November/December 2024
Vol. 37, No. 6

CRB
CONCRETE REPAIR BULLETIN

ICRI PROJECT, SAFETY, AND SUSTAINABILITY AWARDS

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Concrete Repair Bulletin
is published bimonthly by the:
International Concrete Repair Institute, Inc.
1601 Utica Avenue South, Suite 213
Minneapolis, MN 55416
www.icri.org

For information about this publication or about membership in ICRI, write to the above address, phone (651) 366-6095, fax (651) 290-2266, or email info@icri.org. The opinions expressed in *Concrete Repair Bulletin* articles are those of the authors and do not necessarily represent the position of the editors or of the International Concrete Repair Institute, Inc.

ISSN: 1055-2936

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ON THE COVER: Learn about the 3rd Avenue Bridge Rehabilitation, our 2024 Project of the Year Award Winner, in our featured article on page 15.

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FEATURE ARTICLES

DEPARTMENTS

PRESIDENT'S MESSAGE

BRIAN MACNEIL

Time flies fast. And just like that, you are reading my final president's message of my tenure as president. They say a watched pot never boils. One moment you're sipping coffee and planning your ICRI presidency; the next, you're handing the gavel to the next president and wondering where the year went. We're not quite there yet, but by the time you read this, we will be very close.

As I reflect on my time serving as president of this association, I find myself filled with gratitude, pride, and a deep sense of accomplishment. It has been an incredible honor to help lead this organization, and as I hand the reins over to my good friend Gerard Moulzolf (who is going to be an amazing president), I want to take a moment to express my heartfelt thanks to each and every one of you.

First and foremost, I want to extend my appreciation to the dedicated members and volunteers of our association. You are the lifeblood of this organization, and it is your passion, commitment, and unwavering support that have made everything we have achieved possible over the past few decades. From attending conferences and both local and national meetings and contributing ideas to volunteering your time and energy for our various initiatives, your efforts have not gone unnoticed. It has been inspiring to witness your dedication to our shared goals and to see the impact we have made together on raising the bar in the concrete repair industry.

To the board of directors and executive committee, thank you for your guidance, wisdom, and collaboration throughout my presidency. Serving alongside such a talented and passionate group of individuals has been a privilege. I am deeply grateful for the trust you placed in me—and most of all the friendships you have afforded me.

And then there's our full-time staff: Eric Hauth, Dale Regnier, Matthew Carter, and Marissa Esguerra. Your professionalism, attention to detail, and tireless dedication have been the backbone of our operations. Without your efforts, many of our accomplishments would not have been possible. Thank you for your commitment to excellence and for ensuring that our initiatives were executed with precision and care. And an extra thank you to Eric Hauth for his weekly (sometimes 3x a week) feedback/brainstorming/updates/counseling sessions. You are a true asset to the organization.

During my time as president, we faced both challenges and triumphs. Saying that though, it has been mostly triumphs and idea sharing that will pave the way for the association's continued growth and success. I've only contributed to the existing strategic plan and direction that ICRI has been developing for years from the efforts and leadership of previous presidents, volunteers, and staff.

In the upcoming months, we are excited to spread word of our mission to ***Make the Concrete Built World Safer and Last Longer.*** Focus being the key word. We have many strengths within our organization. However, like many organizations, we can get distracted by smaller (yet relevant) initiatives that do not have the same ROI for our larger audience and organization as our core strengths. With more focus on the hardest-hitting initiatives, ICRI will be able to continue to grow in membership, resources, and our presence in the industry. The groundwork for this type of focus has been building over the years and we are at a key point in the organization's growth to really hammer it through.

Together, we have weathered storms, adapted to global and industry changes, and continued to grow stronger as an organization. I am proud of the progress we have made and my contributions to that progress. None of this would have been possible without the collective efforts of our members, board, and staff. It has truly been a team effort, and I am grateful to have been a part of it.

To be honest, it will be bittersweet to hand the gavel over to Gerard at the end of December. But the saving grace in the act is knowing how much can be accomplished under the leadership and guidance of one of the most well-respected experts in the industry. I am so excited to see the leaps and bounds the organization will take in the upcoming year during my friend Gerard's presidency and I look forward to continuing working with all of you to make the concrete world stronger and last longer. Thank you for affording me the honor of being ICRI president in this past year!

Brian MacNeil
Brian MacNeil
President, International Concrete Repair Institute

DIRECTOR'S MESSAGE

ERIC HAUTH

What a year! For me, it kicked off a bit early in December 2023 with an unforgettable trip to Vancouver, British Columbia, to sit down with this guy, ICRI's 2024 President, Brian MacNeil.

The holiday backdrop is fitting. But where is that, you might ask?

Well, after spending a day together holed up to scope out ICRI's year ahead, Brian said, "Hey, later on, meet me at the Fairmont, where we'll catch an Uber to something."

For anyone who knows Brian, "something" can mean just about anything.

So, we jumped in the car, got dropped off, and walked towards an undisclosed location in Vancouver. Eventually, like a kid going to a candy store, he brought me to our destination—the holiday-themed, "Fly Over Canada!"

There we were: two (past?) middle-aged dudes joining little kids and their parents to virtually fly over Canada with Santa and his reindeer! That's Brian. Someone who can go deep on just about any topic in the industry or the inner workings of ICRI and then take you on a fun-filled joyride!

Brian penned his last message as 2024 President on the previous page. True to his nature, he extends thanks and shout-outs to many people other than himself. So, I'm taking this opportunity to extend my gratitude for Brian's countless and continued contributions to the people, the industry, and the organization he cares so deeply about.

When we met up in Vancouver, Brian set out a very simple but clear goal for his year as ICRI President: help streamline the organization and gain even greater traction focused on our core mission of making the concrete built-world safer and last longer.

We've had countless conversations and taken some big steps towards that goal. I'm deeply grateful for Brian's insights, humor, generosity with his time, and commitment to strengthen ICRI for an even brighter future.

The simple goal we talked about in Vancouver is starting to really take shape. Under Brian's leadership, ICRI's Executive Committee and Board of Directors has set forth an even clearer set of goals and, together with staff, a focused plan to help us get there.

We'll share more on these exciting goals soon, but this path forward is something Brian has uniquely inspired and shaped.

Thank you, Brian, for a great year!

Eric Hauth
Eric Hauth
ICRI Executive Director

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...your continued support greatly enhances programs both within ICRI and the concrete repair industry as a whole.

INTRODUCTION TO ICRI TECHNICAL GUIDELINE NO. 320.7-2024

Guide for Structural Grouts Material Data Sheet Protocol

by Dave Wingard, Ph.D. and Joshua R. Lloyd, P.E.

ICRI Technical Guideline No. 320.7-2024,[1] Guide for Structural Grouts Material Data Sheet Protocol, was published recently. This new guideline offers a standardized protocol for testing and reporting of data for structural grouts, which includes cement-based and polymer-based materials. Developed by the ICRI 320 Concrete Repair Material and Methods committee, the 320.7 guideline provides pertinent information that engineers, manufacturers, and contractors can lean on to determine the suitability of a product for a particular application. Specifiers may use this guideline to choose verifiable properties optimized for their selected requirements of a particular grouting situation. Manufacturers can use this document to describe the characteristics of individual materials, allowing users to select the material optimized for their applications. Furthermore, they can also use this document to benchmark their products against other options commercially available in the industry. In addition, contractors can be sure they are receiving relevant information on the preparation, conditioning, and application of these materials. With standardized reporting, users can be sure they are providing or receiving relevant data for project-specific applications of these materials, which leads to a more informed industry, better recommendations, and improving the durability of installations.

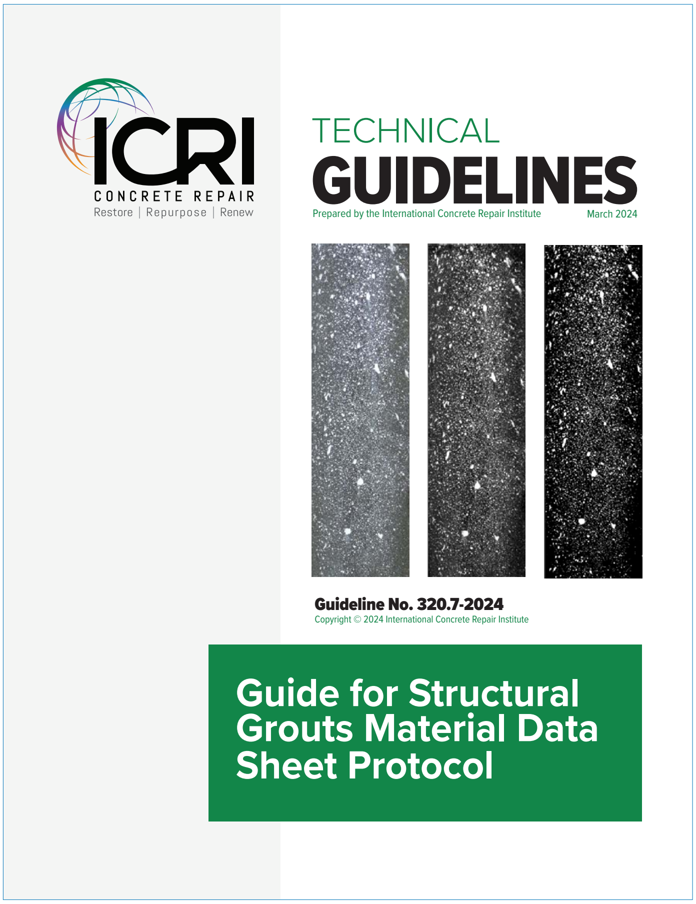

Fig. 1: Cover of ICRI Guideline No. 320.7-2024

GROUT MATERIAL DESCRIPTION

Many structural grouts are currently available; this guideline focuses on hydraulic cement-based and polymer-based grouts. These grouts can be used in a wide range of situations such as grouting under machine and column base plates, crane rails, to name a few. They can have multiple benefits such as but not limited to rapid strength development, non-shrinking, and flexibility of placement fluidity and application depths. There are also potential limitations of the products such as minimum/maximum placement depths with or without aggregate extension, application or service temperature range, moisture exposure, and resistance to certain chemical attack. This guideline helps to provide the user with multiple project variable possibilities they should be aware of when selecting/specifying a structural grout for a project and helps manufacturers to better describe their product to ensure it is used for its intended purpose.

COMPOSITION PROPERTIES OF HYDRAULIC CEMENT-BASED GROUTS

Composition as well as plastic and hardened material properties can vary across different commercially available structural cement-based grouts. This guide discusses different composition properties that may be of importance when selecting a hydraulic cement-based structural grout. Post-tensioning grouts are beyond the scope of this document; you may reference PTI M55.1-12[2] for more information regarding these types of grouts. The composition properties discussed in the guide include mineral aggregate characterization, metallic aggregate characterization, total sulfate trioxide (SO_3) content, total alkali content, total

Fig. 2: Examples from the guide for general material properties and associated standards for hydraulic cement-based grouts

Property	Standard	Importance
Yield and Density	ASTM C138 [6]	Useful for determining the actual coverage provided in field applications.
Flow	ASTM C939 [7]	Important for type of placement method.
Segregation	ASTM C1610 [8]	Although the method was not developed for non-shrink grouts, the information obtained can be used to determine the segregation potential for deeper applications.
Bleeding	ASTM C940 [9]	Useful for determining bleeding and early age expansion of freshly placed grout.
Working Time	ASTM C1107 [10]	Working time represents the maximum usable time frame for a material after mixing. During this time frame, the material maintains its workability and application properties.
Setting Time	ASTM C191 [11]	Important to know when the material has reached initial and final set.
Early Height Change	ASTM C827 [12]	Applicable to grouting, patching, and form-filling operations where the objective is to completely fill a cavity or other defined space with a freshly mixed cementitious mixture that will continue to fill the same space at time of hardening.
Hardened Height Change	ASTM C1090 [13]	Important to provide a means of assessing the ability of a hydraulic cement grout to retain a stable volume during the testing period of 28 days.
Compressive Strength	ASTM C109 [14] / ASTM C39 [15]	Property needed to determine structural suitability of the product.

chloride content, and pH. The guide gives relevant standards to be utilized when assessing these composition properties as well as discussing the importance of these properties for certain situations. An example of this for total chloride content is as follows: The total chloride content should be tested as per ASTM C1218[3] (water-soluble chlorides) or ASTM C1152[4] and values given as a percentage by weight of the material. The considerations of chloride-ion content discussed in ACI 222R[5] require a cautionary statement on the packaging if an oxidizable metal such as iron, steel, zinc, or aluminum is allowed to be embedded in proximity to a chloride-containing concrete repair material.

MATERIAL PROPERTIES OF HYDRAULIC CEMENT-BASED GROUTS

These structural grouts can be utilized in many different applications that may require specific material properties. Job site variables such as temperature of placement and method of placement may place extra importance on working time and fluidity in addition to the recommended general properties. The material property section of this guide for cement-based grouts gives general guidance on a variety of properties along with associated standards; examples of these can be found in Figure 2.

In total, there are 21 test method descriptions and recommendations within this section of the document that provide material property information critical to the selection process of a material and the material's intended use. Additional structural properties found in the guide include flexural, tensile, and bond strengths, along with creep, thermal expansion, chemical resistance, and effective bearing area.

COMPOSITION PROPERTIES OF POLYMER-BASED GROUTS

Composition as well as plastic and hardened material properties can vary across different commercially available structural polymer-based grouts. This guide discusses different composition properties that may be of importance when selecting a polymer-based structural grout. The composition properties discussed in this guide include mineral aggregate characterization, metallic aggregate characterization, net weight, and pH.

MATERIAL PROPERTIES OF POLYMER-BASED GROUTS

As with hydraulic cement-based grouts, polymer-based grouts come in a variety of performance types. The direction provided in this guide covers a multitude of material properties that may be important to the user/specifier based on their specific project application. Standards for testing the properties are given to help provide a common platform for for comparing products and determining if the products will meet project specifications. The material property section of this guide for polymer-based grouts gives general guidance on a variety of properties along with associated standards; examples can be found in Figure 3 on page 10.

HOW TO USE THE MATERIAL

The surface preparation, mixing, placement, and curing of structural grouts can vary significantly between commercially available products. It is important to understand how to use each individual grout prior to use; this guide helps to provide standard verbiage to make comparing different products easier.

This section of the guide starts with surface preparation, which recommends the use of CSP numbers defined by ICRI 310.2[23] to identify the condition of the substrate concrete prior to application of the structural grout.

The mixing section goes on to comment on equipment and recommends mixing equipment per ICRI 320.5R[24] and recommends that mixing time and sequence of mixing be followed per manufacturers' recommendations. For hydraulic cement-based structural grouts, the guide recommends following the manufacturer's requirements for amount of water to be added to the mix or not exceeding the maximum recommended consistency range.

For placement, the guide recommends that the structural grout manufacturer should specify the minimum and maximum thickness of placement, finishing instructions, as well as whether the material should be in restrained or unrestrained configurations.

Curing instructions can vary across the different types of structural grouts covered in this guide (hydraulic cement-based and polymer-based), which is why the guide recommends each structural grout provide information regarding curing (both type of curing as well as duration of curing).

SUMMARY

The intent of this document is to offer a standardized protocol for testing and reporting of data for structural grouts, which includes hydraulic cement-based and polymer-based materials. The guide will be useful to a wide audience—including but not limited to users, specifiers, and manufacturers. Users or specifiers may use this guideline to choose verifiable properties optimized for their selected requirements of a particular grouting situation. Manufacturers can use this document to describe the characteristics of their product, allowing users to select the most suitable product that is optimized for their application. Furthermore, this document can be used to benchmark their products against other options commercially available in the industry.

Fig. 3: Examples from the guide for general material properties and associated standards for polymer-based grouts

Property	Standard	Importance
Density	ASTM C905[16]	Useful for determining the actual coverage provided in field applications.
Flow	ASTM C1339[17]	Important for type of placement method.
Segregation	ASTM C1610[8]	Although the method was not developed for non-shrink grouts, the information obtained can be used to determine the segregation potential for deeper applications.
Working Time	ASTM C308[18]	This is useful for determining maximum usable working time (pot life) and the approximate consistency at end of that time.
Flexural Strength	ASTM C580[19]	Used to determine the flexural strength and modulus of elasticity in flexure of cured chemical-resistant materials.
Tensile Strength	ASTM C307[20]	Determines the tensile strength of cured chemical-resistant materials in the form of molded briquet of 1 in (25 mm) cross section.
Coefficient of Thermal Expansion	ASTM C531[21]	Important for determining thermal compatibility between materials.
Compressive Strength	ASTM C579[22] Method B	Property needed to determine structural suitability of the product.

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David Wingard, Ph.D. is a Group Leader at The Quikrete Companies, LLC, one of the largest manufacturers of pre-blended, packaged concrete and cementitious products in North America. He has 20-plus years of experience in the concrete industry and is the current Vice Chair of the ICRI 320 Repair Materials and Methods Committee. David has a BS, MS, and Ph.D. in Civil Engineering from Clemson University, with the primary focus of the degrees in construction materials.

Joshua Lloyd, P.E. is a structural engineering and materials testing consultant with a company he founded in 2022. He has over 12 years of experience in structural condition assessments, structural restoration, construction defect evaluation and repair development, load testing, non-destructive testing, and field inspection and testing during construction projects. Josh has been a member of ICRI since 2013, was the Georgia Chapter President in 2017-2018, is the Vice Chair of the ICRI Membership Committee, and is the current chair of ICRI 320 Repair Materials and Methods.

WOMEN IN ICRI

SPOTLIGHT— Giuliana Zarada

by Michelle Nobel, Women in ICRI Committee Member

GIULIANA ZARADA

Giuliana Zarada is a Structural Engineer in training at Simpson Gumpertz & Heger (SGH) and a member of the ICRI Committee 320-Concrete Repair Materials and Methods and Women in ICRI Committee. She previously interned with SGH and Gessner Engineering while completing her undergraduate and graduate degrees from the Georgia Institute of Technology, where she received her B.S. and M.S. in Civil and Environmental Engineering. She always loved math and physics and decided to study structural engineering upon the advice of her high school A.P. Physics teacher, who saw her interests and encouraged her toward a profession where she would use those skills every day. Besides the rigorous courses, Georgia Tech taught her the "you can do that" motto. If you put your mind to something and can be resilient in your pursuit, you can make things happen.

