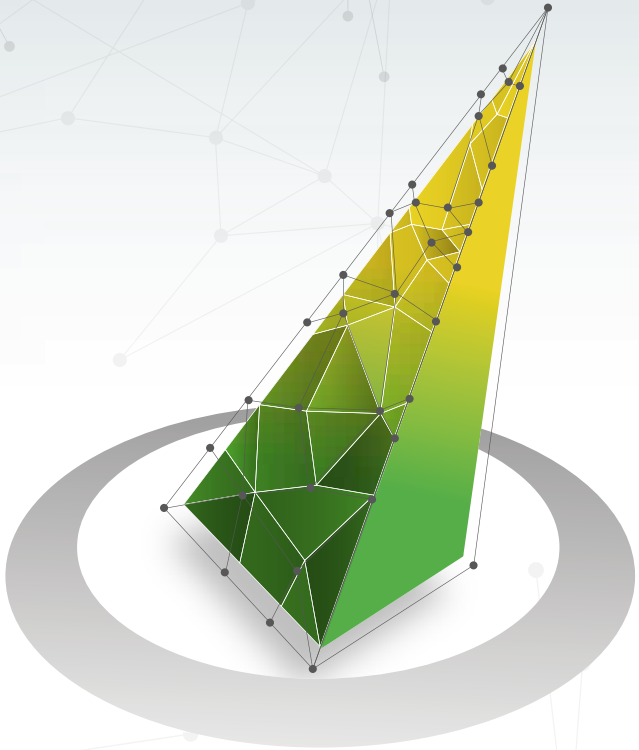


AEC Excellence Awards 2016

AUTODESK.

1ST PLACE

U.S. Bank Stadium

2ND PLACE & LARGE BUILDING CONSTRUCTION COLLABORATION WINNER

Tencent, Beijing Headquarters Building Project

LARGE INFRASTRUCTURE CONSTRUCTION COLLABORATION WINNER

HydroBIM-Yangfanggou Hydropower Station

SMALL INFRASTRUCTURE CONSTRUCTION COLLABORATION WINNER

Holden Mine Water Treatment Plant

SMALL BUILDING CONSTRUCTION COLLABORATION WINNER

Summertime

FEATURED PROJECT

Lanzhou Railway Hub Project

FEATURED PROJECT

Birmingham City University—City South Campus Development

FEATURED PROJECT

Palace Het Loo

FEATURED PROJECT

Highway Bridge

Images courtesy of Mortenson Construction; China Construction Third Engineering Bureau Co., Ltd.; Hydrochina Kunming Engineering Corporation Ltd.; IMCO General Construction; Beijing Branch Company of China Railway Construction Engineering Group Co., Ltd.; BCU and BAM; HFB Visuals; and Schüßler-Plan GmbH.

CONSTRUCTION

1ST PLACE

FIRM: Mortenson Construction
PROJECT: U.S. Bank Stadium
LOCATION: Minneapolis, Minnesota, USA
OWNER: Minnesota Sports Facilities Authority

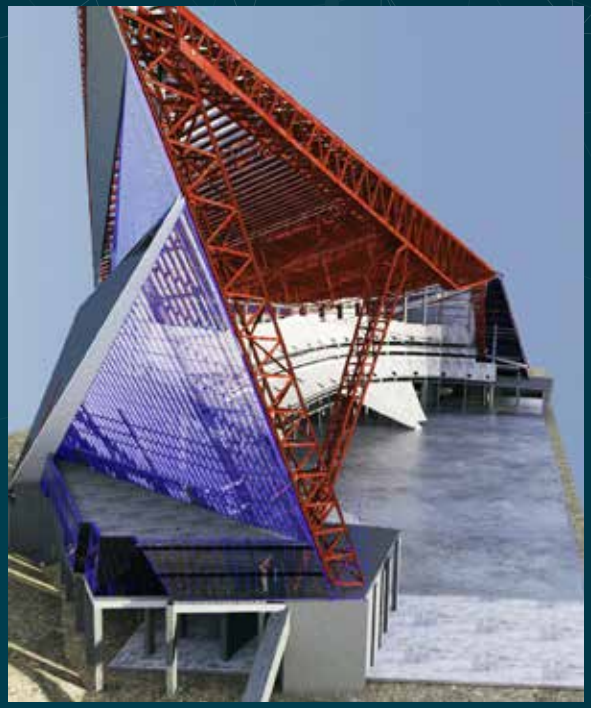
To succeed in construction, you've got to work fast without sacrificing quality—but complex projects with unusual design features and building materials can make that a challenge. Mortenson Construction meets the challenge by using technology to connect design with delivery. With virtual design and construction (VDC) principles and Building Information Modeling (BIM) tools, the company enables construction teams to go inside the digital project model even while design is ongoing, helping them to visualize building components more clearly and identify problems earlier.

