

2023 Outstanding Repair & Rehabilitation Project

O'Hare Plaza West Drive and Executive Garage Restoration

By Joshua Freedland



Fig. 1: O'Hare Plaza Entrance. Photo copyright Bob Elmore.

While infrastructure projects such as parking garages are often the last projects to be funded due to their utilitarian nature, they are important to the health of commercial properties since they are often the first impression for tenants and visitors. At O'Hare Plaza, the parking garage serves the 700,000 ft² (65,000 m²) office complex. Construction of the complex began in 1969 and includes five mid-rise office buildings with most parking spaces located on the lower levels. The property's prime location on a major expressway near O'Hare International Airport, as well as its size, provided a rare opportunity for Bulley & Andrews Concrete Restoration (BACR) to complete a large-scale, multi-phased plaza renovation project.

SIGNS OF DETERIORATION

After 50 years of enduring Chicago's often unpredictable and extreme weather, the garage was showing signs of deterioration. Its façade and structural integrity eroded over time. Exposure to deicing salts and freeze-thaw cycling led to cracks and spalls of the concrete as well as corrosion of the embedded steel reinforcing.

Recognizing the deterioration, JLL, the property's on-site management company, hired engineering firm WGI to evaluate, to design repairs, and to perform construction administration services on the three-phased renovation. The project aimed to not only repair the deterioration but also to improve the appearance and performance of the garage. Wright



Fig. 2: Extensive deterioration inside the parking structure.



Fig. 3: Extensive deterioration inside the parking structure showing sunlight through the ceiling.

Heerema Architects served as the architect for Phase 1 and designed the site improvements with WGI. After a competitive bid process, BACR was selected to implement the design to support the office complex and its next generation of tenants.

A MULTI-PHASED OPERATION

Between 2019 and 2022, BACR performed a multi-phased operation to implement the project. The comprehensive plan included repairing the infrastructure of the garage while delivering an updated plaza.

Phase 1 (South Drive Renovation Project) included improvements to the concrete structural slab, beams, and columns. These repairs included partial, underside and full-depth repairs using shotcrete. A new paver system was installed including a waterproofing and a snow-melt system and drains. New concrete curbs and sidewalks were installed, as well as new handrails for staircases. A new skylight was added to provide natural light below grade, while new lighted bollards were installed for site protection. Finally, new electrical, including lighting, was installed throughout the area.



Fig. 4: Demolition of exterior slab.



Fig. 5: Waterproofing membrane on exposed roof slab.

Phase 2 (East Drive and Two-story Garage Restoration) included maintenance to the concrete structural slab, beams, and columns. These repairs included partial, underside, and full-depth repairs using shotcrete. A new paver system was installed, including a waterproofing system and drains. Additionally, concrete curbs and sidewalks were installed, and the basement level of the garage was also repainted.

Phase 3 (Executive West Drive Restoration) included repairs to the concrete structural slab, beams and columns. These repairs included partial, underside, and full depth shotcrete. Phase 3 alone included 11,000 ft² (1000 m²) of

underside repairs. A new deck coating was installed in addition to a new paver system, including a waterproofing system and drains. Similar to the repairs in Phase 2, new concrete curbs and sidewalks were also installed, and the basement level of the garage was repainted.



Fig. 6: Overview of roof slab with full depth repair areas apparent.



Fig. 7: Ground view of removed roof.

ACCOMMODATING THE AGGRESSIVE SCHEDULE

BACR leveraged their experience working within occupied buildings to develop a comprehensive project approach to implement the designed repairs. Our team used pull planning—a team-based, production control system for scheduling and planning delivery projects that involves all trade contractors, consultants, and vendors. This helped BACR monitor the schedule and coordinate with trade partners to solicit their buy-in and be held accountable for their production. The removal of the deteriorated concrete was completed using a hydrodemolition trade partner. The hydrodemolition was BACR's critical path activity and



Fig. 8: Replacement roof slab ready to cast.



