas such as concession stands, food storage areas, and restrooms. Spalling concrete from elevated structures could come loose and fall on unsuspecting patrons at any time (Figs. 1a and 1b).

Petrographic analysis and air content testing performed on the sample cores revealed significant carbonation of the concrete surface, micro-cracking, and an inadequate air void system in the oldest sections of concrete at the "Lower Bowl." In its report, the testing lab deemed the durability of the concrete surface to be, in a word, "poor." Fortunately, the newer, structured sections of the Cotton Bowl, added in 1948 and 1949, were in somewhat better condition.

The potential for excessive moisture vapor emission prevented the protection of the 49 rows of seating cast on-grade at the "Lower Bowl" by means of a membrane-forming deck coating system. The Engineer determined that resurfacing the treads and risers using a trowel-applied, breathable, polymer-modified repair mortar containing an integral corrosion inhibitor provided the best means of protection for these concrete surfaces. The elevated portions of the concrete structure would be repaired, then protected using a waterproof deck coating system. Expansion joints in the seating areas would receive two layers of protection, while the expansion joints at the ramps would be outfitted with a traffic-grade system, due to the extensive use of motorized vehicles.

REPAIR SYSTEM SPECIFIED

All removal geometry, surface preparation, application methods, measurement and testing were specified to be in accordance with ICRI Guidelines. The scope of work and material specifications included the following:

1. Horizontal repair of concrete <1" in depth and overhead repairs
2. Horizontal repair of concrete >1" in depth
3. Repair of cracks in concrete
4. Pedestrian Traffic Deck Coating System
5. Expansion joint system at seating area
6. Expansion joint system at ramps and concourses
7. Wall coating
8. Quality assurance to include post-placement, visual inspection
9. Sounding of repairs and overlay
10. In-situ adhesion testing of the cementitious overlay material to the substrate in accordance with ICRI Guideline No. 210.3R

PROJECT INSTALLATION

Visual inspections and random soundings of the repairs were made during the entire course of the project (Fig. 2), to ensure that the Owner would be provided with a quality installation. In addition, in-situ pull-off tests, performed in accordance with ICRI Guideline 210.3R, tracked and documented the quality of the cementitious overlay installation (Fig. 3a and 3b). Test locations and results were documented on a spreadsheet and reviewed at the monthly project coordination meetings.

MAJOR CHALLENGES AND UNFORESEEN CONDITIONS

Major project challenges included careful planning and coordination of the seating and repair contractors' operations to maximize efficiency and phasing of the work in an extremely tight construction schedule. Detailed pre-planning of this orchestrated effort paid significant dividends by avoiding potentially disastrous delays.

By completing a thorough condition assessment, the Engineer significantly reduced the number of unforeseen

Fig. 1a: Corroded reinforcing steel resulted in spalling of the concrete, posing a significant hazard to patrons below


Fig. 1b: Typical deteriorated concrete surfaces at the "Lower Bowl"


Fig. 2: Sounding of concrete at underside of Upper Deck prior to installation of repair mortar

Fig. 3a: Applying cementitious overlay to horizontal and vertical surfaces at the "Lower Bowl"

Fig. 3b: Concrete surfaces at the Upper Deck protected by pedestrian traffic deck coating system

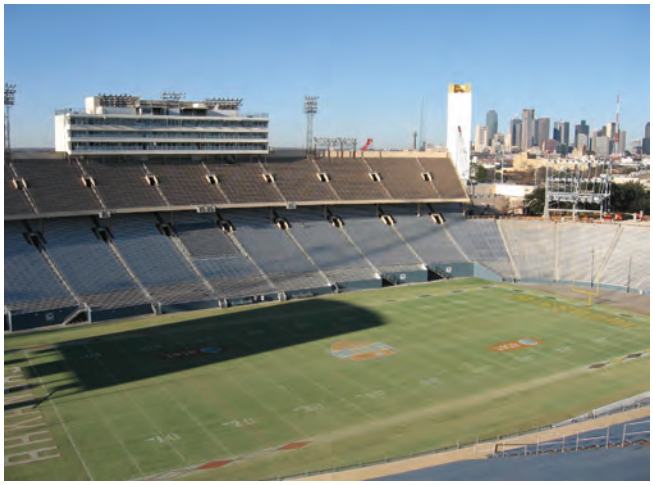


Fig. 4: 2007 project completion at the Cotton Bowl

Fig. 5: 2022 view of current conditions at the Cotton Bowl

conditions encountered during the course of the work. However, at three locations in the "Lower Bowl," the existing concrete was found to be so severely deteriorated that repair was deemed unfeasible. At these locations, it was determined that the concrete had to be removed and replaced with new, high-early strength concrete.

OUTCOME AND FUTURE

Phase I repairs were so successful, the stadium underwent a complete renovation and seating expansion to 90,900 spectators in 2013. As a historically significant venue, renovations allowed the structure's design to remain true to its record-breaking glory days (Fig. 4). The 2007 Phase 1 repairs have served to correct structural deficiencies, protect the concrete structure from deterioration and significantly prolonged the life expectancy of this historic structure (Fig. 5). As of June 2022, the Cotton Bowl stadium was part of the City of Dallas' successful bid for the 2026 World Cup soccer matches that further highlights the continued beneficial use and vitality of the stadium.

The Renovation of The Cotton Bowl, Phase 1, Fair Park I

SUBMITTED BY
JQ Engineering, LLP
Dallas, TX

OWNER
City of Dallas
Dallas, TX

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MATERIALS SUPPLIERS/MANUFACTURERS
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Lyndhurst, NJ

LymTal International, Inc.
Lake Orion, MI

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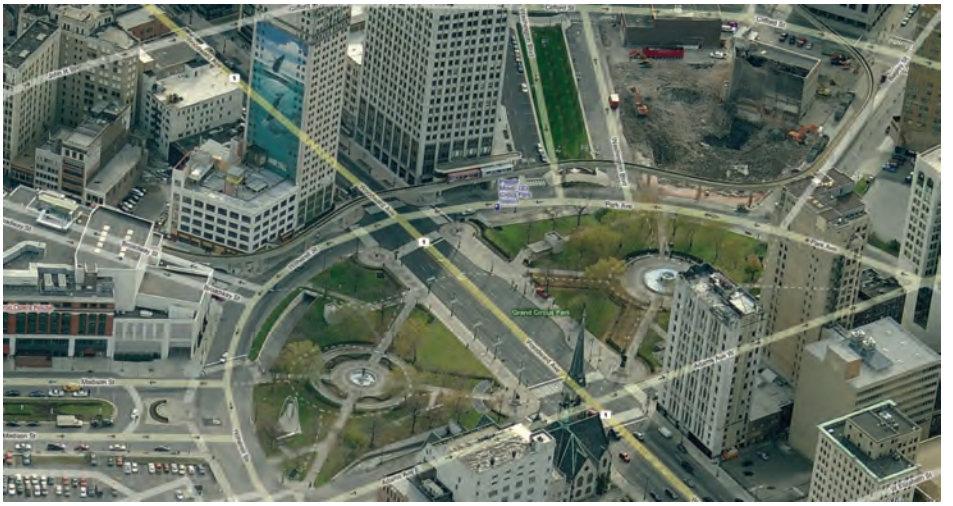
AWARD OF EXCELLENCE

PARKING STRUCTURES CATEGORY

Grand Circus Park

DETROIT, MICHIGAN

SUBMITTED BY PULLMAN



Grand Circus Park

BACKGROUND

Located in the heart of Detroit, Grand Circus Park, a 5-acre public park, was established in 1860 and is comprised today of landmarks such as Ford Field, Little Caesars Arena, and the Detroit Opera House. Underneath the Park area is the Grand Circus Parking Garage, providing 900 parking spaces across 400,000 square feet of surface area. Built in 1955, the garage is divided into two sections connected by an underground tunnel (Fig. 1).

Over time, the garage experienced significant deterioration due to corrosion and lack of maintenance over its 60+ year lifespan. It was acquired by Grand Circus Holdings, who recognized the garage required significant repair to make it safe and operable for long-term revenue generation.

The Owner brought in a General Contractor for emergency repairs along with an Engineering inspection team to investigate existing conditions and determine the root cause of deterioration. The Team determined that partial depth repairs of designated areas of the concrete, including replacement of the steel reinforcement as necessary, along with a new traffic coating system, was necessary to correct the deterioration and provide long-term protection to the garage. Design-build delivery was selected for several reasons, including expediting the schedule, maximizing use of budgeted funds, and to achieve the Owner's objective of keeping the garage operational during repairs.

APPROACH

The Project Team (General Contractor and Engineer of Record) was selected due to their extensive experience addressing deteriorated concrete structures, expert-level understanding of how to approach design-build projects and prior partnering success. The Project Team was given the initial inspection documents and performed additional investigation to further develop and refine the repair design and budget. The next level investigation to identify the optimum repair design was in-depth and included visual inspection, hammer sounding, chain dragging, and ground penetrating radar (GPR). From this condition survey and subsequent materials testing, a structural analysis was completed as part of preparing the comprehensive repair design.

Because of the design-build delivery selected, the Project Team was able to begin working on preliminary design, constructability considerations, acquiring permits, preliminary

sequencing and scheduling, and other construction pre-planning simultaneously during the investigation phase. This included demolition planning (Fig. 2) and was expedited with immediate approval and permitting so the work in the field could begin. The Project Team was able to work together to perform technical and construction tasks that created the shortened path to completion.