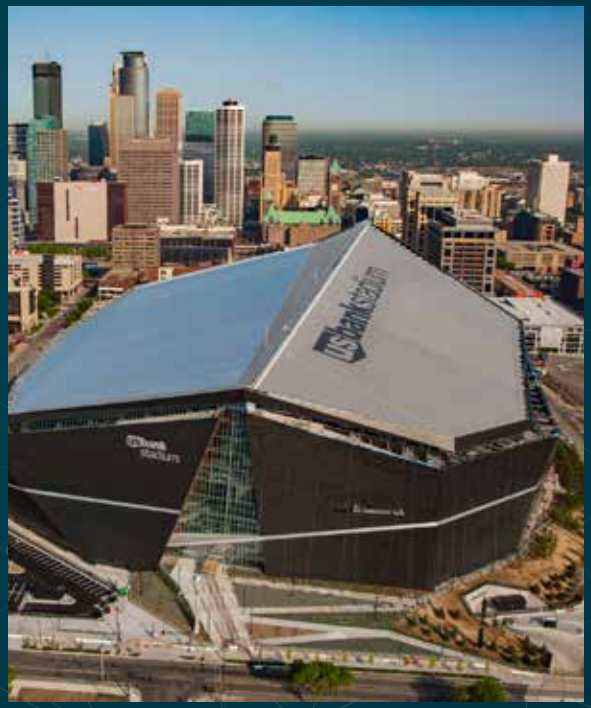
Connecting design and delivery

Mortenson was the general contractor on the U.S. Bank Stadium project, the recently opened home of the National Football League's Minnesota Vikings. An architectural marvel, the stadium has design features that include a massive transparent roof, zinc metal exterior panels, and the 5 largest pivoting glass doors in the world. By teaming with HKS Architects, Mortenson gave the construction team visibility into the BIM model well before construction began. As a result, during the design phase, Mortenson was able to conduct the entire process of building the stadium virtually, eliminating problems before construction even began.

During construction the company used cloud and mobile technology to connect the job site to the model, empowering stakeholders in the field to visualize their work in context and spot and fix problems earlier. To help stakeholders visualize the model as realistically as possible, Mortenson used virtual-reality headsets. Wearing the headsets, the stakeholders could enter the 3D project model and experience exactly what the finished space was supposed to look and feel like.

Mortenson completed U.S. Bank Stadium a full 6 weeks early—a first for a U.S. stadium—at a cost of hundreds of millions of dollars less than the cost of similar stadiums. With the savings, the owner added enhancements throughout the facility, including 2,000 high-definition flat-screen TVs. With results like these, it's no surprise that owners increasingly see BIM as mission-critical for their projects.






Vikings
bankstadium

2ND PLACE & LARGE BUILDING CONSTRUCTION COLLABORATION WINNER

FIRM: China Construction Third Engineering Bureau Co., Ltd.
PROJECT: Tencent, Beijing Headquarters Building Project
LOCATION: Beijing, China
OWNER: Tencent Technology (Beijing) Co., Ltd.