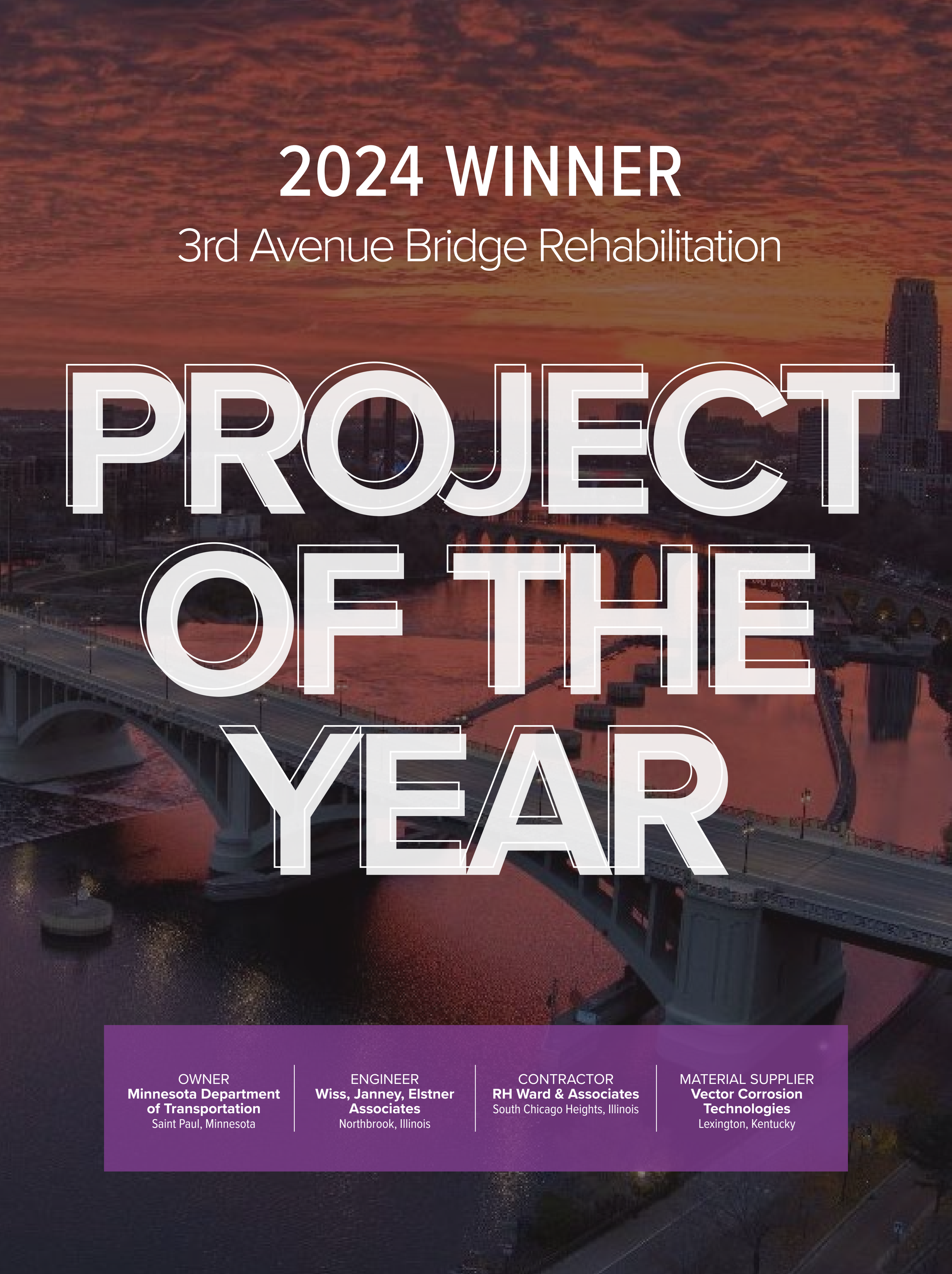
Giuliana started as a technical intern at SGH in 2019 and began working as a full-time engineer in training in 2020. She had the privilege of seeing worlds collide every day by working on new design projects, repair, and restoration work. When she's not assessing and designing repairs for existing structures, she's building analysis models and designing new buildings ranging from offices and labs to healthcare and retail facilities. She loves seeing the full life cycle of buildings, from construction to repair to end of life. Understanding the complete picture helps guide her work at all stages of a structure's lifecycle, ultimately enhancing her role as a valuable partner in the design and maintenance processes and as a proficient engineer.

She has always been interested in the repair and reuse of existing structures from a sustainable and historic perspective. She enjoys ensuring that the built environment is safe and enjoyable for the future. Giuliana joined ICRI to learn from industry experts and stay updated on new products and technology.

Giuliana is passionate about volunteering and outreach. She is a member of the SGH Volunteering Committee, organizing opportunities to give back to our communities. She is very enthusiastic about community outreach, especially in STEM education. She loves engaging with students of all ages, teaching them about the industry, and explaining the role of structural engineers. These students are our future and the next generation of industry professionals.

Outside of work, Giuliana has many interests. She has played roller derby for almost ten years and currently skates with Boston Roller Derby under the name "Structurally Unsound," a name she hopes inspires fear in her opponents. She also has been singing for almost her entire life with different groups. She performed with the women's a cappella group Nothin' But Treble, various choirs, and even a few bands. She's currently a member of the Arlington-Belmont Chorale and Chamber Choir. She loves being outdoors, particularly backpacking or remote canoeing and camping in Vermont or New Hampshire. Giuliana has a beautiful family with her wife, Katie, and their pup, Rocco.

It has been a pleasure to have Giuliana as a part of this incredible organization and as a member of the Women in ICRI Committee. I am thrilled and inspired to see ICRI attracting such a vibrant young woman who will help lead ICRI into the next generation. Like many before her, I believe Giuliana will make many friends and significant contributions to ICRI and the Women in ICRI.



2024 WINNER

3rd Avenue Bridge Rehabilitation

PROJECT OF THE YEAR

OWNER
Minnesota Department of Transportation
Saint Paul, Minnesota

ENGINEER
Wiss, Janney, Elstner Associates
Northbrook, Illinois

CONTRACTOR
RH Ward & Associates
South Chicago Heights, Illinois

MATERIAL SUPPLIER
Vector Corrosion Technologies
Lexington, Kentucky

2024 PROJECT OF THE YEAR WINNER

HISTORIC CATEGORY

3rd Avenue Bridge Rehabilitation

MINNEAPOLIS, MINNESOTA

SUBMITTED BY WISS, JANNEY, ELSTNER ASSOCIATES

Image 1: (Cover picture) View of historic 3rd Avenue Bridge in downtown Minneapolis during rehabilitation

INTRODUCTION

The 3rd Avenue Bridge rehabilitation project, completed in 2023, stands out for its immense scale, the bridge's one-of-a-kind historic concrete arch construction and setting, the unusual composition and severe deterioration of the original 100-year-old concrete, and the innovative methods that were used to repair the concrete to extend the bridge's life for another 50 years.

The condition assessment, alternatives studies, and repair design phases collectively took three years, and construction spanned another three years, involving numerous design and construction partners and representing the largest-ever bridge rehabilitation in Minnesota and one of the largest in the country.

HISTORY OF THE BRIDGE

The 3rd Avenue Bridge, originally designed and constructed in the early 1900s, is a listed historic structure and classic example of the open spandrel concrete arch bridges that were common in that era (Image 1). Located in downtown Minneapolis, Minnesota, the 3rd Avenue Bridge is unique because of its scale, its use of Melan reinforcing system, and its S-curve geometry to avoid breaks in the limestone riverbed. The bridge, opened in 1918, is one of 24 bridges of prominent historic significance that has been selected for long-term preservation, and it is included in the Statewide Historic Bridge Management Plan.

The bridge consists of seven original concrete arch spans in the river and approach spans on either end. Arch spans 1 through 5 consist of three arch ribs, while Spans 6 and 7 consist of full width barrel arches, both of which support spandrel columns that in turn support the bridge deck. The bridge was constructed using the Melan reinforcing system, patented in 1892 by Austrian bridge engineer Joseph Melan. In the Melan system, there are no conventional steel reinforcing bars in the arches. Rather, the concrete arches are reinforced with internal steel trusses composed of double-angle chords connected with riveted steel gusset plates and diagonal cross braces.

Although the bridge had been rehabilitated before, first in 1939 and then with extensive concrete repairs and a full deck replacement circa 1980, the bridge by the early 2000s was again displaying significant concrete deterioration and structural deficiencies that needed to be addressed. The purpose of the recently completed rehabilitation was to address the bridge condition, raise the NBI rating from 4 to at least 6, and achieve a target service life of at least 50 years.

CONDITION ASSESSMENT

As a first step in the rehabilitation of a historic concrete bridge, a well-conceived condition assessment was critical for success in achieving long-lasting repairs. The objectives of the condition assessment were to characterize the construction and current condition of the structure, and, most importantly, to identify the deterioration mechanisms that were attacking the individual structure. Common deterioration mechanisms for historic concrete include cyclic freeze-thaw damage, chloride-induced corrosion damage, and carbonation-induced corrosion damage.

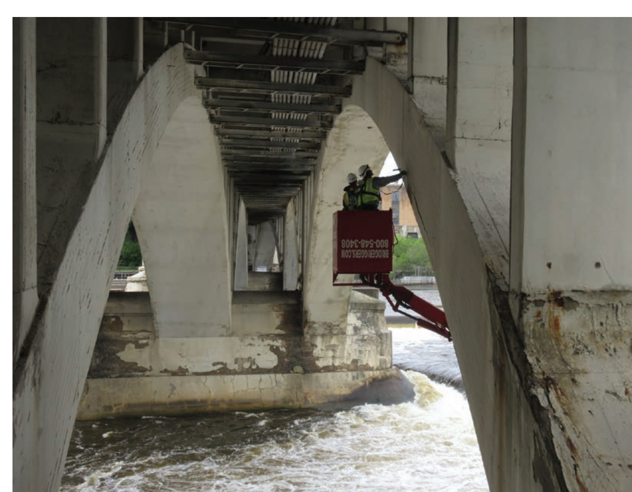


Image 2: Hands-on inspection from under-bridge inspection unit (snooper), illustrating deterioration of arch ribs and pier bases

Image 3: Close-up inspection, illustrating deterioration in pier bases and arch ribs

PHASE 1: BRIDGE INSPECTION

The condition assessment for the 3rd Avenue Bridge was performed in two phases. Phase 1 consisted of a close-up, element-level bridge inspection and representative sounding of 100% of the exposed surfaces (Image 2, Image 3). Distress conditions and condition states were digitally mapped on scaled drawings using tablets.

Image 4: Core sampling through deep freeze-thaw damage in arch rib near springline

PHASE 2: FIELD TESTING, MATERIAL SAMPLING, AND LAB TESTING

Based on the Phase 1 inspection, small study areas across the bridge were selected to represent the full range of conditions present. Phase 2 consisted of field testing and materials sampling at each study area, with the primary goal being to identify the severity and the mechanisms of deterioration occurring in the concrete for each element type. The study areas were spatially distributed across the bridge to represent the range of conditions and material types present.

Field testing methods at over 100 study areas utilized on the 3rd Avenue Bridge included half-cell potential surveys, corrosion rate measurements, resistivity testing, carbonation testing, and ultrasonic thickness testing of steel truss members (Image 4, Image 5). Lab testing of material samples taken from the bridge, comprising over 80 concrete cores and 10 steel samples, included testing for mechanical properties of concrete and steel materials, chloride content profiling, and petrographic analyses of numerous cores to identify vulnerabilities specific to the concrete in this structure. Service life projections were developed for each element type, which were used to inform the development of rehabilitation alternatives and life cycle cost comparisons.

Image 5: Non-destructive testing at spandrel column during bridge inspection and assessment phase

CONCRETE REHABILITATION DESIGN AND CONSTRUCTION

After analysis of the rehabilitation alternatives with various service life projections, the alternative that would achieve a service life of at least 50 years was selected, which became the design criteria for the concrete repairs.

Rehabilitation of the bridge required complex engineering and construction sequencing. Access from below using barges was limited due to the multi-tier falls and adjacent power station. This necessitated a top-down approach, but loading on the superstructure had to be limited to avoid overloading the existing arches which, due to their shallow profile, experience high bending stresses under unbalanced loads. A series of tower cranes were constructed within the bridge piers to accomplish the deck and column replacements, with assistance from smaller mobile cranes. Access to the substructure required complicated suspended scaffolding and dewatered cofferdams in the fast-moving river (Image 6).

Image 6: View of multiple means of access, including suspended scaffolding and dewatered cofferdam. (Photo credit: Joe Szurszewski Photography)

HIGH QUALITY SURFACE REPAIRS FOR HISTORIC CONCRETE

The details of the concrete repair design were developed to achieve historic sensitivity and high-quality, durable repairs. The guiding principle behind the repair design was to address and mitigate in the future the root deterioration mechanisms identified, primarily chloride-induced corrosion and freeze-thaw damage, which are different mechanisms but both water-driven.

Based on the inspection, concrete surface repairs were specified for all locations where delaminations, spalls, and previous repairs were present, and repair details were developed for each typical location. Unique details were provided to address the severe corrosion-related distress at the arch rib corners (Image 7, Image 8), longitudinal cracking at the tops and bottoms of the arch ribs, and areas where freezing-and-thawing damage was particularly deep. The concrete repair specifications were designed to allow the contractor freedom to choose form-and-pour, form-and-pump, or shotcrete methods with either prepackaged or ready mixed concrete for each type of repair. Applicable material properties and quality control requirements were included for each repair method and material.

Image 7: Arch corner repair extending across full height of barrel arch, showing continuous and discrete CP anodes, supplemental rebar/anchorages, and coated Melan steel

Image 8: Application of wet-mix shotcrete to arch underside

DEEP CONCRETE REPAIRS FOR FREEZE-THAW DAMAGE

At the 3rd Avenue Bridge, freeze-thaw damage was often present below drain discharges or at arch springlines where water collects. Based on petrographic examination of core samples, most of the surface repairs were anticipated to be no more than 6 inches deep, but repair details were provided for depths up to 12 inches, which was the deepest damage observed in the core samples.

Even deeper freeze-thaw damage was present at the pier bases, near the waterline and below drain discharges. Maximum concrete erosion was up to 17 inches and freeze-thaw damage up to another 8 inches was present beyond that. Rather than removing all the freeze-thaw damaged concrete, the repair details required removal of a uniform 12 inches of concrete to reach what was defined as an “intact concrete substrate” (aggregates firmly embedded in solid paste but some freeze-thaw related cracking allowed). Deeper removals were performed in localized “pockets” to reach an intact surface. Longer epoxy-anchorages were installed deeper into the sound material beyond the removal depth, and a new grid of stainless-steel reinforcement was installed near the surface (Image 9).

Image 9: Pier base jacket repair in progress, showing cofferdam, concrete removals, and supplemental rebar/anchorages at top, and formwork and new concrete jacket at bottom of pier

MITIGATION OF FUTURE FREEZE-THAW DAMAGE AND REINFORCING STEEL CORROSION (I.E., EXTENDING SERVICE LIFE)

CRACKS REPAIRS AND COATING

Film-forming coatings and sealers are widely used to keep water from penetrating concrete but are often inappropriate for a historic structure according to preservation standards. However, research showed the 3rd Avenue Bridge had various surface treatments in its history. The original concrete is non-air-entrained, and chloride contaminated, and therefore extremely vulnerable to future deterioration and loss of historic fabric if water penetrates. After discussions between historians and technical experts, it was agreed that crack repairs and a high-performance, film-forming, water-resistant coating would be applied to all historic concrete surfaces. A relatively thin acrylic-based coating product was selected so as not to mask the original form-board lines. It can be removed, which is important for historic structures, and it enhances the appearance of the concrete by masking multiple generations of different colored patches.

TARGETED CATHODIC PROTECTION AT ARCH CORNERS

The deterioration in the arches was concentrated at the arch corners where exposure is the worst due to direct runoff and two-side exposure to moisture and freeze-thaw cycling. Corners that were distressed were repaired using a custom detail that included careful reinforcement to control cracking and maintain tight perimeters and bond, as well as continuous cathodic protection anodes to protect portions of the Melan angles that were not exposed, cleaned, and coated.

To mitigate future deterioration along the arch corners where there was no current distress, a targeted cathodic protection approach was implemented. Discrete, two-stage anodes were field located based on half-cell potential testing performed during the construction phase (Image 10, Image 11).

Image 10: Half-cell potential testing during construction

Image 11: Discrete, two-stage anodes installed in cored holes along sound arch corners between corner repairs

RESTORATION OF HISTORICAL FEATURES

The 3rd Avenue Bridge is on the National Register of Historic Places and is an icon in the Minneapolis skyline. Preservation of original materials to the extent possible and restoration of the original bridge aesthetics was a primary consideration. The project was reviewed and approved by the historic preservation agencies without any adverse impact to the historical integrity of the bridge.

Preserving aesthetics meant that original profiles needed to be replicated accurately. The intricate profile of the monumental piers was reproduced in the pier jackets using field-built formwork and self-consolidating concrete. Shotcrete repairs in areas most visible to the public were hand-finished to match the board-form lines in the adjacent original concrete (Image 12). Pier walls that were replaced utilized form liners to replicate the board form finish. The surface coating applied over the entire bridge was color-matched to the original colors during the period of historical significance. For each type of concrete repair, mockups were required so that both quality and aesthetics could be confirmed.

Image 12: Hand-finishing board form lines in shotcrete repairs on pier face to match existing surface texture

The rehabilitation also provided an opportunity to restore several original aspects of the bridge that had been lost. For example, the curved ends of the original cap beams were reproduced in the new precast cap beams, and new streetlamps mimicking the original historic lighting on the bridge were installed. The aluminum railings installed circa 1940 were cleaned and reinstalled, including augmentation to meet current code requirements.

Rehabilitation was completed and the bridge was opened to traffic in October 2023 (Image 13, Image 14, Image 15). Total construction cost was approximately $150 million, over 100,000 SF of concrete surface repairs were installed by shotcreting, and over 10,000 cathodic protection anodes were placed. The beauty and longevity of the rehabilitated bridge achieved by the collective skills of a team of experts in concrete repair design, materials, and construction make this one of the most impressive historic bridges in the country that will be admired for generations to come.

Image 13: "Before" photograph along upstream side of bridge, showing concrete deterioration in pier bases and arches

Image 14: "After" photograph along upstream of bridge, showing repaired arches and pier bases with new coating, along with replaced columns, cap beams, and railings above

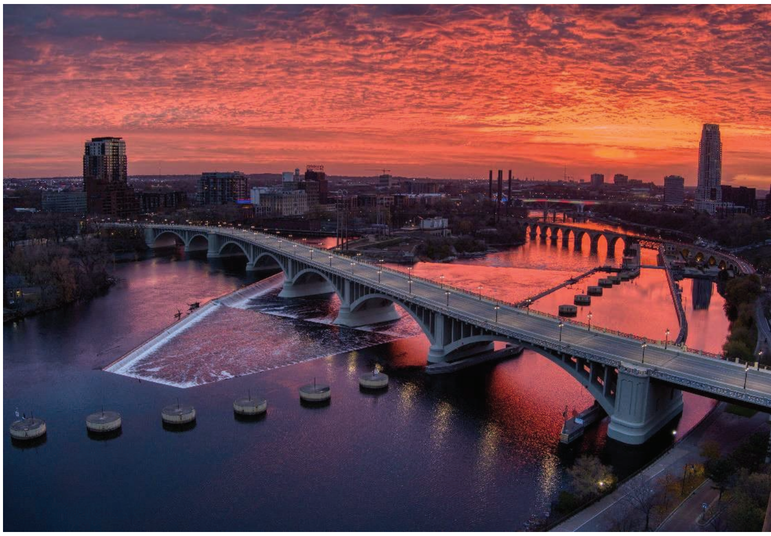


Image 15: Overall view of 3rd Avenue Bridge after completion of rehabilitation (Photo credit: Trey Cambern Photography)

UPCOMING CONVENTIONS

Visit www.icri.org/conventions for the latest updates!