The repair scope of work included:

- Partial depth slab repairs
- Full depth slab replacements
- Partial depth column repairs
- Partial depth wall repairs

Along with the structural repairs, the Project Team managed the following other building modifications:

- Replacement of the fire suppression system
- Repairs to the HVAC system
- Upgraded lighting
- Repair of the elevator system
- Complete upgrade of stair towers
- Upgraded signage

Additionally, the Project Team installed a new traffic waterproof membrane. By the completion of the project, over 40 different subcontractors and consultants worked together to implement the parking structure repair and upgrade.

CHALLENGES

As with most repair and renovation projects, there were unforeseen challenges that had to be overcome throughout the duration of construction. The most impactful of these was a condition within the slabs discovered in the early stages of the project. Based on the distressed areas of the slabs observed during the investigation, the project approach was developed and budgeted based on performing isolated concrete repairs (both full-depth and partial-depth) as required.

Another challenge was that a widespread partial depth removal and overlay had been performed about 20 years prior, with a separation that was present at the bond interface in many areas beyond what was planned for repairs (Fig 3). The resulting increase in repair quantities to capture this separation issue would have created a substantial budget and contingency overrun., The Project Team was tasked with developing a solution to fit within the current project budget. Because of the design-build approach, the team was able to efficiently evaluate multiple options, and ultimately came to an “outside the box” solution. To address the significant increase in repair quantities needed, the team developed and implemented a new method of repair that involved replacement of multiple contiguous bays (defined by a typical 27’ square column to column grid) in lieu of isolated repairs (Fig. 4). This required a process of re-design by the structural engineer and shoring engineer, performance of a mock-

Fig. 1: Grand Circus Garage prior to renovation

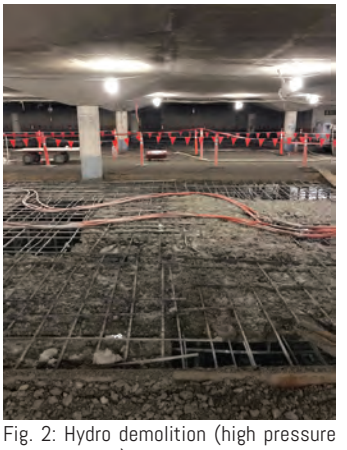


Fig. 2: Hydro demolition (high pressure water blasting) was used to remove concrete

Fig. 3: Separation plane between past repair and original concrete

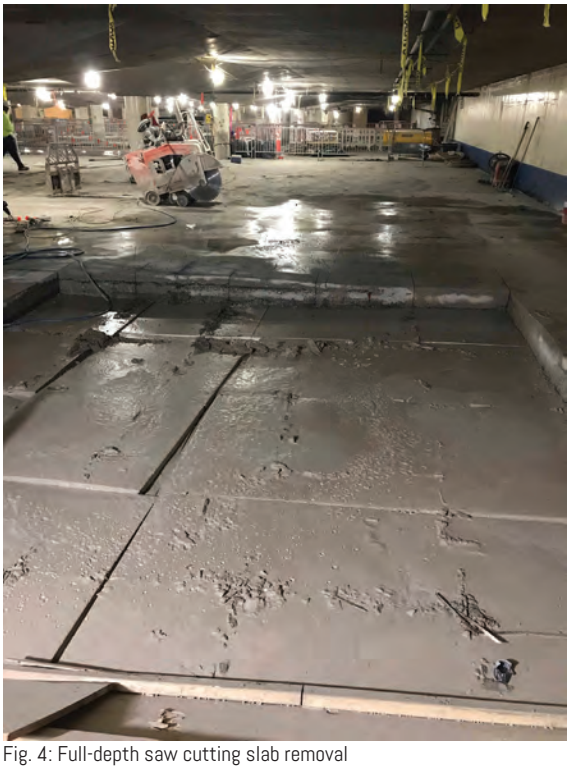


Fig. 4: Full-depth saw cutting slab removal

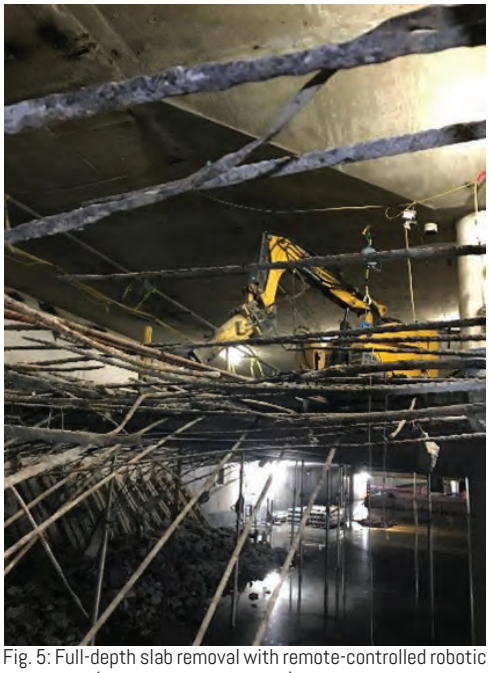


Fig. 5: Full-depth slab removal with remote-controlled robotic equipment (and lateral wall shoring)

Fig. 6: Concrete surface preparation prior to placement

Fig. 7: Grand Circus Garage at completion of repair and upgrade project

up repair, additional subcontractors, re-evaluation of debris disposal, and acquisition of a substantial amount of new equipment such as the slab shoring system and machinery to transport the removed slab sections, among other adjustments (Fig. 5 and 6).

This in-depth problem solving and re-design, all took place concurrently with the first phase of the project work and the new solution was kicked off immediately at the start of the second phase. This change, in conjunction with phasing adjustments, allowed for an additional 15% of the total elevated slab area to be repaired within the established budget, and the overall project schedule was reduced from 24 months to 20 months. The result and benefit provided to the Owner was an earlier return to full revenue-generating capacity and added longevity to the structure due to additional full-depth repair performed.

RESULTS

The Project Team at Grand Circus worked a total of 140,000 job hours, placed 5,000 cubic yards (3,823 cubic meters) of concrete and 600 tons of new steel reinforcement, along with many other enhancements to the structure that is vital to Detroit's premier venues. There were zero OSHA recordable incidents on the project, and this is the highest level of success. Using the collaborative benefits of design-build delivery, the Project Team was also able to reduce the timeline by 5 months.

The Grand Circus Parking Garage project was a success because the Owner, General Contractor, and Engineer of Record worked together as a team to develop and implement the repair and renovation necessary to extend the service life of this important structure. The end result provided the Owner and City of Detroit a restored garage to provide safe, well-lit parking in a convenient location (Fig. 7).

Grand Circus Park Garage

SUBMITTED BY
PULLMAN
Swedesboro, NJ

OWNER
Grand Circus Holdings, LLC
Detroit, MI

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

REPAIR CONTRACTOR
PULLMAN
Trenton, MI

MATERIALS SUPPLIERS/MANUFACTURERS
Structural Technologies
Columbia, MD

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AWARD OF EXCELLENCE

WATER STRUCTURES CATEGORY

Columbia Boulevard Wastewater Treatment Plant

NORTH PORTLAND, OREGON

SUBMITTED BY SIKA CORPORATION

Columbia Boulevard Wastewater Treatment Plant

HISTORY

The Columbia Boulevard Wastewater Treatment Plant (CBWTP), located in North Portland, Oregon serves a population of approximately 600,000 people every hour of every day. Built in December 1970, this wastewater treatment facility services the entire city of Portland with approximately 70 million gallons of water. On rainy days, this powerhouse can service up to 450 million gallons of water per day.

Located at 5001 N. Columbia Boulevard, the Columbia Boulevard Wastewater Treatment Plant has eight main aeration basins that are approximately 20,000 square feet each in size and has a dimension of 21 x 42 x 386 ft (6.4 x 12.8 x 117.7 meters) per basin (Fig. 1). This facility has been in use since the completion of construction.

PROJECT PURPOSE

As part of this project, six aeration basin structures were thoroughly evaluated for cleaning, maintenance, and various repairs. These evaluations, consisting of visual assessments and material tests, in conjunction with past condition assessments, resulted in a recommended plan for remediations with major repair work started in 2016 (Fig. 2).

The repair process was split into two main elements of short-term maintenance repairs and long-term life extending rehabilitation and protection. Various techniques and materials were explored for each repair dependent on the situation.

For short-term maintenance repairs, scheduling was spread over the course of the following one to three years while basins were emptied alternatively. The protection expectancy for short-term repairs was approximately 10 years. The suggested short-term repair processes to tackle important areas in common maintenance projects included:

- Crack injection repair with a pressure injected epoxy used to seal any gaps or cracks in the concrete.
- Joints where water leakage or infiltration could happen.

- Point repair of control joints in limited concrete wall movement utilizing flexible membranes or hydrophilic water seals installed into the joints.
- Exposed and corroded reinforcing steel repairs with a protective coating.
- Spall repair using a cementitious repair mortar.
- Large gap repair of eroded sections between slabs and wall pilasters utilizing a non-shrink cementitious grout.

For the long-term rehabilitation and protective methods, the primary objective was to prevent further deterioration of the interior walls of the basins from erosion/chemical attacks. The subcontractor ultimately went with hydro-demolition to remove any damaged concrete utilizing highly pressurized water shot to create an even surface. A specialized custom hydro-demolition machine was created specifically for this project's needs and streamlined efficiency within repair techniques (Fig. 3a and 3b).

SELECTED REPAIR MATERIALS

Multiple materials and systems were evaluated through side-by-side onsite mockups. A cementitious pre-packaged shotcrete repair material was selected for a wet spray application to speed up the application of over 20,000 square feet per basin. The shotcrete material was sprayed onto the walls to achieve a smooth uniform surface while the integral corrosion inhibitor of the selected product allowed a further step in protecting reinforcement steel (Fig. 4a and 4b).

