

The Beck Group
brockettedavisdrake

Customer Success Story

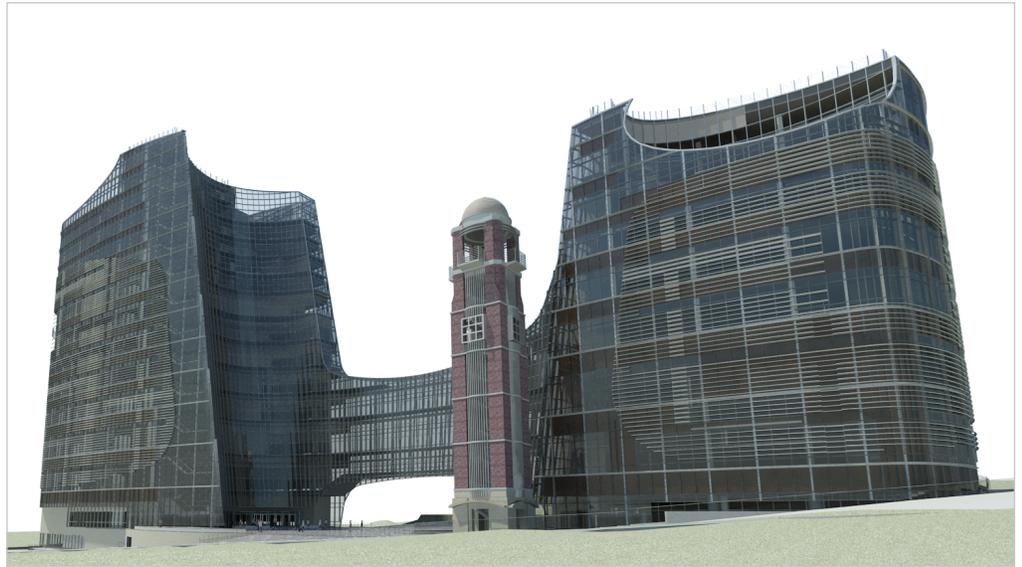
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We turned to BIM and Autodesk Revit software to help explore and refine every aspect of the concept. BIM helped us meet a number of challenging cost, square-footage, and sustainability requirements.

—Rick del Monte
Managing Director
The Beck Group

BIM goes underground.

The Beck Group uses BIM software from Autodesk to design an innovative church building that extends 120 feet underground.



Project Summary

Founded in 1912 and headquartered in Dallas, Texas, the Beck Group offers a full range of design and construction services. Its Dallas-based architecture group recently partnered with structural engineering firm brockettedavisdrake (BDD) to undertake an ambitious design project for one of South Korea's most popular Christian churches, the SaRang Community Church in Seoul. Above ground, the building features two curving glass and steel towers joined by a sky bridge. But the most striking aspect of the design is underground. The building extends more than 120 feet below grade, which allows the church to get the most from its chosen site.

The Beck Group and BDD executed the project by applying two key assets to solving the project's many design challenges: the expertise of its multidisciplinary team and Building Information Modeling (BIM). Using a BIM process, which was based on models created with Autodesk® Revit® Architecture and Autodesk® Revit® Structure, allowed the team to capture, explore, and refine their ideas using intelligent models from the earliest stages of the conceptual design process. "Autodesk BIM solutions helped us to explore a level of geometric complexity in the building that would have been otherwise impractical," says Kelly Cone, innovations director for Beck Group. "BIM is not just about visualizing an innovative form; it helps you turn great concepts into better, more constructible designs."

The Challenge

More than 45,000 people attend services at SaRang Community Church each week, making it one of the more popular "megachurches" in South Korea. The church's sanctuary only accommodated a few thousand people, causing the church to rent space in nearby facilities and broadcast services to congregants. Church leaders decided to build a new church, and purchased a 1.7-acre site in central Seoul. Though small for its intended purpose, the US\$100 million site represented a rare find in densely built Seoul.

Knowing the site would prove challenging for even the most creative architects, the church invited five firms to compete for the project, including Beck Group, which has a history of designing religious buildings. The team from Beck Group quickly developed a proposal that maximized available above and below ground space.

"We won the project based on an initial sketch and project proposal that we had only a week to develop," says Rick del Monte, managing director for Beck Group and lead designer on the project. "Winning the work was only the first hurdle on the project. We turned to BIM and Autodesk Revit software to help explore and refine every aspect of the concept. BIM helped us meet a number of challenging cost, square-footage, and sustainability requirements."