2024 FINALIST

Baltimore Design School

PROJECT OF THE YEAR

OWNER	ENGINEER	CONTRACTOR	MATERIAL SUPPLIER
Baltimore Design School	**Columbia Engineering, Inc.**	**Southway Builders**	**Sika Corporation**
Baltimore, Maryland	Columbia, Maryland	Baltimore, Maryland	Lyndhurst, New Jersey

2024 PROJECT OF THE YEAR FINALIST

LONGEVITY CATEGORY

Baltimore Design School

BALTIMORE, MARYLAND

SUBMITTED BY SIKA CORPORATION

Image 1: The abandoned factory before the renovations

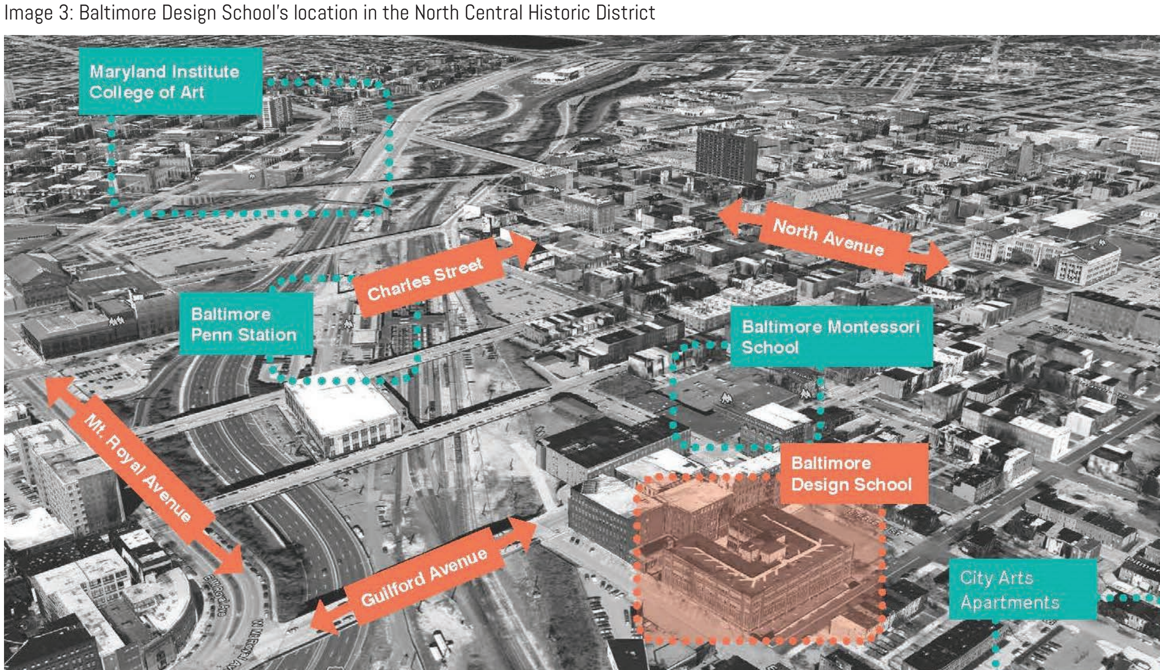
INTRODUCTION

It is an extremely rewarding experience when the vision for the restoration of an abandoned building becomes reality as a critical component for the restoration of a depressed local community. This formerly vacated factory was so decrepit that the HBO series *The Wire* used the building as a setting symbolic of post-industrial urban decay (Image 1). But with a creative and energetic project team motivated by this exciting challenge, along with a grant from Adobe and creative financing, this suffering structure has been resuscitated into a state-of-the-art public school for training future designers. As it is now known, the Baltimore Design School is a pinnacle of sustainability from the structure itself, to its immediate impact on the community, and for what will be the perpetual results of its curriculum for multitudes of graduates (Image 2).

Image 2: Exterior of Baltimore Design School 10 years after the renovation

The Baltimore Design School is the first-of-its-kind combined public middle and high school dedicated to students interested in architecture, graphic design, and

Image 3: Baltimore Design School's location in the North Central Historic District



fashion. It is located in the North Central Historic District and is the first area in the city as an arts and entertainment district listed on the National Park Service's National Register of Historic Places (Image 3). The school was founded a few years ago; but its current home, a 110,000-square-foot facility, was a former clothing factory that was yet another casualty of the declining manufacturing industry in the US (Image 4). This facility was given a $26.85 million overhaul and now it stands tall in the City of Baltimore—not as symbolic reminder of inner-city blight, but a center that will develop the artists and designers for many generations to come (Image 5).

Image 4: Workers in the original factory

Image 5: The official opening of the new Baltimore Design School on August 26, 2013, was celebrated by school founder and chair and then-State Senator Catherine Pugh, then-Governor Martin O'Malley, then-Mayor Stephanie Rawlings-Blake and Principal Nathan Burns, surrounded by other officials, supporters, and students

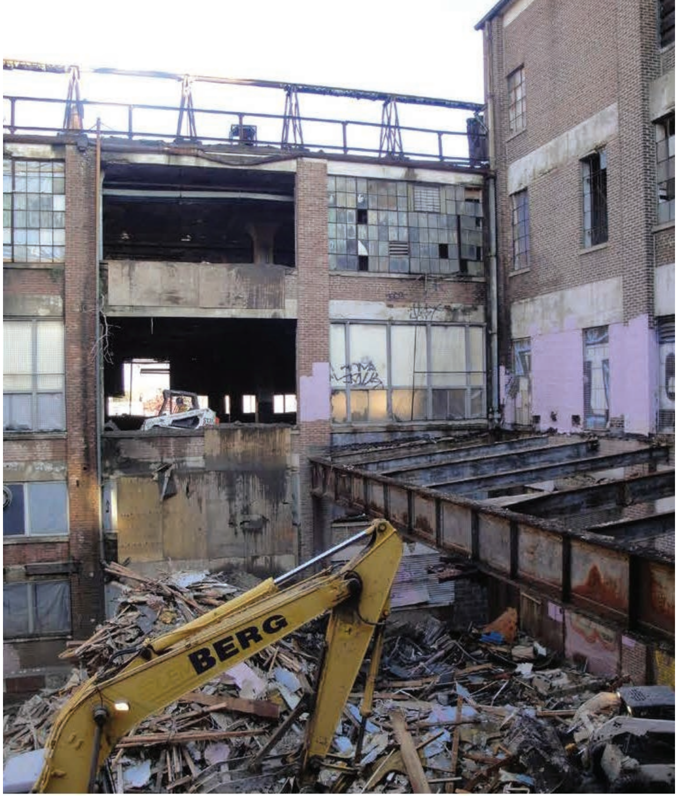


Image 6: Clearing the courtyard

THE HISTORY OF THIS STRUCTURE

This building was constructed in 1914. The four-story structure was the machine shop for a global supplier of bottle caps before housing a clothing manufacturer and played an important role in Baltimore's economy. The building was a representation of state-of-the-art industrial construction during the early decades of the twentieth century. The Crown Cork and Seal Company machine shop was designed in 1914 by Baltimore Architect Otto G. Simonson and built by the West Construction Company. Constructed of reinforced concrete, the building was the first in Baltimore to use a "beamless floor system", also known as flat-slab construction, that did not require structural beams to span between columns.

If there were LEED points in the 1920s, this structure would have been recognized for its creative use of natural light and HVAC systems. Expansive industrial steel-sash windows totaled over 60% of the surface area of the building's exterior skin. The ventilation system was also extremely advanced, as it did not rely upon the large windows to provide a consistent flow of fresh air, as air from the surrounding area was very dusty and harmful to the delicate machinery inside the building. The facility utilized an extremely innovative mechanical system that provided clean, tempered air throughout the building. The clean air passed over a series of pipes that were heated with hot water in the colder months and chilled with cold water in the warmer months with the aid of applying a geothermal process by means of ground water. This HVAC system was claimed to be able to keep the building interior at a consistent 70°F year-round. The conditioned air was then forced by another set of fans through the hollow structural columns and distributed through various openings in the columns.

CONDITION ASSESSMENT

Once the decision was made regarding the site selection, a design and construction team was assembled to perform condition assessments of what would be required to make this grand vision a practical reality. Unoccupied and lacking maintenance for over a quarter of a century, the building was in extreme disrepair. Due to the lack of concrete cover, lower quality concrete, and advanced carbonation, corrosion had spread throughout the exterior reinforced elements and interior columns. Ceilings and spandrel beams were especially heavily damaged from advanced corrosion. Testing revealed that the concrete was 2,000 psi in compressive strength, low for today's standards but consistent with building codes of that era.

The steel reinforcement was smooth and uncommonly placed diagonally to column alignment. Severe corrosion diminished the capacity of the reinforcement, making it necessary to utilize structural strengthening in addition to the repair and protection work.

SITE PREPARATION

The building interior looked like a junkyard as it was left in place for over two decades with everything still inside. Before any substrates could be worked on or from, they would first need to be seen. A massive clean-out operation had to be performed to remove equipment, furniture, and everything else imaginable from a suddenly deserted factory—not to mention the litter from many uninvited guests over the years (Image 6). Abatement had to be performed to ensure protection for all the construction workers and staff.

Image 7: Courtyard 10 years after renovation

REPAIR STRATEGY

Upon completion of the assessment, it was clear that an extensive and multi-faceted approach would be required to meet the complex challenges induced by decades of neglect. The following was the agreed and employed strategy of the design and construction team.

STRUCTURAL AND NON-STRUCTURAL CRACK REPAIR

Cracks that were not corrected as a result of the extensive spall repair techniques were individually classified into two categories: structural and non-structural. The structural cracks were repaired by means of low-pressure injection with high-modulus, low-viscosity epoxy resin. Non-structural cracks were addressed by route and seal with low-modulus polyurethane sealant for adhesion, flexibility, and overcoating benefits.

Image 8: Hand-applied mortar in 2014

CONCRETE REPAIRS

All major methods of concrete repair techniques were incorporated into the overall strategy. This included hand-applied, machine-applied, form and pour, and form and pump applications. The method of installation was selected based on the orientation, the size of the repair, and the predicted productivity of the technique.

- Any surviving smooth rebar in the repairs were thoroughly cleaned and coated with a corrosion-resistant primer that also increased adhesion with the repair material. However, there was a great deal of reinforcement throughout the structure that was terminally corroded and had to be replaced with new rebar or complemented with additional strengthening. New reinforcement was required for all the spandrel beam repairs.

- The hand-applied method was chosen for both the smaller more isolated repairs on columns and ceilings, and for the more complicated architectural features such as with the exterior arches (Image 8, Image 9).

- Machine-applied repair mortar was used to repair some large ceiling sections. This method was selected to improve production while providing a very dense material (Image 8, Image 9).

Image 9: Façade of building 10 years later

- Flowable repair mortars and concretes were predominately used in larger surface area repairs to the columns varying from shallower to deeper thicknesses.

- Prepackaged, self-consolidating concrete was used to repair the vast volume of spandrel beams at all the windows. The limited width and depth of the repair, combined with the quantity of and size of the required reinforcement, plus the expansive length of spandrel beams, dictated special consideration to the application and material.

STRUCTURAL STRENGTHENING

Roof slabs of the building had extreme section loss requiring new reinforcing. Supplemental reinforcement was also used to bring slabs back to their safe load bearing capacity. Carbon fiber plates were installed for strengthening these areas along with strengthening locations of new cut outs for conduits, pipes, ducts, and vents and for the new HVAC system (Image 10).

Image 10: Carbon fiber plates

JOINT SEALING

- For all joint sealing of concrete and masonry surfaces, a low-modulus polyurethane sealant was selected.

- A silicone sealant was applied to all glass substrate related connections.

CORROSION MITIGATION

As the destructive nature of the carbonation-induced corrosion was on display to a great extent throughout the interior and exterior of the structure, strategic effort had to be employed to avoid covert corrosion that had yet to reveal itself. Therefore, a penetrating surface-applied corrosion inhibitor was sprayed to the underside of the roof slab, all exterior surfaces, and all interior areas within four feet of the exterior.

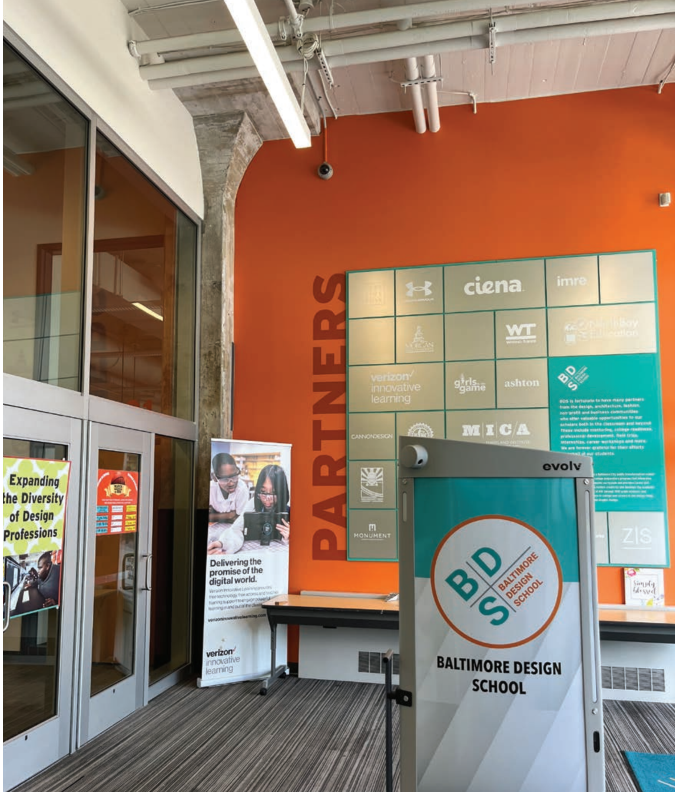


Image 11: Preservation of columns in 2024

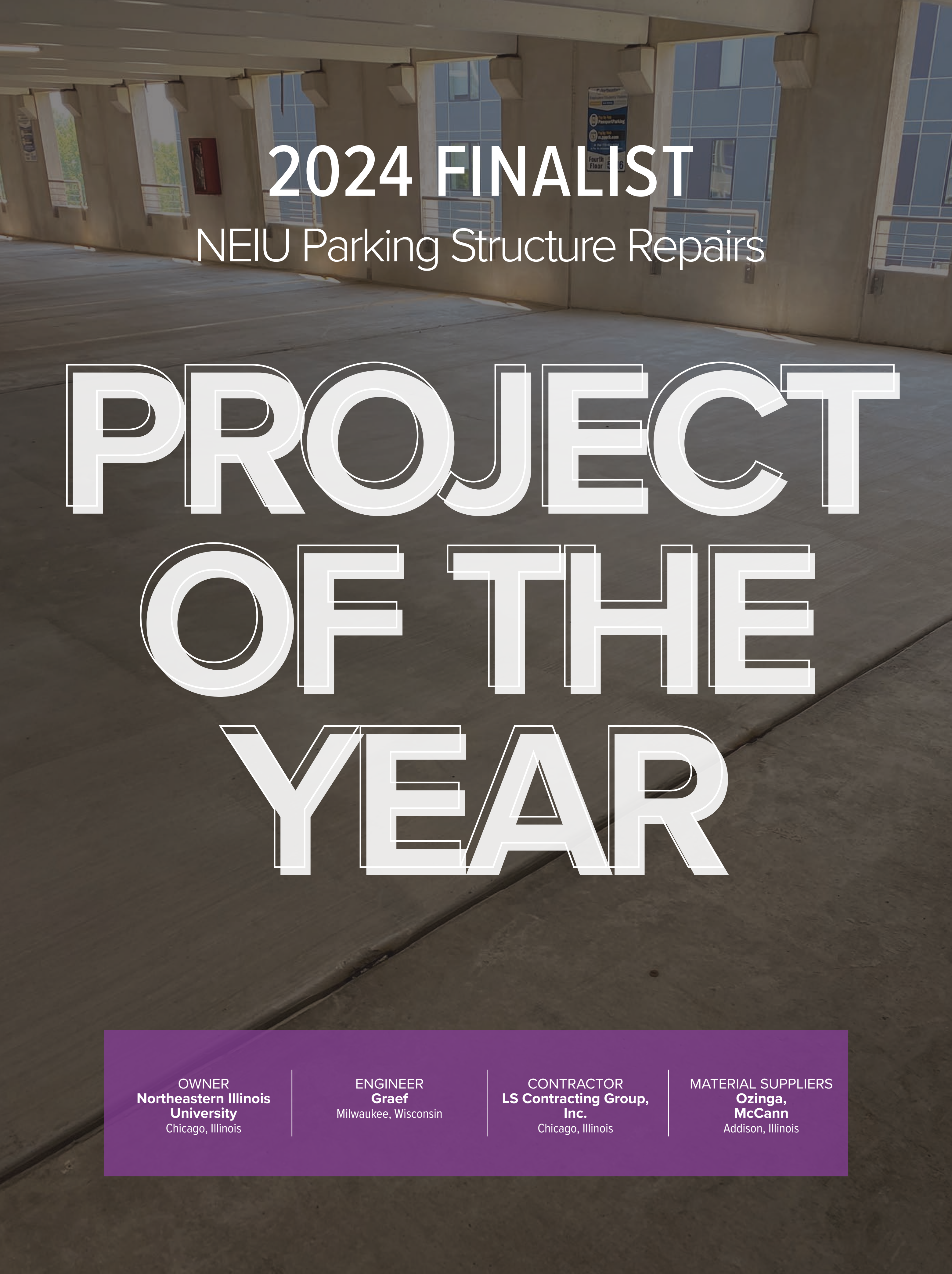
PROTECTIVE AND ARCHITECTURAL COATINGS

Careful deliberation was given for the selection of an interior coating. Historic consideration and the impact of maintaining the original feel of the building were factors. Conversely, the effects of continued dusting and the results of unhindered carbonation demanded a coating. Research and site-applied samples forged consensus to use a clear, breathable, anti-carbonation coating that would halt the carbonation process, bind up and seal in the dust, and preserve the historic appearance.

CONCLUSION

Over the past decade, the Baltimore Design School has transformed into a leading institution, fostering creativity in aspiring designers. Its modern facilities and collaborative environment have consistently nurtured talent, ensuring students are well-prepared for the industry, while contributing to Baltimore's vibrant creative landscape for future generations (Image 11, Image 12).

Image 12: Completed classroom 2014



2024 FINALIST

NEIU Parking Structure Repairs

PROJECT OF THE YEAR

OWNER	ENGINEER	CONTRACTOR	MATERIAL SUPPLIERS
Northeastern Illinois University Chicago, Illinois	**Graef** Milwaukee, Wisconsin	**LS Contracting Group, Inc.** Chicago, Illinois	**Ozinga, McCann** Addison, Illinois

PARKING STRUCTURES CATEGORY

NEIU Parking Structure Repairs

CHICAGO, ILLINOIS

SUBMITTED BY GRAEF

Image 1: Parking deck after repair completed

2024 PROJECT OF THE YEAR FINALIST

INTRODUCTION

The project, located on the campus of Chicago's Northeastern Illinois University, is a five-level parking structure that provides student and faculty parking. The first level is constructed with cast-in-place, slab on grade concrete, while the upper four levels are constructed with precast, prestressed concrete. The building is approximately 300 feet in the east-west direction and 250 feet in the north-south direction. Originally built in 2005, the parking structure accommodates approximately 1,150 vehicles. The open-air parking structure was designed without the need for mechanical ventilation or fire suppression systems, in accordance with the building code requirements at the time of construction (Image 1).

The structural framing for the parking structure is comprised of pre-topped, precast double tee floor structure elements supported by precast concrete beams, walls, and columns. The double tees span approximately 50 to 60 feet between supporting members and are connected by weld plates, forming a floor diaphragm that braces the structure and resists lateral loads. The perimeter of the structure has architectural precast panels with thin brick to match the adjacent buildings.

Image 2: Fire damage to the underside of the level four precast double tees

PROBLEMS THAT PROMPTED REPAIR

In February 2017, a car fire occurred on the third floor of the parking facility, damaging the underside of the level four precast double tees (Image 2). The extreme heat compromised the structural integrity of the precast concrete flange and stems of the level four double tees. The concrete corbels and precast walls at the supporting ends of the double tees were not exposed to the high temperatures.