Fig. 9: Replacement roof slab.

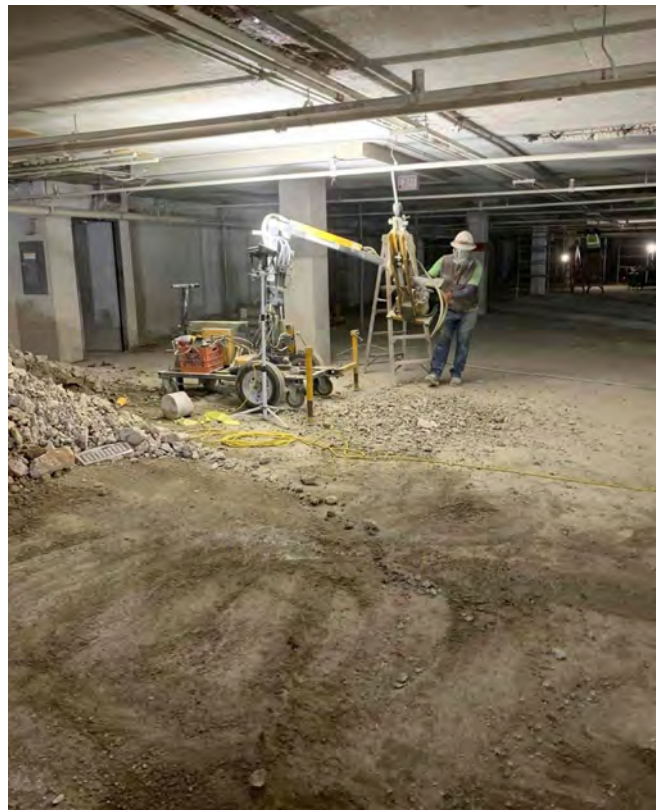


Fig. 10: Mechanically assisted chipping hammer for overhead demolition.

accelerated our schedule so that BACR could successfully meet the project deadlines.

To accommodate the aggressive schedule and to minimize disruption to the building's tenants, BACR worked two shifts to complete the demolition work overnight. Advancements in technology and equipment enabled BACR to focus on sustainability and efficiency. The team used PAM OVE robots for vertical and overhead concrete demolition at locations identified by WGI. The robots reduced the overall load carried and provided increased safety (Fig. 10).

In addition to using PAM OVE robots, hydrodemolition was implemented for all the overhead concrete repairs in the two-story garage and the east lower-level garage. This strategy helped maintain the aggressive schedule. There were two hydrodemolition units onsite during the demolition process: one for overhead demolition and a second for topside, partial-depth demolition which addressed several safety concerns. We could not have any work activity above or below an area while hydrodemolition was being performed because the breakthrough of the concrete would cause serious injury or death to anyone working in proximity of the breach. Another concern was water management. Each unit uses, on average, 50 gallons (190 l) of water per minute, totaling approximately 30,000 gal (114,000 l) of water in a 10-hour workday. All the water used had to be pumped into a special filtration system that removed fine sand particles. The pH and alkaline levels were also tested and adjusted before it was returned to the city water system.

The day crew prepared, coated, and installed the concrete. After removing the unsound concrete, BACR exposed the reinforcing steel. The existing steel was prepared and coated. Where significant section loss was identified, additional supplemental epoxy-coated reinforcing steel was installed. Protective anodes were installed at concrete patch locations to provide long-term protection to the reinforcing from corrosion.

Shotcrete was installed at the vertical and underside partial-depth repairs. The efficiency of shotcrete contributed to completing the project on schedule. The load capacity of the deck forced us to revise our approach during the project to allow for deliveries as well as construction activities. Pump trucks and

short-loaded concrete trucks were used to accommodate the weight restrictions. BACR's nozzle men are ACI certified and have years of experience implementing these repairs. To ensure quality control, each shift and each nozzle man prepared a panel for quality control testing to ensure ideal consolidation of the shotcrete. Two to three nozzle men were each followed by a crew member who would strike and finish the repairs. After curing, the repairs were coated to improve the appearance of the garage.