Autodesk®

Turn concepts into more constructible designs with BIM.

The Solution

Working with BDD's structural engineers, the Beck team began to flesh out the basic concept in the context of the client's specific needs. Above ground height requirements and setbacks from the street necessitated that the parking and the main sanctuary be underground—120 feet. The client wanted a curving, sloping exterior similar to the one in the proposal, while ensuring that the nontraditional shape did not limit usable space.

The design team from Beck Group dove into the project by using their preliminary concepts to develop a project model in Autodesk Revit Architecture software. Using the concept massing tools in Revit Architecture, they were able to manipulate the basic shape of the building. As they made changes, the model helped provide them with insight into the effects on a variety of factors, such as square footage by floor and building height. To review the concepts with the client, the team used Autodesk® 3ds Max® Design software to present near photorealistic visualizations of the design.

"When you have a curving, sloping form, modifications have a huge influence on a variety of factors," says Jay Chung, associate principal and project manager for Beck Group. "A small change to the slope impacts the floor area on every floor. The massing tools in Revit Architecture helped us to develop more than 100 iterations of the building. It's a faster, liberating way to work through ideas."

Chung adds, "3ds Max Design helped keep the clients close to the project by making it possible for them to review more accurate visualizations. Reviewing such realistic renderings gave them confidence that the design was moving in the right direction."

Controlling Costs

The massing tools proved valuable as the team worked to ensure the curving building did not add

unnecessary cost to the glass curtain wall covering the exterior of the building. While the team wanted the exterior wall to appear as a smooth curve to the viewer, they needed to use flat glazing. Through as many as 50 iterations of the skin and curtain systems, the ability to link changes in Revit software was invaluable as the team refined the design to deliver the desired look—without adding excess costs.

Del Monte explains, "We adjusted the shape of the building with the massing tools until we achieved an overall elliptical effect with flat glass. Being able to automatically apply mass changes to the curtain wall helped save about 1,000 hours in design time. Using flat glass for the entire exterior probably saved as much as \$1 million on just the glazing and mullions. Curved glass can be more complex to work with, so there is a construction time and cost advantage, too."

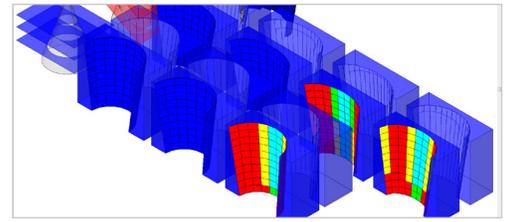
Modeling the Structure

For their portion of the project, the team from BDD started by developing an initial schematic framing in AutoCAD® software. They then transitioned to BIM, working with Autodesk Revit Structure, to provide the Beck Group with the structural system for the architectural model. BDD first modeled the steel columns and concrete elements.

"The Revit Structure model provided a 3D environment for placing the complex structural elements throughout the building," says Cody Campbell, senior project manager for BDD. "We were able to develop the structural system much more easily than would have been possible in a 2D environment. Simply allowing sufficient clearance for cars in the parking garage would have been much more difficult and time consuming in 2D."

Understanding Performance

BIM provided the Beck Group with significant visibility into the feel and performance of the church



from the earliest stages of the project. For example, energy analysis tools in Autodesk Revit Architecture helped the team to design more effective sunshades well before the MEP engineer on the project conducted a formal energy analysis.

"The energy analysis tools in Revit Architecture allowed us to take sustainability into account from the very beginning," notes Chung. "On the sunshades, the tools helped us design them with a vertical orientation that harmonized with the building's exterior. Without the analysis tools, schedule and budget considerations might have forced us to use more traditional horizontal shades."

The Result

The new SaRang Community Church is well on its way to completion in 2012. Chung points to Autodesk BIM products and the use of Revit models in the conceptual design stage as key contributors to the successful design. "A great concept is one that leads to a high-quality, buildable design, accurate construction documents, and ultimately, a great finished building," he says. "Our Revit model brought the many elements of the building together, helping us to understand and keep improving our design choices."

Learn More

Autodesk® Building Design Suite Premium edition includes Autodesk Revit Architecture, Autodesk Revit Structure, and Autodesk 3ds Max Design. Visit www.autodesk.com/buildingdesignsuite to learn more.



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Associate Principal and Project Manager
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