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In Praise of Color and Light

Project: Church of St. Gregory the Great, Portsmouth, RI

Architect: Newport Collaborative Architects of Newport, RI;

Michael DeMatteo, AIA, senior associate

By Kim A. O'Connell

The computer analysis confirmed what the Benedictine monks already knew: Their chapel, the Church of St. Gregory the Great in Portsmouth, RI, swayed and leaked during high winds and storms. In the nearly 50 years since the church's construction, the movement had weakened structural supports and opened the seams around the stained glass windows. As part of their plans for the chapel's restoration, the monks had commissioned a structural engineering analysis, which quantified the stress on the building.

"The structural engineer programmed a computer model with the existing conditions at the chapel," says John Brooks, president of Advanced Building Concepts of Middletown, RI, part of the interdisciplinary team assembled for the project. "When we hit the model with about a 100-mile-an-hour wind, the building would slant six or eight inches, and that was destabilizing the building. It was like a rickety box."

Designed by Pietro Belluschi and built in 1960, the church is the centerpiece of the Portsmouth Abbey campus, a 350-student boarding school operated by the monastery. A noted Modernist, Belluschi designed several buildings on the campus, and it is considered the largest collection of his work. The church marries earthy and traditional materials – dark redwood, fieldstone and stained glass – with a modern silhouette featuring an octagonal central

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volume topped with a spire. Each of the eight bays is lined with long, thin vertical panes of colored glass that form a clerestory level. At the center of the church, above the altar, hangs a massive and dramatic metal sculpture by Richard Lippold, an abstract artist who collaborated with such modern architects as Walter Gropius and Philip Johnson during his lifetime. Called "The Trinity," the sculpture radiates some 20,000 feet of gold-plated wire out from a crucified Christ figure.

But problems were evident from the outset, according to Brother Joseph Byron, one of 14 or so monks who reside on the campus. "From day one the building leaked like a sieve," he says, "and the stained glass couldn't take that movement. We had leaks around the lead work in those windows. For years we would try to putty and caulk it in and do other things to slow down the deterioration." The wire that Lippold chose for the sculpture, furthermore, was fairly inexpensive and the gold plating was very thin, so that some of the wires cracked even during the initial installation. Years of air and water leakage had also damaged the wires and fostered corrosion.

Ultimately, the monastery convened a team of mostly local designers, engineers, art restorers and contractors to tackle the \$4-million restoration of the chapel. Their first challenge was to determine an adequate stabilizing mechanism for the structure that would not detract from its historic appearance.

"We started working at the school in 2003, when we were commissioned to do an exterior envelope analysis," says Michael DeMatteo, AIA, senior associate at Newport Collaborative Architects of Newport, RI, and the project architect for the restoration. "It lacked significant lateral bracing, so we embarked on a number of designs to fix the sway in the building." The team ultimately decided on a series of X-shaped cross-braces made of one-inch steel rods. Installed on the interior of the eight central window bays, the X shapes almost disappear against the light filtering through the glass. "There's such a play of light and dark between the glass and the redwood that the bracing really does go away," DeMatteo adds.

Dealing with the glass itself proved to be an exercise in cataloging and precision. Belluschi's design called for a profusion of bright colors in the

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glass panes, creating a random pattern. Once the monks saw just how bright the finished panels were, however, they opted for something a little more subdued. The monastery then installed panels of dark blue glass around the outside of the church, which took the edge off the bright color scheme and helped the panes to cohere with each other. "This was 1960, so it was the most colorful palette you'd ever seen in your life," Brother Joseph says. "So by happenstance, we ended up with storm windows with the blue glass."

What the monks did not know until the restoration, however, was that even the addition of the blue exterior panels had not been enough to dampen all the color sufficiently. During the restoration the team discovered that some panes had a third additional piece glued onto them, to make them even darker. After studying the structure, the team determined that enough wood rot and damage had occurred that they would have to completely remove the more than 4,200 panes of glass and completely rebuild the framing, whose 25-ft.-long timbers had to be harvested, milled and shipped from British Columbia.

The glass panes were each carefully cataloged and organized and sent to the Newton, MA-based studio of Artigiano Stained Glass for cleaning, caulk removal and restoration. New art glass was commissioned where needed, including replacement dark blue storm panels. Even with the slightly muted palette provided by the blue backdrop, the glass now shines with more brilliance than before, according to Brother Joseph.

In the half-century since its installation, Lippold's sculpture had also lost its once-vibrant gleam, as dust and wear had given the wires a dull silver appearance. Yet removing, refabricating and reinstalling the sculpture were not straightforward tasks, as art restorers Howard and Mary Newman, of Newport-based Newmans Ltd., quickly discovered. Lippold had installed the wires one by one in a series of 13 triangular shapes or arrays, fanning out in different directions. The wires themselves were tightened and tied together with mechanisms that reminded the Newmans of guitars, piano strings or even sailboats (Portsmouth is, after all, an island town with a large nautical presence). These similarities helped the Newmans to

determine how to restring and hang the sculpture.

"Basically when I look at a problem, I look at its analogies in the world,"

Howard Newman says. "Lippold was an utter genius. The more we got into it, the more we realized it was like taking apart a piece of music by a jazz musician. Every step you took, you saw more of the structure and the liberties he took with it. We probably invented 100 tools in the process of doing this restoration."

The Newmans decided to craft a series of rigs that would allow them to lock the arrays in their relative positions and then remove them section by section. Each array was then rolled up in carpet padding and installed on a loom that the Newmans had constructed in a local boat shed. Once the arrays were locked into position on the loom, the wires were replaced with new gold-plated wiring that the Newmans had commissioned for the project. Called clad wire, the material is much suppler and less prone to cracking than the original material. Reinstalling the sculpture was painstaking, with the Newmans applying the precise tightening and tension to the wires through the use of screw eyes on wooden boards, a process akin to piano tuning pegs. The six-ft. cross and the 18-in. Christ figure were also carefully refurbished and returned to their central position within the sculpture.

Finally, the architects developed a new lighting scheme for the church, replacing a series of dark canister lights, held together by a maze of wiring on the ceiling, with far more streamlined multi-headed light fixtures. "The ceiling is so beautiful, and it's all wood," DeMatteo says. "With the mess of wires, it was visually distracting. Now, with the glass and everything done, you can really appreciate the architecture of the church." **TB**

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