Once the cementitious material was fully cured, a high-build epoxy coating was utilized to protect these areas from future deterioration (Fig. 5). This system can be revisited to apply additional coats as required for future maintenance.

A post-rehabilitation monitoring program was recommended after the major repair work was completed to quantify the future effects of erosion and chemical attack. One key method incorporated white light scanning every five years to help determine the amount of surface erosion on the wall coatings. Overall, the life expectancy of the protective coatings could be extended indefinitely if there is consistent maintenance paired with coating refurbishment or reapplication approximately every 20 years.

CHALLENGES

No project is completed without its fair share of challenges and scope changes. As previously stated, this facility operates around the clock, servicing more than half a million

Fig. 1: Aerial view of the aeration basins during operation

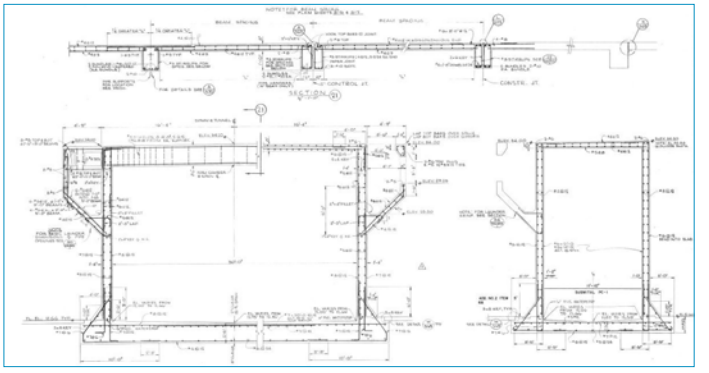


Fig. 2: Excerpt from original construction details on basin dimensions

Fig. 3a: Custom hydro-demolition machine in usage

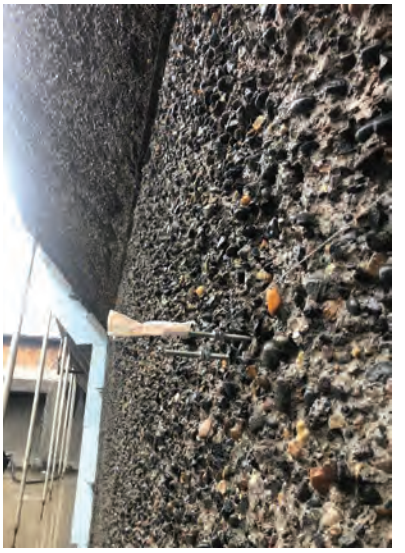


Fig. 3b: Post hydro-demolition wall surface

Fig. 4a: Shotcrete material actively sprayed

Fig. 4b: Completed wall application of shotcrete

Fig. 5: Applied epoxy coating

Fig. 6: Completed basin repairs in usage

customers, and its continued service should be disrupted as little as possible. To do so, a comprehensive schedule was created with basin outage times in mind during repairs. The first completed full rehabilitation was performed on Basins 7 and 8 in the summer 2021. There was a tight timeline of five months to stage, prepare, and install repair materials all to the owner's satisfaction prior to return to service.

With rising temperatures and limited access to certain areas, adaptability to the environment was crucial in the staging. Certain product properties and installation were dependent on staying within a desired temperature range of 45 degrees to 95 degrees Fahrenheit. Summer heat swings fluctuated application windows and with the persistence of the contractor in conjunction with the material manufacturer, certain measures were put in place to ensure the product was applied according to product guidelines. Testing protocols were enacted to monitor product consistency and that material properties were meeting the values given on the product data sheets.

SUPPLY CHAIN WOES

With the supply chain snags in today's climate, material production and supply presented another challenge. By providing an approximate material usage volume per week, a consistent delivery schedule was implemented to ensure on time applications. Coordination and communication between the consultant engineers, installation contractors, and material manufacturers were essential in overcoming this ever-changing challenge.

MONEY, MONEY, MONEY

Aside from environmental constraints and challenges, there are always the constraints of budget. The approximate cost of rehabilitation for each pair of basins, including wall preparation, resurfacing, installation of a temporary moisture barrier, and a polymer wall coating, were estimated at $775,000 ($3,100,000 for all eight basins). Rehabilitation costs were based on today's dollars and the current condition of the basins.

Cost for future rehabilitation may increase with the expected continued deterioration of the basins. Therefore, adjustments to cost for future rehabilitation should be budgeted accordingly.

CONCLUSION

The timeline to complete this scope of work will take an estimated four years, targeting two basins per working year. Each tank has its own challenges, but the overall repair process is applicable to the entirety of the project. The completed Basins 7 and 8 prove to show promising consistency of future applications. If the schedule is maintained according to plan, the CBWTP will be rehabilitated properly with extended life cycles looking to service the city of Portland for years to come.

Columbia Wastewater Treatment Plant

SUBMITTED BY
Sika Corporation
Lyndhurst, NJ

OWNER
City of Portland Columbia Blvd. Wastewater Treatment Plant
Portland, OR

PROJECT ENGINEER/DESIGNER
Jacobs
Corvallis, OR

REPAIR CONTRACTOR
Kiewit Infrastructure West Co.
Portland, OR

MATERIALS SUPPLIER/MANUFACTURER
Sika Corporation
Lyndhurst, NJ

AWARD OF MERIT

HISTORIC CATEGORY

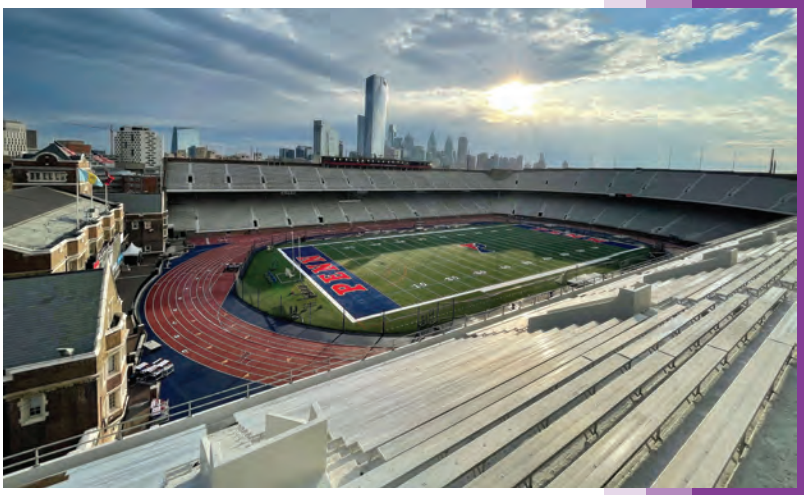
Franklin Field: Restoring America's First Modern Football Stadium Phases 2 to 6

PHILADELPHIA, PENNSYLVANIA

SUBMITTED BY CVM ENGINEERS

Franklin Field was originally constructed in 1895 as a venue for athletic events. The lower section of reinforced concrete bleachers was added in 1922, and the steel-framed upper grandstands added in 1925. The addition of the upper grandstands created the first modern, two-tiered football stadium in the United States. Since 1925, Franklin Field has hosted Ivy League sporting events, political events, NCAA Championships, Philadelphia Eagles games, University commencement, and the Penn Relays. After nearly a century of service, the reinforced concrete in the upper and lower grandstands had deteriorated and needed a comprehensive restoration to extend the service life of the structure. This submission addresses Phases 2 to 6 of the restoration program, that were completed between June 2019 and January 2022.

Development of the restoration plan required evaluation of the performance of prior repairs, review of repair options, owner consultation to gauge tolerance for future maintenance, and to determine the owner's desired service-life of the repaired structure. These discussions led to a restoration plan designed to provide a minimum expected service-life of 25 years, with routine condition surveys, maintenance, and replacement of sealants and coatings over time. The repair design for Franklin Field was developed in accordance with the requirements of ACI 562–16.



Extensive repairs were required to address concrete spalling due to reinforcing steel corrosion, most of repairs located at or adjacent to previous repairs. Repairs were largely designed to be full depth, with the repair material selected to match the original concrete properties. Access limitations at the stadium resulted in all repairs being completed using pre-packaged concrete materials, placed by hand, largely using 5-gallon buckets for concrete transport. The project had an overall budget of $38.3M and was completed on time in January 2022 at a total cost of $37.2M.

Franklin Field: Restoring America's First Modern Football Stadium Phases 2 to 6

SUBMITTED BY
CVM Engineers
King of Prussia, PA

OWNER
Trustees of the University of Pennsylvania
Philadelphia, PA

PROJECT ENGINEER/DESIGNER
CVM Engineers, Inc.
King of Prussia, PA

REPAIR CONTRACTOR
PULLMAN, SST, Inc.
Swedesboro, NJ

CONSTRUCTION MANAGER
JJ White, Inc.
Philadelphia, PA

MATERIALS SUPPLIER/MANUFACTURER
Vector Corrosion Technology, Inc.
Tampa, FL

AWARD OF MERIT

LONGEVITY CATEGORY

Bayshore Boulevard Balustrade Restoration

TAMPA, FLORIDA

SUBMITTED BY SIKA CORPORATION

Bayshore Boulevard in downtown Tampa has the distinct honor of being the longest continuous sidewalk in the world. Supporting this 5-mile-long sidewalk is a concrete seawall built as a protection from the Tampa Bay water. On top of the seawall sits a 5-mile-long ornate reinforced concrete balustrade (decorative railing) as a safety measure for the users of this long sidewalk.

