

# Masterpiece of the Midwest

By Graeme Sharpe

## The Restoration of the West Baden Springs Hotel

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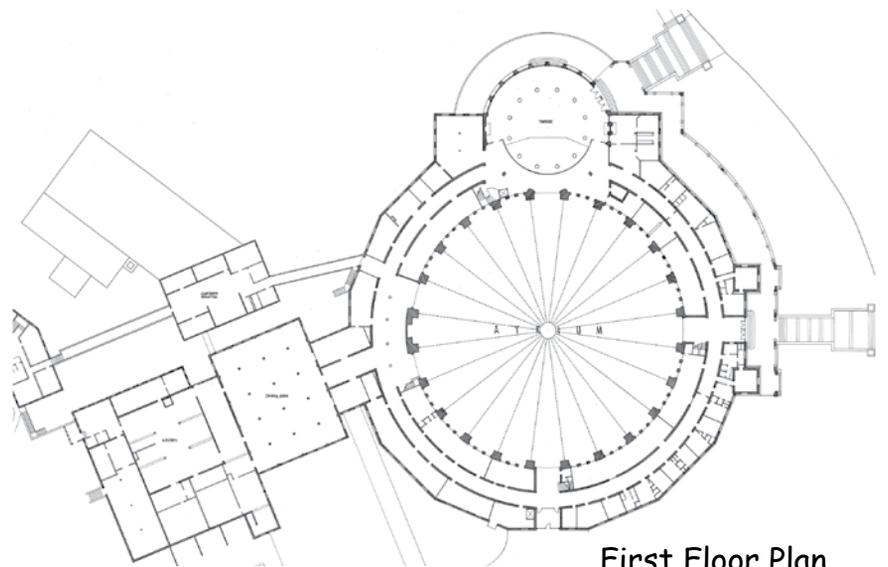
**F**ew people realize that a hotel built in 1902 near French Lick, Indiana once held the title of “World’s Largest Dome”, and that it was the largest dome in the United States until the Astro-dome was built in 1965. In fact, the West Baden Springs hotel has spent the last 75 years in obscurity, and only the dedicated work of Indiana preservationists saved this landmark hotel from ruin. Thanks to their efforts, this important structure has been preserved, restored to its original condition, and put back into service as a first-class hotel (Figure 1 above).

When the West Baden Springs Hotel opened in 1902, industry journals immediately recognized it as an architectural and engineering marvel, naming the hotel the “Eighth Wonder of the World”. It contained about 500 guest rooms arranged in a circular plan and boasted a steel and glass dome spanning 200 feet above a six-story atrium (Figure 2). The resort also included a smaller domed entry lobby, a natatorium, a powerplant and utility building, and an attached ballroom. (see sidebar, page 40)

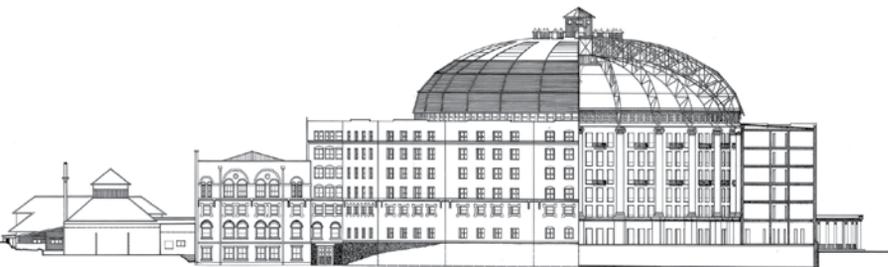
The hotel was enormously successful during the affluent era of the roaring 20’s. However, it fell on hard times after the collapse of the stock market in 1929. The hotel business failed and the West Baden Springs Hotel closed in 1932. New ownership followed as the hotel became a Jesuit seminary from 1934-1964 and, later, a university campus, the Northwood Institute, from 1966-1983. Transitional ownership, bankruptcy, and litigation followed and the building was abandoned in 1985.

Motivated by a partial collapse of a wall on the west side in the early 1990’s, the Historic Landmarks Foundation of Indiana (HLFI) bought the property in 1996. When the HLFI acquired it, it appeared a complete structural collapse was imminent. In addition to the collapsed wall, years of sitting idle had taken their toll on the hotel and the building rapidly deteriorated. The HLFI, working with philanthropists Bill and Gayle Cook, moved quickly to stabilize the hotel. George Ridgway, a native of Southern Indiana, was selected as the architect because of his knowledge of the hotel’s history as well as his

experience with historic restorations. In keeping with the HLFI’s mission, all members of the design team dedicated themselves to preserving as much of the original structure as possible. When new structural elements were required, every effort was made to limit their intrusion into the existing spaces.



