

2012 Outstanding Repair & Rehabilitation Project

St. Paul Union Depot

By Richard Maxwell and Dave Sawyer

The St. Paul Union Depot, also known affectionately as SPUD, was originally built in 1881, at which time it became a landmark transportation facility in downtown St. Paul, MN. It served as a major Midwestern rail hub until its tragic destruction by fire in 1915. Construction of a new facility began in earnest soon after World War I and reached completion in 1923. At its height of operation in the 1920s, millions of pieces of mail moved through the depot annually; there were nine railroads operating within its walls, with an average daily train movement of close to 300.

The depot effectively ceased all transportation functions in 1971, when Amtrak moved its rail services elsewhere. The head house, a stark example of neoclassical architecture, was added to the National Register of Historic Places in 1974. Since that time, a number of businesses have occupied it, along with the U.S. Postal Service, which had been using it in conjunction with the neighboring Central Post Office.

But that all changed in 2011, when the Ramsey County Regional Railway Authority (RCRRA) approved plans to purchase the head house as part of a massive \$250 million effort to return the trains to the depot.



Fig. 1: St. Paul Union Depot

Currently, a massive rehabilitation project is underway to restore SPUD (Fig. 1) to its historical glory, and RAM Construction Services, out of nearby Little Canada, MN, is playing a key part in the restoration.

According to Bryan Dziuban, RAM's Minnesota Regional Manager, the scope of work at SPUD involved some restoration of the carriageway and tunnels connecting it with the depot, but the bulk of the work took place in the southwest parking structure under the train deck (Fig. 2 to 5). The parking structure required over 30,000 ft² (2800 m²) of removal and replacement of concrete. While the vast majority of delaminated concrete removal was achieved through hydrodemolition, RAM was responsible for hand-chipping those areas where the hydrodemolition apparatus was unable to reach.

From the outset, RAM's focus was on the mandate given by the RCRRA and the general contractor, Mortenson Construction (located in neighboring Minneapolis): restore the structural integrity to the historical landmark while remaining as true as possible to the original construction aesthetics.

But RAM didn't once consider a form-and-pour approach to this extensive challenge. As Jody Forsman, RAM's Restoration Field Superintendent, puts it, "The company prides itself on its knowledge of the materials and techniques that will yield the highest performance for any given application" and, as one of the largest shotcrete restoration contractors in the



Fig. 2: The majority of concrete removals were performed by hydrodemolition



Fig. 3: Smaller, isolated concrete repairs manually removed by a pneumatic jackhammer

Midwest United States, “we chose a dry-process shotcrete approach, using King Packaged Materials’ MS-D1 Shotcrete.”

In the case of the depot parking structure, RAM was adamant that the hydrodemolition get under way 2 to 3 weeks before shooting began. Even with its focus on quality workmanship, RAM still caught up to the hydrodemolition apparatus on two occasions.

Because the original parking structure, built in 1932, was formed and poured on wooden slats that were anywhere between 6 to 8 in. (152 to 203 mm) wide, the challenge for RAM was not only in replacing the concrete with the shotcrete



Fig. 4: Final stage of removals prior to shotcrete application



Fig. 5: Column prepared for shotcrete application



Fig. 6: Multiple layers of shotcrete prior to finish coat



Fig. 7: New shotcrete surface to resemble 1932-formed rough-cut plank finish

process but also in finishing it to emulate the original pattern left by the formwork used over 80 years before. To achieve this, RAM used a fabricated form board, which they pressed into the partially set concrete overhead, thus achieving an effect that imitated and blended in with the pattern left by the original formwork. This “historical touch” was very successful throughout the entire concrete replacement and included those areas that had been previously repaired but were not restored to the original pattern and aesthetic (Fig. 6 and 7).

