2016 Honorable Mention

The Pacific

By Jason Myers

The Pacific, at 2155 Webster Street in San Francisco, CA, is a concrete building with two levels below grade and nine levels above grade with a total of over 250,000 ft^2 (23,000 m^2) of usable space. The building was constructed and completed in 1967 and spent most of its life as the University of Pacific School of Dentistry. The Dentistry school moved to a new location in 2014. After the school departed, the building was repurposed into 77 condominium units and 10 townhomes.

As part of the repurposing, the existing façade of precast concrete was removed to allow for the installation of full-height windows. This lightened the weight of the building considerably but in turn reduced its structural strength and rigidity. As part of the repurposing, the building needed to be brought up to current seismic codes. As a result, the building required extensive new strengthening of the shear walls and columns. The shotcreted additions to the shear walls were between 8 and 18 in. (20 and 45 mm) thick with typical field reinforcement of No. 7 (No. 22 metric bar) bars at 6 in. (15 mm) on center with various boundary element conditions. Additionally, all the columns not encased in existing or new shear walls were jacketed with shotcrete. This typically involved over 20 columns per floor. Overall, the project used over 1750 yd^3 (1340 m^3) of shotcrete and covered 65,000 ft^2 (6000 m^2) of surface area.

One of the difficulties on the project was coordination, but ultimately this also showed one of the strengths of shotcrete. Due to existing site conditions, there were a lot of redesign issues as well as wall modifications because existing concrete sections were not plumb and straight. With the flexibility of shotcrete, we were able to easily increase the wall thickness areas as required to get proper reinforcement clearances. Also, with our easily moved shotcrete operations, we could move to different walls as the schedule

Fig. 1: Typical reinforcement for shear walls and boundary elements on the fourth floor

Fig. 2: Column encasement and shear walls reinforcement on the first-floor level

required. Sometimes the moves were at the last minute because wall sections had not been signed off on due to unanswered questions or new field discoveries dealing with existing conditions. With the minimal formwork required by shotcrete, the other trades were able to work above the walls until just before shotcrete operations started. This would not have been possible with a standard form-and-pour concrete operation. Often modifications of the reinforcement and required demolition would be completed immediately before shotcreting started on a particular wall. With shotcrete's inherent flexibility, the schedule of the General Contractor was significantly less impacted by these changes than would have occurred with a form-and-pour operation because the formwork wouldn't be able to be started until all issues were resolved or, even more time-consuming, having to remove and replace the formwork when additional issues arose.

One of the requirements of the project was the Owner's desire for LEED certification. One of the ways that shotcrete was able to help improve the sustainability and in turn the LEED rating was by using recycled supplementary cementitious materials (SCMs), including slag and fly ash in the shotcreted concrete mixture. The design 28-day compressive strength of the shotcrete was 6000 psi (40 MPa) and the final concrete mixture used a 45% replacement of the cementitious material with 30% slag replacement and 15% fly ash replacement. Because of the high replacement of cement, the shotcrete mixture was very difficult to pump, but with the use of pumping aids, such as Rheomac VMA, they were still able to get a production rate of over 90 yd^3 (69 m^3) per shift through over 500 ft (150 m) of delivery pipe and hose. The Owner was also concerned about potential cracking in all of the concrete surfaces. This issue was resolved by using a shrinkage-reducing admixture (Masterlife SRA). Shrinkage tests were not performed on the project, so it is not known how much of a benefit the admixture provided, but the Owner was very satisfied with the results.

The largest issue on the project that shotcrete was able to solve was with site logistics. The project was located in a very congested part of San Francisco with narrow streets, a lot of vehicle and pedestrian traffic, and numerous local businesses. When the project was bid, one of the conditions allowed use of both Sacramento Street (the long axis of the project) and Webster Street (the short axis of the project). However, by the time Dees Hennessey Inc.'s (DHI) portion of the work began, the project's only allowable pumping location was from Webster Street, the narrower of the two streets. The General Contractor had numerous difficulties throughout the project with all of their concrete pours because of this narrowness of the street and numerous times had to perform off-hour pours due to space and traffic limitations. With the smaller footprint of a shotcrete operation, they were able to easily slide into the single parking lane that was available and shotcrete the entire project from the far end of the building. As mentioned previously, some of the pumping distances were up to eight stories high

Fig. 3: Basement perimeter walls during shotcrete wire installation

Fig. 4: Shotcrete installation for column encasement

(because of the slope gradient) and across the entire long-axis length of the building for a total pumping distance of over 500 ft (150 m).

The Pacific was a difficult project to work through and had many issues that had to be resolved. The inherent advantages of shotcrete provided efficient solutions to many of these issues on the job. With the Owner, General Contractor, and DHI working together, they were able to make this a mutually successful project for a building that has already served for 50 years and is ready for its next season of service.

HONORABLE MENTION

Project Name
The Pacific

Project Location
2155 Webster Street, San Francisco, CA

Shotcrete Contractor
Dees Hennessey, Inc.*

General Contractor
Plant Construction Company

Architect
Handel Architects

Structural Engineer
Holmes Culley

Material Supplier
Central Concrete

Project Owner
Trumark Urban

*Corporate Member of the American Shotcrete Association

Jason Myers *graduated from California Polytechnic University, San Luis Obispo, CA, in 1995 with his bachelor's degree in civil engineering and from Golden Gate University, San Francisco, CA, in 2015 with his master's in business administration with an emphasis in project management. Myers started out his professional career working for an earth retention subcontractor, where he learned the importance of budgeting, scheduling, and client relationships. Also during this time, he was introduced to the use of shotcrete and its applications. After working for a general contractor for a couple of years he realized that he enjoyed the tighter knit of working for a subcontractor and the ability to construct projects on a tighter time frame with several going at once. Myers also enjoys the process of handling most of the procedures that go into constructing a project rather than seeing only a small portion of the process. Myers joined Dees Hennessey in 2004 and has been a part owner of the company since 2007. He currently serves as the Vice President of Operations as well as the Safety Director.*

Fig. 5: The Pacific after construction completion