Constant coordination with the building team on sequencing minimized the project's impact on the occupied



Fig. 11: Concrete slab with heating piping for melting ice and snow.

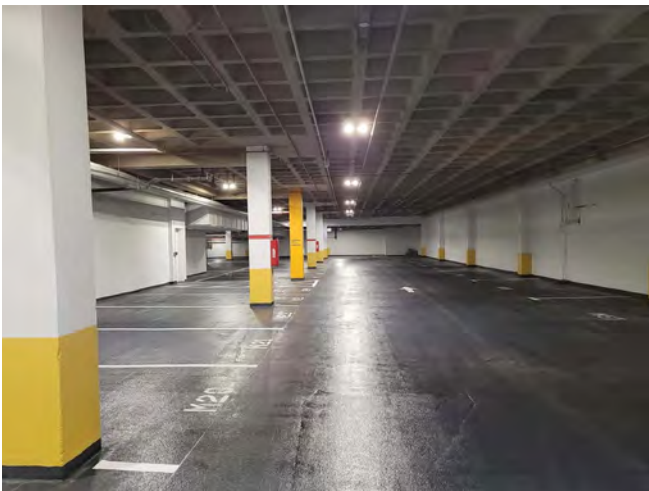


Fig. 12: New top-side coating on repaired slabs.



Fig. 13: Repaved pedestrian walkway.

buildings and their tenants. Maintaining entrances and exits while coordinating two shifts to complete the project was a major challenge. Construction progress required shifting pedestrian paths to keep the occupants safe from the construction activities. Weight load capacities on the existing deck forced BACR to revise their project approach to allow for deliveries as well as construction activities. Pump



Fig. 14: Repaved and re-landscaped driveway approach to O'Hare Plaza parking garage.

trucks and short-loaded concrete trucks were used to accommodate the weight restrictions.

Phase 3 was performed during the height of the COVID-19 pandemic. In addition to mitigating the spread of the virus at the jobsite, BACR had to navigate a cement/aggregate shortage due to supply chain issues caused by the pandemic. The approach required weeks of preplanning.

A MODERNIZED UPGRADE

O'Hare Plaza is located adjacent to the Kennedy Expressway and is visible to countless commuters every day. In addition to the structural restoration, the plaza's exterior aesthetic was enhanced by the addition of landscaping. Overall, the project created an opportunity to modernize and upgrade the complex's overall appearance as well as to improve the long-term performance of the parking garage for decades to come.

2023 OUTSTANDING REHABILITATION AND REPAIR PROJECT

Project

**O'Hare Plaza West Drive and Executive
Garage Restoration**

Project Location

Chicago, IL

Shotcrete Contractor

Bulley & Andrews Concrete Restoration

Materials Supplier

Sika STM/Glenrock

General Contractor

Bulley & Andrews Concrete Restoration

Owner

JLL



Joshua Freedland is Bulley & Andrews' director of historic preservation. During his 25 year career, his expertise has benefited hundreds of historically significant structures throughout the country including Prudential Plaza and Nickerson Mansion in Chicago; Jackson Lake Lodge in Grand Teton National Park, WY; and the Washington Monument in Washington, D.C. Joshua leverages his exceptional depth of knowledge in materials and construction techniques to preserve historically significant structures across the nation.

A professional associate of the American Institute of Conservation (AIC) and past chair of the AIC's Architectural Specialty Group, Joshua is an associate editor of the *Journal of the American Institute of Conservation*. He is also an active member of the Emeritus Board of Landmarks Illinois.

Joshua earned a Master of Arts in comparative history from Brandeis University and a Master of Science in historic preservation from the University of Pennsylvania. His penchant for preservation has extended his professional contributions to include teaching, lecturing, and publishing extensively in academic and professional circles. In his spare time, Joshua enjoys the great outdoors, including fly fishing and kayaking.