The combination of saltwater exposure and lack of maintenance had taken its toll on the concrete balustrade. From settlement to corrosion, this structure had all the problems that one could expect of a structure that was not maintained as it should have. Being close to the water made the damages more severe. Because the city was chosen to host a prestigious national event in 2012, the city administration took the challenge of restoring and improving this extraordinary landmark.

When originally restored a decade ago, this project had its share of challenges. Some of the noticeable challenges included matching of the original balustrade, designing special scaffolding, on-site tinting of a special color coating, keeping the sidewalk operational during construction and the car accident right after the project completion. Due to the great advancement in technology that the repair industry has now to offer, this national and international landmark has now been restored for future generations.

Structures like these are of national importance to us a country. We live in an age where sustainability is paramount to all what we do. We know that concrete repair is nothing but an extension of true sustainability as we can extend service life of what has already been built. And to top that, if repairs can withstand the test of time and service life, these projects are the true standing ambassadors of our industry and deserve due recognition.

Bayshore Boulevard Balustrade Restoration

SUBMITTED BY
Sika Corporation
Lyndhurst, NJ

OWNER
City of Tampa
Tampa, FL

PROJECT ENGINEER/DESIGNER
Weber and Tinnen PA
St. Petersburg, FL

REPAIR CONTRACTOR
C.A. Lindman of South Florida, LLC
Pompano Beach, FL

MATERIALS SUPPLIER/MANUFACTURER
Sika Corporation
Lyndhurst, NJ

AWARD OF MERIT

LONGEVITY CATEGORY

Bellaire Tower—The Jewel of Russian Hill

SAN FRANCISCO, CALIFORNIA

SUBMITTED BY SIKA CORPORATION

Bellaire Tower, located at 1101 Green Street, San Francisco, California, sits at the top of Russian Hill. The Tower, known as the "Jewel of Russian Hill," was designed by architect HC Baumann, a prolific San Francisco architect who designed over 400 apartment buildings and hotels during his career. Built in 1930, it was one of the first post-earthquake (1906) residential high-rise buildings in San Francisco constructed to new seismic codes. The Tower performed extremely well in the 1989 Loma Pieta earthquake. Bellaire Tower is a San Francisco Landmark; unfortunately, in the last 20 years, it also has had the dubious fame of being the luxury building with the most water leaks in the Bay Area.

The Art Deco building had a long history of poor maintenance. The primary problem was water leakage in and around the windows. Over the past 25 years, the building was recoated several times resulting in the accumulation of over 90 mils of non-breathable coating(s) over the concrete. Spalling of the concrete resulted in both a safety hazard and an unsightly appearance of a high-profile building.

Bellaire Tower—
The Jewel of Russian Hill

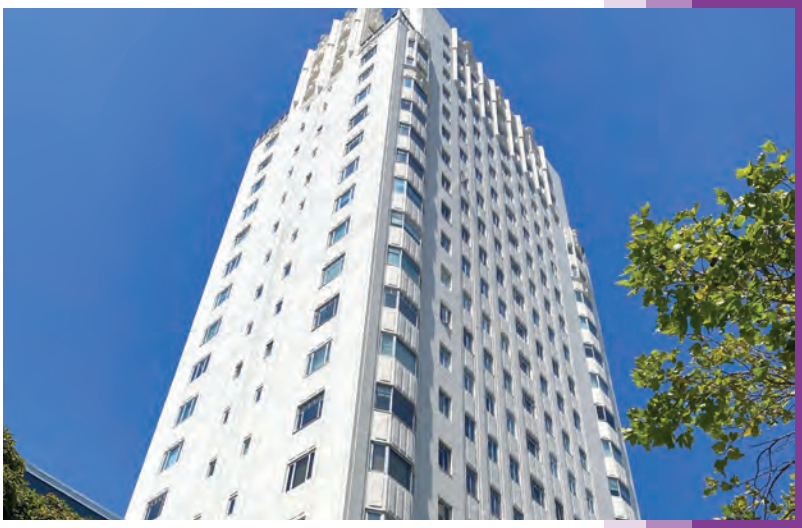
SUBMITTED BY
Sika Corporation
Lyndhurst, NJ

OWNER
The Bellaire Homeowner Association
San Francisco, CA

CONSULTANT
JFM Enterprises Inc.
San Francisco, CA

REPAIR CONTRACTORS
Everest Waterproofing & Restoration, Inc.
San Francisco, CA

MATERIALS SUPPLIER/MANUFACTURER
Sika Corporation
Lyndhurst, NJ



A thorough mock-up was completed in 2004. The repair project started in spring 2007 and was completed in summer 2010. The extensive work included removing and abating the existing, built-up coatings, concrete repair work, corrosion protection, restoration, or replacement of over 600 windows, followed by the application of new sealants and coatings. The Board was so pleased at the conclusion of the project that the President was overheard saying, "The building is sound, waterproofed, and looking great. The Jewel of Russian Hill is reborn and looking better than ever."

This submittal illustrates how the longevity of a restoration project completed between 2008 and 2010 using industry best-practice methods has stood the test of time.

AWARD OF MERIT

MASONRY CATEGORY

Henry County Courthouse Exterior Restoration

CLINTON, MISSOURI

SUBMITTED BY CONCRETE & MASONRY RESTORATION CO., INC

The Henry County courthouse has been an architectural landmark that stands as a testament to the county's rich history. This project provided a broad assessment of masonry restoration techniques on a variety of architectural details. The elements needing restoration included projected banding courses, eyebrow arch details, rock-faced features, window jambs, gable details, and round mullions. The project scope consisted of the following: cementitious coating removal, solid repointing stone-to-stone mortar joints, stone patch carving, stone replacement, Dutchman repairs, redress of the rock faced stone units with minor deterioration, stone crack repairs utilizing dispersed hydrated lime injection, window frame sealant removal, window frame sealant replacement, cut stone coating installation, window frame painting, and removal of the stone biofilm staining.

Materials were ordered from a company specializing in the type of work being done, and the contractor collaborated with a preservation consultant to ensure proper preservation techniques were applied. Excellent craftsmanship is noted in the reconstruction of round window jambs and arches along the south elevation. Specialized tools, techniques, and onsite training were used to ensure a proper Dutchman repair and workmanlike execution. The quality, color, texture, and finish were all executed with meticulous care, especially where lime mortars were used.

Henry County Courthouse is not only impressive in its entirety but equally as impressive in the fine details that all craftsmen are familiar with. In addition to the techniques used, several technical details were given careful attention for this historical preservation project. The timing, sequencing, and season in which the work was performed were all taken into consideration to implement this restoration. Thanks to our craftsmen and their commitment to learning new techniques that ensured careful attention toward both design and function, a fine-detail oriented project of this scope was successfully executed.

Henry County Courthouse Exterior Restoration

SUBMITTED BY
Concrete & Masonry Restoration Co., Inc.
Kansas City, MO

OWNER
Henry County Courthouse
Clinton, MO

PROJECT ENGINEER/DESIGNER
Speweik Preservation Consultants, Inc.
Elgin, IL

REPAIR CONTRACTORS
Concrete & Masonry Restoration Co., Inc.
Kansas City, MO

MATERIALS SUPPLIER/MANUFACTURER
US Heritage Group
Chicago, IL

Sturgis Materials, Inc.
Kansas City, KS

AWARD OF MERIT

PARKING STRUCTURES CATEGORY

Hampton Plaza

TOWSON, MARYLAND

SUBMITTED BY CONCRETE PROTECTION & RESTORATION, INC.

Located in downtown Towson, Maryland, Hampton Plaza was built in 1971. The structure consists of two semi-circular buildings, one with several floors of office space and the other with 200 residential apartment units, above the circular plaza level and 5 garage levels. After years of deferred maintenance, the post-tension garage structure needed substantial structural repairs. The main scope of work included partial and full depth concrete slab repairs, structural concrete column, beam and wall repairs, post-tension cable repairs as well as vehicular waterproof coating installation and CIT/sealer application to all elevated parking levels. Other work items included supplemental drain and drain piping, structural slab support angle installation, carbon fiber reinforcement, sealant replacements and new line striping.

There were a lot of operational challenges on this project, including limited parking spaces available per phase and limited hours for demolition or when noisy work was allowed, because both residential and office space occupied the property. Additionally, due to the circular construction of the garage levels, the layout of existing post-tension cables made repairs very complicated.

Operational and schedule challenges, along with increased structural/post-tension repair quantities, resulted in an extended schedule and nearly double contract value. However, the team of contractor, owner, and consultant were able to work together to overcome challenges and value design repairs to cut costs where possible, yet still providing quality work that addressed any structural deficiencies and extended the service life of the garage at Hampton Plaza. Additionally, through communication, coordination, and planning, all 50+ phases of work were completed with no major safety incidents.

Hampton Plaza

SUBMITTED BY
Concrete Protection & Restoration, Inc.
Baltimore, MD

OWNER
Hampton Plaza LLP
Towson, MD

PROJECT ENGINEER/DESIGNER
Morabito Consultants, Inc.
Sparks Glencoe, MD

REPAIR CONTRACTOR
Concrete Protection & Restoration, Inc.
Baltimore, MD

MATERIALS SUPPLIERS/MANUFACTURERS
Aggregate Industries
Severn, MD

Evonik Industries
Parsippany-Troy Hills, NJ

AWARD OF MERIT

WATER STRUCTURES CATEGORY

Patapsco Wastewater Treatment Plant

BALTIMORE, MARYLAND

SUBMITTED BY SIKA CORPORATION

The Patapsco Wastewater Treatment Plant (WWTP), located in Baltimore, Maryland, treats approximately 63 million gallons of wastewater a day and serves a population of approximately 450,000 people. The treatment process includes chlorination and de-chlorination of the wastewater; that is one of the last treatment steps prior to it being discharged at Patapsco River and Chesapeake Bay. Over time the chlorine-contact chambers, that are reinforced concrete basins, experienced deterioration due to a chemical reaction between the chlorine and the concrete, resulting in erosion of the cement paste and loss of large aggregates.

