2015 Outstanding Architecture | New Construction Project

Sufism Reoriented Sanctuary

By Jason Myers

Sufism Reoriented is an American spiritual order that focuses on the principles of divine love as the central focus of their lives. They are in the process of constructing a permanent home in Walnut Creek, CA, that is nearing completion. The new sanctuary will be set among the serene gardens on 3 acres (12,000 m^2) of land surrounding a suburban neighborhood. The structure was designed under the guidance of Murshida Carol Weyland Conner and the highly distinguished architectural firm Philip Johnson/Alan Ritchie with Soga and Associates being the Architect of Record. The project had its groundbreaking ceremony on May 24, 2012, and the sanctuary is expected to be completed in the middle of 2016.

An important symbol to the order is the circle. The circle is expressed in the gently sloping saucer domes vaulting the Prayer Hall and the adjacent rooms. The outline of the domes was designed to reflect the soft, rolling hills that border the surrounding valley. Within the sanctuary, the domes create tranquil and uplifting interior spaces for prayer, meditation, and communion with God. The roof of the sanctuary consists of eight small domes, four medium domes, and in the center one large dome (refer to Fig. 1).

Fig. 1: Outside view of domes

The eight small domes have a diameter of 272 in. (6.91 m) with the design of the project having the small domes constructed out of fiberglass. The four medium domes have a diameter of 450 in. (11.43 m) and a height of 158 in. (4.01 m) with a concrete thickness of 7.5 in. (0.19 m) with an approximate area of 1500 ft^2 (140 m^2) each. The single large dome has a diameter of 76 ft (23.16 m) and a height of 258 in. (6.55 m) with a concrete thickness of 7.5 in. (0.19 m) with an approximate area of 5800 ft^2 (540 m^2). The concrete contractor, Overaa Construction out of Richmond, CA, was awarded the concrete portion of the project and had originally planned on casting the domes, but once the project got out of the estimating department into the construction phase, they realized that cast-in-place was not the best solution. At this point, Overaa Construction started conversations with Dees-Hennessey, Inc., about the possibilities for using shotcrete (refer to Fig. 2(a) and (b)).

Shotcrete proved an ideal solution for the domes as the complexity of the formwork was eliminated and the architectural features of the domes could immediately be seen and evaluated by the owner, contractor, and Dees-Hennessey to ensure the domes were geometrically correct before the shotcrete setup and make corrections if needed during placement. A full-height section of the dome was constructed as a preconstruction test panel to qualify the nozzlemen as well as to confirm the architectural finish was acceptable for the general contractor, architect, and owner.

Each of the domes had an opening in the top of the dome (oculus). This required the concrete contractor to start each of the domes by casting a concrete compression ring around the base and at the top of each dome to lock in the reinforcing bars and the structural frame of the structure. Each of the medium-sized domes was shot monolithically during a single mobilization. Due to the size and weight of the large dome, it was split into six sections and two nonadjacent sections were shot during the three mobilizations to com-

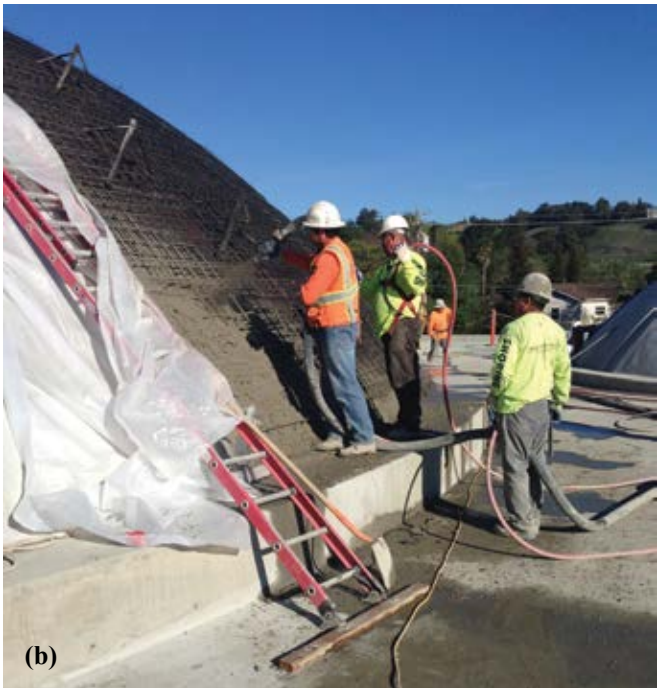

Fig. 2(a) and (b): Large dome shotcrete installation

plete the large dome. The reinforcement wiring for these domes was extremely difficult due to the geometry. Surveyors established the correct geometry, but as each section was completed, there was less area to walk on and increased chances of the wires being damaged. There were numerous evenings when the contractor's or owner's representative, who wanted to visualize what the domes were going to look like, had to be chased off of the domes to prevent damaging the layout (refer to Fig. 3).

One of the challenges for the shotcrete placement was creating an accurate dome shape. After the shotcrete work was complete, a fluid waterproofing membrane was applied directly on the concrete surface. This required all of the shotcrete surface to be finished on the curved surface within tight construction tolerances. Any deviation in shape would have been very noticeable. Furthermore, any patching would have shown through the waterproofing membrane. A distinct advantage with shotcrete was the final shape could be continuously checked and adjusted as needed to make sure the proper geometry was achieved. This was extremely challenging in the large dome, first with it being such a large structure and then having to install it in six different sections, where the final structure could not be visualized until all six sections were complete. This challenging placement was successfully executed by Dees-Hennessey with no issues or patching required. In the end, the owner was very satisfied with the shotcrete surface texture and geometry. Additionally, they were able to use a thinner and simpler waterproofing membrane because of the quality of the shotcrete

Fig. 3: Large dome shotcrete preparation

Fig. 4: Medium dome with channel

finish. An additional challenge was each dome's drainage channel and ladder, installed along the curved surface, that required additional detail work (refer to Fig. 4).

Dees-Hennessey relied on its more than 30 years of shotcrete experience on difficult projects to ensure that quality control, safety standards, and correctness along with industry standards were used on this project. Although this was a very difficult project, it showed that with the proper preplanning and thinking through how the project is going to be constructed, construction can be greatly simplified and help to eliminate many of the problems that can occur down the road. The success of this project is due to the great teamwork between all parties and individuals.

The Outstanding Architecture | New Construction

Project Name
Sanctuary for Sufism Reoriented

Project Location
Walnut Creek, CA

Shotcrete Contractor
Dees-Hennessey, Inc.*

Concrete Contractor
Overaa Construction

Design Architect
Philip Johnson Alan Ritchie Architects

Architect of Record
Soga and Associates

Material Supplier
Central Concrete

Project Owner
Sufism Reoriented

*Corporate Member of the American Shotcrete Association

Jason Myers *graduated from California Polytechnic State 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 multiple projects in process simultaneously. 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, Inc., in 2004 and has been a part owner of the company since 2007. Myers currently serves as the Vice President of Operations as well as the Safety Director.*