

HOK

Customer Success Story

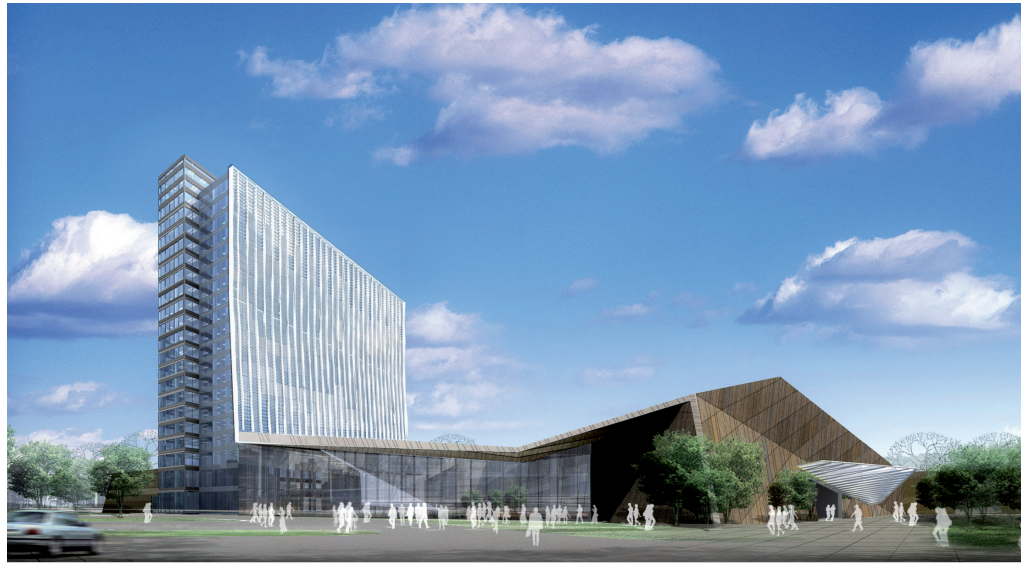
Revit® Architecture  
Revit® Structure  
Revit® MEP  
AutoCAD® Civil 3D®  
Autodesk® NavisWorks®  
Autodesk® Ecotect™  
Autodesk® 3ds Max®  
Autodesk® Buzzsaw®  
AutoCAD®

As a firm, we are committed to integrated project delivery and sustainable design. To best achieve those initiatives, the Revit platform for BIM is our software of choice.

—Edward McCrary, FAIA  
Managing Principal  
HOK  
San Francisco, California

# Build a better world.

For more efficient, more sustainable buildings, HOK employs integrated project delivery and the Revit® platform for BIM.



Sheraton Ulaanbaatar Hotel, Mongolia. Courtesy of HOK.

## The Firm

HOK is one of the world's largest and most successful architectural, engineering, and interior design firms. Since 1955, it has completed thousands of major projects and won numerous awards, including a recent first-place ranking on Engineering News-Record's inaugural list of the Top 100 Green Design Firms. Today, HOK employs more than 2,600 employees in 26 offices around the world. And although its skilled professionals offer expertise in a broad variety of disciplines—including architecture, landscape architecture, engineering, construction, and lighting—HOK prides itself on its ability to integrate these services into a unified creative effort that helps the firm fulfill its principal mission: using design to help clients achieve their goals. More than just a philosophy, this principle has inspired many of the firm's most important business and technology strategies, including the decision to implement three of the industry's most significant trends: building information modeling (BIM), integrated project delivery (IPD), and sustainable design.

## Providing BIM Leadership

Since the mid-1990s, HOK has been a leader in the adoption of new design technologies. For the past decade, the AEC industry has been undergoing a dramatic paradigm shift, moving away from traditional 2D drafting methods to BIM, an integrated process that enables architects, engineers, owners, and builders to share consistent, reliable project information throughout all phases of design and construction. "It is an essential part of our strategy to be a leader in this movement," says Patrick MacLeamy, the firm's CEO. "BIM supports our core mission in a way that no other design process can do."