In addition to the repair and replacement of the double tee components that were exposed to fire, the project also included the following repairs to the parking structure:

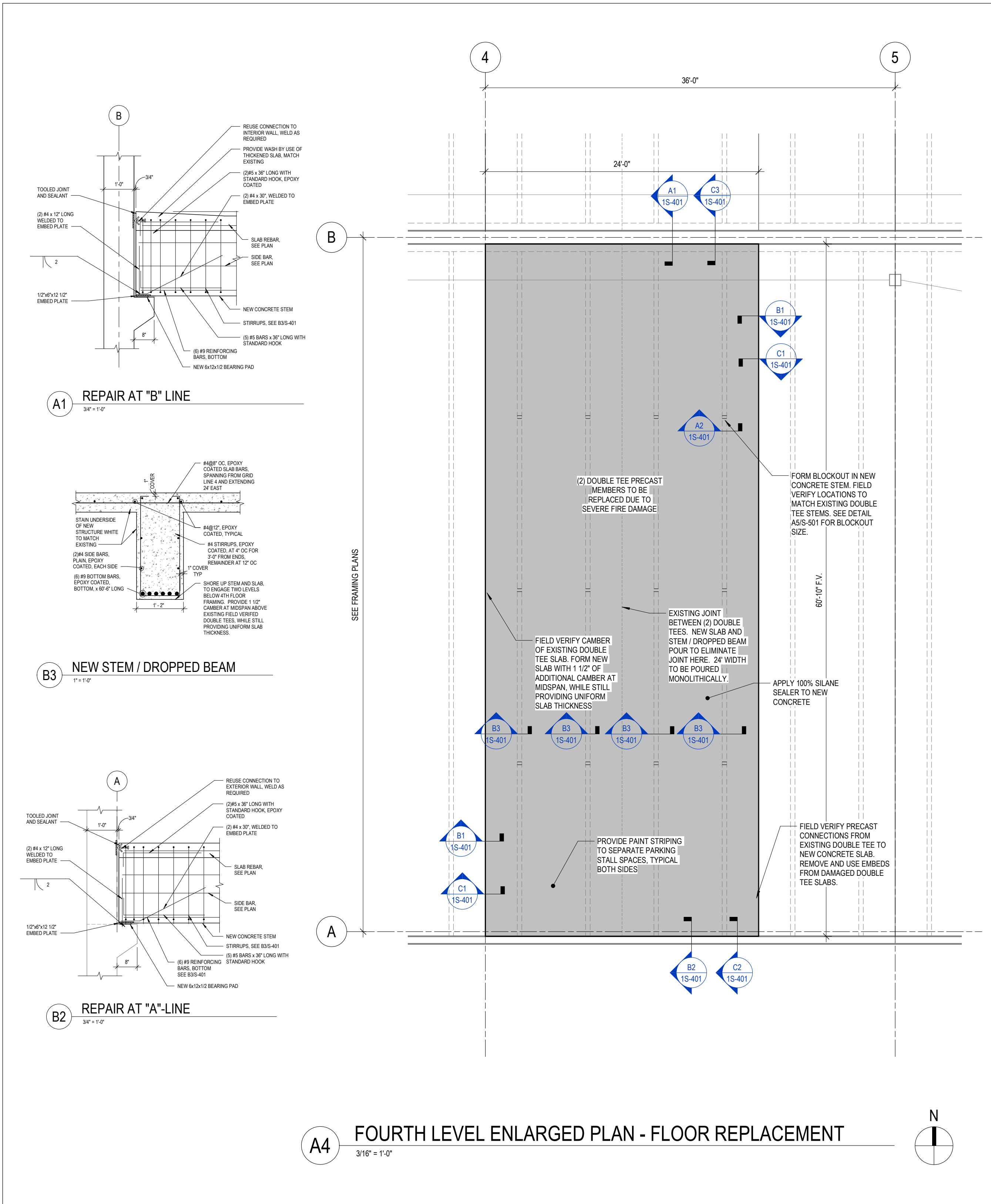
- Concrete corbels
- Precast connections
- Double tee stems top and underside concrete spalls
- Vertical concrete spalls on wall surfaces
- Joint sealant replacement between precast concrete members
- Flanged expansion joint replacement
- Silane sealers
- Cast iron drainpipe repairs and replacement

While these repairs were also a substantial part of the project scope, the primary focus of the project was on the replacement of the damaged double tees.

INSPECTION/EVALUATION METHODS

The consulting engineer retained a third-party testing agency to perform a petrographic examination using the methods of ASTM C856, "Standard Practice for Petrographic Examination of Concrete." The concrete surface was chain dragged from the top side of the deck and a delamination sounding roller was used from the underside to evaluate the extent of the damage from the fire. Large areas of unsound concrete and delaminated concrete were observed in the area directly above the fire, which played a crucial role in determining the final repair method.

Image 3: Site plan with details



TEST RESULTS & CAUSE OF DETERIORATION

A petrographic analysis of a concrete core taken from the level 4 precast double tee, which was exposed to fire, revealed a horizontal crack approximately 1.5 inches from the bottom of the core.

The crack was determined to have formed initially due to exposure to extreme heat—exceeding 573°C—for a long duration of time because the parking facility did not have fire suppression sprinklers. The petrographic analysis also revealed microcracking of the quartz particles and other siliceous fine aggregate particles near the bottom third of the flange, which had been exposed to extreme heat. Lastly, the core indicated that there was substantial dehydration of the cement past in the bottom third.

REPAIR SYSTEM SELECTION

The chosen repair system was significantly influenced by site constraints and the petrographic analysis conclusions. The extreme heat had caused concrete delamination over a large area of the fourth level double tees, necessitating an extensive range of removal and replacement of the concrete. The prestressing steel and mild reinforcement, also exposed to extreme heat, required extensive testing to ensure the integrity was not compromised. The original design of the double tee featured 270 KSI prestressing strands in the stems.

Above the fourth level fire-damaged double tees, there were roof double tees. However, removing all welded connections and temporarily displacing the roof double tees to erect the new double tees at level four was deemed impractical by the design team, leading us to another solution.

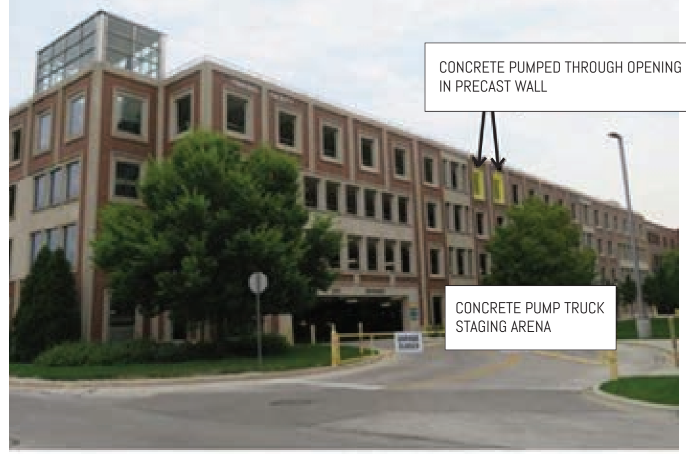
Another option that was considered, but not chosen, was the use of steel beams with composite concrete slab. Parking structures must comply with code-mandated fire ratings, necessitating the installation of fireproofing on exposed steel. Additionally, steel is not typically a good solution for harsh environments because exposure to deicing salts and water accelerates corrosion activity.

During the design phase, both internal and external post-tension tendons were considered. However, the sloped internal ramp on one side and the exterior precast walls on the other side posed challenges for accessing and stressing the tendons in the dropped beams. External post-tensioning would have required additional fireproofing, thereby increasing project costs.

The solution chosen by the design team involved replacing the fire-damaged double tees with precambered cast-in-place concrete that is reinforced with mild steel (Image 3). The new cast-in-place concrete required the beams and slab to be formed and poured using a precambered edge and bottom forms. After removing the forms and temporary supports, the cast-in-place concrete beam and slab system was welded to the adjacent precast components on all sides.

SITE PREPARATION & LOGISTICS

The exterior of the parking facility was constructed with precast concrete panels with 4'-6" wide openings centered on each of the double tees.



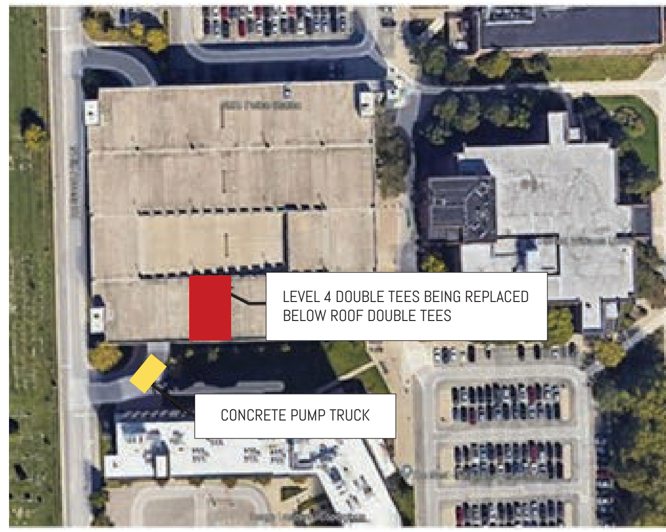


Image 4: Location of damage in relation to pump truck access

To get the new concrete to the double tee replacement area, a pump truck was positioned so that concrete was pumped through an opening and moved into position by a concrete buggy (Image 4, Image 5). The weight of the fresh concrete and the equipment used to place the concrete required shoring and reshoring down to the levels below. Maintaining partial access for students and faculty was crucial to the owner, making it essential that the parking structure remain partially open. Closing the entire structure during construction was not an option.

Image 5: Pump truck positioned to pump through opening

DEMOLITION METHOD

Before demolition could begin, all welded connections around the fire-damaged double tees had to be severed. The contractor chose to implement a remote-controlled demolition machine equipped with a hydraulic breaker to chip away the concrete into more manageable pieces for removal from the parking structure (Image 6). To protect the double tees below from damage, loose concrete was collected on the level beneath using tires and plywood to dissipate the impact load, ensuring the deck remained undamaged. A skid-steer loader was then used to gather the loose concrete debris and safely transport it out of the parking structure.

Image 6: Remote controlled demolition

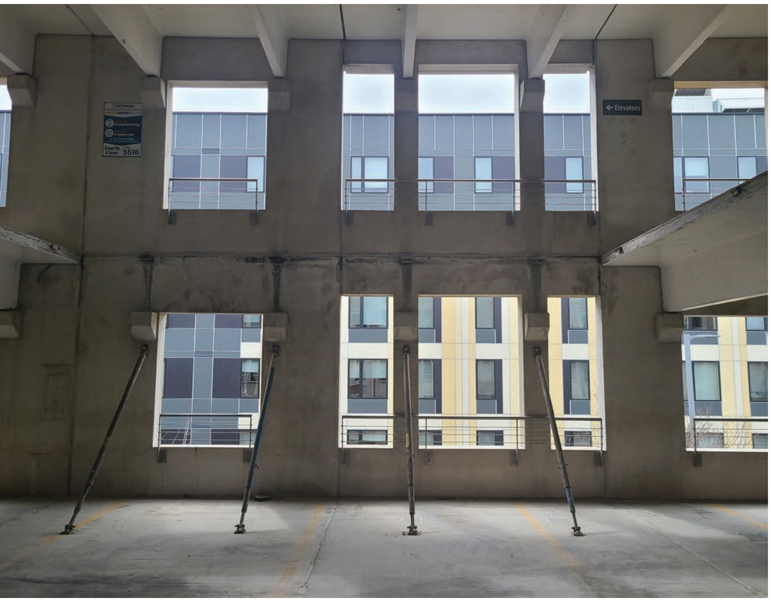


Image 7: Temporary bracing and double tee removal

Temporary shores were strategically placed around the demolished area to stabilize the structure until the new cast-in-place floor system was completed (Image 7). Temporary shoring and reshoring was also coordinated with the contractor in areas that exceeded the capacity of the surrounding precast components.

UNFORESEEN CONDITIONS FOUND

After demolishing the damaged double tees, all exposed flange connectors between the existing double tees became visible (Image 8).

Image 8: Double tees removed

Surprisingly, there were fewer connections than expected, prompting the team to devise a plan to add connections to adjacent double tees for better load distribution. This involved fabricating additional connectors before pouring the new cast-in-place system, ensuring they were ready for welding after removing the temporary shores. Some existing connections and embeds could not be salvaged during demolition, necessitating further coordination between the designer and contractor to fabricate new steel connections.

SPECIAL FEATURES

The precambered cast-in-place system performed exceptionally well. Leading up to the scheduled concrete pour date, there were multiple meetings between contractors and designers. Initially, the concrete contractor expressed doubts about the precamber value, expecting it to be less than the calculations showed. However, precise calculation of the precamber from the designer was used, which was crucial to ensure that the new cast-in-place slabs deflected into position as the contractor lowered the shores and started to align with the adjoining precast. The design utilized a T-section analysis to calculate the deflection at the different stages. The dropped beams and slabs were cast monolithically, with reinforcement detailed to tie them together and form the composite section (Image 9, Image 10). After removing the shores, immediate inspection revealed no visible cracks in the new cast-in-place concrete beams and slabs components (Image 11, Image 12). Site visits were periodically performed to visibly inspect the new cast-in-place concrete.

Image 9: Partial rebar detail with formed repair

Image 10: Reinforcement for monolithic pour

CONCLUSION

Throughout the project, the design team referenced the ACI and ICRI manuals, design guidelines, and specifications during the design, detailing, and repair process.

The contractor that performed the work deserves a lot of credit for the project execution, forming the cast-in-place beams and slab perfectly, and ultimately placing the concrete despite the accessibility and site challenges. The design team and contractor collaborated to develop and implement a long-term solution that would satisfy the owner and minimize disruptions to the campus.

Image 11: Precambered form edge after concrete placement

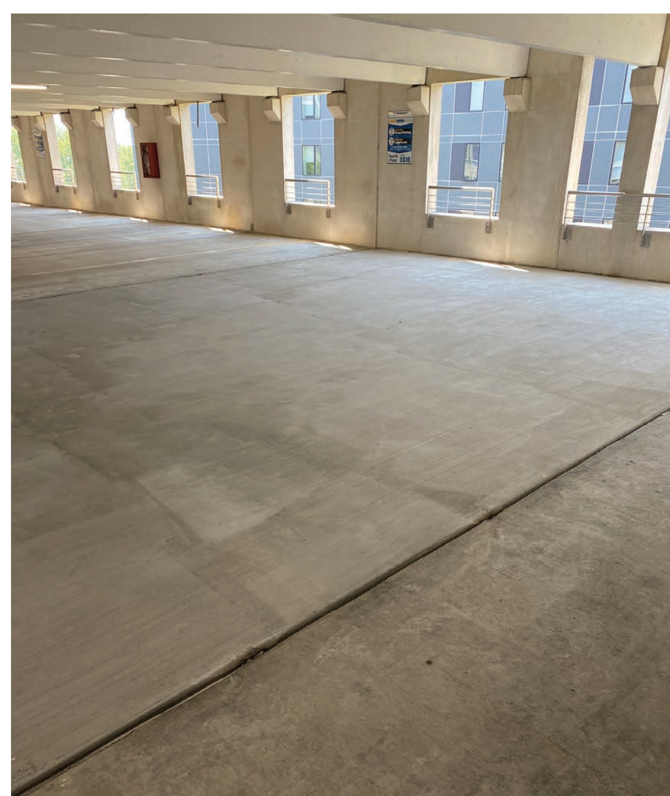
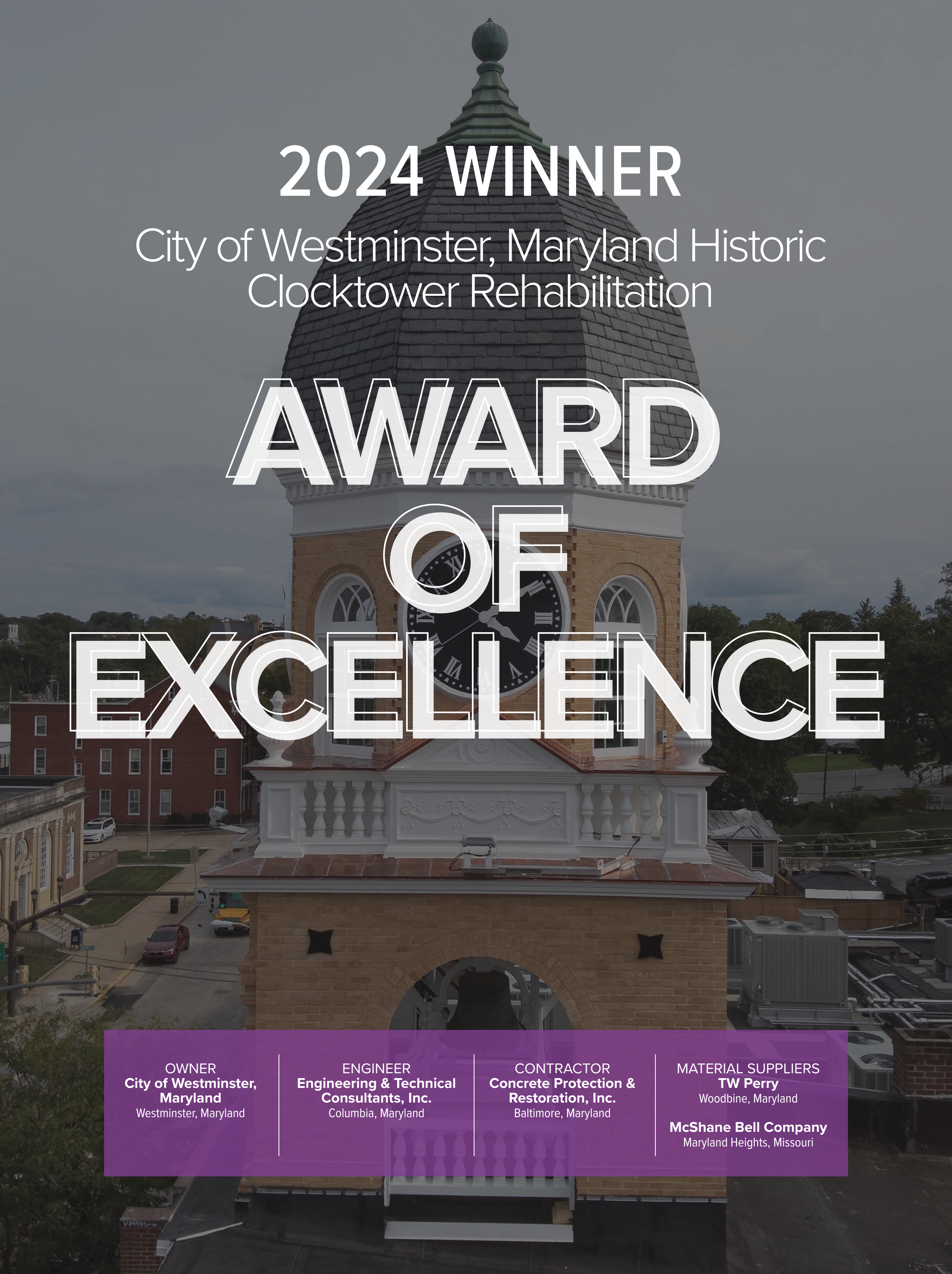


Image 12: Concrete system after shores were lowered



2024 WINNER

City of Westminster, Maryland Historic Clocktower Rehabilitation

AWARD OF EXCELLENCE

OWNER
City of Westminster, Maryland
Westminster, Maryland

ENGINEER
Engineering & Technical Consultants, Inc.
Columbia, Maryland

CONTRACTOR
Concrete Protection & Restoration, Inc.
Baltimore, Maryland

MATERIAL SUPPLIERS
TW Perry
Woodbine, Maryland

McShane Bell Company
Maryland Heights, Missouri

HISTORIC CATEGORY

City of Westminster, Maryland Historic Clocktower Rehabilitation

WESTMINSTER, MARYLAND

SUBMITTED BY CONCRETE PROTECTION & RESTORATION, INC.