With an average repair depth of 4 in. (102 mm), RAM used approximately 45 truckloads of King shotcrete for the project, amounting to approximately 500 yd³ (380 m³). As Richard Maxwell, RAM’s Director of Operations, Restoration Division, puts it, “The key to a successful shotcrete repair lies exclusively with your crew, of whom the most important individual is your nozzleman.” RAM uses the services of 15 ACI Certified Nozzlemen throughout their areas of operation. Having made shotcrete a core part of their restoration and rehabilitation division, they take the need to ensure that their personnel maintain certified status on an ongoing basis seriously. The SPUD parking structure rehabilitation required the services of four nozzlemen during RAM’s original contract. Steve Spindler, Project Foreman for RAM, was responsible for 95% of the shotcrete required on this project. He has at least 20-plus years of experience as an ACI Certified Nozzleman.

SPUD was finished on time in September 2012. The extensive rehabilitation that RAM undertook to restore the underside of the train deck for the parking structure will significantly ease parking congestion around the depot. The entire structure will allow for an area of up to 250,000 ft² (23,226 m²) devoted entirely to parking. That bodes well for the future of this high-exposure facility that is expected to become the Grand Central Station of the Midwest. As a major hub for local light-rail transit, Metro transit buses, Greyhound and Jefferson buses, Central

Corridor light rail, and the return of Amtrak, a fully rehabilitated parking structure takes on more importance than ever. In addition, thanks to the respect accorded past building practices, the historical SPUD can expect a bright future.

About the Company

Founded in 1918, RAM Construction Services is one of the oldest and most experienced waterproofing and restoration contractors in the United States. RAM Construction Services has built a solid reputation based on knowledge, experience, and reliability. Completing more than 2000 projects per year, RAM Construction Services has grown into one of the largest Midwestern contractors specializing in the restoration of aging structures and skilled waterproofing of new structures.

Over the years, RAM Construction Services has revitalized aging structures in dozens of states across the country. The projects range from below-grade waterproofing of a 600,000 ft² (55,742 m²) auto assembly plant, to weatherproofing a 32-story office tower, to the delicate cleaning and restoration of stone and terra cotta on a 100-year-old church.

Corporate experience and the individual skill of superintendents and tradesmen are RAM's keys to a successful job. RAM Construction Services is available to advise clients on the methods most appropriate for cost and time savings. The best evidence of RAM's successful craftsmanship is the long list of repeat customers, owners, contractors, and construction managers who invite them to work on their projects.

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Project Name

St. Paul Union Depot

Project Location

St. Paul, MN

Shotcrete Contractor

RAM Construction Services*

General Contractor

Mortenson Construction

Architect/Engineer

URS Corporation

Material Supplier/Manufacturer

King Packaged Materials Company*

Project Owner

Ramsey County Regional Railroad Authority

*Corporate Member of the
American Shotcrete Association



Richard Maxwell has been a leader in concrete restoration for over 24 years. He specializes in parking decks, bridges, buildings, soil stabilization, and zoological exhibits throughout the Midwest, East Coast, and several southern states. In addition to shotcrete, Maxwell supervises other aspects of construction, including epoxy overlay, caulking, specialty deck coating, and post-tension repair for numerous types of concrete structures. He works directly with owners and owner representatives to consistently meet strict schedules and tight budgets. Hard work and dedication has advanced Maxwell to his present role as Director of Operations. In this capacity, he oversees all restoration projects for RAM's corporate office in Livonia, MI, as well as its three satellite offices located in Cleveland, OH; Cincinnati, OH; and Minneapolis, MN. Maxwell is highly involved with RAM's Safety Committee and is dedicated to promoting a safe working environment. He is an ASA member and has been involved with projects that received the International Concrete Repair Institute's Award for Excellence in 2000 and 2008, as well as ASA's Outstanding Shotcrete Project Award in Repair and Rehabilitation in 2007.

(Editors note: We regret to announce the death of Mr. Maxwell on January 11, 2013 at the age of 46. ASA extends our sincere condolences to the Maxwell family and co-workers.)



Dave Sawyer is a Technical Representative with King Packaged Materials Company and is responsible for the sales and marketing of its line of shotcrete products in the southern Ontario, Canada, and U.S. Midwest markets. He has over 24 years of experience in the concrete industry and is a member of the American Concrete Institute (ACI) Toronto Chapter, ASA, and The Building and Concrete Restoration Association of Ontario.