After early experimentation with several possible BIM solutions, HOK standardized on Revit® Architecture BIM software. "In 2005, our Board mandated the use of Revit Architecture on all new projects," says MacLeamy. HOK also set the ambitious goal of implementing the new software on more than 20 projects in the first year alone.

Autodesk®

# BIM enables HOK design teams to more accurately visualize, simulate, and analyze building performance, appearance, and cost.

Subsequently, HOK adopted Revit® Structure software, Revit® MEP software, and AutoCAD® Civil 3D® software for use along with other BIM tools for visualization, analysis, and collaboration from Autodesk, including Autodesk® 3ds Max® software, Autodesk® Ecotect™ software, Autodesk® NavisWorks® software, and Autodesk® Buzzsaw® project management software.

## Expanding BIM Globally

One of the firm's early efforts with the Revit platform for BIM was the 90,000-square-meter stadium that is part of the JVC Culture, Convention, and Business Center in Guadalajara, Mexico. HOK designed the stadium based on a conceptual design by Studio Massaud-Pouzet. After completing construction documents with AutoCAD® software, the team modeled the facility using Revit Architecture, Revit MEP, and Revit Structure to perform additional coordination checks. Upon review, they discovered—and were able to resolve prior to construction—numerous minor conflicts between the discipline-specific models. The team also employed AutoCAD Civil 3D on the project. “It helped us make better decisions and produce more accurate construction drawings,” says Luis Fernandez de Ortega, associate.

In London, HOK architects designed the fast-track 5 Churchill Place project at Canary Wharf with Revit Architecture. Together with the structural engineers, who used Revit Structure, team created an accurate digital model of the 36,000-square-meter (390,000-square-foot) building before beginning construction, significantly improving coordination. “If we hadn't used the Revit platform, our

work might have been easier initially, but we would have ended up with gaps at the interfaces and a lot of rework,” says Robert Studd, project leader. For increased understanding of the overall project, the team members regularly updated and distributed a NavisWorks model of the project to the extended design team.

On a third project, the 118,000-square-foot Veterinary Medicine Research Facility at the University of California, Davis, HOK and its consulting engineers employed all three components of the Revit platform for BIM for full multidisciplinary file sharing. This four-story building required close collaboration among the architectural, structural, and MEP disciplines to coordinate the complex air distribution system and mechanical systems in the building's interstitial spaces, while still providing high ceilings and natural lighting in the lab and office space. “By working closely with the engineers, we modeled the interstitial areas and were able to prove to the client that we could fit all of the necessary systems and still keep the high ceilings,” says architect Casey Visintin, LEED AP. “That was a big success.”

On another university project, the 119,000-square-foot Emory University Psychology Building, HOK extended its use of BIM to both the early programming phase and to collaboration with the builder. Utilizing the capabilities of Revit Architecture, HOK issued a book with 3D/Smart room data sheets to the 40 different researchers assigned lab space in the building, which they updated as the process evolved. “That was tremendously helpful in obtaining input and a consensus from end users on final

One of the biggest benefits of integrated project delivery was the development of close relationships among all of the parties. There was a real incentive to work together.

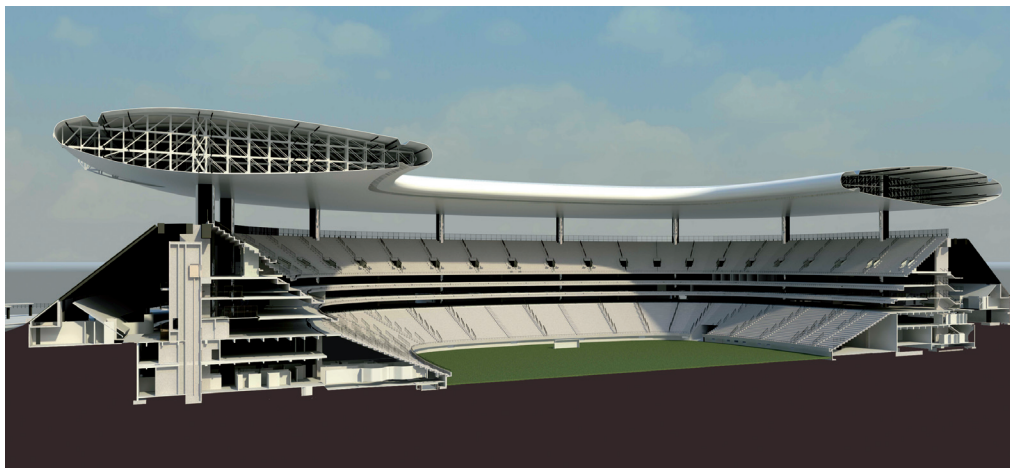
—Bruce Madsen  
Revit Specialist  
HOK  
San Francisco, California

