A COLD NIGHT IN GEORGIA

Renovation of the First Baptist Church of Atlanta

By Nebil Sedki, P.E.

It was a Saturday night in December 2005. The holiday season was in full swing, but the crew working on the sanctuary of First Baptist Church in Atlanta, Georgia was in a much more serious mood. They were gathered on this chilly evening for a very important test.

Following the successful testing, this formerly solemn crew burst into applause and the holiday spirit.

Several years ago, the First Baptist Church of Atlanta left its historic downtown facility to move into an office building/warehouse in the suburbs. The transition went well, but the large *Intouch* television ministry demanded a sanctuary that would both house the local congregation and meet all the requirements of a broadcast studio. The former warehouse was large enough, but huge support columns blocked the camera views and part of the congregation's view, and the floor needed to be sloped for optimum lines of sight.

The dilemma was whether to build a new sanctuary or adapt the old facility. Since the cost of a new building was prohibitive, the challenge was to make the old facility work.

Project Team

Structural Engineer of Record - Sedki & Russ Structural Engineers
Architect of Record - Arnold & Spiess Architects
General Contractor - Project Builders
Steel Fabricator - Steel Inc.
Steel Erector - Williams Enterprises
Foundation Contractor - Atlas Piers of Atlanta

The design team considered many options. In each case, the three determining factors were cost, time, and the amount of disruption involved. In the end, all parties agreed that the best course of action was to remove three columns.

One column was supporting the low roof, high roof, and mechanical mezzanine, as well as the wall between the low roof and high roof. This column carried a total load of approximately 320 kips. The other two columns were supporting the low roof on one side and a 90-foot-long truss at the high roof on the other side, along with the wall between the high roof and the low roof.

Close-up of the members of the new truss.

The new truss that was added between the low roof and the high roof, using the existing post as part of the truss.

The column supporting the highest load was bearing on the basement wall, and transferring the load to the other columns would require major disruption to the floor below. The solution was to move the support for the column 7 feet 6 inches from the column and the basement wall, and provide beams cantilevering this distance to pick up the column.

The supporting beams had to be located at the high roof to avoid reducing the height of the sanctuary. These beams were supported by a steel truss spanning 75 feet and bearing on two columns. The other ends of these beams were connected to an existing 90-foot truss at the high roof.

The other two columns had a completely different problem. They were not located over a basement, but rather in the wall between

The excavation of the orchestra pit.

the high roof and low roof. However, when the high roof was built, it was posted up from a steel truss at the low roof at 7 feet 6 inches on center. The posts were steel tubes, connected to both the truss at the low roof and the steel beams at the high roof, except for a wide flange column which had been added at the 90-foot truss.

The difference between the low roof and high roof is 17 feet 2 inches. Instead of adding transfer girders to remove the columns, the design team introduced a truss between the two roofs, using the existing posts as the vertical web members. Then the design team added diagonal members between the vertical posts and a top and bottom chord, which were two steel tubes – one at each side of the vertical posts.

This approach avoided causing major disruption of the existing finishes. The load was transferred to one column 30 feet away from the existing column; however, there was no place to locate a column at the other end without creating the same problem. Since the first column was supported by two columns 7 feet 6 inches away from the other trusses, the first truss was used to cantilever out to pick up the other trusses.

Another major criterion was to pick up these columns without causing any deflection that could possibly affect the existing walls and change the roof slope. To solve this, the design team did not connect the cantilever beams to the new truss; instead, they provided jacks between the truss and the beams.

Now fast forward to the cold Saturday night in December 2005. Why was the shivering crew gathered around with spotlights lighting up the building?

The first step was to saw cut the column to be removed just above the ground floor. Then the crew started to jack up the steel beam from the new truss until there was daylight at the saw cut location.

And when they saw this daylight (actually nightlight), the crowd roared – the load had transferred to the truss. Shims were then added between the beams and the truss, and everything was left "as is" for 48 hours to make sure that all of the connections were working and everything had been done correctly. Then the column was removed.

No jacking was required for the other two columns, because calculations indicated only a very small deflection, which was confirmed in the field test.

Another problem involved the foundation. Since the two new columns were only 7 feet 6 inches from the existing basement wall, and the other two columns were next to a new raised platform and basement, the best approach was the use of Atlas Piers. With these piers, the load is transferred below the basement level, avoiding providing lateral load to the basement wall, and also resting on the fill below the slab on grade.

Yet another difficulty was sloping the floor similar to a theater floor. Since the structure was bearing on an existing frame, the amount of dead load that could be added was limited. The final design involved

The actual cutting of the load-bearing columns, one carrying over 320,000 pounds.

The Port-o-Cochere in progress.

The finished Sanctuary/Broadcast Studio.

placing a 2¾-inch-thick sand lightweight concrete slab reinforced with welded wire mesh in sheets, bearing on Styrofoam with a density of 2.0 pounds per cubic foot. To prevent the slab from cracking, saw-cut joints were introduced at 11 feet 3 inches on center each way, with the mesh stopping at each joint.

Lighting and sound are crucial to television production, so 440 linear feet of catwalks had to be hung from the existing roof structure at different levels. Fortunately, the existing structure had the redundancy to support these catwalks. Other design tasks included an orchestra pit, a raised platform with a basement below, a covered walkway and a Port-o-Cochere.

The design team faced many challenges, but in the end, all were successfully completed.

This may not be a "Miracle on 34th Street", but it would not be too much of a stretch to call it "almost a miracle on Highway 285".▪

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