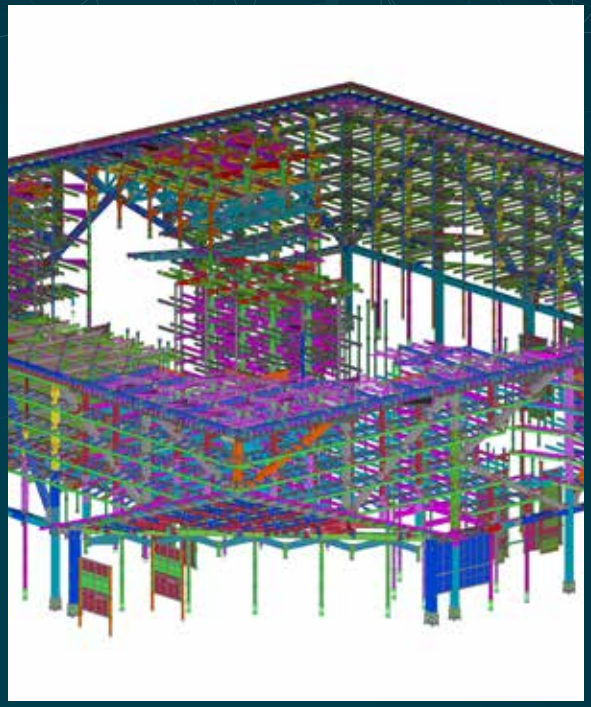
Smart buildings monitor and optimize operations automatically. Smart construction sites do the exact same thing. Take, for example, those managed by China Construction Third Engineering Bureau Co., Ltd. As part of its embrace of Building Information Modeling (BIM) for connecting the entire project lifecycle, from design to build to operate, the company uses BIM as a unified platform for Internet of Things (IoT) applications to better measure, monitor, and manage construction and the job site.

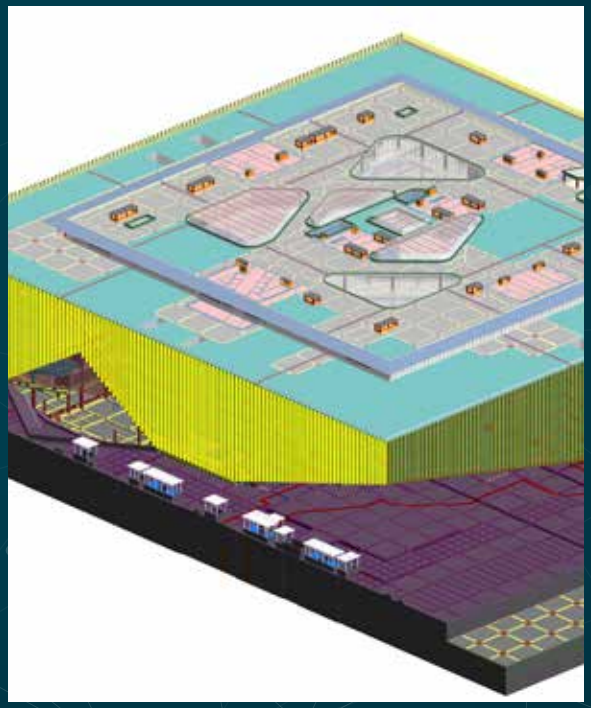
Connecting the smart construction site using BIM and the IoT

China Construction Third Engineering Bureau Co., Ltd., is using BIM across the entire construction process of its Beijing project for Tencent, maker of the popular QQ and WeChat messaging apps. Located in the city's Haidian District—also known as China's Silicon Valley—the Tencent building integrates research, office, parking, and auxiliary facilities. The building is huge, with more than 330,000 square meters (1.6 million square feet) of floor space, and it includes extensive smart features.

To make the construction site safer and more productive, the builder is using BIM in a unified platform with smart building applications. Sensors monitor dust and noise levels, and they track the progress of building inspectors and security personnel. A smart ID card system tracks the location of team members. To count the bars in a pile of steel rebar, workers simply photograph the pile; the number is calculated and uploaded to the model automatically. And at one corner of the Tencent building there is an 81-meter (266 foot) steel girder overhang; by scanning the girders with lasers, total stations generated precise 3D models of the overhang, which were uploaded and compared to the BIM model in real time to ensure building accuracy.

Construction isn't finished yet, but using BIM has already paid off. Thanks to efficiencies BIM has helped unleash, the project timeline has shortened by 90 days and project cost has been reduced by more than RMB ¥650 million, or almost $100 million. And when construction is complete, the BIM model will make handoff to the facility manager seamless. More generally, BIM empowers China Construction Third Engineering Bureau Co., Ltd., to push the boundaries of connected construction, driving new efficiencies and providing experience that will only become more valuable as the world becomes more connected.





LARGE INFRASTRUCTURE CONSTRUCTION COLLABORATION WINNER

FIRM: Hydrochina Kunming Engineering Corporation Ltd.
PROJECT: HydroBIM-Yangfanggou Hydropower Station
LOCATION: Sichuan Province, China
OWNER: Yalong River Basin Hydropower Development Co., Ltd.

