The Beck Group uses BIM software from Autodesk to design an innovative church building that extends 37 meters underground.

“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-meter, and sustainability requirements.”

**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 37 meters 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 Modelling (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 visualising 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 “mega churches” 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 maximised available above and below ground space.

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The Beck Group
The massing tools proved valuable 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.”

Modelling 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 harmonised 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. Cone 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.”

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