First Floor Plan



Partial Elevation/Section

Figure 2: Typical Plan and Elevation view of hotel (Historic American Engineering Record, Drawn by Sharon Washburn and Kim Spurgeon, 1973, and Roland David Schaaf, 1974).



Figure 1: West Baden Springs Hotel after restoration.

The first phase of the project, from 1996-1998, focused on ensuring the safety and preservation of the landmark hotel, as well as preparing the building for potential new owners. An earlier study determined that water infiltration caused a failure at the roof level, leading to the wall collapse. Once the building was made weatherproof, a new wall was built of reinforced concrete masonry with precast concrete floors and brick veneer on the exterior. The existing walls that remained standing near the collapse were braced to prevent any further problems (Figure 3).

Fortunately, the dome was unaffected by these problems and only required maintenance and new roofing materials. However, the water leaking into the atrium had resulted in floor heaving and deep cracking throughout the mosaic tiled floor. After exploratory digging, the design team decided to install an active pump and drainage system to prevent future movement. Several tunnels that had been installed below the atrium floor for mechanical systems by the previous owners were backfilled or reinforced to prevent subsidence.

At this point, the final use of the structure was still unknown. Thus, the design team had to assume high floor loads to allow for many potential uses. In order to meet the floor design loads and to keep the original floors intact, all the floors were resupported with new steel framing that cut the span of each slab in half. The low quality of concrete used in the original construction and the failure of slabs throughout the building necessitated this expensive solution. Where the original slab was determined to be deficient even with the new framing, it was shored in place with metal decking from below. All steel beams were supported using epoxy anchors embedded into the existing brick masonry bearing walls (Figure 4). The epoxy anchor manufacturer performed on-site tests to determine actual anchor design capacities, a procedure that reduced the number of anchors for many situations.



Figure 3: Rebuilding of collapsed wall on West side.



Figure 4: Typical floor framing repair in corridor.

Within the attached building that housed the ballroom and dining rooms, the concrete floor supporting the ballroom was at risk of failing. However, resupporting the floor with new steel beams was not an option because of the historically significant ceiling features. The solution was to build a new steel framed floor above the original floor, which turned the original concrete floor into a massive suspended ceiling. In this same area, one of the walls was found to be moving away from the building. This necessitated the construction of a new reinforced concrete masonry unit wall, tied back to the original wall to provide the required bracing. The restoration team also addressed the failing original wooden roof trusses by reinforcing their bottom chords with new steel rods (Figure 5).

The final work on the first phase of the project involved replacing the Moorish tower caps with lightweight aluminum reconstructions. The new caps were premanufactured in two pieces, weighing 19 kips each and lifted by helicopter onto tapered pins that ensured proper placement onto the towers. After this installation, the structure was determined to be safe enough to conduct tours to showcase the work performed and to attract potential buyers. Eventually it was decided to restore the building back to an upscale hotel, bringing the hotel full circle a century after its original construction. Ownership was transferred to a new venture, Blue Sky Casino, along with the French Lick Springs Hotel and Resort. The resort would once again attract a mix of patrons interested in relaxing, playing golf, or gaming at the nearby casinos.

The second phase, from 2004-2007, restored the hotel to its original use and appearance. An important part of this work involved updating the structure to meet current building code standards. For example, the exposed steel in the domed atrium did not meet current fire prevention standards. The option of installing sprinklers throughout the dome was not feasible. Thus, the decision was made to install a water cannon within the atrium area. Furthermore, the existing vents on the dome were converted into smoke evacuation systems. The addition of these new components allowed the structure to meet modern fire safety standards without affecting the historic architecture.

The most challenging part of this phase for the structural engineers was turning an existing basement space into a convention/meeting area, which required the removal of several masonry bearing walls. Steel framing, used to resupport loads from above, acted as temporary shoring and permanent framing as the renovation progressed. Other construction work for this phase focused on auxiliary buildings. Silver Creek Engineering designed a new structural steel frame for the reconstructed natatorium building on the original footprint. The new natatorium configuration was based on original historic documents. One of the last structures added was a new porte cochere at the west end that utilized steel moment frames wrapped in brick veneer.

