From Olympic Swimming Stadium to Community Center

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Front view of Los Angeles Swimming Stadium

The renovated Los Angeles Swimming Stadium competition and family pools, now part of the Exposition Park Intergenerational Community Center (EPICC), opened on July 4, 2003. The redesigned Swimming Stadium is the focal point of the complex, which is sited on about six acres of land at the southwest corner of Exposition Park. Built at the same time as the nearby Coliseum for the 10th Olympiad Games of 1932, the original stadium contained 5000 grandstand seats, ground level locker rooms, and multi-purpose rooms on the second floor. The structure was converted into a 66,000 ft^2 (6130 m^2) three-story recreation center with two basketball courts, locker facilities, weight and fitness rooms, multi-purpose rooms, a stage, a sound studio, and a kitchen. The architect on the conversion project blended the 71-year old architectural façade of the LA Swimming Stadium, preserving the historic integrity with contemporary use of glass and other materials to create an expansive facility. The public/private funded $30 million project also includes the adjacent refurbished 1928 club house which will house a senior center, a new 10,000 ft^2 (930 m^2) child care center for after-school and preschool programs, a new amphitheater, and a community garden.

Structural Characteristics

The entire EPICC is a 124,000 ft^2 (11,500 m^2) facility. This revived city landmark comprises three distinct components:

1. The 66,000 ft^2 (6130 m^2) renovated and expanded 1932 Olympic Swimming Stadium that now includes basketball courts, meeting rooms, an auditorium, as well as exercise and locker rooms;
2. A new 10,000 ft^2 (930 m^2) child care center; and
3. An 11,000 ft^2 (1020 m^2) repurposed senior center (formerly an abandoned house).

The 66,000 ft^2 (6130 m^2) renovated and expanded 1932 Olympic Swimming Stadium was originally constructed with cast-in-place concrete walls, approximately 8 in. (20 cm) thick formed with 1 x 12 in. (2.5 x 30.5 cm) boards. Square-shaped reinforcing bar typical of the era was commonplace on the project.

Problems that Prompted Repair

Over the years, corrosion had caused extensive spalling within the Olympic Swimming Stadium structure walls and architectural concrete at the arches and overhangs. There was also extensive cracking within the stadium structure walls and architectural concrete at the these same locations.

Extensive scaffolding was necessary for repairs

Ornamental detail repair

Close-up of ornamental detail repair

One cause for some of these cracks was that in the years subsequent to construction, the stadium had been through several earthquakes.

The walls of the stadium also showed extensive weathering and wearing away of the cement paste at the wall surface, leaving aggregate exposed with a "sandy" texture.

Visual inspections of the stadium uncovered these problems, and acoustical emissions tests were employed to uncover all of the spalling locations. Because of the large number of spalls, cracks, and the heavy corrosion evident on the reinforcing steel, it was determined that the damage to the structure was such that it was not acceptable for the original planned additions. The concrete would need to be restored to create an acceptable structure.

Because of its age and historical significance, historical restoration standards were required for funding and preservation of the complex.

Repair System Selection

Several different materials were needed to repair this structure. A 100% solid, structural epoxy injection resin was selected for the cracks. The epoxy conformed to ASTM C 881, Type 4.

A three-component, epoxy cementitious bonding agent and anti-corrosion coating was chosen for the reinforcing steel and properly prepared substrate.

For the extensive spalling on the walls, a two-component, polymer-modified mortar was chosen to complete the repairs. And finally, to ensure a uniform look, a two-component, polymer-modified cementitious coating was placed on the walls.

Repairs

To begin the repairs, a large scaffolding system (see photo, top left) was erected to allow the contractor access to all of the wall surfaces. To chip away the bad concrete, the contractor used small-sized jack-hammers (less than 20 lb each) to prevent micro-cracking to the original concrete. Because the spalls were on a vertical surface, however, the perimeter cut was made with a small grinder equipped with a 4 in. (10 cm) diamond blade.

The surface preparation of the exposed reinforcing steel conformed to ICRI Technical Guideline No. 03730, "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion."

To ensure conformity, a copy of this guide was kept on the project site. This included the following steps:

1. Creating a rectangle perimeter for the removal geometry;
2. Creating a 1/4 in. (0.6 cm) deep perimeter cut;
3. Providing a minimum of 3/4 in. (1.9 cm) clearance beneath the reinforcing steel; and
4. Sandblasting the corroded steel to remove rust and clean the resultant surface.

The cracks were repaired first using epoxy injection. Repairs to all the spalled areas followed, and the repair mortar was hand-troweled into place. Finally, the cementitious coating was applied with a spray application and then brushed to conform to the previous surface finish. Care had to be taken to not hide form marks.

Project Challenges

There were several special challenges on this project due to the historical value of the original structure and the need to comply with historical preservation and restoration standards. For example, the repair of the spalls and cracks created a patch-work appearance that did not comply with the project objective of restoring the original appearance of the building and needed to be redone.

Also, the walls were originally made with cast-in-place concrete with 12 in. (30 cm) wide wood forms. The cementitious coating would therefore have to be thick enough to hide the cracks and spalls, but not so thick that it covered the original form lines. To ensure this coverage, numerous products were site-tested with a mock-up. From the mock-ups, one product was chosen that had the correct consistency.

The next challenge was finding the proper color. The intention was to restore the original color of the

Close-up of spall prior to repair

Patched area before coating

Color and texture samples

Cementitious coating color and texture mock-up

Overall view of completed project

concrete that was poured in 1932 and weathered for roughly 70 years. One particular area of the coliseum was selected as the standard.

The chosen cementitious coating was available in two colors: white and grey. Neither color matched the original concrete. The product was therefore blended at the project site. The color blend consisted of the following: 70% grey and 30% white with an integral color pigment added to achieve color.

Among all the other problems, color and texture of the finish were key to a successful restoration. The contractor determined that separating the two issues was the only way to achieve a good result. The order of texture first followed by the color provided the best result. The product selected allowed some flexibility in application methods that created different textures. Several application textures were applied in samples to be selected by the architect. Achieving the correct color match was its own unique challenge. Selection of the southwest corner of the Swim Stadium as the area to apply samples offered the best view of the coliseum.

Several tests with the above formula matched the aged, warm-tone concrete. White and grey colors of the cement coating were used to achieve the tone, whereas the addition of integral powder pigment achieved the color. Color pigment powders were limited to prevent impact to the performance characteristics of the cement coating.

This project was conceived by a public/private partnership to encourage cross-generational communication. It integrated new and renovated facilities while preserving an important part of Los Angeles' history. The project also exceeded hiring goals for minority and at-risk youth.

LA Swimming Stadium

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City of Los Angeles
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Project Engineer
Zimmer-Gunsul-Frasca Partnership
Los Angeles, California

Repair Contractor
CK Arts
Bel Aire, California

Material Suppliers
Degussa Building Systems
Shakopee, Minnesota

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