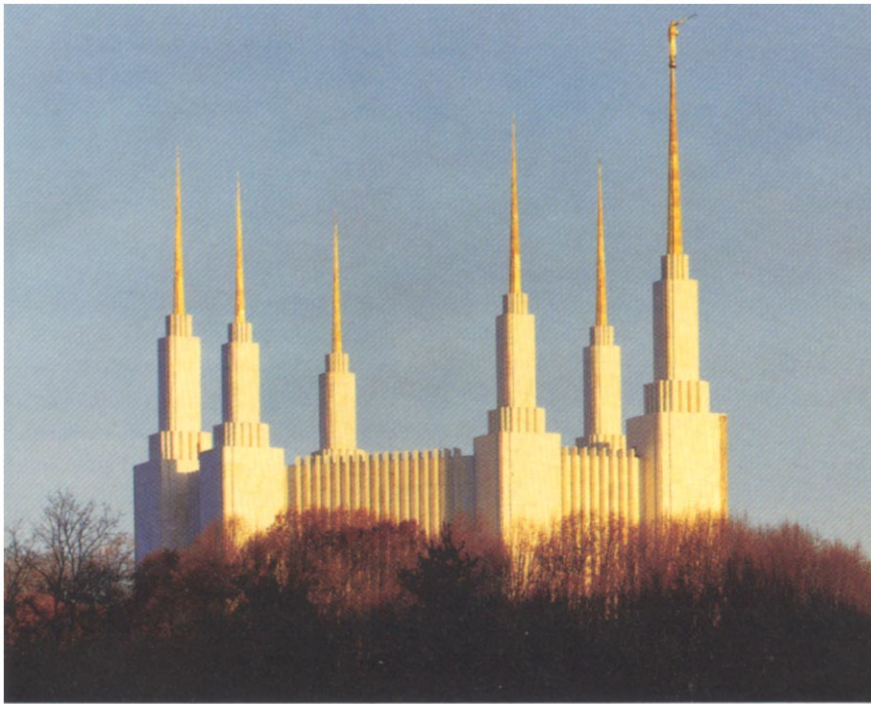


TWENTY-THREE MILES OF CAULK

By Kathy B. Sedgwick





The exact very high standards for construction. Only the finest and most durable materials are used in the construction of a temple. Cost of the Washington Temple, including furnishing, exceeded \$16 million. Photo by David Hofeling.

Scaffolding on one of the Washington, D.C., area's most recognizable buildings has drawn heavy attention from Beltway commuters.

The Washington Temple of the Church of Jesus Christ of Latter-Day Saints is undergoing a \$2 million renovation. Plans to restore the Kensington, Md. structure began nearly two years ago with an exterior conservation appraisal conducted by Harty Weese Associates. The comprehensive study included a detailed examination and evaluation of the 11,800 Alabama white marble panels (173,000 square feet) sheathing the 16-story temple.

The study recommended that the entire 20-year-old structure be recaulked to assure a watertight building envelope; in addition, visibly cracked marble, plus those marble sections that were projected to crack soon, would be replaced.

Measuring 248 feet long and 136 feet wide, the structure's six spires are porcelain steel plated with gold. Atop the highest of the spires stands an 18 foot, 2½ ton golden statue of the Angel Moroni, which rises 288 feet above ground level.

The renovation will entail removal and replacement of roughly 23 miles of caulk.

Work began on site this past December with completion scheduled for October 1994. However, since work started, the original scope of the work was expanded to include restoration of the six towers front the roofline to the top of the spires. To complete this additional work, the contractor requested and was granted a 30-day extension, shifting the completion date to late November. Additional scaffolding for the spires should reach the top of the Angel Morini by mid-summer.

THE PLAYERS

Overseeing the Temple renovation is K. Lloyd Hess, project manager, Temples and Special Projects Division for the Church of Jesus Christ of Latter-Day Saints. This

division is responsible for new construction and renovation of temples all over the world. The Washington Temple renovation is Hess's 19th project since he started working for the Church 12 years ago.

According to Hess, the Church exacts very high construction standards. Only the finest and most durable materials are used in the construction of a temple. "For every product and every method used on this renovation project, the contractor is required to prepare a mockup for the architect and myself to review and accept or reject," he said.

To meet these high standards, the church hired Pagliaro Brothers Stone Company of Upper Marlboro, Md., as the contractor.

Hess described the stone contractor as very conscientious and anxious to do the job right. "I would use them on any job I do, no matter where it is, if they were interested in giving me a bid."

Lenny Pagliaro explained how a stonework specialist won the sealant work on the Temple. "Although we do some sealant work, it's generally tied to stonework. We would never go out and try to get a job that was just a sealant job. One of the reasons we were able to get this job is because some of the marble panels had to be replaced or repaired and, during removal of the caulk, the stone must be prepared to receive the new sealant. That gave us an edge over a typical sealant contractor."

Pagliaro Brothers has been in business since 1968 and has done a number of large stone restoration jobs like the Washington Temple. The company recently renovated the Library of Congress, where their crews removed and reset marble, fabricated and installed new marble floats, walls and furniture, and cleaned and restored existing marble floors, walls and mosaics.

Scaffolding for the Temple renovation was designed, supplied and installed by Universal Builders Supply, Inc. UBS has provided scaffolding for such large-scale renovation projects as the Statue of Liberty and Ellis Island, the Capitol in Harrisburg, Penn., the Jefferson and Lincoln Memorials and the River House

Apartments in Arlington, Va. The latter won them the Washington Building Congress Craftsmanship Award.

Spider Staging Corporation, suspended scaffolding specialists, supplied the swing staging and suspended scaffolding for the project.