In 2017 the City of Baltimore announced a repair and rehabilitation project for its four chlorine chambers, weir walls, effluent channel, and other structural elements located within the chambers. The contract amount was $7.8M. The project included repairing all large cracks and spalls, repouring of baffle walls, replacing of the expansion joint material, resurfacing the concrete walls with a cementitious repair mortar, and coating the concrete surfaces with a chemically resistant epoxy. Recent inspection after one year of service concluded that the coating was in excellent condition and any ferric chloride residue could be easily wiped off.

The Patapsco WWTP is part of the critical infrastructure for the City of Baltimore. Maintenance of such facilities is not only important to serve the population of the city but to also protect the environment where the treated wastewater is discharged. These types of projects are not only challenging to plan, but even more tasking to implement to ensure a lasting repair. Strong cooperation between all parties involved resulted in a highly successful project that left all parties involved satisfied.

Patapsco Wastewater Treatment Plant

SUBMITTED BY
Sika Corporation
Lyndhurst, NJ

OWNER
Baltimore City Department of Public Works
Baltimore, MD

PROJECT ENGINEER/DESIGNER
EBA Engineering, Inc.
Baltimore, MD

REPAIR CONTRACTOR
Kiewit Infrastructure Company
Wilmington, DE

MATERIALS SUPPLIERS/MANUFACTURERS
Sika Corporation
Lyndhurst, NJ

ICRI SAFETY AWARDS

In 2020, the ICRI Safety Committee completed plans to create a new ICRI Safety Award. Its purpose is to support a culture of safety in the concrete repair industry with the belief that all incidents and injuries can be avoided. The award creates a new way to recognize industry safety best practices, celebrate leaders in our industry, and share those best practices so others may learn and put them into practice.

The first awards were presented at the 2021 Fall Convention Awards Luncheon in Minneapolis, Minnesota. There were two submittals in 2021, both from contractors; and both received awards. The Runner-Up award was given to Restoration Systems, Inc., Chaska, Minnesota, and the President's Award was given to PULLMAN, Monroeville, New Jersey.

This year the committee received a total of six submittals from four contractors, one engineering firm, and one manufacturer. The submittal process requires answers to several questions pertaining to specific safety programs and an overall safety philosophy. Submitters are also asked to upload back-up information to testify to the safety standards they present. There are 15 questions with 7 requiring backup attachments. The information requested covers a wide range of jobsite safety considerations.

After the submittal process was complete, the committee gathered a panel of three judges for the review process. This year's process resulted in a very tight contest. All the candidates provided a complete package of information and all clearly demonstrated an outstanding safety environment in their respective companies. The overall scores ranged from 247.6 to 255 with the highest score awarded to the President's Safety Award Winner.

The judges were very impressed with the submittals. When it was time to discuss what had influenced their scores, the judges had some inspired comments to share:

"All too often I think of construction safety as hard hats, glasses, and fall protection; just what happens on a job site. This year, in reviewing the submissions for the ICRI Safety Award, it was eye-opening for me to see how our members engage in safety as a mainline concern. From the countless hours in preplanning the safe execution of a project, to the genuine concern of contractors for the safety of their workers in the field and the public around their work."

Another remarked, "from the ICRI manufacturers and designers, I was thrilled to see how deep their dedication to safety goes as well. Safety is a concern on the manufacturing facility side as well as with design professionals when they need to perform site inspections and site surveys. It really is all-encompassing. One submitting company sees their trucking fleet as a significant part of their safety program. They actively manage that safety hazard through safe driver training, frequent monitoring, and an internal award system."

A third noted, "construction safety has grown to be so much more than a reflective vest and a pair of gloves; it is a key component to our success."

In short, the submissions and the safety initiatives they encompass clearly show how important this new award is to ICRI and the industry that we represent. The 2022 winners are noted below.

A big thank you goes out to all who took the time to submit for the 2022 Safety Awards, the judging panel for their work, and the ICRI Awards Committee for their support of this program. And to the ICRI 120 Environmental Health and Safety Committee for creating this outstanding award program and the all-encompassing criteria that celebrate industry best practices and improve jobsite and worker safety. Let's double the submittals next year!

SAFETY AWARD 2021

PRESIDENT'S AWARD

PRESENTED TO

PULLMAN

SAFETY AWARD 2021

RUNNER-UP AWARD

PRESENTED TO

RESTORATION SYSTEMS, LLC

SAFETY AWARD 2022

PRESIDENT'S AWARD

PRESENTED TO

SIKA CORPORATION

SAFETY AWARD 2022

EXCELLENCE WINNER

Contractor Category

PRESENTED TO

BAKER RESTORATION AND WATERPROOFING

SAFETY AWARD 2022

EXCELLENCE WINNER

Engineering Category

PRESENTED TO

READ JONES CHRISTOFFERSEN LTD

SAFETY AWARD 2022

MERIT WINNER

Contractor Category

PRESENTED TO

BUCKEYE CONSTRUCTION AND RESTORATION, LTD

CONCRETEREPAIRCALENDAR

NOVEMBER 7–9, 2022
2022 ICRI Fall Convention
Atlanta, GA
Website: www.icri.org

DECEMBER 7, 2022
ICRI Concrete Surface Repair Technician
Live Performance Exam
Dallas, TX
Website: www.icri.org

JANUARY 16–19, 2023
World of Concrete
Las Vegas, NV
Website: www.worldofconcrete.com

JANUARY 31–FEBRUARY 2, 2023
The International Surfaces Event
Las Vegas, NV
Website: www.intlsurfaceevent.com

APRIL 2–6, 2023
ACI Concrete Convention
San Francisco, CA
Website: www.concrete.org

APRIL 17–19, 2023
2022 ICRI Spring Convention
Vancouver, BC, Canada
Website: www.icri.org

PEOPLEONTHEMOVE

CORTEC® CORPORATION ANNOUNCES NEW CHIEF OPERATIONS OFFICER

Cortec® Corporation is pleased to announce the promotion of its Director of Manufacturing, Caleb Pheneger, to the position of Chief Operations Officer (COO). In his new role, Pheneger will be extending his support for projects and operations to Cortec's Canadian subsidiary Bionetix®, in addition to his manufacturing oversight of five Cortec® Corporation plants in the United States.

"Caleb's excellent overall performance is what motivated me to promote him to the position of Chief Operations Officer (COO)," commented Boris Miksic, Cortec® founder and CEO. "I look forward to seeing him lead us to new levels of growth and continual improvement at Cortec® Corporation with his hard work, dedication, and organizational insight. He is one of the most talented chemical engineers I have worked with during my 50 years in the specialty chemical industry manufacturing space, with good understanding of chemical processing, polymer compounding, extrusion, paper-coating technology, and organic synthesis."

Pheneger has a Bachelor of Science degree in Chemical Engineering and has successfully risen to many challenges over the past decade at Cortec®. In 2012, he started working in Cortec® Laboratories as a Technical Services Engineer and soon found himself in the position of Production Manager at Cortec® World Headquarters in 2014. For the last five years, he has overseen manufacturing at all Cortec® U.S. plants.

NICK DAVIS JOINS INTERNATIONAL GROOVING & GRINDING ASSOCIATION AS DIRECTOR OF TECHNICAL SERVICES

The International Grooving & Grinding Association (IGGA) has announced the hiring of Nicholas R. Davis as its Director of Technical Services.

In the newly created position, Davis will join IGGA executive director John Roberts in pursuing the association's goals through the development and implementation of educational and promotional initiatives while providing technical resources and engineering guidance to contracting agencies, consultants and industry partners.

Prior to joining the IGGA, Davis gained six years of experience as assistant engineer at the New York State Department of Transportation (NYS DOT), where he authored specifications and reports, managed a certification program for testing agencies that perform ride quality testing, and managed specification and data collection for the first performance engineered mix (PEM) project in New York State, among other accomplishments. He participates in the Road Profile User Group (RPUG) and National Concrete Consortium (NCC) and was recently selected to be the NCC state representative for the Northeast region. Davis's previous experience includes civil engineering support roles with the City of Troy in Troy, N.Y. and the Absolute Fire Protection company in Selkirk, N.Y.

INDUSTRYNEWS

THE US' LARGEST 3D PRINTED BUILDING PROJECT SO FAR – A TWO STORY HOUSE OF 4.000 SQ FT

- House located in Houston, Texas – home to an increasing no. of 3D printed buildings
- Designed by HANNAH architects, 3D printed by PERI with CIVE as the general contractor using COBOD construction 3D printer

PERI and CIVE is following up with a 2-story building in the US that also doubles as the largest 3D printed residential building so far in the States.

The 4,000-square foot project showcases the possibilities of 3D printing technology, mass customization, and design solutions that integrate conventional construction methods. With a hybridized construction method that combines concrete 3D printing with wood framing, this approach allows the two material systems to be used strategically and aims to increase the applicability of 3D printing in the US, where framing is the one of the most common construction techniques.

The building design is conceptualized as a series of printed cores that contain functional spaces and stairs. The spatial cores are connected by wood framing to produce an architectural alternation of concrete and framed interiors. The project's scalable design and construction process is applicable for multifamily housing and mixed-use construction.

PERI 3D Construction has an extensive record of advancing the implementation of 3D printing in building construction. PERI has completed six projects in Europe and in the US including the first 3D printed home in Germany and Europe's largest 3D printed apartment building..