BACKGROUND

The historic clocktower, which sits atop a now-retired 3-story fire engine house, is a beloved landmark for small town Westminster, Maryland. The nearly 130-year-old structure provides a glimpse into Westminster's rich past, but also plays a major role in the city's everyday routine as many residents listen for the hourly chimes to set daily activities (Image 1).

So, what was the City of Westminster to do when the clocktower showed significant signs of structural instability and distress due to decades of water-related damage? Could the City of Westminster afford a major rehabilitation project to revive a major historic icon or would the clocktower be demolished to avert the serious risk of the structure collapsing onto bustling Main Street

Image 2: Deficiencies in the tower base

Image 1: Westminster Clock Tower completed

below? The solution to this problem included a truly collaborative team effort between key City personnel, a local engineer, and a restoration contractor along with $1,000,000 in funding from both national and state governments.

PROJECT HISTORY & MILESTONES

- **1896:** New 3-story fire engine house constructed on Main Street. The engine house included a clocktower that housed the bell, which was purchased by the city in 1881 (for $0.25/lb.) that was transferred from the old fire station.
- **1998:** Engine house retired (building is now privately owned).
- **2017:** Concerned with deterioration, Westminster city hires an engineer for an evaluation. Immediate, temporary shoring and eventual comprehensive rehabilitation recommended.
- **2018:** Temporary shoring installed.
- **2021:** The engineer and city meet to discuss worsening conditions and needed rehabilitation.
- **Summer 2022:** City publicly bids out the project.
- **Fall 2022:** City awards project.
- **Winter 2023:** Project commencement.

STRUCTURE CHARACTERISTICS

The clock tower stands 35' tall and weighs over 150,000 lbs. It sits 60 feet above the ground on the corner of the roof of the now-retired engine house. The structure consists of three major sections. The base is square-shaped, triple-wythe brick masonry base with arches providing access to the historic bell. The second, middle section is the octagon-shaped, triple-wythe brick masonry tower attic displaying four clock faces and four windows. The third section is the timber-framed roof featuring original slate tiles.

The clocktower exhibits many beautiful architectural elements including wood balustrades in the base archways and windows, metal cornice, in addition to architectural pieces featured along the transition between the tower base and attic.

PROBLEMS THAT PROMPTED REPAIR

The clock tower sits in plain view and signs of distress were recognized by the city with the primary concern in the clock tower base (Image 2).

Other signs of damage include:

- Masonry under the metal cornice was significantly bulged/ deteriorated.
- Arches had subsided leaving large gaps in the masonry.
- Mortar was washed-out, missing, and/or cracked.
- Corroding metal cornice and architectural components.
- Vandalism to windows and ornamental pieces.

INSPECTION/EVALUATION METHODS & TESTING

The Engineer performed a comprehensive visual inspection including the use of boom lifts and drones. Intrusive sampling was performed in many locations to determine the construction details and current conditions. Existing paints/coatings were tested and often contained lead.

SITE PREPARATION

The major components of the site preparation include:

- Documentation of existing components and measurements to ensure replacement components nearly perfectly matched the existing. Preparation and careful review of shop drawings provided quality assurance.
- Careful removal of the nearly 145-year-old bell, which predated the clocktower structure.
- Careful dismantling, storage, and transport of the clock assembly.
- Confirmation of existing conditions of the 3-story building (e.g., roof and structure) to confirm their adequacy to support the temporary shoring and scaffolding.
- Protection of the existing 3-story building, which was privately owned.

Image 3: Graphic illustration of the sequencing

Image 4: Demolition of the tower base with shoring

DEMOLITION METHOD

The sequence of deconstructing/reconstructing the entire masonry tower base, while temporarily supporting the tower attic and roof above, was a herculean effort. Image 3 graphically illustrates the sequencing of shoring, demolition, masonry installation, structural steel installation, and wood framing installation in a phased manner (Image 4, 5).

REPAIR PROCESS EXECUTION

Though complex, the major components of the rehabilitation project were performed in the following sequence:

- Documentation and site preparation. Fabrication of new architectural components.
- Structural rehabilitation (e.g., tower base reconstruction and tower attic repairs).
- Application of various “waterproofing” components (more on this later).
- Installation of architectural/ornamental elements.
- Installation of lighting, reinstallation/servicing of the clock mechanisms, and reinstallation of the historic bell.

USE OF STATE-OF-THE-ART METHODS

During rehabilitation, the upper two-thirds of the tower (approximately 75,000 lbs.) was suspended in the air while reconstructing the base section. Often overlooked, the temporary shoring/bracing system utilized state-of-the-art methods (Image 6). Needle beams supported steel angles which “sandwiched” the tower attic walls while the Contractor simultaneously deconstructed/ reconstructed the tower base in quadrants.

Additionally, many modern waterproofing materials/methods were utilized/implemented without altering the exterior aesthetics (Image 7).

Image 5: Tower base reconstruction with structural steel installed

USE OF MATERIALS AND VALUE-ENGINEERING

The project utilized several alternative materials to increase durability, as well as decrease project costs and future maintenance.

- A 16 oz copper cornice replaced the corrosion-prone steel cornice.
- The four wood clock faces were replaced with aluminum clock faces (clock hands/mechanisms were salvaged/restored).
- The metal architectural/ornamental components were replaced with fiberglass and PVC replicas.
- Composite flooring was installed in the tower attic in lieu of wood.
- PVC soffit replaced the wood soffit (under the tower attic).

Image 6: Suspension of the upper two-thirds during reconstruction of the base

Image 7: Waterproofing and flashing materials installed

AESTHETICS

Faced with the rehabilitation of a severely deteriorated and unstable structure and understanding the goals of the city to increase durability, the design was focused on preserving the exterior aesthetics.

One key example of this is the reconstruction of the tower base veneer (Image 8). Although the tower base was converted from a multi-wythe brick masonry wall to a grout-filled, reinforced CMU wall, a salvaged brick veneer was used so there was no noticeable change to the clock tower aesthetics.

Image 8: Salvaged brick veneer installation

As part of the rehabilitation, new uplighting was installed to illuminate the revitalized clocktower at night. Additionally, backlighting was installed behind the new windows with options for different colors to highlight various holidays and celebrations. The lighting systems are remotely controlled to limit the need to access the clock tower.

SUMMARY

This project included many facets of large historic restoration projects, compacted into a 14'x14' footprint with a final restoration cost of $1,137,527.00.

In all, the project was hugely successful with the city celebrating the public clocktower with a re-opening party along Main Street, with efforts of the key project team memorialized by an engraved bronze plaque.

Waterproofing & Protection with MPC Park Deck

Two-component, polymer-modified, cementitious traffic-deck waterproof coating

Crossfield Products Corp. | miracote.com | 800.692.3502 | miracote@cpcmail.net

2024 WINNER

Hartsfield-Jackson Atlanta International Airport North and South Domestic Terminal

AWARD OF EXCELLENCE

OWNER	ENGINEER	CONTRACTOR	MATERIAL SUPPLIERS
City of Atlanta, Department of Aviation Atlanta, Georgia	**Walker Consultants** Atlanta, Georgia	**Gutknecht Construction** Columbus, Ohio	**Coastal Construction Products** Tucker, Georgia **LymTal International, Inc.** Woodstock, Georgia

2024 AWARD OF EXCELLENCE WINNER

PARKING STRUCTURES CATEGORY

Hartsfield-Jackson Atlanta International Airport North and South Domestic Terminal


Typical shoring layout for slab strengthening slot installation

ATLANTA, GEORGIA

SUBMITTED BY WALKER CONSULTANTS

INTRODUCTION

The North and South Domestic Terminal Parking Decks provide 13,216 total parking spaces for the world's busiest airport by passenger volume. Both structures were originally constructed in approximately 1980 and later expanded horizontally in 1986, followed by vertical expansion in 1995. These structures provide separate hourly and daily parking with the closest parking access to the Hartsfield-Jackson Atlanta International Airport (H-JAIA) Domestic Terminal. Consequently, they are among the highest traffic volume parking structures in the southeastern US.

Over the past 40+ years, the structures have undergone six repair programs, with the first occurring in 1986 and the most recent performed in 2016. The project Engineer's 2020 condition assessment revealed widespread deterioration, primarily in the original cast-in-place portions, due to failures of previous repairs and new deterioration as the structures approached the end of their original design life.

CONDITION ASSESSMENT AND EVALUATION METHODS

The South Deck comprises approximately 2.4 million square feet of floor space over four levels while the North Deck comprises approximately 2.1 million square feet of floor space over four levels. The original cast-in-place PT portions of both decks comprise three levels (two supported). The Third Level of the original structures served as the top level with direct exposure to ultraviolet rays and precipitation for 15 years until the vertical expansion was completed in 1995. Both the horizontal and vertical expansions were constructed of precast concrete with floor systems composed of precast double-tee beams framing into precast inverted-tee girders and walls.

The first step in the restoration process involved performing a complete condition assessment of both structures. The assessment found the original portions of both structures to be in poor condition and the expansions to be in fair condition. The Owner was aware that the structures were nearing the end of their design life and planned to replace the South Deck in 5 years and the North Deck in 10 years. The assessment identified widespread structural deterioration, including failed slab PT tendons throughout the original portions of both structures with a higher concentration of failure on the original top levels. Finally, inferior quality and failure of some previous repairs contributed to the observed deterioration.

Failed PT tendon with multiple broken wires protruding from the top of the slab

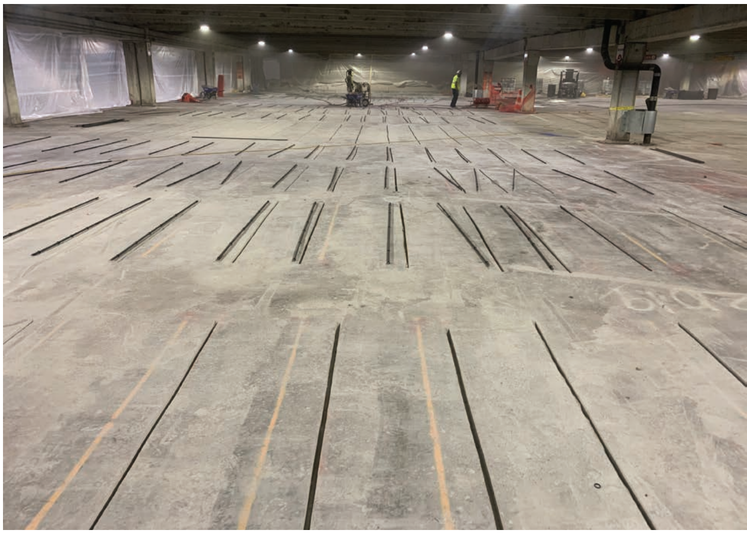

While the original structure's thin slabs were constructed with limited conventional mild-reinforcement that corrode more slowly than the high-strength PT tendons, we found that significant loss of the PT tendons would result in loss of a viable load path for the slab system. Therefore, significant slab strengthening in the original structures would be required to achieve safe operation of both structures for the desired remaining service lives in addition to significant routine maintenance repairs for the expansion structures.

Shoring layout on Terminal Parkway to maintain partial use of the roadway during construction

REPAIRS

An invasive PT testing program was found to have too great an impact on the tight operations at the airport. The thin slabs and poor profile construction tolerance of the existing tendon sheathing added complication to proceeding with the traditional repair approach. A more creative repair approach was needed to practically meet the parking needs of the Atlanta Department of Aviation.

To ensure a viable load path for the anticipated remaining design life and beyond (considering the reality of large construction project planning), we assumed that the entire P/T system might fail along with total loss of the mild reinforcement at the top of the slab. Visual observations from the condition assessment supported the assumption that the existing mild reinforcement at the bottom of the slab was in good condition after 40 years of service and would remain in good condition for the foreseeable future. The new slab strengthening approach would consist of a series of slots 1-1/4-inches deep at approximately 15-inch spacing to be installed over each joist throughout the original structures. New high-strength corrosion-resistant steel reinforcing bars would be near-surface mounted into the slots and bonded to the slab with a structural epoxy resin adhesive. The size, strength, and distribution of the new reinforcement was designed to provide the slab with adequate support to resist the governing code-required loads without the P/T- and mild-reinforcement assumed to fail in future service. Additionally, temporary shoring would need to be installed to support the slabs and joists during slab strengthening slot installation activities.



Slab strengthening slot installation in progress

Despite the design allowing for failure of the existing embedded reinforcement, the supplemental reinforcement was to be installed without damaging existing embedded reinforcement in keeping with "do no harm" principles governing good restoration engineering practice.

In addition to strengthening repairs, routine maintenance repairs were to be performed:

- Concrete repairs to spalled/delaminated structural elements
- Crack epoxy injection
- Construction of new vehicle barrier walls
- Recoating exposed structural steel connections
- Shear connector repair or replacement
- Expansion joint replacement
- Tee-to-tee joint sealant replacement
- New traffic bearing waterproofing membrane installation

To meet the operational needs of the airport, the repairs had to be completed in phases, with repair quantities and locations being determined by both the Design and Construction Teams at the beginning of each phase. In total, 21,000 individual repair locations were identified, tracked, and completed.

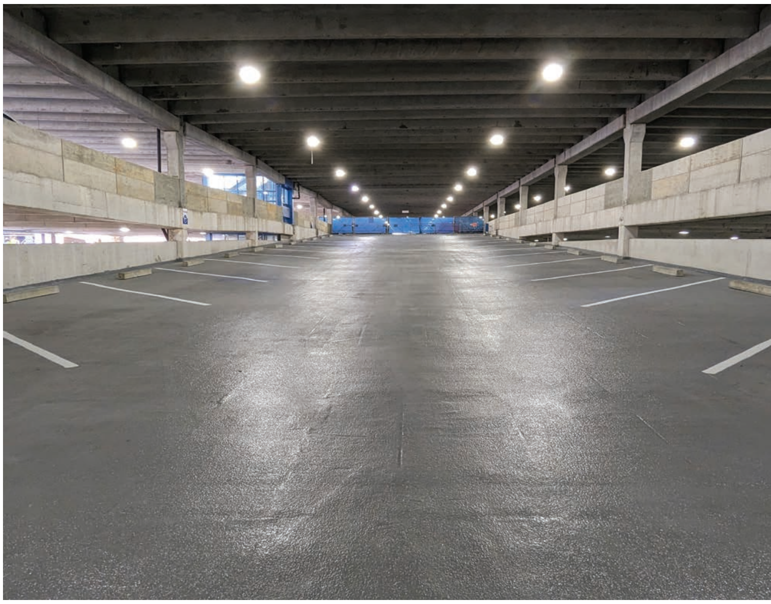
Load testing the slab to verify the performance of the new slab strengthening slots

CHALLENGES

Completing a highly technical construction repair project of this scale in one of the busiest parking structures in the Southeast presented numerous challenges that may be anticipated, such as coordination among a large team of stakeholders, personnel turnover during the 5-year project, managing several simultaneous construction activities, mitigating construction delays due to inclement weather, and safety and security of the jobsite.

RESULTS

In total, 46 miles of supplemental reinforcement was installed using 17,710 gallons of epoxy, 64 cubic yards of cementitious repair material was mixed on site and placed, and twelve acres of multi-coat waterproofing membrane was applied, all with an average crew size of 50 laborers. 13,500 shoring posts were constantly being erected, dismantled, moved, and erected again throughout the project. The final mobilization phase was reopened by October 2023.



Completed slab strengthening repairs, waterproofing repairs, and new vehicle barrier installation

Overview of completed repairs prior to reopening

2024 WINNER

The Granite Club Garage Rehabilitation Project

AWARD OF EXCELLENCE

OWNER
The Granite Club
Toronto, Ontario, Canada

ENGINEER
WSP Canada
Toronto, Ontario, Canada

CONTRACTOR
Duron Ontario Ltd.
Toronto, Ontario, Canada

MATERIAL SUPPLIERS
Corrosion Services Company Limited
Toronto, Ontario, Canada

2024 AWARD OF EXCELLENCE WINNER

PARKING STRUCTURES CATEGORY

The Granite Club Garage Rehabilitation Project

TORONTO, ONTARIO, CANADA

SUBMITTED BY WSP CANADA

Granite Club Cover Photo (Courtesy of the Granite Club)

INTRODUCTION

The Granite Club is a multi-purpose fitness/recreation facility located in Toronto, Ontario. Built in 1972, the attached parking garage consists of a three-level underground structure with suspended slabs employing conventionally reinforced concrete. The slabs are protected by a mastic asphalt traffic topping over a rubberized asphalt waterproofing membrane. The traffic topping system was installed in the 1990s, meaning the unprotected concrete was left exposed to winter deicing salts for over 20 years. This complex is subjected to heavy in/out traffic volume in a typical day, contributing to significant salt exposure over successive winters.

Over 30 years ago, The Club was advised that the reinforcing steel in the garage slabs was actively corroding, and after considering their options they decided to install an Impressed Current Cathodic Protection (ICCP) system to mitigate corrosion of the reinforcing steel embedded in the floor slabs. This system uses non-sacrificial anodes powered by a rectifier to distribute protective current to the cathode (in this case, the embedded steel). The rectifier sends direct current from the anode on the slab soffit to the embedded steel (cathode) effectively rendering the steel structure immune to corrosion. The ICCP system was installed between 1992 and 1998.

During the evaluation of the structure's condition and the effectiveness of the CP system, there were three major key findings related to the CP system (Fig. 1):

- Concrete laboratory analysis (Figure 1) indicates the chloride contamination levels in the floor slabs are 2 to 15 times higher than thresholds needed to initiate corrosion of embedded reinforcing steel.
- In spite of the very high levels of chlorides in the concrete, the extent of concrete deterioration was modest.
- In the previous five years, the CP system operating data indicated the system was approaching the end of its service life as the conductive coating anode system was becoming less conductive.

With the suspended slab waterproofing and CP systems reaching the end of their respective service lives, The Granite Club was offered two management options:

1. Full Suspended Slab Replacement; or
2. Localized Concrete Repairs combined with a Full Cathodic Protection System Renewal

The Granite Club chose to proceed with the localized repairs only, along with the Full CP System Renewal.

PROJECT DETAILS

From 2022 to 2023, the project team completed the first phase of the project with future phases set to be completed in 2025 and 2026. The work completed can be broken down as follows.

Verifying the continuity of reinforcing steel within the suspended slabs

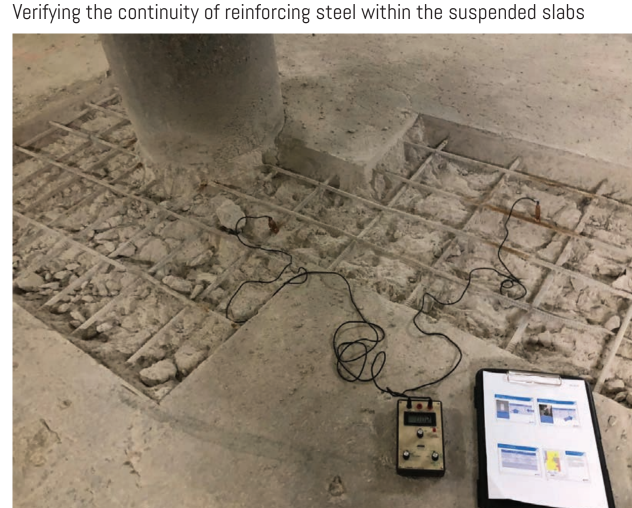


Figure 1: Chloride Laboratory Analysis

Total Chloride Ion Content

Core No.	Horizon from the Top of the Core (mm)	Chloride Ion Content (%)	Chloride Ion Content Corrected for Background (%)
P1-1	10-20 100-110	0.536 0.035	0.501 0.000
P1-2	20-30 100-110	0.378 0.327	0.343 0.292
P1-3	20-30 100-110	0.802 0.067	0.767 0.032
P1-4	20-30 110-120	0.418 0.046	0.383 0.011
P1-5	20-30 100-110	0.103 0.533	0.068 0.498
P2-6	20-30 100-110	.453 0.620	0.418 0.585
P2-8	20-30 100-110	0.217 0.129	0.182 0.094
P2-9	20-30 100-110	0.094 0.307	0.059 0.272
P2-10	20-30 100-110	0.082 0.106	0.047 0.071

Background Chloride Parent Concrete is 0.035%

CONVENTIONAL CONCRETE REPAIRS

Prior to renewing the cathodic protection components, the project included typical garage repairs. These included localized concrete repairs, and full mastic waterproofing system replacement and drain replacement.

