

Architectural Shotcrete

By Adam Dobrowolski and Deane Hudson

In our lives, we seldomly look back and say, “that was a very cool project.” This is one of those projects because of the challenges we faced from the start. Poor access, intricate finish, difficulty in formwork, concrete chemistry, and protection of the existing exterior façade were all challenges of the Uber Mission Towers Project.

THE PROJECT

Our project was to install the curved and sloping structural terrace walls with seats on the seventh floor of the two Uber Mission Towers Buildings at the New Chase Center in San Francisco, CA (Fig. 1). This project consisted of 3307 linear ft (1008 m) of curved planter walls ranging from 3 to 9 ft (1 to 3 m) in height, with a total of 455 yd³ (348 m³).

PROJECT CHALLENGES

When we first arrived on site, we immediately faced some unique challenges, such as the tower crane was gone, the exterior all glass façade was in place, and the waterproofing membrane was installed on seventh floor decks. As I stood and looked at the glass exterior from the courtyard, I thought—how will the team pull this off? As with every project Joseph J. Albanese, Inc. (JJA) performs, it all begins with a solid plan in preconstruction.

THE JJA PRECONSTRUCTION PROCESS

JJA’s preconstruction process is a full team-integrated approach that occurs on every JJA project. From estimating, project management, virtual construction, and

operations, team members combine talents and experiences to put together the best game plan to ensure success. Considering the unique nature of the walls themselves and overall setting of the outdoor terrace, JJA’s in-house virtual construction team played a critical role—both for internal building efficiency and design coordination prior to JJA mobilizing (Fig. 2).

Though this project originally called for the walls to be constructed with the form-and-pour method, based on our experience and capabilities, we demonstrated the value of shotcrete placement to our client. It was obvious shotcrete was the best solution to achieve the vision the architect desired—namely concrete walls that both curved and sloped. Two additional benefits included the ability to improve schedule and to provide a vapor blast finish (a light sandblast with water/sand on steel trowel finish that results in an even, exposed sand finish).

LOGISTICS

After many considerations regarding access to the seventh-floor terraces, we decided on the following plan to logistically complete the project. First, all forming material would be hoisted to each terrace with a 150 ton (136 tonne) crane from the adjacent side streets. We would also hoist out all debris and forms after completing shoots at each tower with the same crane system.

Our second access concern was how to supply shotcrete to the seventh-floor roof terraces. Under typical site conditions, we would anchor slickline to an existing elevator

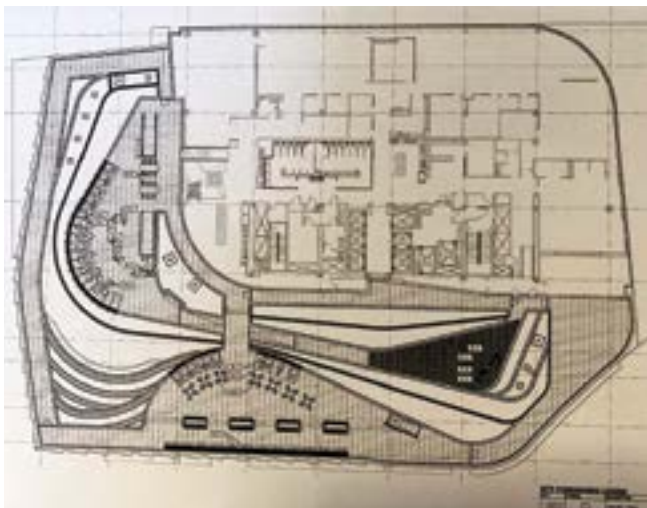


Fig. 1: North Tower plan

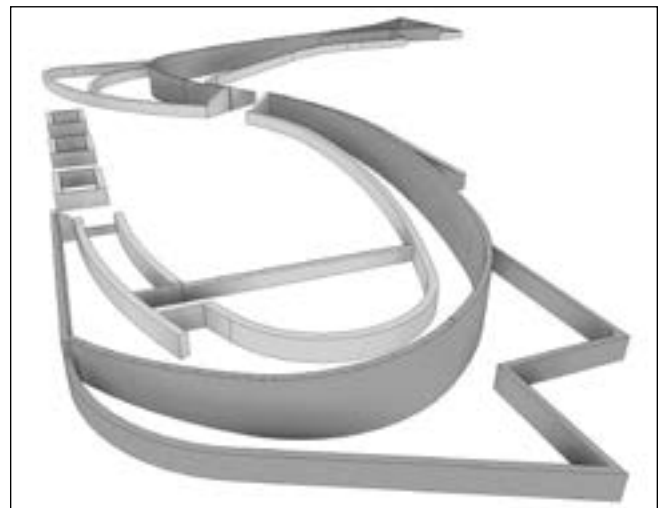


Fig. 2: BIM of project



Fig. 3: Self-supporting scaffold tower

opening, outside face of the building, or column line to the seventh floor, and then use rubber hose to service our work area. This was not possible with all floors, elevators, and exterior glass on the building already in place.

