Considered the “most spectacular and symbolic of all modern-day construction achievements,” the new 300-foot spiralling Temple and World Headquarters of the Reorganized Latter Day Saints in Independence, MO, borrows its design concept from the intricate logarithmic configuration of the nautilus sea shell and became an extraordinary challenge for the building materials supplier and the craftsmen of Schowengerdt Plastering Company, Kansas City, MO.

The new $35 million RLDS Temple, designed by internationally recognized architectural firm Helmut, Obata & Kassabaum (HOK), St. Louis, MO, is part of the church’s world headquarters complex located in Independence, MO.

This nationally acclaimed religious complex located in Harry S. Truman’s hometown—consisting of the main 47,500 sq ft sanctuary, general offices, visitor’s theaters, museum, bookstore and school—covers 13 acres of a 42-acre headquarters site and encloses nearly 165,000 square feet of interior space.

**THE INTERIOR SPIRAL CHALLENGE**

Schowengerdt Plastering Company was hired by general contractor J.E. Dunn Construction Company, Kansas City, MO, to handle all wall and ceiling installations within the Temple complex. According to Steve Banks, Schowengerdt project manager, nearly 18 months were spent just in preliminary planning, product testing, design modifications and pricing schemes with the architects at HOK prior to beginning the interiors.

Schowengerdt replicated the precise CAD system

*Spiral* - Cont’d on page 17
The new RLDS Temple in Independence, MO, is considered one of the most “spectacular and symbolic of all modern-day construction.” The intricate logarithmic spiral design, patterned after the nautilus sea shell, was achieved using wallboard over 20-gauge metal channeling.

Spiral - Cont’d from page 23

generated matrixes of Helmut, Obata & Kassabaum for the interior spiral. HOK principal-in-charge was Gyo Obata; HOK design architect was Robert Stockdale.

Work on the interior spiral itself began in mid 1991 and spanned eight months before completion. As Banks commented, “The sanctuary spiral, actually a double radius which spirals around all three revolutions of the ceiling, once framed in metal somewhat resembled the ‘ribs of a boat hull.’” Replication of the spiral that began with the lower 100-foot radius and twists upward to a 10-foot radius required Schowengerdt’s crews to make half-size mock ups that only could be built two bays wide due to limitations in adjacent warehouse space. The interior mock-up itself utilized 20-gauge metal and two layers of laminated 3/4 in. plywood gussets suspended from structural steel framework of the building. All mock-ups were subjected to strut load tests.

Once the mock-ups and test results were finally approved, an interior 195-foot shoring tower, equivalent to the interior spiral height, was installed, around which the exterior structure and stone, stainless steel and glass cladding revolved from ground-level up. As the exterior progressed, the shoring tower became scaffolding for the interior wall and ceiling installation.

On the interior spiral, Schowengerdt’s crews of carpenters and tapers usually averaged 12 men at one time. Only when the spiral reached its smallest dimensions at dome height were a half-dozen men needed to finish the peak.

The ceiling below the balcony itself utilized metal lath and plaster. The first revolution of the sanctuary spiral ceiling was constructed with three layers of ½ in. gypsum wallboard laminated to a thickness of ½ in. Each layer was installed using drywall screws and adhesive with the final layer requiring 3 in. screws. A ribbon of windows follows the spiral upwards, allowing natural light to illuminate the nautilus shell pattern.

As the spiral progressed and the radii decreased, one layer of gypsum wallboard was eliminated, finally progressing to only two layers thick at the domed peak. The entire interior spiral surface, which makes three total revolutions, was finished with a thick trowelled skim coat of Gold Bond Lite Ready Mix, specified by the contractor since it dried rapidly, was “easy to work,” and had very low shrinkage. All surfaces of were later painted an off-white hue.

The spiral’s four revolutions were supported by 24 continuous steel “bents,” located every 15 degrees around the spiral’s perimeter. Loads were supported by the “bents” and by a continuous spiralling truss which connects the bents and forms
Skilled craftsmen troweled on skim-coat to more than 750,000 sq ft of gypsum wallboard throughout the entire 165,000 sq ft RLDS complex.