We specified that all steel in the new concrete patches be epoxy coated. By coating the steel inside the patches, the di-electric properties of the epoxy force the CP current to exclusively flow to the steel exposed to chloride-contaminated concrete outside the new patches, making the CP system operate more efficiently.

PROJECT STATISTICS

The specific project statistics are summarized as follows:

Completed Phase 1

- Cost: $1.6 Million (All costs are presented in USD)
- Size of Project Area: 4500 m^2
- Concrete Repairs: 370 m^2 or 60 m^3 of new concrete in repair areas
- New Steel: 550 kg

Projected Future Phases

- Project Cost: $2.1 Million
- Size of Project Area: 6,250 m^2
- Concrete Repairs: 530 m^2 or 80 m^3 of concrete
- New Steel: 800kg

Totals (est.)

- Cost: $3.7 Million
- Square Footage of Work Area: 10,750 m^2
- Concrete Repairs: 900 m^2 or 140 m^3 of concrete
- New Steel: 1,350 kg

FINANCIAL IMPACT

In total, by proceeding with the localized repairs only along with the full CP renewal strategy, the Granite Club is projected to spend $3.7 million to fully restore the structural integrity of the garage, while also mitigating corrosion of the reinforcing steel that remains embedded in severely chloride-contaminated concrete. This cost is only 42% of the projected full suspended slab replacement cost of $8.8 million, creating savings close to $5.1 million (roughly $475 /$m^2$).

	Concrete Volume (m^3)	Concrete Carbon Factor (kg eC0$_2$)	Rebar Weight (kg)	Rebar Carbon Factor (kg eC0$_2$)	Concrete Carbon Total (kg eC0$_2$)	Rebar Carbon Total (kg eC0$_2$)	Material Subtotal (kg eC0$_2$)	Transport / Construction / Waste (kg eC0$_2$)	Total (kg eC0$_2$)
Cathodic Protection Renewal	142	313	1,349	1	1,044	44,299	45,343	5,442	50,785
Full Slab Replacement	2,722	313	258,577	1	200,164	852,133	1,052,297	126,276	1,178,573

Figure 2: Embodied Carbon

Difference: 1,127,788

CLIENT OPERATIONS IMPACT

By proceeding with the localized repairs only along with the full CP renewal strategy, The Granite Club also benefited from the following:

- We project the construction duration for a full slab replacement strategy to be 50% more than the chosen Full CP Renewal strategy.
- The CP renewal strategy is considerably less noisy than the full slab replacement.
- The Club membership relies upon on-site parking for the short interval visits to the Club. The CP option was phased in such a manner to ensure over 60% parking remains available throughout the project. The full slab replacement would only allow less than 40% of the parking stalls to remain available.
- The first-generation CP system has lasted almost 35 years. We expect the service life of the second Gen system to exceed 40 years.

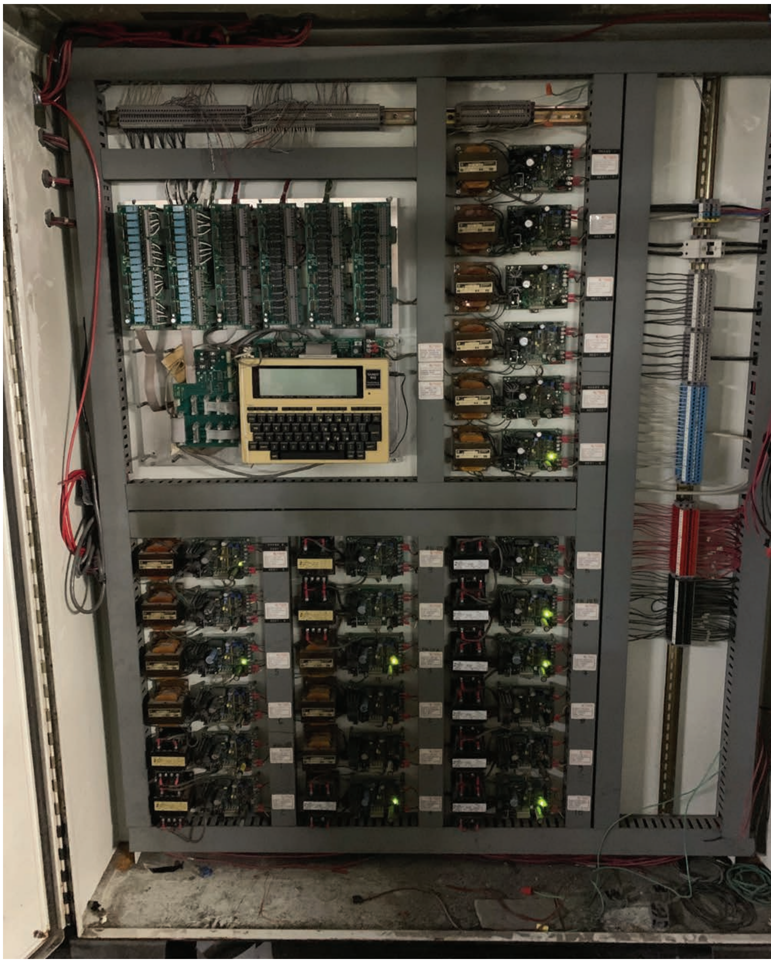
SUSTAINABILITY—EMBODIED CARBON

Performing the CP renewal rather than full slab replacement results in a significant positive impact on the environment. By reducing the amount of concrete and steel needing to be replaced, it greatly reduced the embodied carbon emissions of the project.

We calculated the difference in total embodied carbon emissions between the CP renewal as opposed to the full slab replacement to be 1,127,790 kg eCO_2 (Fig. 2). To give additional perspective, this is equivalent to the following:

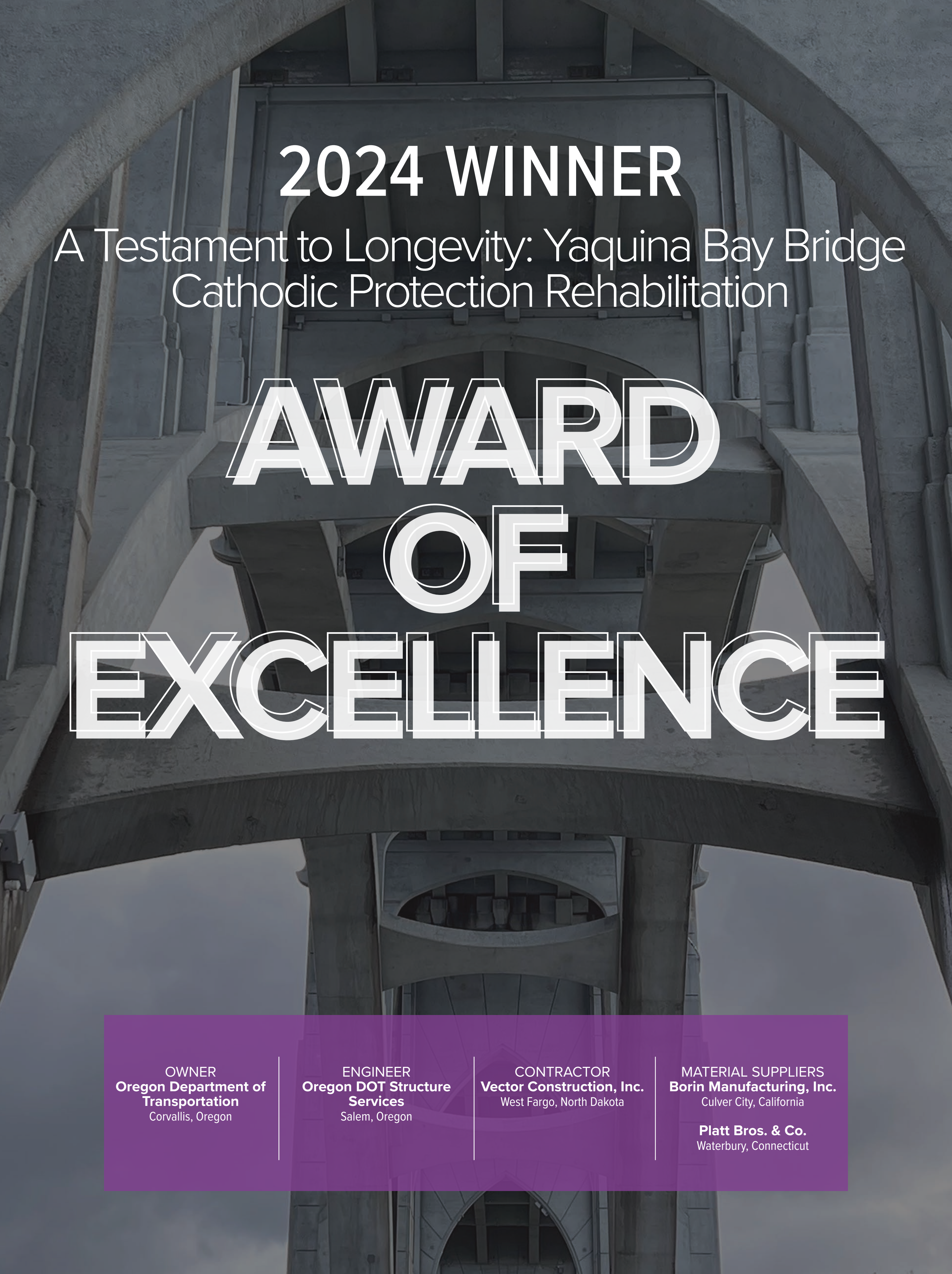
- 245 cars driving for a year;
- 5,640 trees to sequester the carbon emissions (80-year tree life); or
- 1,300 roundtrip flights from Toronto to London, UK.

Applying the highly conductive coating (carbon rich coating that looks like black paint) to the soffit fully



One electrical cabinet contains all rectifiers (one for each zone) that power the anodes

Installing bare platinized niobium wires embedded within the conductive coating


2024 WINNER
A Testament to Longevity: Yaquina Bay Bridge Cathodic Protection Rehabilitation
AWARD OF EXCELLENCE
OWNER
Oregon Department of Transportation
Corvallis, Oregon
ENGINEER
Oregon DOT Structure Services
Salem, Oregon
CONTRACTOR
Vector Construction, Inc.
West Fargo, North Dakota
MATERIAL SUPPLIERS
Borin Manufacturing, Inc.
Culver City, California
Platt Bros. & Co.
Waterbury, Connecticut

2024 AWARD OF EXCELLENCE WINNER

TRANSPORTATION CATEGORY

A Testament to Longevity: Yaquina Bay Bridge Cathodic Protection Rehabilitation

Yaquina Bay Bridge

NEWPORT, OREGON

SUBMITTED BY VECTOR CORROSION TECHNOLOGIES

BACKGROUND

The famous US Route 101 coastal highway spans roughly 1,500 miles along the Pacific Ocean from southern California to northern Washington. The beautiful historic Yaquina Bay Bridge in Newport, Oregon, sits along this highway as one of eleven significant bridges designed by the famous architect Conde B. McCollough. Construction of the renowned two-lane spandrel arch bridge began in August 1934 and was completed and opened to the public on Labor Day weekend in 1936. The bridge uses Art Deco and Art Moderne design motifs and forms borrowed from Gothic architecture. The bridge's construction was initially meant to replace the ferry service across the bay because it could accommodate more cars faster than regular ferries.

The Yaquina Bay Bridge, a testament to architectural brilliance, is not just a functional structure but a piece of history. Standing tall at 130 feet and stretching over 3,200 feet, this bridge blends concrete and steel, featuring concrete curved t-beam spans, concrete deck arch spans, steel deck arch spans, and a main steel through-arch span. The bridge's steel members are strategically placed over the 130-foot navigational channel to facilitate maritime traffic. The construction of this historic bridge involved a massive 30,000 cubic yards of concrete and 3,100 tons of steel.

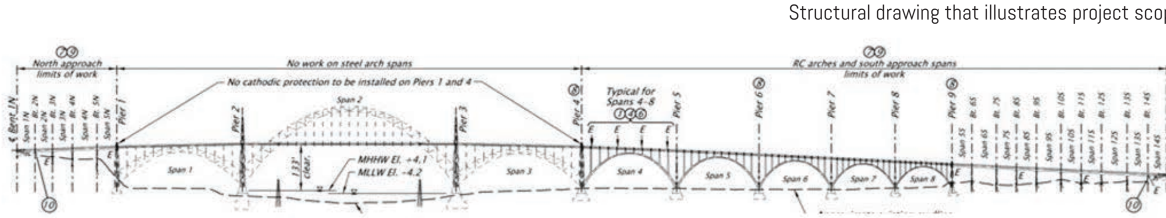
Throughout its life of serving public transportation, the bridge's substructure has been susceptible to environmental impact, including wind, salt-water spray, humidity, and temperature swings—all of which are a recipe for corrosion. Cathodic protection was installed to preserve its structural stability to promote a safe passage for public transportation.

In 1985, the Oregon Department of Transportation carried out a "carbon paint anode" impressed current cathodic protection demonstration project on the two northernmost reinforced concrete deck girder spans on the Yaquina Bay Bridge. There was no observed failure of the conductive anode after five years of application in 1990, nor after 15 years of application in 2000.

Between August 1992 and February 1994, the bridge's thermally applied impressed current cathodic protection (ICCP) system was installed. This ICCP system consisted of a thermally sprayed zinc anode, also referred to as "metalizing". The metalizing process propels molten zinc metal onto the concrete surface which acts as the ICCP anode.

The Oregon Department of Transportation selected this externally applied anode due to its application process and ease of installation around the complex geometry of the substructure. The non-destructive cathodic protection system also mimics the "concrete gray" color, an essential consideration for rehabilitating the historic bridge. In 1999, four zones on the approach spans were

Structural drawing that illustrates project scope



included in a two-year field trial of humectants to improve zinc anode performance. The humectants $LiNO_3$ and LiBr were applied to two zones; the adjacent zones were left untreated as controls. The humectants substantially reduced circuit resistance compared to the controls.

Scaffold with containment

PROJECT

In 2019, the Yaquina Bay Bridge rehabilitation project came out for bid. The structural repairs included new bent and pier bearings, beam seat extensions, expansion joint replacement, 5,500 linear feet of structural crack repair, seismic retrofit, removal and replacement of the existing ICCP system, and many other incidental scopes of work. The project consisted of removing and replacing roughly 320,000 square feet of existing zinc anode, making it one of history's most significant ICCP projects. The project also called for 160 square yards of concrete repairs. The minimal quantity of repairs needed was a true testament to the success of the ICCP system, especially considering the harsh saltwater environment. The Yaquina Bay Bridge project started in August 2020 and was completed by August 2023.

Installing the ICCP system was a meticulous process where the sound concrete was cleaned and profiled, followed by a 99.99% zinc anode application using equipment that melts and projects the zinc onto the surface. Finally, impressed current was applied to the zinc anode and the internal structural steel, protecting the steel and prolonging the life of the bridge. A total of 170,000 pounds of zinc were applied using thermal arc spray to a thickness of 15-20 mils.

ACCESS

Each arch and support span were fully scaffolded. The arch spans' scaffold was supported by anchor plates and cables fastened to the deck soffit, arch spans, and spandrel columns, while the approach spans' scaffold was supported from the soffit and directly off the ground.

Walk bridges were built and used between arch spans to provide equipment and material access. Enclosures were constructed around the scaffold to protect the public and the environment from silica and zinc exposure during the installation of the ICCP system. At the peak height of the bridge, there were as many as 17 stories of scaffolding.

INSTALLATION OF THE ICCP SYSTEM

Six hundred tons of abrasive media was used to remove the previously installed zinc in addition to cleaning and profiling the concrete surface to accept the new zinc anode. After the abrasive blasting stage, delaminated or spalled concrete was identified for removal and replacement.

Brass terminal plates were installed on the concrete surface and eventually connected to the zinc (anode), while structure connections were made to the reinforcing steel (cathode). The anode and reinforcing steel were checked and confirmed to be non-continuous.

Installing thermally sprayed ICCP system

Metalizing on a properly prepared concrete surface

Metalizing from Snooper Truck

Completed cathodic protection installation

CONCLUSION

Opting for cathodic protection over costly removal and replacement saved significant time and resources and ensured the bridge's structural integrity in a challenging coastal environment. This project, involving removing and replacing 320,000 square feet of zinc anode and addressing 160 square yards of concrete repairs, stands as one of the most significant ICCP undertakings in history.

Despite facing numerous challenges, including environmental impacts, wildlife nesting periods, structural access, and the constraints of the COVID-19 pandemic, the project team skillfully navigated these obstacles.

The rehabilitation of the Yaquina Bay Bridge is a testament to ODOT's commitment to preserving architectural heritage while implementing modern engineering practices. The project's successful completion not only restored the bridge's functionality and safety but also preserved its historical significance, ensuring that this iconic structure will continue to serve the public and stand as a symbol of engineering excellence for years to come.

Poor air quality from Oregon wildfires

2024 WINNER

Reviving Heritage: Surfside's Journey from Historic Landmark to Luxury Haven

AWARD OF MERIT

OWNER	ENGINEER	CONTRACTOR	MATERIAL SUPPLIERS
Fort Partners Ft. Lauderdale, Florida	**Kline Engineering & Consulting** Manassas, Virginia	**Structural-Builders and Restorations (S-BR)** North Miami, Florida	**White Cap Construction Supply** Doral, Florida

2024 AWARD OF MERIT WINNER

HISTORIC CATEGORY

Reviving Heritage: Surfside's Journey from Historic Landmark to Luxury Haven

SURFSIDE, FLORIDA

SUBMITTED BY KLINE ENGINEERING & CONSULTING

The Seaway Villas, built in 1936 as the first beachfront apartment house in Surfside, Florida, was designated a historically significant building in 2014. This Mediterranean-inspired 3-story masonry landmark was preserved and integrated into the new $200 million Surf Club Residences project, an exclusive luxury oceanfront development. To make this redevelopment possible, the roof and interior walls had to be removed first, preserving the façade and exterior walls. Then, the preserved structure had to be temporarily moved to the east approximately 150 feet, to enable the construction of a below-grade parking garage, new foundation, and basement. After the new construction was brought up to grade, the building was repositioned to its final resting place, about 12 feet east of its original location, now elevated above a one-story underground garage. This final relocation enabled the seamless integration of the new 11-story luxury condo with the historic Seaway Villas façade. In a collaborative design/build effort, the KLINE and Structural-BR teams worked together to strengthen the building shell that needed to be lifted to a height of 6" to clear the building foundation. The original structure had load-bearing hollow CMU blocks and three wood floors. The teams also managed the temporary relocation to make space for expanding the below-grade parking and to accommodate additional amenity space. The structural design services ensured the safe movement of the structure and delegated design for the permanent elevated structural slabs for the historic building. These slabs were redesigned as a hybrid system, incorporating post-tensioning (PT) in the E-W direction and conventional reinforcement in the N-S direction.