programming decisions,” says lab planner Chirag Mistry, LEED AP. To identify any conflicts and ensure coordination prior to construction, the contractor worked with its subcontractors to issue a complete model of the building in Autodesk NavisWorks software, which allows teams to visualize all types of models regardless of file format or size.

## Moving the Profession Forward with IPD

Since adopting the Revit platform for BIM, HOK has rolled out more than 300 Revit projects worldwide and completed construction documentation on more than 100 of them, including a 22,000-square-foot interior renovation for Autodesk in the historic Landmark Building at One Market in downtown San Francisco.

To ensure a successful outcome for this fast-track project with an ambitious LEED Platinum sustainable design goal, Autodesk engaged HOK, two other architects, and the builder in an innovative integrated project delivery (IPD) process. HOK was responsible for designing the office space while the other architects designed the customer briefing center and the design gallery. All three worked closely from project outset with the contractor. “Full use of the collaborative, integrated project delivery process facilitated by BIM was a major goal,” says Bruce Madsen, HOK Revit specialist.



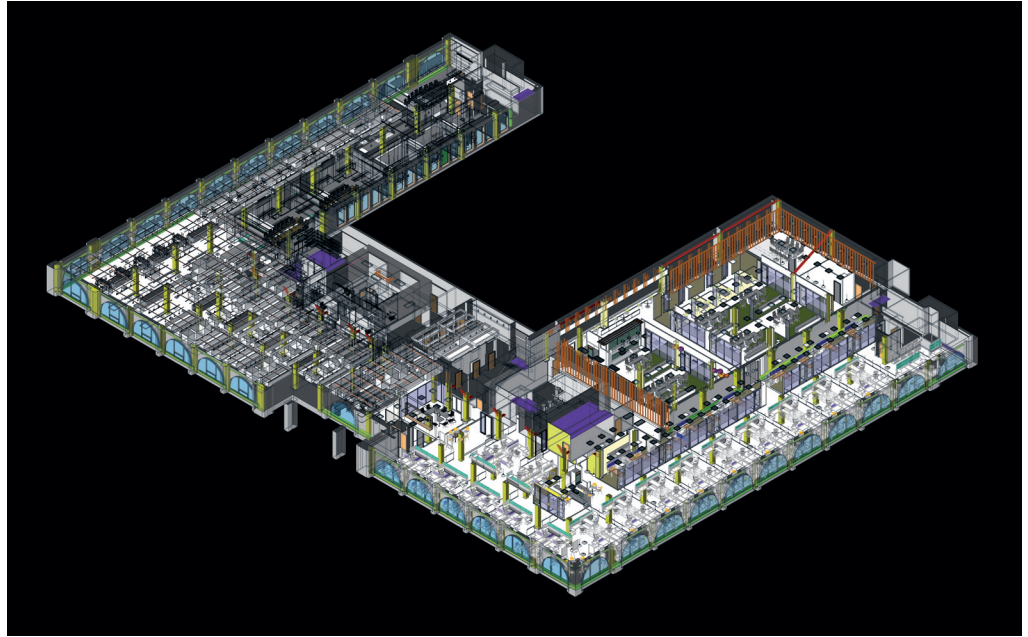
JVC Culture, Convention, and Business Center in Guadalajara, Mexico. Courtesy of HOK.