**Spiral- Cont’d from page 17**

At the uppermost peak of the interior spiral, a 10-foot diameter dome was sculpted by traditional lath and plaster construction, using self-furring, diamond-mesh metal lath and lightweight Gypsolite plaster, from National Gypsum Company/Gold Bond Building Products also specified by Schowengerdt since the product would eliminate the need for hauling sand to such heights. The plaster also provided great fire-resistive qualities and the same insulating values of a plaster containing sand.

Chris Lazowski, a representative for the project’s building material supplier, stated “This achievement in precision wallboard installation and finishing is a true tribute to the ageless craftsmanship of the dry-wall trade combined with advances in computer technologies for construction engineering and design.”

That same technology is also evident in the construction of two 60-foot elliptical acoustical pylons that flank the sanctuary speakers’ platform. The two soaring pylons were fabricated from 16-gauge structural steel studs and two layers of 3 in. plywood to form a ½ in. thickness. This served as the base for 5/8 in. wallboard that was pre-bowed and laminated four-layers thick to meet acoustical requirements of the mas-
sive sanctuary that houses a 1,012-rank, 5,585-pipe organ, one of the largest in the United States.

Gypsum wallboard, depending upon the thickness of the core and the radius of the surface, actually can be applied directly to curved surfaces. Since certain radii in the Temple were considered short, Schowengerdt simply moistened the paper facings of the wallboard to allow water penetration through the core, stacked the boards on a curved form and allowed them to dry until the boards regained their original hardness in the curved shape.

As the interior spiral twists upward from its first 100-foot radius revolution to its final 10-foot radius and 208-foot high domed peak above the 1,800-seat sanctuary, the architect and contractors have successfully replicated the symbolic inner chambers of the nautilus sea shell, considered universal by the RLDS Church.

**Finishing the Complex**

More than 750,000 sq ft of gypsum wallboard was skim-coated throughout the entire 165,000 sq ft RLDS complex. Craftsmanship was a consistent requirement for Schowengerdt. Noteworthy achievement was intricate wallboard detail in the Joint Council Room, which features a heptagon, or seven-sided vaulted ceiling.

The cut-out heptagonsection, 10-feet across at the main ceiling level, converges upward to a peak 24 inches high. The central heptagon is encircled by a narrow, recessed light cove. The ceiling uses 5/8 in. wallboard. Florescent lighting within the cove illuminates a seven-sided conference table below.

In addition, the 60-seat Chapel features a 40-foot high ceiling with an octagon-shaped cut-out section, stepped fascias and light coves, all formed by 5/8 in. wallboard.

**The Exterior Spiral Challenge**

Within the relatively flat plains area surrounding Independence, the landmark exterior spiral of the new Temple easily dominates the skyline for a reported 300 square miles. The exterior spiral, which twists approximately 192 feet beyond the interior spiral height, with its stainless steel roof revolves above vertical walls of smooth thermal-surfaced Georgia “Oconee” granite and protective thermal pane windows. Satin-finished stainless steel was specified since the metal over time would not oxidize and stain the light-colored stone materials.

The exterior stones were subjected to strict performance tests prior to installation for absorption, density, flexural strength, modulus of rupture, freeze-thaw, water porosity, accelerated durability (acid rain) and stone strength at anchors. For example, the first stone specified, an Italian limestone, was rejected.

The exterior spiral, atop its 200-foot wide sanctuary base, peaks at 300 feet above the exterior east entrance. The steeple at its pinnacle is only 24 inches wide.

The Temple building itself, which covers one acre, is so massive that 150 tons of structural steel, based in nine caissons, were required for temporary support during construction. Approximately 278 caissons were drilled to bedrock, one under each structural column, with 114 caissons required 20 to 40 feet deep to bear the sanctuary weight alone. The entire complex required 1,450 tons of steel in all.

Final dedication is scheduled at the church’s World conference in April 1994. 

—Photo Credit: Sinclair-Reinsch/
Mike Sinclair

Construction Dimensions/June 1993 25