APPRAISAL FINDINGS

A number of problems were observed by Weese Associates during the exterior conservation appraisal. These included caulk deterioration, clacked and chipped marble panels and panel distortion.

The original caulk had softened and moved out of the joints, and in some cases the caulk ran the full length of vertical joints to create a gooey pool at the building's base.

Water penetrated the porous marble and collected behind the marble panels, creating a potential for water intrusion to the interior. According to Hess, moss was growing on the back of marble panels, and a few had bowed and popped free from the concrete panel. However, water had not actually penetrated to the Temple interior.

Weese's examination of the Temple construction project specifications indicated that the original sealant joints were filled with preformed caulking stops or gaskets to keep the joint free of concrete during manufacture. This caulking stop remained in place and served as the backing for the sealant.

A one-part polysulfide sealant was specified for all joints between marble facing units after the wall panels and cladding had been set in place on the building structure. However, analysis indicated the original sealant used was an acrylic, not a polysulfide.

RECOMMENDATIONS

Weese's appraisal of the marble included a detailed, keyed drawing of each face of the building, which gives the contractor and project manager a clear picture of which marble panels to repair and which to remove and replace.

Approximately 170 marble panels will be replaced, others will receive a "dutch repair." Using diamond saws, workers cut out a uniform piece of marble around the crack, the hole is then



K. Lloyd Hess (center), Tony (left) and Craig O'Callaghan (right) of UBS enjoy the view from the roof, 125 feet above the ground level. Photo by Kathy B. Sedgwick



Deteriorated sealant has softened and melted out of horizontal joints. Photo by Kathy B. Sedgwick.

fitted with a new piece of marble.

During the renovation, the old caulk is being removed with electric blades. A new backer rod is installed at each marble facing joint. At each vertical concrete panel joint both a primary and secondary backer rod are added, with a weep gutter to the exterior.



Bruce Carter (Pagliaro Brothers) adds new caulk to a horizontal joint on one of the six towers. Photo by Kathy B. Sedgwick

COMPLICATIONS AND CHALLENGES

Lenny Pagliaro described some of the project's complexities. "Well first of all, there's just the idea of having to remove that much caulking. It isn't your normal sealant job. We had to come up with a good way to remove the old caulk and prepare the surface for the new sealant.

"Another big challenge is the height," Pagliaro added. "The work is accessible only by swing stage or scaffolding."

Pagliaro reviewed photos from the original construction of the Temple, where multiple cranes were used. "For this renovation, we don't have the luxury of a crane to help get the material where it needs to be," Pagliaro stated. "The marble panels and other materials have to be man-handled and rigged to where they belong."

The difficult part of the job is not doing the actual work; the difficult part of the job is getting to the work!



Workers check safety lines on the rooftop. Note the beams that counter balance the tow-man baskets, which are lowered between fin walls.



The hoist tower had to fit into a very narrow gap in the side of the building.

Craig O'Callaghan of UBS agreed. "The difficult part of the job is not doing the actual work; the difficult part of the job is getting to the work! Getting to the work requires engineering." would come right off the roof itself with special beams that enabled us to go to the height."

The scaffolding offered another cost savings. According to O'Callaghan, the multi-level scaffold allows for a faster paced project because the contractor can work on several different levels at the same time.

The structure's height brings with it additional safety concerns. Pagliaro explained, "We made a really big point that we want to make it through this project without anyone getting hurt. Because of the height, there is a real possibility of someone getting seriously hurt."

Spider Staging Corporation provided on-site worker safety training for use of the equipment at the beginning of the job. "Spider has been an intricate part of what we're doing," Pagliaro said. "They really have the expertise in the swing stage aspects of the work."

The local climate creates its own set of troubles for the hardworking contractor and his crew. By early June, southern Maryland's sweltering heat and humidity had Pagliaro's 42 men scurrying to complete the south face of the building

so they could move to the cooler sides of the building for the rest of the summer. Pagliaro explained, "On the north side there's a little bit of shade."

The shape of the structure also created some complications. The hoist tower had to fit into a very narrow gap in the side of the building. This limited the space available into which to put the ties to hold the machine. UBS designed a fabricated special tie that holds the hoist tower to the building.

Several faces of the building have a

series of narrow, fin-like projections. The “fins” are about 35 inches deep, with spaces between them ranging between 32 and 36 inches. Workers and equipment must fit between the fins and still have room to work on the marble panels on all three sides.

“We had the equipment that would fit into the fin walls,” explained Christopher Bates of Spider Staging Corporation’s Laurel, Md., office.

Modular scaffold platforms were used across the face of the fins, with traction

hoist “baskets” fitting between the fins.

The newly approved work on the tower above the roof could have created some logistical problems. UBS resolved potential problems by providing two towers’ worth of material. “While they work on one lower, we erect the second,” said O’Callaghan. “When the work is complete on the first tower, they move to the second, which give us time to break down the first and put it up on another tower, and so on until all six towers are complete.



Narrow “fin” walls complicated the job. On the left a small “basket” rides beside a modular platform rigged to work outside the fins. Photo by Christopher Bates.



Scaffolding on one of the six towers rises from the roof to the base of the gold-plated spire. Photo by Kathy B. Sedgwick.

Despite potential problems, the construction team at the Washington Temple has succeeded in finding solutions. Pagliaro, O’Callaghan and Bates all give credit to Hess for the strong sense of cooperation and mutual respect that pervades the project.

“Mr. Hess is a very knowledgeable construction person,” explained O’Callaghan, “and he’s realistic.” □

About the Author

Kathy B. Sedgwick is a free-lance writer based in Laurel, Md. She is former executive director of the Foundation of the Wall & Ceiling Industry and former editor of **Construction Dimensions** magazine.