# BIM is ideally suited for the demands of IPD since it enables the exchange of accurate project data early on.

IPD requires architects, engineers, owners, and builders to collaborate much earlier in the design process, with the goal of overcoming many problems common to the building industry, including waste and inefficiency. Because the Revit BIM platform enables design teams to exchange highly accurate project data very early in the design process, it is ideally suited for the demands of IPD.

Another feature of IPD is that the owner, the architects, the contractor, and the builder are all typically bound to one contract—with shared risks and rewards tied to achieving specific project goals. “There was a real incentive for us to work together,” says Madsen. “When you’re all committed to the same project results, you really get together and solve problems as a team—without worrying about who is to blame. That’s a real change in the paradigm.”

“The level of collaboration we enjoyed on this project is something that we want to repeat on future projects,” says Madsen. “There was constant communication all around the team to make this project work.” The team members gathered weekly and frequently held meetings via WebEx. During those sessions, the team projected the model onto a large whiteboard and navigated through it using Revit or NavisWorks software, finding any discrepancies



Landmark at One Market, 2nd Floor Office Space Layout. Courtesy of HOK.

and fixing them on their laptops. The contractor also relied on NavisWorks to combine data from the architects and the A/V consultant into a single model. For exchanging files, the team members used Autodesk Buzzsaw collaborative project management software.

“As a firm, we are committed to integrated project delivery and sustainable design,” says Edward McCrary, FAIA, managing partner at HOK San Francisco. “To best achieve those initiatives, the Revit platform for BIM is our software of choice.” Currently, the Autodesk One Market project is on track to attain LEED Platinum sustainable design certification.

## Greener, Better Performing Buildings

HOK has a longstanding history of support for sustainable design. In the early 1990s, HOK became the first major design practice to join the U.S. Green Building Council (USGBC). HOK professionals also collaborated extensively in the development of the initial LEED sustainable design rating system. Today, more than 620 HOK employees have earned LEED accreditation. In all, HOK has completed 31 LEED- and six BREEAM-certified projects, and is currently pursuing LEED certification on more than 100 projects.

“BIM is integral to our approach to sustainable design,” says Miles Walker, HOK firmwide CAD manager. With BIM, the information required for sustainable design, analysis, and certification becomes available as a by-product of the standard design process. Designers can use that information to more accurately visualize, simulate, and analyze project performance, appearance, and cost before a building begins—leading to the most energy-efficient buildings possible.

One of the firm’s recent projects, the Sheraton Ulaanbaatar Hotel, Mongolia, highlights many of the strengths of BIM for sustainable design and analysis. “Because the weather in Mongolia is extreme—very hot in the summer and very cold in the winter—we wanted to create an architecture that is both aesthetically pleasant and energy efficient,” says Dickson Mak, AIA, LEED AP, an associate and design architect from HOK’s Hong Kong office.

On this project, HOK began using Revit Architecture and Autodesk Ecotect (an energy analysis tool that measures how the environment will affect building performance) midway through the schematic design process. The structural consultant employed Revit Structure software.



Churchill Place, Canary Wharf, London. Courtesy of HOK.

# Using Autodesk Ecotect, HOK can rigorously test sustainable design concepts to make sure they will work in real-world conditions.

During the design phase, HOK established a wish list of environmental strategies to pursue on the project. “We’re using Ecotect to test those strategies and determine which ones are most effective,” says Mak. For example, using Ecotect, HOK analyzed the building’s undulating roof to determine which section was best suited for photovoltaics. “That also helped us determine how best to orient the building.”

Feedback from Ecotect has led to meaningful changes in the hotel’s design. “By extracting the model from Revit Architecture, we were able to use Ecotect to test how effectively the shadings we designed blocked the summer sun, while still allowing sun to come through in winter time,” says Mak. When the team members discovered that some sunlight still entered the hotel during the summer, they repositioned the devices—improving performance while facilitating easier window cleaning.

