COMPANY

Hoar Construction

LOCATION

Birmingham, Alabama, United States

SOFTWARE

Autodesk® Building Design Suite Ultimate

BIM for good health

Autodesk BIM solutions accelerate delivery of a $450 million expansion of a major children's medical center

BIM and the Autodesk Building Design Suite have made a very real contribution. The suite provided ready access to the BIM tools we used to help coordinate the project, reduce waste, and collaborate with the design team.

—Aaron Wright
BIM Director
Hoar Construction

Image courtesy of Hoar Construction.

Project summary

Based in Birmingham, Alabama, Hoar Construction delivers construction services to clients in a number of sectors, including healthcare, government, and mixed-use. With today's leading-edge healthcare facilities so reliant on technology and connectivity behind every wall and ceiling, few project types present more complexities than those for the healthcare industry. The new 785,000-square-foot facility expansion of the Benjamin Russell Hospital for Children campus typifies this complexity. The facility, with 12 patient floors plus equipment floors and rooftop heliport, will house state-of-the-art medical technology, all in an environment designed to reflect the playfulness of the precious young people it will serve.

A longtime user of Autodesk® Building Information Modeling (BIM) solutions, which enable users to explore projects digitally before they are built, Hoar Construction recently enhanced its capabilities by adding Autodesk® Building Design Suite Ultimate Edition to its workflow. The Building Design Suite helped the team manage the complexities of the Children's of Alabama expansion. How? By making it easier to collaborate with the entire project team.

As Hoar Construction BIM Coordinator Preston Hite explains: "The Building Design Suite let us explore the best way to construct the hospital as it was being designed. No matter which Autodesk application was needed to create the design, the suite provided us with the right tools, helping us to coordinate the project more seamlessly."

The challenge

The hospital's parent organization, Children's of Alabama, engaged Hoar Construction, in a joint venture with KBR Building Group, to help guide the project before design began on the hospital expansion. Leaders at the hospital understood the complexity of the project, and they wanted Hoar Construction to provide a contractor's perspective on design decisions as they were made. The ultimate goal of this early involvement was smoother execution of construction in the field. Just as importantly, the hospital wanted to ensure the project was completed on time and on budget.

"Children's of Alabama wanted the entire project to progress smoothly, efficiently, and quickly," says Hoar Construction Senior Operations Manager John Harchelroad. "From the earliest stages of the project, we wanted to rely heavily on efficient modes of project delivery, such as prefabrication, that add speed and reduce waste. We saw BIM as essential to achieving the precise coordination that makes efficient project delivery a reality."

AUTODESK.

BIM helps reduce material waste and speed construction on major healthcare project

The solution

After choosing Hoar Construction to provide input on the design, Children's of Alabama engaged the architectural joint venture of HKS and Giattina Aycock Architecture Studio to design the expansion facility. A key donor to the project specified that the building's design should reflect the fact that it serves children. Featuring a curving façade punctuated with bright colors, the hospital's exterior and interior have a lively, playful feel.

As the architects created a model of the building in Autodesk® Revit® Architecture software, part of Autodesk Building Design Suite Ultimate, Hoar Construction explored the model for constructability within the same application. The implications of the building's curves attracted the Hoar Construction team's attention. Concerned about allowing enough space for the complex building systems required by hospitals, the team believed that the soffits specified in the design took up too much space.

"The exterior of the building curves, as do most of the interior hallways, which makes above-ceiling runs more complex for building systems," says Hite. "Soffits framed all the way to the deck above would have taken up quite a bit of the available space. Using the model to help create an RFI, we suggested boxed soffits as an alternative in Revit Architecture. The architects and engineers easily visualized our approach using the model, and they accepted the suggestion. We had more space for systems, and the boxed soffits used less material, so there was a small cost savings, too."

Coordinating as a team

Prior to beginning construction, Hoar Construction invited the subcontractors on the project to participate in the BIM process. During construction, the firm established a room for the subcontractors' designers to come together and work simultaneously on models of their portions of the project. Working on a shared server, the team used multiple Autodesk® Building Design Suite Ultimate applications side-by-side to help coordinate their systems.

"We spent a lot of time gathered around one or two computers comparing and talking through options," says Hite. "We coordinated in real time with help from Revit models. We also aggregated the various models in Autodesk® Navisworks® Manage software, which is available in Autodesk Building Design Suite Ultimate. The clash detection tools in Navisworks Manage helped us address interferences."

Hite points to an example of how precise coordination can affect a project. He says, "The plumbing subcontractor, Superior Mechanical, used their models to really plan installation steps, and they actually ordered pipe to length from their supplier, rather than having to make stock lengths fit the design. It made a huge impact. On a large healthcare project, you might expect a plumbing subcontractor to generate as much as 10 percent material waste. Superior Mechanical generated only 1 percent material waste on this project."

Fast prefab

The curving façade of the hospital expansion is clad on all sides in glass curtain wall with an intricate pattern of various transparencies, colored panels, and accent lighting. To accelerate installation, Hoar Construction worked with the curtain wall subcontractor, Physical Securities, to prefabricate the façade off-site in a nearby warehouse, generating two-story sections that arrived at the site preassembled and were installed in minutes. Working from the Revit model helped allow for increased precision in the prefabrication process, and the team was amazed by how perfectly the curtain wall snapped into place.

Harchelroad explains, "The preassembled curtain wall panels filled 13 flatbed trailers. We trucked them to the site and installed them. They were precisely engineered thanks to the BIM process. The entire curtain wall went up in about six weeks, which is incredibly fast. BIM makes it so much easier to get value out of prefabrication."

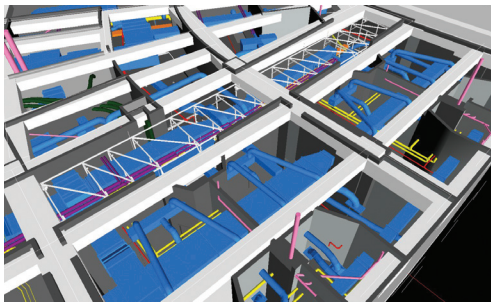

Image courtesy of Hoar Construction.

The result

Set to open on time and on budget, the Benjamin Russell Hospital for Children has already seen an impact. "The speed with which the expansion has gone up is impressive," says Kathy Bowers, media relations coordinator for Children's of Alabama. "The new construction has added light and color to the Birmingham skyline. We've always delivered the best care possible to the children of Alabama and soon we'll have even more advanced facilities to serve children. Seeing the construction progress so smoothly has only added to our excitement."

"BIM and the Autodesk Building Design Suite have made a very real contribution on the project," says Hoar Construction's BIM Director Aaron Wright. "The suite provided ready access to the BIM tools we used to help coordinate the project, reduce waste, and collaborate with the design team. The return on investment is evident in the gains made in the schedule and the fact that the project's target budget was met. Based on the success of BIM on this project, we will not undertake any building going forward without first modeling our work."

Harchelroad adds, "In addition, the BIM model will survive the construction project and live on as a facilities management tool. It can not only be used as a more accurate and detailed as-built document, but also all the operations and maintenance documents have been layered into the project. The model will serve as a kind of owner's manual for the new facility."

AUTODESK.