



Radiating beauty

Carpenter's Roofing & Sheet Metal installs a unique copper roof system

by Ashley St. John

Windsong, an estate situated on Lake Worth in Palm Beach, Fla., epitomizes glamour. The Georgian Revival-style home was designed by John Volk, a well-known Palm Beach architect, in 1939. During the years, the estate underwent changes from its various owners; in May 2003, it was purchased by Wilbur and Hilary Ross, who wished to restore the home to its original aesthetics.

The Rosses asked architect Thomas M. Kirchhoff of Jupiter, Fla., to restore the home to Volk's original vision. Kirchhoff used original blueprints and photos to perform the restorations, which resulted in the Rosses receiving the 2005 Ballinger Award from The Preservation Foundation of Palm Beach; the annual award commemorates a restoration or renovation that best exemplifies the traditions of Palm Beach's original houses and the architects who designed them.

In 2009, the Rosses decided to build a guest house on the property adjacent to Windsong. The guest house, aptly named Windsong Too, was intended to accommodate guests and serve as a space for entertaining. The Rosses again hired Kirchhoff to design the guest house; Worth Builders of Palm Beach, West Palm Beach, Fla., was hired as the project's general contractor.

Windsong Too was constructed in Georgian style to match Windsong; the symmetrical building comprises identical bedroom suites flanking an oval-shaped ballroom with a domed ceiling and skylight.

"Kirchhoff requested a conference about the unique Baroque-style roof structure," says Jason Lovelady, president of Carpenter's Roofing & Sheet Metal Inc., West Palm Beach. "Kirchhoff and Worth Builders of Palm Beach asked us to participate in the layout, fabrication and installation of copper roof panels on the building's elliptical-shaped dome."

Difficulty with diamonds

Carpenter's Roofing & Sheet Metal began installing Windsong Too's new roof system March 1, 2009. The work required two full-time architectural sheet metal mechanics. The dome has an 18-inch-wide built-in gutter around the perimeter; a complete guardrail system was built around the perimeter and securely fastened to the structure.

According to Lovelady, the project was as logistically challenging as any he has experienced.

"The structure is an 8-inch-thick concrete- and steel-reinforced elliptical dome," Lovelady says. "We were asked to design and install custom diamond-shaped flat-seam copper panels on the dome so the seams provide a radiating swirl from the outside edges of the skylight at the dome's apex."

The roof's radiating swirl is intended to mimic the pattern of the marble floor in Windsong Too's main entertaining space.

"During the design stage, I selected an intricate marble

floor pattern created by radiating swirls of diamond shapes that become smaller as they approach the center of the room," Kirchhoff says. "I asked Carpenter's Roofing & Sheet Metal to provide a similar look for the roof."

Crew members poured 5,000-pound-per-square-inch non-nailable structural concrete, primed the concrete and installed Polyglass Polystick™ TU Plus peel-and-stick membrane over the entire deck. However, designing and installing the panels proved to be complicated.

"A special challenge was figuring out how to mark the lines for sizing and layout of the panels on the curved ellipse," Lovelady says. "You can't snap a curved line."

Crew members covered the skylight opening, located its center, divided the dome into quadrants, set a maximum panel width of about 20 inches at the eave and divided each quadrant into an even number of segments. A flexible metal band was anchored to the dome's apex and then swung into place for the necessary crayon marks.

Carpenter's Roofing & Sheet Metal had nothing to reference when designing the panels.

"We never had encountered a copper roof like this in our 80-year history," Lovelady says. "We weren't able to find a single reference to such a pattern on an elliptical dome in our library of reference materials or through numerous online search engines."

Kirchhoff says: "They found examples of round domes with diamond-shaped panels and elliptical domes with trapezoid-shaped panels, but they could not find one example of an elliptical dome with the diamond swirling pattern required."

Carpenter's Roofing & Sheet Metal discovered no two panels would be identical and prefabrication was impossible. The company hoisted a metal shear and metal break to the roof with a crane to create an on-site sheet metal shop, which helped reduce travel between its sheet metal shop and the job site.

"Using Revere Copper Products' 16-ounce-per-square-foot mill finish sheet copper, we measured, fabricated and installed each individual custom copper interlocking panel on the roof," Lovelady says.

Project name: Windsong Too

Project location: Palm Beach, Fla.