For more information visit www. cobod.com

EUROPE'S FIRST 3D PRINTED OFFICE EXTENSION IS NOW COMPLETE IN AUSTRIA

- Office building located in Hausleiten, Austria - the country's first 3D printed building
- Designed by Mense-Korte Achitects (Germany), 3D printed by PERI in cooperation with Austrian STRABAG using COBOD construction 3D printer

Europe's first 3D printed office extension has opened in Hausleiten in Austria. The project is a result of a collaboration between the construction technology group STRABAG and the scaffolding and formwork manufacturer and 3D concrete printing pioneer PERI.

The building is a 125 m² office extension to an existing building in Hausleiten.

The shell construction in Hausleiten was completed in around 45 hours of pure printing time.

In 2018 PERI Group acquired a minority stake in COBOD. Since then, both companies have worked closely together to push the boundaries of 3D construction printing. With the printing project in Hausleiten, the PERI 3D printing team have now successfully completed six printing projects with COBOD's 3D construction printers.
For more information visit www. cobod.com

HOLCIM INVESTS IN 3D CONSTRUCTION PRINTING TECHNOLOGY LEADER COBOD

Holcim announces its investment in COBOD International, a global leader in 3D construction printing, to advance world-class 3D printing materials, robotics, and automation together. Building on its collaboration with COBOD since 2019, this investment will further leverage Holcim's innovative range of proprietary ink TectorPrint, tailored for 3D printing. Holcim and COBOD have successfully collaborated on a range of innovative building projects, from 3D-printed windmill tower bases with GE, to the world's first 3D-printed school in Malawi and Africa's largest 3D-printed affordable housing project in Kenya.

Holcim's TectorPrint is an innovative 3D printing ink range that can be tailored for complex applications from residential buildings to infrastructure. Empowering smart design, 3D printing can reduce material use by up to 50% to build more with less with no compromise in performance.

For more information visit www. cobod.com

INTERESTED IN SEEING YOUR NEWS IN THIS COLUMN?

Email your 150-200 word news to editor@icri.org. Content for the January/February 2023 issue is due by December 1, 2022, and content for the March/April 2023 issue is due by February 1, 2023. ICRI reserves the right to edit all submissions.

NEX TO COLLABORATE WITH CANADIAN-BASED REBAR MANUFACTURER MST REBAR INC.

NEx: An ACI Center of Excellence for Nonmetallic Building Materials, announces MST Rebar Inc. as a new Bronze Supporting Member. The organizations will work together to help drive NEx's mission to collaborate globally on the use of nonmetallic building materials driving research, education, awareness, and adoption. MST Rebar Inc. will join Sustaining Members Aramco and ACI, and Gold Supporting Member ExxonMobil, to support NEx in achieving its mission.

MST Rebar Inc., formally B&B FRP Manufacturing Inc., is the manufacturer of MST Bar in Toronto, Ontario, Canada. The company has over 50 years of experience in the fiberglass industry with experienced engineers on staff specializing in chemical, civil, and mechanical engineering. MST Rebar Inc. uses cutting edge technology to produce the highest grade of Glass Fiber Reinforced Polymer (GFRP) rebar in the world.

"MST-BAR is the best solution to combat corrosion while also helping the environment," said MST Rebar Inc. CEO Borna Hajimiragha. "It is manufactured with an extremely environmentally friendly process, and a very low carbon footprint. Our vision to provide a sustainable and reliable solution to help reduce CO2 emissions goes hand in hand with NEx's initiatives."

Visit www.concrete.org for more information.

ACI FOUNDATION 2022 TECHNOLOGY FORUM SUCCESS

For the first time in two years, the ACI Foundation's Concrete Innovation Council (CIC) successfully hosted an in-person Technology Forum. The sold-out event took place August 30- September 1, 2022, in Saint Paul, MN. The Technology Forum is an industry-exclusive educational and networking event for concrete professionals.

The Technology Forum provided attendees the opportunity to connect with representatives from material suppliers, architecture & engineering firms, contractors, academics, top-level executives, and regulatory agencies.

"It was great to be back in-person for this years' Technology Forum," stated, Ann Masek, Executive Director, ACI Foundation. "This years' Forum was a high-quality and thoughtful program, full of great discussion with forward-thinking and collaborative insights."

The 2022 Technology Forum included three technology showcases, twelve presentations, and a debate. Technology showcases highlighted: A Carbon Negative Method for Producing Portland Cement & SCMs, Concrete Sensors to measure Curing and Machine Learning Methods for Producing Low-Carbon Concrete. Key points of the new FRP bar code were introduced. Legal issues in concrete construction were discussed and progress for Integration of Alternative Cements into Building Codes was summarized.

To learn more about the Technology Forum or to receive the latest information for the 2023 Technology Forum scheduled for August 29 – August 31, 2023, in Portland, OR visit https://www.acifoundation.org/technology/forums.aspx.

CONCRETE INDUSTRY MANAGEMENT PROGRAM SEEKS DONATIONS FOR 2023 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 2023 CIM Auction to be held at World of Concrete. The auction is scheduled for Wednesday, Jan. 18, 2023, 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 2023 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, California State University – Chico, South Dakota State University, the Executive MBA program, as well as help fund scholarships," said Ben Robuck, Chairman of the CIM Auction Committee.

Once again, the CIM Auction organizers are hoping for another record event in 2023. According to CIM Marketing Committee Chairman Brian Gallagher, the 2022 auction broke all previous years' auctions, raising more than $1.74 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."

World of Concrete exhibits are open from Jan. 17-19 and seminars run Jan. 16-19.

Last year's auction items included a concrete mixer truck, a truck-mounted concrete pump with truck chassis., a high-performance mixer, a laser screed, a truck wash system and much more. Other donated items included cement and admixture, skid steers, concrete saws, drills, mixers, vibrators, scaffolding, safety equipment, 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 donating to the auction should contact CIM Auction Committee Chairman Ben Robuck at ben.robuck@cemex.com or (404) 456-6867.

AMERICAN CONCRETE INSTITUTE HONORS OUTSTANDING CONTRIBUTIONS TO THE INDUSTRY

The American Concrete Institute (ACI) is pleased to recognize several individuals for their outstanding contributions and dedication to ACI and the concrete industry. The Fall 2022 awardees consist of personal and paper award winners who will be recognized at the ACI Concrete Convention, October 23-27, 2022.

The following medals and awards recognize exemplary achievement, groundbreaking research, and service to ACI and the concrete industry:

- ARTHUR R. ANDERSON MEDAL – Michelle L. Wilson
- ROGER H. CORBETTA CONCRETE CONSTRUCTOR AWARD – James E. Klinger
- CLYDE E. KESLER EDUCATION AWARD – Tyler Ley
- ROBERT F. MAST AWARD – Miroslav Vejvoda
- HENRY C. TURNER MEDAL – Steven H. Kosmatka
- CHARLES S. WHITNEY MEDAL – National Concrete Pavement Technology Center (CP Tech Center)
- ACI CONCRETE SUSTAINABILITY AWARD – O. Burkan Isgor
- ACI EDUCATION AWARD – Kimberly Waggle Kramer

- WASON MEDAL FOR MOST MERITORIOUS PAPER – Fernando Martirena, Karen Scrivener, Franco Zunino
- ACI SYMPOSIUM VOLUMES AWARD – Sarah Bergmann, Manfred Curbach, Josef Hegger, Sebastian May
- WASON MEDAL FOR MATERIALS RESEARCH – Yohan Jacquet, Arnaud Perrot, Vincent Picandet
- METE A. SOZEN AWARD FOR EXCELLENCE IN STRUCTURAL RESEARCH – Erick A. Burgos, Mohammad Sajedul Huq, Andrés Lepage, Rémy D. Lequesne
- ACI CONCRETE INTERNATIONAL AWARD – Paul Beagley, Tim Manherz, Peter J. Ruttura, Bruce A. Suprenant, Eldon "Tipp" Tipping

Visit concrete.org for more information.

ICRI**CHAPTER**NEWS

CHAPTER CALENDAR

ICRI Chapters are hosting events in 2022. Check with individual chapters by visiting their chapter pages to determine if they have made any plans after this publication went to print. You can also contact a Chapter Leader from any chapter to ask if they have added an event.

