

COLLEGE CAST

Ace craftsmanship, modern concrete practice uphold Frank Lloyd Wright's textile block design



With more than a half-century's experience in cast stone and masonry production, Eugene Castonguay anchored Stone & Lime's Sharp Center textile block contract. A switch to the Teflon-coated plastic inserts and wet cast process boosted quality after he and colleagues started with wood inserts and a dry casting regimen.

Famed architect Frank Lloyd Wright's Usonian house design, calling for manually crafted, precast "textile block," has become a reality after 50-plus years at Florida Southern College, thanks to the school's president plus a determined architect, contractor and fabricator team applying today's best practices and code compliance measures to a project with pre-war roots. Backed by more than \$2 million in initial donations, construction on the 1,700-sq.-ft. project, repurposed as the Sharp Family Tourism and Education Center, began in the spring of 2011 and is scheduled for completion this summer.

Wright, who died in 1959, designed 18 structures for the Lakeland, Fla., college, of which 12 were built between 1938–1958. They comprise the Child of the Sun collection, the largest single-site Wright installation in the world, although considerably lesser known than the architect's two most prominent works, Fallingwater in western Pennsylvania and the Guggenheim Museum in New York City. Landmarks among the completed structures are the 160-ft.-diameter Water Dome, covered esplanades, Annie Pfeiffer Chapel, Danforth Chapel, and Polk County Science Building. The latter was the last to be completed, and houses the world's only Wright-designed planetarium.

The Usonian house concept, with its textile block enclosure, was envisioned for Florida Southern faculty. As an authentic Wright design on its original site, the Sharp Center becomes the first new Usonian textile block project commissioned since 1964. Wall connection details and other engineering adjustments were made as building codes and hurricane survivability ordinances have changed significantly since the Wright era. However, the original plan's overall design and structural system have not been impacted.

Anchored with the Sharp Family funding, the project has progressed under Florida Southern President Dr. Anne Kerr; historic building restoration specialist Jeff Baker, partner of Albany, N.Y.-based Mesick, Cohen, Wilson, Baker Architects; and, Stone & Lime Imports Inc., a North Brookfield, Mass., contractor specializing in turnkey precast or stone fabrication and erection.

The last of the signature concrete textile blocks for the Sharp Center was erected in March. Around 2,000 units in 47 different varieties were required for the interior and exterior walls. The original textile blocks at Florida Southern were hand built on-site by students utilizing Wright-designed molds; the Sharp project initially saw authentic wooden mold designs recreated by 79-year-old artisan, Eugene Castonguay, in Stone & Lime's Massachusetts shop. Florida Southern arranged to use the specs with their owner, the Wright Foundation, based at the architect's Taliesin West retreat in Arizona.

After encountering some durability issues with plywood forms, Castonguay and crews moved to resin-coated formwork. They also switched to Teflon-coated plastic inserts, fabricated with a CNC cutter to exact specifications. To prevent cracking and preserve detailing, the inserts fit inside the mold and were removed after the block was released. Mold edges were tapered 2.5 degrees to augment stripping. Early product was dry cast, but exhibited susceptibility to water penetration and lacked fine detail. Stone & Lime switched to a wet cast process in which blocks were set for two hours in the form before removal, and then acid etched for an open-pore, dry-cast appearance.

"At the beginning, I saw lots of problems with the design," says Stone & Lime President Ken Uracius. "Some of the blocks are

stacked with no mortar joints, meaning no room for error in the height. If one block was off one-eighth or one-sixteenth of an inch, the wall could start turning. The Teflon-coated plastic made the forms last longer and increased accuracy. It's cut to one-thousandth of an inch."

The concrete mix design was revised from original specs—heavy on local materials—to increase durability while maintaining the same finish as vintage textile blocks, which were molded from a sandstone and coquina shells mixture. Project principals experimented with more than 50 mixes for the new blocks, creating hundreds of samples before arriving at the final composition: Fine and coarse aggregate from Pennsylvania and an earth tone binder based on a natural cement from France, Prompt, sourced from Vicat S.A.—parent of Birmingham, Ala.-based National Cement Co.

"Our blocks are nearly twice as dense and strong as the original blocks, which means they will not erode in the same fashion," says architect Jeff Baker. Indeed, the original concrete has proved unstable in the Florida climate, he adds, with the Child of the Sun Collection being added to World Monument Fund's 2008 list of 100 most endangered sites in the world—primarily due to the decaying of the textile blocks.

Deterioration issues surrounding the original grout tube and steel reinforcement methods on Wright's vintage Florida Southern buildings were also addressed, notes Baker. During Sharp Center construction, grout was injected under pressure; silicone caulk, unlike clay in the original buildings, was used to set the blocks and prevent the grout from leaking. The new reinforcing scheme combines vertical, stainless steel threaded bars and couplers, horizontal



(left photo) Thomas Crean Jr. (left), Tim Pollard and fellow Stone & Lime crew members prepared 47 molds in a contract requiring 2,000-plus pieces and six truckloads from Massachusetts to Florida. Michael Maguire (left) of Lakeland, Fla., who has chronicled the Sharp Center precast fabrication and construction for the website, www.buildingtheusonian-house.com, confers with Stone & Lime President Ken Uracius.



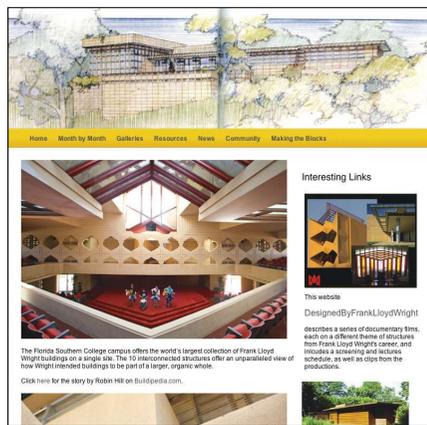
epoxy coated bars, and, custom designed steel wythe connectors. Furthermore, wall cavities are filled with a polyisocyanurate foam instead of being left open, per the original design.

Prepared by Josephine Smith and Don Marsh with information from Florida Southern College; Mesick Cohen Wilson Baker Architects LLP; and, University of Southern California PhD candidate, Edward Losch, P.E., S.E., LEED AP.



After 15 months of construction—and nearly 53 years since its architect’s death—the Sharp Family Tourism and Education Center will join 12 other Frank Lloyd Wright buildings on the Florida Southern campus. Project principals adhered to the original Usonian textile block scheme for a mortarlless wall system, but changed the concrete mix design and reinforcement detail for durability and code compliance.

Lakeland-based Michael and Phyllis Maguire, veterans of journalism, art, photography and related endeavors, launched a website, www.buildingtheusonianhouse.com, to track the Sharp Family Tourism and Education Center and spotlight the craftsmanship and expertise project principals have brought to Frank Lloyd Wright’s newest landmark.



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