2024 WINNER

Conservation of Costantino Nivola's Concrete Play Horses

AWARD OF MERIT

OWNER	ENGINEER	CONTRACTOR	TESTING
PACT Renaissance Collaborative LLC	**Old Structures Engineering**	**Monadnock Construction**	**GB Geotechnics USA**
New York, New York	New York, New York	Brooklyn, New York	New York, New York

HISTORIC CATEGORY

2024 AWARD OF MERIT WINNER

Conservation of Costantino Nivola's Concrete Play Horses

NEW YORK, NEW YORK

SUBMITTED BY JABLONSKI BUILDING CONSERVATION, INC.

The conservation of Costantino Nivola's 18 concrete play horses posed some unique and interesting challenges, including replicating concrete artwork elements that were severely damaged or lost to time. While formed concrete repairs are not unusual in structural repairs, recasting sculptural elements in place has few precedents. Ultimately, this technique allowed for repairs that remained true to the artist's original design while providing the durability necessary to withstand the elements and playful children for years to come. To accomplish this unique concrete project, detailed documentation of existing conditions and materials analysis were essential to understanding deterioration conditions and devising repairs. Ground penetrating radar and metal detection were used to detect reinforcement, and petrographic and other laboratory analysis were performed to determine the original concrete mix design and performance. One of the most complicated aspects of the analysis related to the color changes of the horses, which were originally black, white, and gray. The black horses turned gray and the gray horses pink. Analysis showed that the black horses were pigmented with carbon black, which easily washed away due to its extremely small particle size. Tests performed on the horses now shades of pink confirmed that the color of the gray matrix could have been altered by acid exposure over time. Once the color issues were figured out, molds were made, and missing parts were re-cast. New stainless steel reinforcement bars were carefully grafted onto the original plain steel rebar present in each of the horses' legs, and new reinforcement was added to support repairs to the horses' muzzles. Repair concrete mixes were developed using previous petrographic and chemical analysis as a guide. After allowing the repairs ample time to cure and harden, the horses were ready to return to their concrete pasture.

2024 WINNER

Jackson Lake Lodge Façade Restoration

AWARD OF MERIT

OWNER
Grand Teton Lodge Company
Moran, Wyoming

ENGINEER
Nurture Architects
Chicago, Illinois

CONTRACTOR
Bulley & Andrews Concrete Restoration
Chicago, Illinois

MATERIAL SUPPLIERS
The Glenrock Company
Elmhurst, Illinois

HISTORIC CATEGORY

2024 AWARD OF MERIT WINNER

Jackson Lake Lodge Façade Restoration

MORAN, WYOMING

SUBMITTED BY BULLEY & ANDREWS CONCRETE RESTORATION

When Jackson Lake Lodge opened in 1955, it redefined modernist architecture's place in the National Park Service (NPS). Architect Gilbert Stanley Underwood's design blended rustic elements with modernist aesthetics, resulting in a striking three-story concrete structure that harmonized with its surroundings in Grand Teton National Park. Designed for John D. Rockefeller, Jr., the lodge was a precursor to the Mission 66 building program, transforming NPS architecture from 1956 to 1966. The Lodge was designated a National Historic Landmark in 2003. Its unique Shadowood concrete texture and acid-stained finish, mimicking natural woodgrain, was revolutionary. However, by 2020, climate extremes caused significant damage to the concrete, leading to a preservation project that concluded in 2022. This project faced numerous challenges, including maintaining visitor access during peak tourist season and ensuring safety for the more than 3 million annual visitors. The design team developed a comprehensive repair plan, including exterior concrete repairs, roof replacement and promenade deck recoating. Due to site restrictions, detailed assessments and testing were limited, necessitating competitive bids for concrete repairs based on approximate quantities. The project was completed on time and under budget. A key aspect was replicating the historic Shadowood finish. Working with concrete suppliers, a custom patching material was developed to match the original texture. The concrete mix, aggregate, and texture were meticulously adjusted, and extensive trials were conducted. Initial trials were tested during winter months indoors so that when the weather permitted, mock-ups could quickly be installed and approved by the stakeholders. The original acid stain finish, lost to weathering and overpainted, was replicated using a multiple coat potassium silicate stain, developed with the expertise of conservators from the University of Pennsylvania. The project preserved the Lodge's historic appearance, allowing visitors to appreciate its architectural beauty as originally intended.

2024 WINNER

Historic First Baptist Church - Exterior Masonry Repairs

AWARD OF MERIT

OWNER	ENGINEER	CONTRACTOR	MATERIAL SUPPLIERS
First Baptist Church of Asheville Asheville, North Carolina	**Carleton Collins Architecture** Asheville, North Carolina	**WxTite LLC** Greensboro, North Carolina	**Boston Valley Terra Cotta** Orchard Park, New York **Guaranteed Supply Company** Fletcher, North Carolina

MASONRY CATEGORY

Historic First Baptist Church - Exterior Masonry Repairs

ASHEVILLE, NORTH CAROLINA

SUBMITTED BY WXPROOFING, A DIVISION OF WXTITE

The Historic Church in downtown Asheville, North Carolina, which was completed in 1927 and designed by architect Douglas Ellington, features a four-story, domed, polygonal brick façade with Art Deco influences. It was in need of some major masonry repairs. The Architect teamed up with a local Engineer (SKA Consulting Engineers), which specializes in historical repairs to façades, and they collectively came up with the necessary repairs along with historical procedures for completing said repairs, which included:

- Full demolition of parapet walls including rebuilding substrate with poured in place concrete gable walls, reusing, repairing, and also replacing damaged with new terra cotta units.
- Salvaging and reusing the existing terra cotta coping caps. Historical restoration of the sanctuary windows including removing and replacing the large plexiglass covers.
- Through-wall flashing induction at the window heads and at the parapet walls utilizing fully soldered lead coated copper flashings.
- Over a mile of random masonry repointing.

Over 400 individual damaged bricks had to be replaced all the while matching in color and composition the brick and mortar which is almost 100 years old. Access was via fixed scaffolding. This was very tricky as the scaffolding had to be calculated to be able to rest on lower roofs while allowing access to all areas of a very cut up façade.

2024 WINNER

Repairs and Waterproofing of CBD Parking Garage

AWARD OF MERIT

OWNER
City of Malden
Malden, Massachusetts

ENGINEER
Simpson Gumpertz & Heger
Waltham, Massachusetts

CONTRACTOR
Structural Preservation Systems LLC
Chelmsford, Massachusetts

MATERIAL SUPPLIERS
Sika Corporation
Lyndhurst, New Jersey

2024 AWARD OF MERIT WINNER

MASONRY CATEGORY

Repairs and Waterproofing of CBD Parking Garage

MALDEN, MASSACHUSETTS

SUBMITTED BY SIMPSON GUMPERTZ & HEGER

The CBD Parking Garage, owned by the City of Malden, Massachusetts, is a square-shaped, six-level, steel-framed structure built in the early 1980s. The elevated parking levels consist of post-tensioned (PT) concrete slabs interconnected by entrance ramps integrated with the parking levels and an exit helix ramp at the center of the garage.

The project initiated when deteriorated concrete fell into an occupied office space at the lowest level. An initial investigation of the area above the occupied space, which included GPR scanning and localized exploratory openings, identified significant deterioration of the PT tendons (nearly 50%) at the construction joints at the lower two parking levels. In addition, there was a measurable deflection of the slabs across the joints.

Following the initial investigation, a condition assessment of the entire garage structure was performed to develop a scope of remedial work with a prioritized capital plan. The condition of the concrete and steel framing elements throughout the garage was also assessed. The condition assessment included additional investigation of the condition of the PT tendons at the remaining parking decks. There was localized concrete deterioration at many locations at the elevated parking deck and ramp slabs, some showing severe deterioration.

The owner awarded the project to a contractor specializing in structural repairs. The contractor performed PT tendon and concrete repairs and installed waterproofing as prioritized in Years 1, 2, and 3 of the capital plan. The engineer and contractor's collaboration and combined experience in PT repairs resulted in an effective project. The repair work was successfully executed and completed in the summer of 2023.

2024 WINNER

West Virginia Capitol Stairs

AWARD OF MERIT

OWNER
West Virginia Department of Administration
Charleston, West Virginia

ENGINEER
WDP & Associates
Charlottesville, Virginia

CONTRACTOR
PULLMAN
Imperial, Pennsylvania

SPECIAL PROJECTS CATEGORY

2024 AWARD OF MERIT WINNER

West Virginia Capitol Stairs

CHARLESTON, WEST VIRGINIA

SUBMITTED BY STRUCTURAL GROUP, INC.

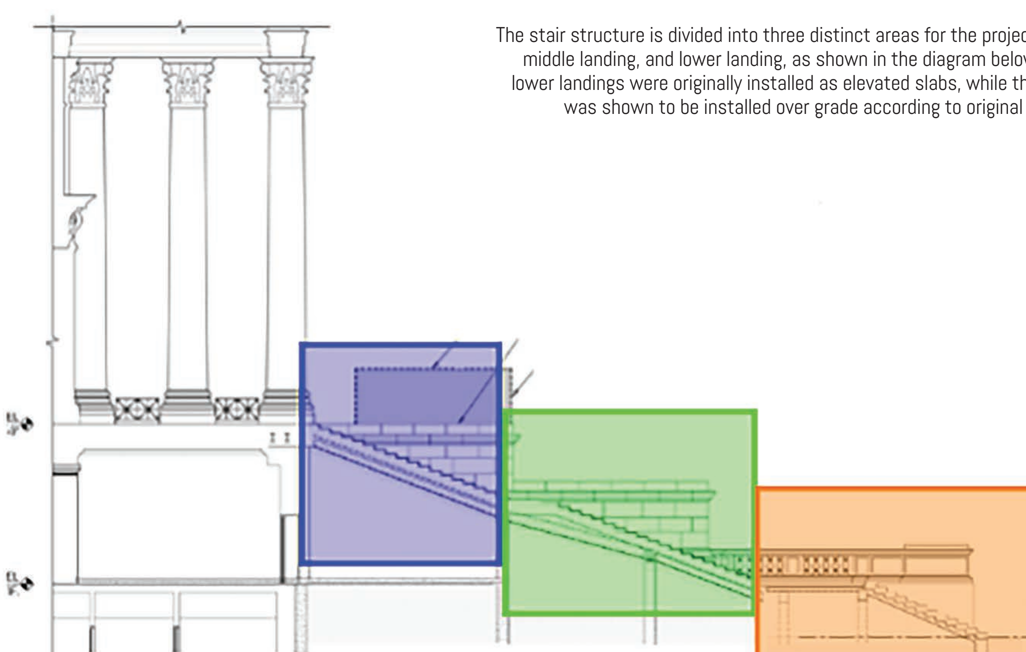
The West Virginia State Capitol Building, completed on June 20, 1932, boasts a grand North portico entrance accessed by a monumental stair. Crafted from a blend of brick masonry, structural steel, and reinforced concrete, adorned with limestone treads and panels, this stairway houses a notable feature beneath its upper flight: the State legislature's transformed Reading Room.

In March 2021, an incident occurred when a section of concrete from the underside of the slab above the Reading Room spalled and crashed down. Responding swiftly, the State issued an Emergency Purchase Order to investigate potential structural vulnerabilities. The culprit: water infiltration causing corrosion of reinforcing bars within the concrete. Further inspection uncovered additional corroded areas, delaminated concrete, and evidence of corrosion in the concrete-encased steel beams supporting the structure.

The project's scope included the removal and replacement of concrete slabs, intricate repairs to the stair's structure, and the installation of a robust waterproofing system. A new mechanical setup was also integrated, enhancing functionality within the Reading Room. Extensive stone restoration and meticulous reinstallation of cladding were undertaken, while the east and west walkways received new concrete stair structures and pavers.

This comprehensive repair and restoration not only preserved the Capitol's historic integrity but also fortified it against future challenges, ensuring its enduring legacy in West Virginia's architectural landscape.

The stair structure is divided into three distinct areas for the project: upper landing, middle landing, and lower landing, as shown in the diagram below. The upper and lower landings were originally installed as elevated slabs, while the middle landing was shown to be installed over grade according to original design drawings



2024 WINNER

Stegeman Coliseum Concrete Ceiling Structural Repairs

AWARD OF MERIT

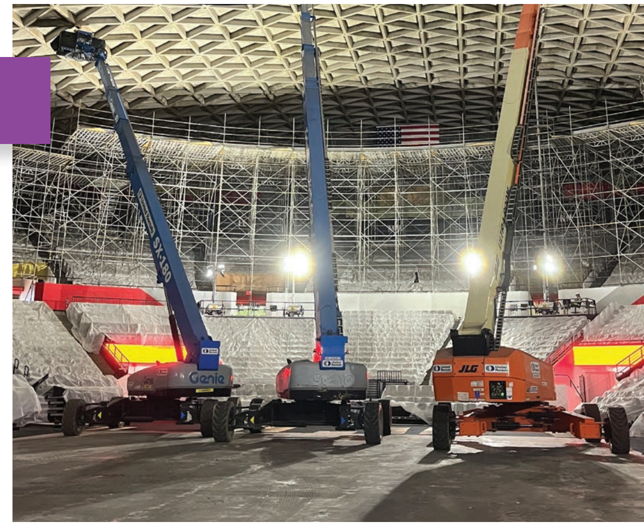
OWNER
The University of Georgia
Athens, Georgia

ENGINEER
Wiss, Janney, Elstner Associates, Inc.
Duluth, Georgia

CONTRACTOR
United Restoration and Preservation, Inc.
Mableton, Georgia

MATERIAL SUPPLIERS
Sika Corporation
Lyndhurst, New Jersey

SPECIAL PROJECTS CATEGORY

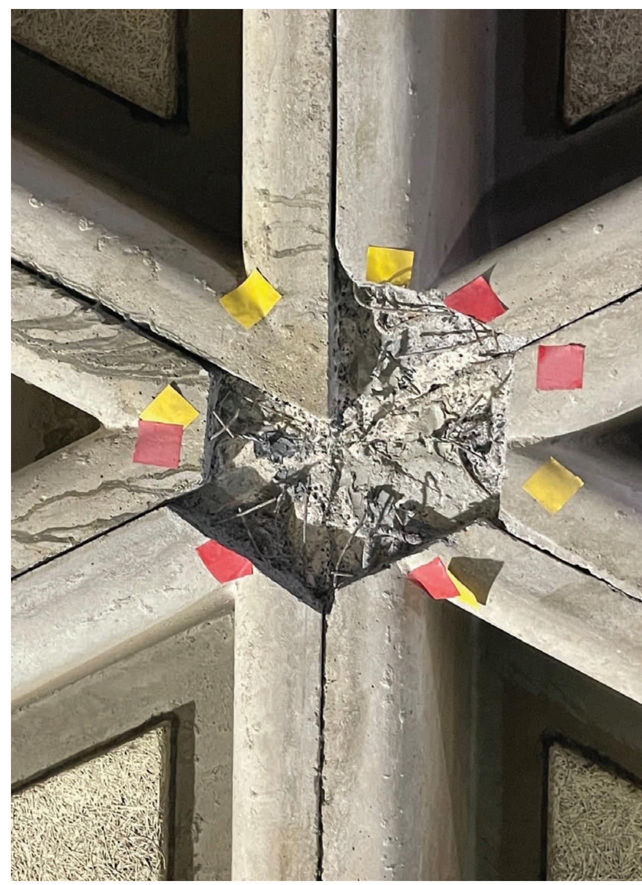


2024 AWARD OF MERIT WINNER

Stegeman Coliseum Concrete Ceiling Structural Repairs

ATHENS, GEORGIA

SUBMITTED BY UNITED RESTORATION AND PRESERVATION, INC.



In March of 2020, falling concrete shut down the iconic sports arena, Stegeman Coliseum. Located on the campus of The University of Georgia, it is the home of Men's and Women's Basketball, Volleyball, and Gymnastics for the Bulldogs. Stegeman Coliseum also served as the host site of the 1996 Summer Olympics for Gymnastics (Rhythmic), and Volleyball (Indoor). The University immediately engaged a leading Structural Engineering firm, WJE, which identified that localized stresses at form corners were causing concrete cracks and eventually spalls of concrete to fall into the seating area surrounding the center court. United Restoration was tasked to mobilize hundreds of construction workers, coordinate the delivery of 43 truckloads of scaffolding and embark on the necessary repairs to the vast interior ceiling of the 185-foot-high structure.

The engineered repairs were extensive as workers saw-cut concrete beams, sounded and repaired spalls at unsound concrete, and realigned hundreds of "nodes" where multiple precast joints came together. After the necessary and preventative repairs were completed, United Restoration installed a "high-density polyethylene mesh" protective barrier that covered the entire ceiling, end-to-end. This soft protective barrier will serve to protect and prevent future concrete spalls and flaking from reaching the floor. In the end, United Restoration completed 1,318 overhead concrete repairs, 4,867 concrete joint relief cuts, and installed 86,000 sf of soft protective barrier. The repairs and preventative measures were all completed prior to the Annual Stegmania Event, the kickoff celebration of both the Men's and Women's basketball teams.

2024 WINNER

YVR Runway Dowel Bar Retrofit Project

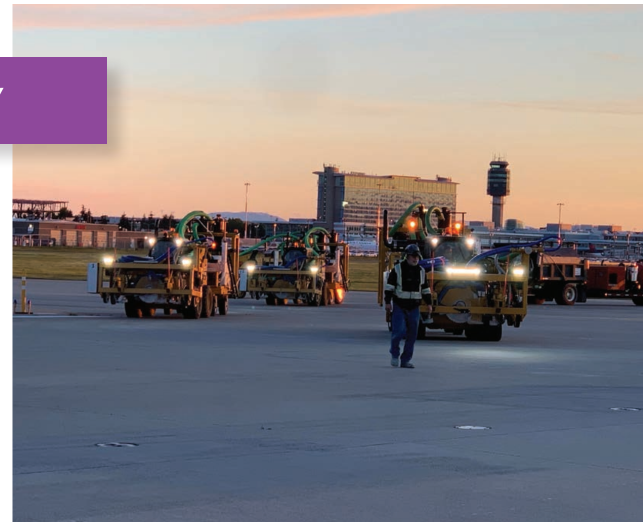
AWARD OF MERIT

OWNER	ENGINEER	CONTRACTOR	MATERIAL SUPPLIERS
Vancouver International Airport (YVR) Vancouver, British Columbia, Canada	**Flatiron Constructors** Vancouver, British Columbia, Canada	**Flatiron Constructors** Richmond, British Columbia, Canada	**Kwik Bond Polymers** Benicia, California

2024 AWARD OF MERIT WINNER

TRANSPORTATION CATEGORY

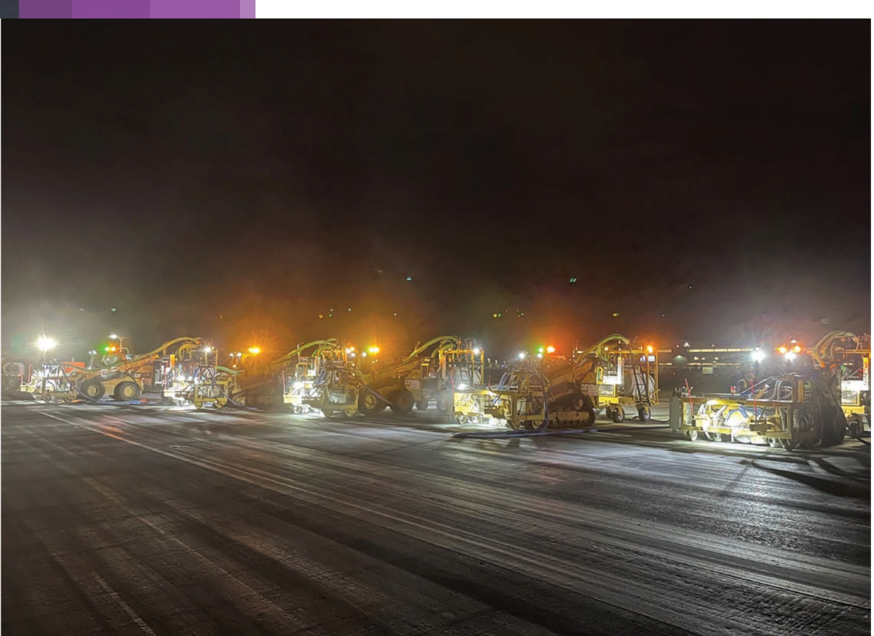
YVR Runway Dowel Bar Retrofit Project



VANCOUVER, BRITISH COLUMBIA, CANADA

SUBMITTED BY CANWEST-AIRPORT RUNWAY REHABILITATION

The main North Runway at YVR International Airport in Vancouver, British Columbia, constructed in the 1980s, had deterioration occurring on the concrete surface due to the loss of load transfer between the panels. The constant weight and friction of aircraft landing created wear and tear on the runway surface over time, which causes the concrete panels that make up the runway to become uneven or separated, leading to gaps or voids between the panels.