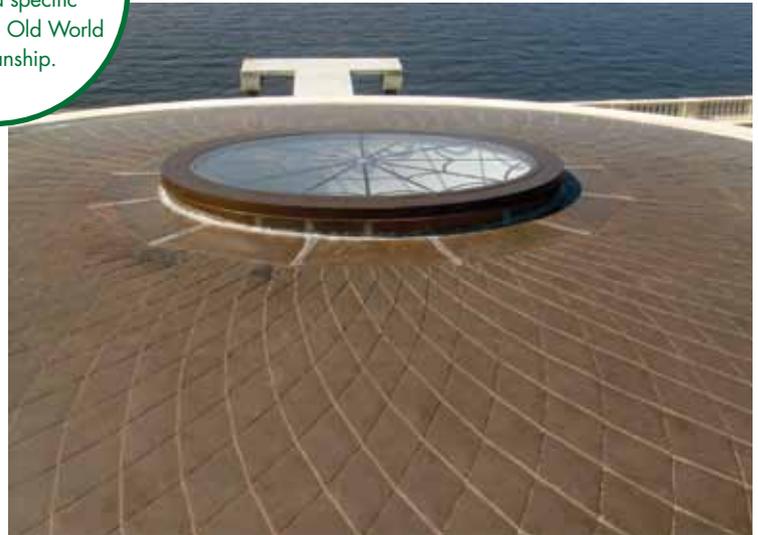
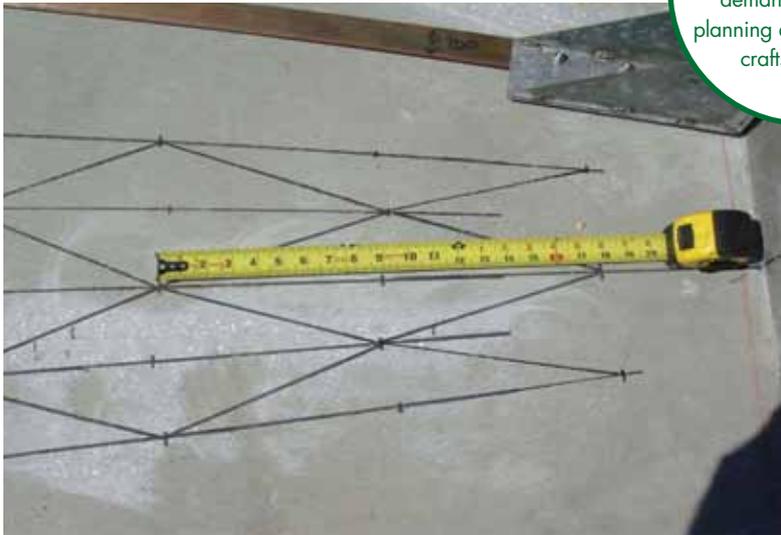
Project duration: March 1, 2009-Aug. 31, 2009

Roof system type: Copper

Roofing contractor: Carpenter's Roofing & Sheet Metal Inc., West Palm Beach, Fla.

Roofing manufacturer: Revere Copper Products Inc., Rome, N.Y.

Gold Circle Award category: Innovative Solutions—New Construction



Windsong Too's diamond-pattern copper elliptical dome demanded specific planning and Old World craftsmanship.

Each panel was anchored with four interlocking copper cleats and eight flat-head stainless-steel concrete fasteners—two fasteners per cleat. The fasteners were chosen because they are suitable for concrete, copper-compatible and the head will not telegraph to the roof's surface.

"The process to measure, shear, break, hand-trim and install each piece of metal with a minimum of four interlocking seam cleats into the concrete deck took at least 15 minutes," Kirchhoff says. "It didn't matter whether it was a larger panel along the outside of the dome or a small piece near the apex; each required the same process and amount of time."

The finished roof comprises about 1,700 diamond-shaped copper pieces and more than 5,500 concrete screws.



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A unique existence

Carpenter's Roofing & Sheet Metal completed roofing work on Windsong Too Aug. 31, 2009.

"It took a little longer than we estimated because of the weather—not only rain but also extreme heat working on a copper roof surface during a Florida summer," Lovelady says.

Lovelady says he is proud of the roof's remarkable beauty, which is appreciated by the owners, architect, builder and various other local architects and design professionals.

For the unique installation, Carpenter's Roofing & Sheet Metal won NRCA's 2011 Gold Circle Award for Innovative Solutions—New Construction.

Lovelady says: "We were completely on our own devising the techniques needed to install this particular pattern of diamond-shaped copper panels on the unusually shaped dome. There aren't many like it in existence, which makes it unique." 🌟🌟🌟

ASHLEY ST. JOHN is *Professional Roofing's* associate editor.