It takes energy to power the economy of tomorrow—ideally, clean energy. That's why China is aggressively building out its system of hydroelectric power plants. These are enormous projects with unique challenges, requiring the coordination of thousands of people. With the experience gained from building 400 hydropower projects, Hydrochina Kunming Engineering Corporation Ltd. knows what works to get the job done right. On projects like the $2 billion HydroBIM-Yangfanggou Hydropower Station, currently under construction, the company utilizes BIM to connect teams across the project lifecycle—from design to build to operate.

SMALL INFRASTRUCTURE CONSTRUCTION COLLABORATION WINNER

FIRM: IMCO Construction
PROJECT: Holden Mine Water Treatment Plant
LOCATION: Holden Village, Washington, USA
OWNER: Rio Tinto

Infrastructure projects can involve many stakeholders and extremely difficult working conditions. BIM helps IMCO Construction to keep everyone looped in—and manage the entire project lifecycle—so it can meet tight deadlines while doing the job right. For the Holden Mine Water Treatment Plant project, the company faced challenges, including a remote mountain location that was accessible only by boat, and a diversity of parties whose buy-ins were required to ensure project success. Using BIM and other technologies, IMCO connected off-site stakeholders to the job site, while providing vastly enhanced project visibility.

SMALL BUILDING CONSTRUCTION COLLABORATION WINNER

FIRM: HFB Group
PROJECT: Summertime
LOCATION: Amsterdam, Netherlands
OWNER: BAM

Complex designs can be prohibitively expensive to build, and they make it challenging to ensure building quality. Holland's HFB Group uses BIM to help transform complex designs into reality. BIM enables the company to anticipate construction problems instead of reacting to them—and so build more-complex buildings of higher quality in less time. On the Summertime project, BIM is helping to connect project delivery with project design in a way that is not possible otherwise—speeding design by providing manufacturers with direct access to the model, and speeding construction by improving communication and management in the field.

FEATURED PROJECT

FIRM: Beijing Branch Company of China Railway Construction Engineering Group Co., Ltd.
PROJECT: Lanzhou Railway Hub Project
LOCATION: Lanzhou, China
OWNER: Lanzhou Railway Hub Project Engineering Construction Headquarters of Lanzhou Railway Administration

China Railway Construction Engineering Group Co., Ltd., uses BIM to connect teams and meet the challenges of modern transportation infrastructure projects. By helping managers to communicate information and track problems in the field—and by providing opportunities for stakeholders in the field to visualize their work—BIM empowers the company to drive coordination and efficiency across the project lifecycle. On the Lanzhou Railway Hub project, the company used BIM to keep the entire project team connected to one another and to the 3D model, introducing new efficiencies to everything from planning and construction simulation to project and schedule management.

FEATURED PROJECT

FIRM: BAM Construct UK
PROJECT: Birmingham City University—City South Campus Development
LOCATION: Birmingham, England
OWNER: Birmingham City University

BAM Construct UK extends BIM beyond design and construction with its BIM for Facilities Management offering. On the Birmingham City University City South Campus Development project, BAM is using BIM to make smart design decisions and speed and improve the quality of construction. Perhaps even more important from the owner's perspective, the builder will deliver a project that has smart, connected features and systems that will drive better building performance and lower operations and maintenance costs.

FEATURED PROJECT

FIRM: Schüßler-Plan GmbH
PROJECT: Highway Bridge
LOCATION: Düsseldorf, Germany
OWNER: Schüßler-Plan GmbH

The complex geometry of bridges makes 3D modeling difficult. Schüßler-Plan creates better 3D bridge models faster using BIM. When the company changes specific design parameters, ramifications throughout the model are reflected automatically, speeding—and lowering the cost of—design. To hone its BIM-based approach to bridge design, Schüßler-Plan created the Highway Bridge, a 3D model of a curved concrete bridge that is 285 meters long. The resulting workflows promise to accelerate the design phase of projects, and make it easier than ever to change the 3D model based on data from the field.

FEATURED PROJECT

FIRM: HFB Group
PROJECT: Palace Het Loo
LOCATION: Apeldoorn, Netherlands
OWNER: Kingdom of the Netherlands

HFB Group knows that the more owners know about BIM, the more they like it. BIM helps HFB to build better projects faster—but for owners, the real benefits arrive over the long haul, as digitally connected systems and automated operations drive better performance and lower maintenance costs. For the Palace Het Loo project in the Netherlands, HFB is renovating and expanding a historic building—a museum that was once a residence of the Dutch royal family—and turning it into a digitally connected asset, while improving performance and lowering operations and maintenance costs.