Ecotect also supports links to other analysis programs that provide more detailed calculations for several modules, including lighting or energy simulation. “Before we used these tools, we had to make many design decisions based upon educated guesses,” says Mak. “With the help of Revit Architecture, Ecotect, and other analysis software, such as IES, we are much more confident in our sustainable design decisions.”

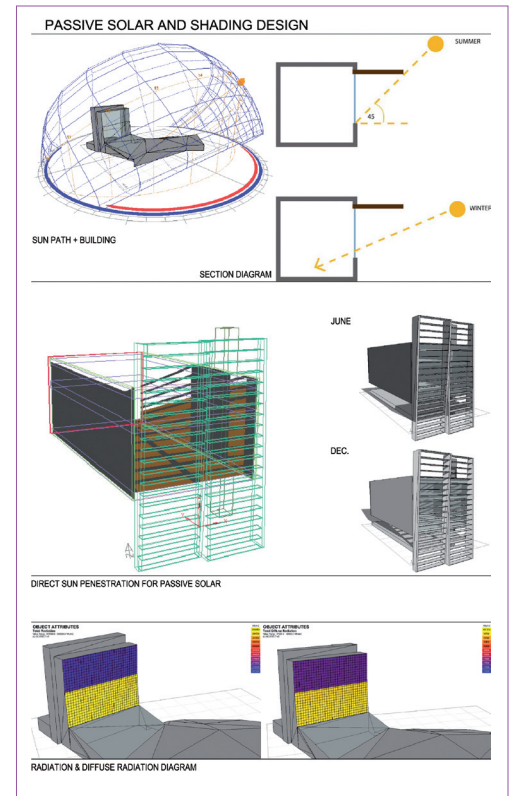
## Results

As a result of adopting the Revit platform for BIM, HOK project teams have been able to work more efficiently, producing better, more accurate designs earlier in the building process. These increased levels of accuracy have led to fewer requests for information (RFIs) during the construction process as well as a reduction in change orders. In some cases, HOK has even been able to reduce the size of project teams by up to 20 percent.

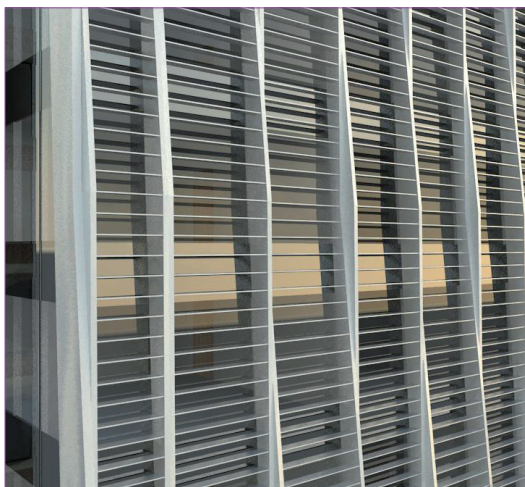
As compelling as these benefits are, perhaps even more important are the new capabilities—including IPD and sustainable design—BIM makes possible. By enabling everyone on the extended design team to participate in the design process much earlier than ever before and to predict more reliably how a building will perform, BIM enables HOK to dramatically improve its relationships with the owners, builders, and consulting engineers, participate fully in IPD and more quickly achieve sustainable design goals.

“HOK is committed to using technology to meet the changing demands of its customers, the industry, and the world,” says Walker. “Our clients are asking for BIM—and we’re delivering on what BIM has to offer.”

To learn more about Autodesk products for Architecture, Engineering and Construction, visit: [www.autodesk.com/aec](http://www.autodesk.com/aec).



Sheraton Ulaanbaatar Hotel Ecotect Solar Shading Studies. Courtesy of HOK.



Revit Architecture and its parametric capabilities are incredibly useful, enabling the team to perform detailed studies quickly. And after we make a change, we can bring it back into Ecotect and analyze how it works. That’s a great help.

—Dickson Mak, AIA, LEED AP  
Design Architect  
HOK  
Hong Kong

Sheraton Ulaanbaatar Hotel, Shading Devices. Courtesy of HOK.