BALTIMORE-WASHINGTON
November 1, 2022
ANNUAL MEMBER MEETING AND AWARDS BANQUET
Martin's West
Baltimore, MD

December 8, 2022
FALL TECHNICAL SEMINAR
CP&R's Main Office
Baltimore, MD

CENTRAL FLORIDA
December 15, 2022
CHAPTER CHRISTMAS PARTY
St. Johns River Steak & Seafood
Sanford, FL

CHICAGO
November 17, 2022
CHAPTER DINNER MEETING
Erie Café
Chicago, IL

CINCINNATI
November 16, 2022
NOVEMBER TECHNICAL SESSION
TPC River's Bend
Mainville, OH

December 7, 2022
WINTER SOCIAL
TPC River's Bend
Mainville, OH

DELAWARE VALLEY
November 29, 2022
FALL SYMPOSIUM
Philadelphia Marriott
Philadelphia, PA

FLORIDA FIRST COAST
November 1, 2022
ANNUAL SPORTING CLAYS EVENT
Jacksonville Sporting Clays
Jacksonville, FL

FLORIDA WEST COAST
November 11, 2022
SPORTING CLAYS EVENT
Tampa Bay Sporting Clays
Land O' Lakes, FL

INDIANA
December 1, 2022
CHAPTER HOLIDAY PARTY
Indiana War Memorial
Indianapolis, IN

METRO NEW YORK
November 17, 2022
PYRRHOTITE TECHNICAL EVENT
Club 101
New York, NY

METRO NEW YORK
December 7, 2022
ANNUAL HOLIDAY PARTY
Freemans (end of Freeman Alley
Off of Rivington, between the Bowery and Chrystie)
New York, NY

MICHIGAN
November 3, 2022
TECHNICAL PRESENTATION
Topic: Corrosion Inhibitors
Uptown Grille
Commerce Township, MI

NEW ENGLAND
November 1, 2022
TECHNICAL PRESENTATION
Topic: Petrography
Location: TBD

December 6, 2022
CHAPTER HOLIDAY SOCIAL
Location: TBD

NORTH TEXAS
November 3, 2022
NOVEMBER MEMBERSHIP MEETING
Las Colinas Corporate Center
Irving, TX

December 9, 2022
CHAPTER BOARD MEETING
Las Colinas Corporate Center
Irving, TX

SOUTHEAST FLORIDA
October 28, 2022
25TH ANNUAL GOLF TOURNAMENT
The Club at Emerald Hills
Hollywood, FL

VIRGINIA
November 17, 2022
FALL DEMO DAY
Richmond Primoid Warehouse
Henrico, VA

VIRGINIA HOSTS FALL SYMPOSIUM

On Thursday, September 15, 2022, the ICRI Virginia Chapter held its Fall Symposium in Williamsburg, Virginia, at the beautiful Grand Ballroom of the Colonial Heritage clubhouse. The event was well attended with 42 registrants and presenters. Presenters were from across the industry and included ICRI Technical Director Dave Fuller. Topics presented were enlightening and educational, resulting in much discussion between presenters and attendees. The presentations included an update on the adoption of ACI 562-21 Repair Code in Virginia, discussions of the iCOR non-destructive testing tool for the detailed detection and evaluation of corrosion of reinforced concrete structures without the need to have a connection to the rebar, practical considerations for monostrand PT repairs, non-destructive concrete scanning including an onsite demonstration, and troubleshooting protective coatings and sealers for concrete.


Virginia Symposium attendees watched a demonstration of non-destructive concrete scanning equipment

The chapter appreciates all who attended and presented, and they are thankful for the continued support of the sponsors including Guaranteed Supply Company, KGS Construction, Richmond Primoid, Dunbar, Freyssinet, USCP, and Carolina Restoration Company. The chapter looked forward to seeing everyone October 20 in Richmond at its annual Demo-Day with multiple opportunities for attendees to experience hands-on participation, as well as food, door prizes, and camaraderie.

DELAWARE VALLEY TOSSES A FEW BAGS

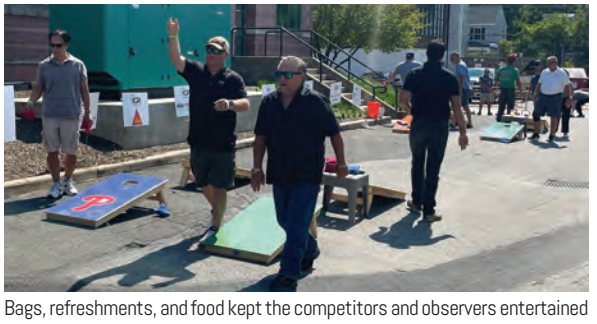
Friday, September 16, 2022, was the Delaware Valley Chapter's 2nd Annual Cornhole Tournament—an event quickly becoming one of the most fun events of the year! Twenty-eight teams competed in a single-elimination tournament to determine whose bags were on the mark. Refreshments were provided by Well Crafted Wine & Beverage Co. and Roll 'em Up Food Truck was on hand serving tasty egg rolls and roll ups. When the last bag had flown, Steve Ionescu of SAW Restoration Corp and Harry Cook were the champions!


Tournament champions Harry Cook and Steve Ionescu

The chapter thanks all who came out and gives a special thanks to the event sponsors: Autonomic Materials, Inc., B Squared Engineering LLC, Cortec Corporation, Culbertson Restoration, TB PHILLY, INC, The Falcon Group—Engineers, Architects & Capital Reserve Specialists, G.C. Zarnas & Company, Klein & Hoffman, Master Builders Solutions, Pullman Philadelphia, Sika USA, Valcourt Building Services, Watts Restoration Inc., and White Cap. The chapter would also like to call out food truck sponsor ECS Limited.


There was plenty of action all day long


The tournament is a fun and entertaining way to network with ICRI peers


Bags, refreshments, and food kept the competitors and observers entertained


The chapter picked a perfect sunny day for its cornhole tournament

ICRI**CHAPTER**NEWS

CHAPTER ACTIVITIES

BALTIMORE-WASHINGTON DISCUSSES PRESERVATION CHALLENGES

On September 8, 2022, the Baltimore-Washington Chapter successfully hosted its 3rd Quarter Dinner Meeting at Maggiano's in Tysons Corner. The night started with a social hour where members and guests enjoyed drinks amongst friends before sharing a family-style dinner. The meeting began with a few announcements from Chapter President Justin Long, PE, who provided chapter news and announced that the 2022 Annual Members Meeting would be held during the scheduled 4th Quarter Dinner Meeting. Then, longstanding member and ICRI Marketing Committee Chair Ed Kluckowski, PE, spoke about the importance of joining a national committee and discussed the benefits of injecting new blood into the various committees.

Guest speaker Benjamin Curran presenting on Preservation Challenges Facing Endicott Period Fortifications at the September BWC Chapter meeting

Keynote speaker Benjamin Curran did a fantastic job presenting on *Preservation Challenges Facing Endicott Period Fortifications*. Attendees enjoyed Mr. Curran's unique perspective as an educator (an Historic Trades Curriculum Developer to be exact). He also reviewed a well-known historical landmark located in Baltimore, Maryland—Fort McHenry. Special thanks to Programs Committee Chair Tom Ouska and Facilities Committee Chair Joe Wilcher III, PE, for all their hard work in coordinating this excellent event!

ICRI**CHAPTER**NEWS

ICRI STAFF VISITS

ICRI STAFF HITS THE ROAD—CHAPTER VERSION

ICRI Executive Director Eric Hauth, Technical Director Dave Fuller, and Program Director Dale Regnier hit the road in mid-September to mix and mingle with three ICRI chapters from one end of the country to the other.

Eric Hauth helped kick off the re-emergence of the Pacific Northwest Chapter by taking part in its 2022 Golf Outing in Washington State and presenting at the post-scramble luncheon on September 15. Dave Fuller gave a presentation on September 15 at the Virginia Chapter Fall Symposium in Williamsburg, Virginia. And, Dale Regnier joined a group of ICRI travelers at the Chicago Chapter's social outing for a Wrigleyville Rooftop event in Chicago.

If your chapter is interested in a visit from an ICRI staff member, either for a technical presentation or a meeting with local leadership, be sure to reach out.

Patrick Hennessy from CBRE, Kerry May from OAC, and Marta Dzheneva from OAC welcomed ICRI Executive Director Eric Hauth to their team competing in the 1st Annual Pacific Northwest Chapter golf outing

ICRI Technical Director Dave Fuller was one of the speakers recruited by the Virginia Chapter for their successful 2022 Fall Symposium

ICRI Program Director Dale Regnier joined a group of ICRI members at the Chicago Chapter's Summer Social, a rooftop event at the Chicago Cubs vs Colorado Rockies game. Gathered here are (back row): Scott Harrison (VA), Ingrid Rodriguez (FWC), Alex Somohano (MNY), Zelina Johnson (CHI), Jim Fadelin (CHI), Suzie Smith (CHI), Michelle Nobel (FWC), Tom Jones (CHI), and Bob Jones (CHI). In the front row are Gigi Sutton and Dale Regnier

ICRI**CHAPTER**NEWS

CHAPTERS COMMITTEE CHAIR'S LETTER

MICHELLE NOBEL
Chapters Chair

I hope everyone's year is going great so far! Florida had another devastating hurricane that impacted several parts of the state. Hurricane Ian was the deadliest hurricane to strike Florida since the 1935 Labor Day hurricane. Ian caused widespread damage and destruction across western Cuba and the southeast United States, especially in Florida and South Carolina. Many of my Florida friends are still without power or water as I write this. I drove to Ft. Lauderdale a week after the hurricane to tour the MAPEI plant there and meet with my colleagues. The devastation was everywhere. Trees were uprooted, signs mangled, billboards destroyed, and debris was everywhere. I was on Interstate 75, not even in the city, and I was shocked. The day after the storm, the weather was incredible. The sky was the color of azure blue and there was a peaceful, cool breeze in the air. Hopefully, in the prophetic words of Walt Disney, *"After the rain, the sun will reappear. There is life. After the pain, the joy will still be here."*

It looks like we will be doing an in-person ICRI Roundtable in December with plans to have it in the Philadelphia area. More details to follow, so keep an eye out for more information.

I'm excited to go to Hotlanta for the 2022 ICRI Fall Convention. The hotel is the beautiful InterContinental Buckhead Atlanta. I can't wait to see everyone in person again!

If you want to see the topics and information for the 2022 ICRI Spring Convention, they're still available on the ICRI website, in the ICRI 2022 Spring Convention in the review section. So, if you missed it, check it out when you have time.

I'm excited to meet the new members of the recently established ICRI Mexico Chapter! Hopefully, a few members will be at the 2022 ICRI Fall Convention. We will have more news from the ICRI International Membership subcommittee at the Fall convention. There will also be news coming from ICRI Certification and Education. Lots to be excited about for ICRI! We're making strides around the world.