Our solution to getting shotcrete to the seventh floor was to set up a standalone scaffold to support the 3 in. (75 mm) slickline and our vapor blast material hoses. The scaffold system was engineered and installed by Bear Scaffold and Services from Alviso, CA. The design had a large footprint at the base, which was anchored to the ground, while the top of scaffold tower was anchored to the deck on seventh floor. The scaffold tower was approximately 10 ft (3 m) from the building. The overall height of the scaffold was 95 ft (29 m) (Fig. 3). We purchased new 3 in. slickline and heavy-duty clamps to ensure we had no issues with old slickline ruptures due to higher pumping pressures. The slickline was attached to the scaffold tower with new 3 to 2 in. (75 to 50 mm) swivel clamps, and JJA fabricated its own blowout box to clean out the system daily and keep it operating safely.

Once we figured out logistics, we self-performed all formwork and reinforcement over the existing waterproofing. After layout of the walls on waterproofing, a 6 in. (150 mm) strip of the waterproofing was removed and dowels installed at 36 in. (914 mm) on center at 4-1/2 in. (114 mm) embedment. We also laid the flutes out on top of the deck in front of the wall to avoid having to scan at each dowel location and to expedite layout.

CONCLUSIONS

As is typical with the construction industry, JJA's team faced challenges and circumstances through construction. It was JJA's field team's leadership (Superintendent Ismael Sandoval, Carpenter Foreman Jose Ramirez, and Shotcrete Foreman Anastacio "Tacho" Rivas) and solution-oriented attitudes, coupled with the leadership and team approach



Fig. 4: Uber Mission North Tower



Fig. 5: Uber Mission South Tower



Fig. 6: Uber Mission Tower planter seats

of General Contractor DPR Construction, that ultimately pushed this project to finish safely and ahead of schedule.

JJA's tradesmen were able to demonstrate why JJA is an industry leader in shotcrete, and true to our core values, we were able to complete this high-quality project safely with zero safety incidents. JJA is proud of the finished product and is excited about the future architectural applications of shotcrete that we can perform for our clients! This was a very cool project!

2019 OUTSTANDING ARCHITECTURE | NEW CONSTRUCTION PROJECT

Project Name

Uber Mission Bay Tower Terraces

Location

San Francisco, CA

Shotcrete Contractor

Joseph J. Albanese Inc.*

General Contractor

DPR

Architect/Engineer

Huntsman Architectural Group, SWA Architects

Material Supplier/Manufacturer

Central Concrete – U.S. Concrete

Equipment Manufacturer

Reed Shotcrete Equipment*

Project Owner

Uber Technologies Inc.

*Corporate Member of the American Shotcrete Association



Adam Dobrowolski is a Project Manager at Joseph J. Albanese, Inc. Originally from Chicago, IL, Dobrowolski used to spend his breaks from school performing interior and exterior renovations for homes. He graduated from the University of Illinois at Urbana-Champaign and moved to California in 2006 to work with his family's venture

capital software company. After a few years, he decided that he wanted to get back into construction and joined the County of San Diego's Parks and Recreation department. During his time with the County, Dobrowolski served as a Project Manager executing capital improvement projects primarily in the East County, which included upgrading and renovating parks, constructing trails, constructing permanent County facilities, and serving as a liaison between community groups and the Board of Supervisors. In 2016, Dobrowolski moved to the Bay Area with his fiancé and joined the Joseph J. Albanese team, where he currently serves as a Project Manager with a primary focus in structural concrete, though he also has experience in demolition, grading, excavation, site concrete, shotcrete, and retrofits.



Deane Hudson is Joseph J. Albanese's Shotcrete Manager and oversees shotcrete production, quality control, and safety. Hudson is a powerhouse, equipped with over 28 years of shotcrete industry knowledge and experience. He is highly skilled in estimating, project management, supervising civil, underground, retrofit, and new

construction projects. Hudson is a member of the American Shotcrete Association (ASA), the American Concrete Institute (ACI), and The Beavers Inc.