The challenge was to perform the repairs around the high volume of flight activity at YVR, without closing the runway, as it was not possible to remove the North Runway from service for an extended period. This made the common solution of full panel replacement repair method infeasible. To circumvent the high runway movements, the engineering team made an ambitious plan to allow the rehabilitation work to be done while maintaining normal daily flight operations. The plan involved installing over 65,000 dowels to stitch together the concrete panels of the North Runway to strengthen and reduce deflection, retrofit, and preserve the existing runway.

This installation would have to happen overnight, in a short 10pm-6am work window, allowing planes to land the very next morning. Conventional concrete cutting equipment could not perform this type of work either, without significant modification, creating the need for an innovative solution. Once the project was awarded, the design team only had 100 days to fabricate and test the cutting machines. Each night shift, 500 slots had to be cut, cored, concrete chipped out, cleaned, dowel bars inserted, and backfill material placed in each slot.

Testing and cleaning preceded the recommissioning of the runway each morning. Given the unique innovation required, the accuracy needed, and quality to maintain, this was an extremely challenging project to perform.

2024 ICRI Safety Awards

In 2020, the ICRI Safety Committee created 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. This award creates a new way to recognize industry best safety practices, celebrate leaders in our industry, and share those best practices so that others may learn and put them into practice.

This year, the committee received five submittals from three contractors and two manufacturers/suppliers. 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 with several of the questions. There are a total of fifteen questions with seven 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 judges for the review process. All the candidates provided a complete package of information, and all clearly demonstrated an outstanding safety environment in their respective companies. The judges were impressed with the level of commitment to safety from every submittal.

Thank you to everyone who submitted for the 2024 Safety Awards. ICRI sends a note of thanks to the judging panel for their work, 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 for ICRI. We look forward to this award as it continues to celebrate industry best practices and improve jobsite and worker safety every year.

CONGRATULATIONS TO THE WINNERS OF THE ICRI 2024 SAFETY AWARD.

SAFETY AWARD 2024

CONTRACTOR CATEGORY AWARD OF MERIT

Western Specialty Contractors, Inc.

SAFETY AWARD 2024

MANUFACTURER/ SUPPLIER AWARD OF EXCELLENCE

Sika Corporation - Chattanooga Plant

SAFETY AWARD 2024

PRESIDENT'S SAFETY AWARD WINNER

Carolina Restoration & Waterproofing, Inc., a C.A. Lindman Company

ICRI CONCRETE REPAIR SUSTAINABILITY AWARDS

2024 ICRI Sustainability Awards

In an effort to promote sustainability in concrete repair, ICRI announces that the 2024 Sustainability Award goes to projects that exemplifly the concept and demonstrate a commitment to the repair and restoration profession.

To determine the winner, a task group within Committee 160 volunteered to review every project that was submitted for consideration for the 2024 ICRI Project Awards program.

After reviewing these projects, each task group member compiled a short list of candidate projects most aligned with the sustainability theme. Using ranked-choice voting, two finalists were chosen from the many commendable and noteworthy candidates.

CONGRATULATIONS TO THE WINNERS OF THE ICRI 2024 SUSTAINABILITY AWARD.

SUSTAINABILITY
AWARD OF EXCELLENCE

The Granite Club Garage Rehabilitation Project
WSP Canada Inc., Toronto, Ontario, Canada

SUSTAINABILITY
AWARD OF MERIT

A Testament to Longevity: Yaquina Bay Bridge Cathodic Protection Rehabilitation
Vector Corrosion Technologies, Winnipeg, Manitoba, Canada

ICRI**CHAPTER**NEWS

CHAPTERS COMMITTEE CHAIR'S LETTER

DAVID GRANDBOIS
Chapters Chair

In this edition of the CRB I want to talk about the teamwork that it takes from all of us to keep this amazing organization going strong. I must give credit to Charlie Behrens and the Manitowac Minute for the great line, "Keep'er Movin." We are a giant well-oiled machine that takes all of us to keep'er movin!

I hate to brag about the Minnesota chapter, but since that is where I reside, and serve on the board, and I am the one in charge of writing this article, you are stuck listening to me talk about us. The Minnesota Chapter finished another Ragnar run from the State Capitol in St. Paul to the rose gardens in Duluth, settled along the banks of Lake Superior, some 200ish miles in a day and a half. Talk about teamwork. I don't know about any of you but if I was tasked with running 200 miles by myself, let's face it, I'd still be running.

As grueling as that sounds, when you have a team of 12 coming together for a common goal it really makes the overall goal a lot less daunting. Peter Kiewit once said, "A big job is no more than a lot of little jobs put together." That is exactly how you approach a Ragnar, or how you can approach serving on your local board or national board. The local chapter does a lot of big, fun things that take a lot of people doing the little things. Then when you put it all together, the big job gets completed.

This can be applied more closely to your local chapters as you have your routine board of directors meetings and discuss all the things you want to do as a board and all the things you want to accomplish as a team. Specifically, the Minnesota Chapter has a board of 14 that serves a chapter membership group of 70+ professionals. It really takes the entire team to keep this chapter alive and well. That can be said for each of your local chapters.

When you read this, the Fall Convention will have come and gone, but as I write this, it is right around the corner. I'm unable to attend the event this year, and am saddened to miss out on all the team building. Building those relationships helps with the continued growth and success of this great organization.

So, as you make your way back home from the convention and get settled back into your normal routines, think about how you and your local chapter can improve your teamwork to better your chapter and better the experience for the general membership.

Also, keep in mind that elections for officers in 2025 as well as the Chapter Awards for the activities of 2024 are right around the corner! Keep your news and calendar items coming into the National office so chapters, and chapter activities, can be promoted whenever possible.

Best Regards,

David Grandbois, ICRI Chapters Committee Chair
Western Specialty Contractors – Minneapolis, MN

ICRI CONCRETE REPAIR CHAPTERS

ICRI has 38 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.

CHAPTER NEWS

PITTSBURGH HOSTS TECHNICAL ROUNDTABLE

The ICRI Pittsburgh Chapter held its most recent event on September 10, 2024. It was part of the chapter's 2024 technical roundtable series with this month's topic being "Mix Design and Placement". The chapter had a fantastic turnout and some great discussions as a group headed by a very diverse panel that covered essentially every player involved in the process of mix design and placement. The Chapter wishes to thank the panelists who came to help out with this month's topic. They included Matt Watson from Euclid, Tom Bryan with Bryan Materials Group, Lorenzo Scuilli from Mosites, Jim Fitzroy representing Local #526, and Evan Rowles with AES. Chapter Leader and Session Moderator Mike Payne from BECS held the whole program together and presented an informative session.

Pictured at the front of the room are the session panelists selected for this topic. They are (left to right), Mike Payne, Evan Rowles, Jim Fitzroy, Lorenzo Scuilli, Tom Bryan, and Matt Watson

ICRI**CHAPTER**NEWS

MINNESOTA RUNS THE RAGNAR

The members of the ICRI Minnesota Chapter once again ran the 207 mile course from the Minnesota State Capitol in St. Paul to the city of Duluth along the shores of Lake Superior. The group began their journey on Friday, August 10, 2024 and finished on Saturday, August 11, 2024. The total moving time for the team was 34 hours, 13 minutes, and 00 seconds.

If you aren't familiar with these events, they are called a Ragnar and are hosted around the country by www.runragnar.com. Teams are made up of 12 runners; each participant will run 3 legs of the relay, totaling 12-20 miles per person. The team had two vehicles with 6 people in each, where they all ate, slept, cheered, and laughed with each other for the entire time they are on the route, unless you are that leg's runner! Everyone on the team brought their A-game! The team had spirit, grit, and camaraderie. The smiles at the finish line were those of both relief and celebration. This relay is something that many people will never attempt.

The Minnesota Chapter has plans to carry on this tradition for many, many years to come. You are welcome to connect with us if you would like help to put together a Ragnar in your part of the country. The chapter even has runners that will come to you and help you complete your team! Connect with us if you would like to partner with the MN Chapter in your region. info@icrimn.com.

The ICRI Minnesota Chapter runners participating in the 2024 Ragnar Race in August

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MINNESOTA GENEROUS TO LOCAL STUDENTS

The Terry Babcock Memorial Golf Tournament and Fundraiser is the Minnesota Chapter's biggest fundraiser. Proceeds of this event fund our John A. Amundson Scholarship. The purpose of this scholarship is to promote the development of future concrete industry professionals. This annual scholarship provides some financial assistance for undergraduate-level students pursuing course work in the field of concrete. Two outstanding applicants were awarded a total of $3,000 by the Chapter. Grace Sykes and Nick Metzler are both students at Dunwoody College of Technology where they are each pursuing degrees in Construction Management.

Dunwoody College of Technology student Grace Sykes was also awarded a scholarship from the Minnesota chapter

Scholarship winner Nick Metzler accepting his award

ICRI**CHAPTER**NEWS

NORTH TEXAS HAPPY HOUR DRAWS IN NEW MEMBERS

On September 5, 2024, the North Texas Chapter of ICRI hosted a happy hour at Black Agave in Farmers Branch, Texas. Attendees enjoyed cold beer and cocktails, as well as a delicious Tex-Mex buffet. The Chapter is thrilled to note that the event was a big success, with approximately 30 chapter members and friends in attendance. Plus, the chapter was able to personally welcome a total of four new members, who registered for ICRI membership at the happy hour. The Chapter would especially like to thank Parker Mink for his efforts in planning the event!

North Texas Chapter members enjoying a social event at Black Agave in Farmers Branch

CHAPTER CALENDAR

BALTIMORE-WASHINGTON

November 14, 2024
ANNUAL MEMBERS MEETING &
OUTSTANDING REPAIR PROJECT AWARDS
TBD
Maryland venue

December 5, 2024
FALL TECHNICAL SEMINAR
CP&R's Main Office
Baltimore, MD

FLORIDA FIRST COAST

November 11, 2024
CLAY SHOOT TOURNAMENT
Jacksonville Clay Target Sports
Jacksonville, FL

FLORIDA WEST COAST

December 5, 2024
HOLIDAY HAPPY HOUR
Birchwood Canopy
St. Petersburg, FL

GULF SOUTH

November 14, 2024
JOINT FALL MEETING W/AMPP
Brimingham, AL

MINNESOTA

December 4, 2024
MEMBERSHIP HOLIDAY PARTY
Fhima's Minneapolis
Minneapolis, MN

January 2025
CHAPTER MEGA DEMO
Topic: Corrosion
Cement Masons Training Center
New Brighton, MN

NORTH TEXAS

November 7, 2024
CHAPTER MEMBERSHIP MEETING
TBD

PRODUCTINNOVATION

FIGHTING CORROSION IN DESALINATION PLANT CONCRETE

Desalination has become an important strategy to meet the demand for scarce fresh water around the globe. This market is projected to expand at a CAGR of 8.91% from now until 2029, with the MENA (Middle East North Africa) region comprising the largest share.

While such critical infrastructure investments must be built for longevity, the use of a high salinity resource puts more stress on metal structural components, such as reinforcing steel in concrete. With this in mind, we suggest Migrating Corrosion Inhibitors™ as a cost-effective strategy to increase sustainability by extending the service life of reinforced concrete desalination plant structures.

Learn more at www.cortecvci.com.

INNOVATIVE STRUCTURAL HEALTH MONITORING WITH ITEK TECHNOLOGY

CorroDec 2G sensors by InfrastructureTek (ITEK) provide advanced technology designed to monitor the integrity of concrete structures for up to 80 years.

These sensors use wire-mimicking steel reinforcement and dual wire levels to detect both the presence and progression of corrosion and humidity. By delivering early warnings before physical damage, such as cracks and spalling, occurs, they help reduce long-term repair costs. Embedded within concrete, the sensors are passive, battery-free, and use RFID for energy, with NB-IoT technology to transmit data via the cloud.

Compact and durable, CorroDec 2G sensors can be installed in both new and existing concrete structures, including bridges, parking garages, and tunnels. They can be placed with a concrete cover ranging from 10mm to 50 meters and adapt to either horizontal or vertical orientations. Once installed, the sensors provide real-time readings that improve the longevity and safety of concrete-based assets.

Founded by two leaders in the U.S. construction industry, ITEK addresses the critical need for proactive structural health monitoring (SHM). The SHM market is projected to grow significantly, reaching $10.48 billion by 2030, driven by rapid urbanization and the pressing need to maintain aging infrastructure. At ITEK, we believe the future of SHM lies in the widespread adoption of advanced, real-time monitoring technologies like CorroDec 2G.

For more information, visit InfrastructureTek: www.infrastructuretek.com

NEWMEMBERS

COMPANY MEMBERS

All Floor Prep PTY LTD
Henley Brook, WA
Australia
Luke Richardson

Baker Construction Company
Arlington, VA
United States
Jason Krick

Dynamic Engineering Design and Inspection
Bradenton, FL
United States
Bryson Campbell

Endurable Building Products
Minneapolis, MN
United States
Ben Swenson

Kennedy Richter Construction
North Charleston, SC
United States
Paul Kennedy

POST TECH MFG
Fort Worth, TX
United States
Evan Langston

QuakeWrap, Inc.
Tucson, AZ
United States
Mo Ehsani

RASAM Engineers Pvt. Ltd.
Noida, UP
India
Amit Dua

Titan Products, Inc
Pleasant View, TN
United States
Jeff Charter

ADDITIONAL INDIVIDUALS FROM COMPANY MEMBERS

Jason Peddle
AK Industrial Services, LLC
Everett, MA
United States

Jason Hanlon
Braun Intertec Corporation
Minneapolis, MN
United States

Trevor Courkamp
John Rohrer Contracting Co., Inc.
Kansas City, KS
United States

William Kelley
John Rohrer Contracting Co., Inc.
Kansas City, KS
United States

Keith Kesner
Simpson Gumpertz & Heger Inc.
Philadelphia, PA
United States

Chaitanya Sachin S. Chudiwal
Walker Consultants
Houston, TX
United States

Mubashshir Ahmad
Wiss, Janney, Elstner Associates, Inc.
Northbrook, IL
United States

Michael Lee
Wiss, Janney, Elstner Associates, Inc.
Irving, TX
United States

Dale Redden
White Cap Construction
Norcross, GA
United States

Jacob Starks
Wiss, Janney, Elstner Associates, Inc.
Northbrook, IL
United States

Nicholas Wentink
Wiss, Janney, Elstner Associates, Inc.
Northbrook, IL
United States

Jad Costandi
Zirconia Inc.
Tukwila, WA
United States

ADDITIONAL INDIVIDUALS FROM SUPPORTING MEMBER COMPANIES

Daniel Fyfe
Euclid Chemical
Cleveland, OH
United States

Jay Pearsall
Prosoco
Centennial, CO
United States

Chantal Cormier
Vector Corrosion Technologies
Montréal, QC
Canada

INDIVIDUAL MEMBERS

Trevor Adams
Oviedo, FL
United States

Alafia Akhtar
CANY Architecture + Engineering DPC
New York, NY
United States

Levent Aral
ENKA
San Juan, San Juan
Puerto Rico

Christian Arias
Daniello, Salazar & Sons Inc.
West Palm Beach, FL
United States

Tiffany Bedell
Martin Aquatic Design and Engineering
Orlando, FL
United States

Logan Bradshaw
Green Cove Springs, FL
United States

Teri Dattilio
Hollywood, FL
United States

Michael T. "Mike" Donly, P.E.
Donly Engineering Group
New Milford, NJ
United States

Tim Ellison
Construction Marketing Representatives / Ardex
Anthem, AZ
United States

Dylan Gentry
Dalton, GA
United States

NEWMEMBERS

Leo Gloumis
Exo Industries Corp
Woodside, NY
United States

Benjamin Gray
Walker Consultants
Houston, TX
United States

David Greiner
WxTite LLC
Greensboro, NC
United States

Michael Hartwell
TCC Materials
Mendota Heights, MN
United States

Nicholas Heim
StructureCare
Lancaster, PA
United States

Rodney Herman
Carollo Engineers
Phoenix, AZ
United States

Patrick Hopple
LERA Consulting Structural Engineers
New York, NY
United States

Adam Jones
Winnipeg, MB
Canada

Kashi Karne
Walker Consultants
Seattle, WA
United States

Mark Latham
Hallex Engineering
Niagara Falls, Ontario
Canada

Dave Lawler
Slider Engineering Group, Inc.
West Palm Beach, FL
United States

Sultan Mahmood
NUTRIEN
Saskatoon, SK
Canada

Paul Monnin
Dayton Superior Corporation
Miamisburg, OH
United States

Jody Proudfit
Construction Marketing Representatives / Ardex
Quincy, MA
United States

Andy Ross
Norwalk, CT
United States

Jake Ruddy
PCS
Newark, DE
United States

Tarniya Rugsasri
Passawarn Co., Ltd.
Bangkok, Thailand

Tory Schmidtke
Robert H Ward and Associates
Minneapolis, MN
United States

Elizabeth "Betsy" Smith
Destin, FL
United States

Dylan Tague
Joseph B. Callaghan, Inc.
Philadelphia, PA
United States

Dylan D. VanPutten
C-Sharpe Co. LLC
Orange Beach, AL
United States

Dalton Walker
United Flooring Products, Inc.
Spring Hill, FL
United States

Pete Warren
MAPEI Corporation
San Francisco, CA
United States

Brenna Wenzel
Brenntag Specialties
Houston, TX
United States

Peter Willetts
Construction Marketing Representatives / Ardex
Aliquippa, PA
United States

GOVERNMENT MEMBER

Andrew Jenkins
US Bureau of Reclamation
Denver, CO
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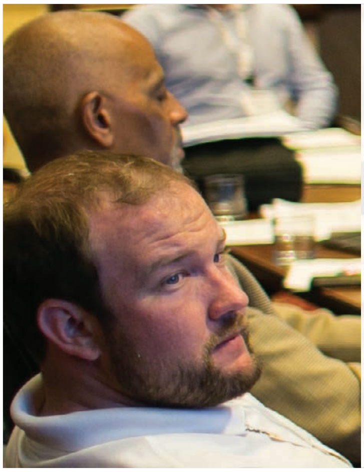

Volunteer

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

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

Visit www.icri.org for more information.

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

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Questions? Contact ICRI Program Director Dale Regnier at daler@icri.org


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