If you haven't looked at the Certification and Education tab on the ICRI.org website lately, It has information about the CSMT/CSRT programs, webinars, and the ICRI Learning Center. Upcoming live Concrete Slab Moisture Testing and CSRT Certification Exams are happening in Ft. Worth and Dallas, TX. You can check on the ICRI.org website with the following link: https://www.icri.org/events/event_list.asp?show=&group=&start=6%2F22%2F2022&end=&view=&cid=22550

I tell you this every month, so you know that your chapter can receive rebates. Host an event at your chapter; you'll receive rebates if the participant identifies the chapter as the promotional source. Don't miss out on opportunities to earn rebates for your chapter. The program information is on the Certification and Education tab of the ICRI.org website.

The Women in ICRI Committee is looking for women to join our illustrious group of talented women. Please investigate joining the WICRI group because we would love to have you. We highlight these incredible women from around the world. If you want to join this group, please reach out to Tara Toren-Rudisill at TTorenrudisill@ThorntonTomasetti.com, Monica Rourke at MRourke@mapei.com, or me at mnobel@mapei.com.

Dates to mark on your calendar are:

- 2022 ICRI Fall Convention—November 7-9, Baltimore, Maryland
- 2023 World of Concrete—January 16-19, Las Vegas, Nevada
- 2023 The International Surfaces Event—Jan 31-Feb 2, Las Vegas, Nevada
- 2023 ACI Concrete Convention—April 2-6, San Francisco, California
- 2023 ICRI Spring Convention—April 17-19, Vancouver, British Columbia

Thank you to all the ICRI Chapters that have submitted their events to Dale Regnier for the ICRI calendar. The calendar on the ICRI.org website is a resource if you travel for your company. Look to see what's happening in the area you're visiting. Please continue to send your events to Dale Regnier at daler@icri.org so he can post them on the ICRI website and in the *Concrete Repair Bulletin*. Check out the ICRI calendar to find out what's happening and where it's happening! Here's the link to the ICRI calendar for more information: https://www.icri.org/events/event_list.asp

Please reach out if you need anything from someone at Ewald, the Executive Committee, your Region and At-Large Directors, or your local leaders at your ICRI. We are here for you if you have any questions. We need everyone's support to grow this great organization.

Safe travels, be kind, and I hope to see you at the next ICRI Event!

Sincerely,

Michelle Nobel, ICRI Chapters Committee Chair
MAPEI Corporation

ICRI CONCRETE REPAIR CHAPTERS

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

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

INTERESTED IN SEEING YOUR CHAPTER NEWS & EVENTS LISTED HERE?

Chapter News & Event Deadlines

JANUARY/FEBRUARY 2023 CRB
Deadline: November 10, 2022

MARCH/APRIL 2022 CRB
Deadline: January 10, 2023

Send Chapter News and Event dates by the deadlines above to Program Manager Dale Regnier at daler@icri.org.

PRODUCTINNOVATION

MAPEI INNOVATION IN 3D INDUSTRY: THE ONLY CONSTRUCTION

MAPEI Corporation announced that its Planitop® 3D construction ink/mortar, produced in strategic partnership with Black Buffalo 3D Corporation, a leading provider of large-scale 3D construction printers, has been granted official AC509 certification by the International Code Council Evaluation Service (ICC-ES).

Code officials rely on reports from the ICC as a resource for ensuring that innovative building products comply with code requirements. Both Planitop 3D and the Black Buffalo 3D printing technology were found to meet AC509 code requirements for "bearing, nonbearing, and shear walls up to 40' in height." AC509 is the ICC code relating to "3D Automated Construction Technology for Concrete Walls."

Planitop 3D is available for sale to all printing manufacturers in North America through MAPEI. The proprietary AC509 cement-based construction ink/mortar has been developed through years of research, testing and evaluation by independent and in-house material scientists at MAPEI, Black Buffalo 3D and various third-party labs, including Intertek, which is based in York, PA.

Achieving AC509 certification represents the final step in a lengthy approvals process for MAPEI's Planitop 3D. Milestones in that product approval process include several 16+ hour print sessions on NEXCON™ printers performed by the Black Buffalo 3D team, which have been verified by members of the ICC-ES approved lab, Intertek. The verification process used stringent testing to the criteria of the ICC-ES AC509 standard for 3D printed walls and included testing and verifications at the material, machine and printed wall levels.

Visit mapei.com for more information.

SEVEN NEW DOT APPROVALS FOR CORTEC® MCI®

Cortec® is excited to announce seven new DOT approvals for MCI® Technology in North America! In the U.S., six more state DOTs have added MCI®-2005 NS to their list of approved concrete admixtures. In Quebec, Canada, MCI®-2018 has been approved for DOT use in addition to previously approved MCI®-2000. DOT approval is important for three reasons:

1. It allows engineers to specify MCI® in DOT construction projects for these states/provinces.
2. It lends credibility to engineers desiring to use MCI® Technologies in non-DOT projects.
3. It ultimately can improve the quality of construction by qualifying good-performing products through rigorous review according to industry standards.

MCI®-2005 NS is a concrete admixture that delays time to corrosion and reduces corrosion rates once started. MCI®-2018 is a surface applied corrosion inhibitor (SACI) with water repellency that can be used for periodic maintenance or concrete repair.

With 42% of all U.S. bridges at least 50 years old (according to the 2021 Report Card for America's Infrastructure*), today's generation is seeing a greater need to extend service life for both new and existing structures. MCI® is one of the easiest and most cost effective ways to do so, especially in coastal regions or states/provinces where harsh winters require the use of deicing salts. In addition, MCI® can be helpful in any region to combat carbonation-induced corrosion that sets in over a long period of time.

For more information visit https://www.cortecmci.com/contact-us/.

FIGHTING CONCRETE CORROSION IN WATER TREATMENT FACILITIES FOR GREATER SUSTAINABILITY

Water and wastewater treatment facilities are part of the critical infrastructure that makes our lives better on a daily basis, but often does not get a second thought. Nevertheless, the longevity of these structures not only impacts our municipal budgets but can also affect our long-term carbon footprint, since concrete production is among the largest contributors to anthropogenic greenhouse gas emissions. Specifying Migrating Corrosion Inhibitors (MCI®) into the concrete structural design can promote a more sustainable future by reducing the need for early replacement of high carbon-cost, energy-intensive reinforced concrete in drinking water reservoirs, desalination plants, and wastewater facilities.

Drinking Water Reservoirs and Pumping Systems—products meeting NSF Standard 61 are MCI®-2005 and MCI®-2020

Desalination Plants—products used for this application are MCI®-2005 and MCI®-2020

Wastewater Treatment Plants and Pumping Stations—products used for this application are MCI®-2005 and MCI®-2026

For more information visit https://www.cortecmci.com/contact-us/.

MCI® TECHNOLOGY: AN IMPORTANT KEY TO SUSTAINABLE CONSTRUCTION

Because concrete is a major producer of greenhouse gas, the very act of helping concrete last longer means less new concrete is needed to replace the old concrete, thus reducing overall CO_2 output from cement production. Furthermore, MCI® helps contractors and building owners steward resources wisely by repurposing existing structures and sometimes even using renewable materials for construction.

MCI® Technology can protect against both types of corrosion by forming a protective molecular layer on the surface of the steel reinforcement. By interfering with the natural corrosion reaction between oxygen, steel, and an electrolyte, MCI® delays time to corrosion and reduces corrosion rates once started. MCI® can be applied as a concrete admixture to new structures or as a surface applied corrosion inhibitor (SACI) to existing structures. It can also be combined with repair mortars or water repellents for dual benefit and application convenience. In this way, both specifying engineers and repair contractors can help their work last longer and be more efficient, reducing the time and labor normally needed for repair. This weighs strongly in favor of earning credits toward LEED certification, a prominent sustainability rating system overseen by the U.S. Green Building Council.

For more information visit https://www.cortecmci.com/contact-us/.

MCI® GUIDE TO CORROSION PROTECTION DURING CONSTRUCTION DELAYS

Construction delays are common and often unpredictable. Winter weather, budget constraints, material delays, and leadership changes are all factors that can interrupt the original timeline of a construction project. Unfortunately, delaying a project does not mean the elements of nature stand still. One of the serious problems of construction delays is that materials left out in the open may begin to deteriorate through corrosion. Cortec® suggests the following guidelines to avoid some of these common corrosion problems.

PRODUCTINNOVATION

For more information visit https://www.cortecmci.com/contact-us/.

TACKLE CONCRETE CORROSION WITH MCI®-2040 FOR VERTICAL REPAIRS

Cortec® Corporation, the home of MCI® Technology, is pleased to announce its new, improved MCI®-2040 High Performance Vertical/Overhead Repair Mortar. This is yet another component of Cortec's High Performance Repair System (HPRS®), which helps concrete repairs last longer by inhibiting corrosion and reducing the risk of the insidious ring-anode effect. With MCI®-2040, Cortec® has extended the protective qualities of MCI®-2041 (horizontal repair mortar) to vertical and overhead surfaces, giving concrete contractors an MCI® repair mortar for any angle!

MCI®-2040 is a single-component, fast-setting, high-strength, cement-based repair mortar that is enhanced with Migrating Corrosion Inhibitors (MCI®). MCI®-2040 offers corrosion protection to reinforcing metals both in the patch and in the surrounding areas. This increases the quality and extends the service life of the repair and surrounding structure.

For more information visit https://www.cortecmci.com/contact-us/.

INTERESTED IN SEEING YOUR NEW PRODUCT IN THIS COLUMN?

Email your 150-200 word news to editor@icri.org. Content for the January/February 2023 issue is due by December 1, 2022, and content for the March/April 2023 issue is due by February 1, 2023. One (1) high resolution product photo may be included. ICRI reserves the right to edit all submissions.

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