The Springs Valley region of southern Indiana is currently celebrating the reopening of this amazing structure, as well as acknowledging the contributions of the many people that led to the success of this renovation project. The West

Baden Springs Hotel is poised to pick up where it left off 75 years ago, astonishing both new and returning hotel guests within the six-story atrium with its steel and glass dome soaring above the massive masonry bearing walls. ■



Figure 5: Repair of trusses and new floor framing in ballroom.

## Project Team Members

**Owners** – Blue Sky Casino, LLC., Orange County, IN

**Architect** – G. S. Ridgway and Associates, Inc.,  
Westphalia, IN

**Structural Engineer** – Silver Creek Engineering, Inc.,  
Indianapolis, IN

**Mechanical Engineer** – Heinz Associates, LLC., Jasper, IN

**Project Superintendent – Phase I:**  
Pritchett Bros. Construction, Bloomington, IN

**Project Superintendent – Phase II:**  
CFC Construction, Bloomington, IN

## Original Project Design Team

### Owner - Lee Sinclair (1836-1916)

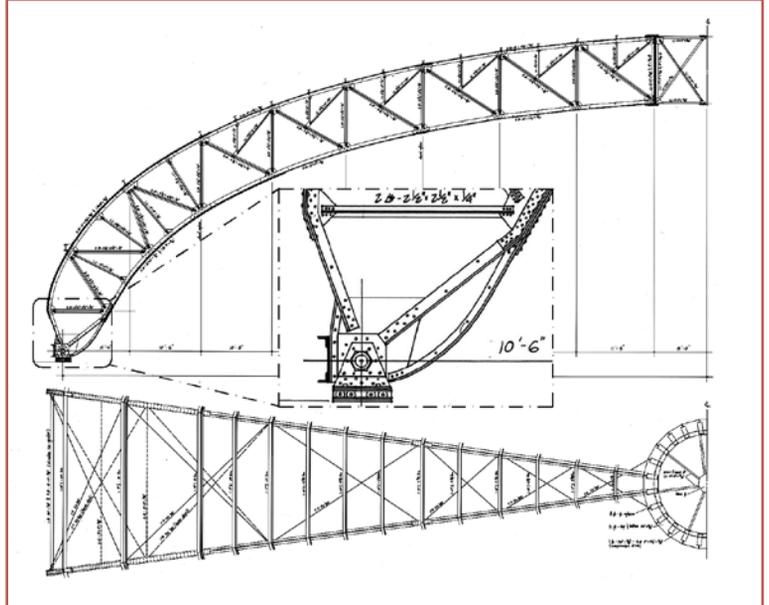
Sinclair commissioned the new hotel after the original hotel burned down in 1901. He decided that the new hotel would be built from fireproof materials. He came up with the concept of a domed atrium with a circular building plan. Wanting to prevent competitors from taking his place as the best resort in the Springs Valley area, he proclaimed that the new hotel would be built in less than a year. He accomplished his goal as it took only 277 days, the result of a massive construction effort.

### Architect - Harrison Albright (1866-1933)

Albright was the state architect for West Virginia and was experienced with large hotels and institutional buildings. He was a vocal proponent for steel and reinforced concrete buildings because of their strength and fire resistance. His work was largely in the style of Beaux Arts, and his design for the West Baden Springs Hotel is one of his best-known structures. He was reportedly the only architect that Sinclair could find that would agree to take on a project of this complexity and ambition given the time constraints. His clever solution was to use a bridge engineer for the dome design and a local construction manager, Caldwell and Drake, for the remainder of the work.

### Engineer - Oliver J. Westcott

Westcott worked for the Illinois Steel Company in Chicago, IL as a bridge engineer who specialized in steel structures. He designed, detailed, and oversaw the fabrication and installation of the steel dome structure. His design of the dome utilized 24 ribs as compression elements built from steel angles with rod bracing. The ribs connected at a 10-foot tall compression drum in the center, and a built-up steel tension ring encircled the base. The supports were mounted on roller bearings that allowed thermal movements to occur without imposing secondary loads on the masonry bearing walls.■



Truss elevation with roller bearing detail (Historic American Engineering Record, Drawn by Mike "Hoosier" Boles, 1973).

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