1ST PLACE

Phoenix International Media Center

2ND PLACE

Shanghai Post-Expo Commercial Building District

SIMULATION & ANALYSIS TECHNOLOGY WINNER

ÖAMTC Headquarters

IPD OR COLLABORATION PROJECT WINNER

Sutter Van Ness and Geary Campus Hospital

COMPUTATIONAL DESIGN WINNER

Samuel Chao Chung Ting Science Museum

DESIGN & FABRICATION WINNER

San Francisco Museum of Modern Art (SFMOMA)

SMALL FIRMS WINNER

The Michal and Avraham Kadar Media Lab Building

FEATURED PROJECT

New Factory for the Jewelry Brand Bulgari Gioielli S.p.A.

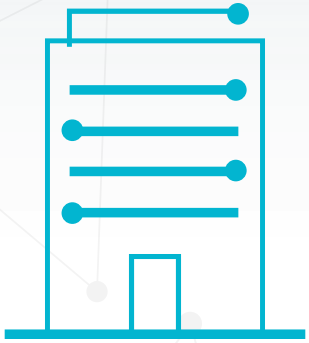
FEATURED PROJECT

1 Oxford Street, London

FEATURED PROJECT

Reconstruction of the Krasnoyarsk Regional Clinical Hospital

Images courtesy of FU Xing, WU Jiming, East China Architectural Design & Research Institute, SIDE – Studio for Information Design GmbH, HerreroBOLDT for VNGC, Aerial Photo by Sky Hawk Photo for VNGC, Land-based Rationalism D.R.C / China Architecture Design Group, Enclos, Kreysler & Associates, Jeff Goldberg, Lior Avitan, Geotectura, Open Project s.r.l., AHMM Ltd., and WERFAU.



BUILDING

1ST PLACE

FIRM: BIAD (Beijing Institute of Architecture Design)
PROJECT: Phoenix International Media Center
LOCATION: Beijing, China
OWNER: Phoenix Satellite Television

The Phoenix International Media Center, the new home of Phoenix Satellite Television, is among the most visually breathtaking new buildings in Beijing. With a design inspired by the endlessly curving form of a Möbius strip, the building's exterior and interior blend space and structure harmoniously, leaving visitors to wonder how the design team achieved such a striking form. The answer is that they turned to Building Information Modeling (BIM) to connect to insights that informed their design choices.

Turning to BIM to understand performance

The team decided to work exclusively with BIM tools and use paperless processes, making this project among the first in China to rely solely on BIM. The overall building shape embodies why BIM proved so essential. The actual shape of the structure's curve reflects the intelligence used to inform the design process. BIM-based infrastructure planning and conceptual design tools helped the team position the highest elements of the building to minimize shading on nearby buildings while also improving energy efficiency. The team modeled and analyzed how the building's shape would influence wind-pressure distribution, working to avoid unexpected changes to air movement in the area.

The team was even able to design the steel structure for easier fabrication and erection. Modeling the way the steel on the project needed to bend helped the team plan for how the steel would come together in the field efficiently. Thanks to the interoperability of BIM design tools, data flowed smoothly into the tools used to generate the steel fabrication shop drawings, saving time and helping to reduce the risk of drawing errors.

The rewards of insight

The Phoenix International Media Center complete, the team reflected on the benefits of following a BIM process. On the curtainwall, they determined that they'd saved significant time on design and installation, and they'd reduced material wastage—all leading to savings of more than RMB ¥6 million. And their use of sheet glass instead of bent glass for the curtainwall had saved over RMB ¥51 million. The intelligence of the process will keep paying dividends over the life of the building, with the owner positioned to take advantage of the model to streamline operations and maintenance. And perhaps the biggest reward? The China-based team increased its knowledge of how to deliver better projects, faster—knowledge they can take to their future work.

2ND PLACE

FIRM: East China Architectural Design & Research Institute Co., Ltd.
PROJECT: Shanghai Post-Expo Commercial Building District
LOCATION: Shanghai, China
OWNER: Shanghai Expo Group

Following the successful 2010 Shanghai World Expo, China is transforming the Expo site into a development featuring 28 buildings, cultural areas, and public spaces. Heading the design effort is East China Architectural Design & Research Institute Co., Ltd. With such a massive undertaking, the design leaders realized that success would depend on keeping the huge extended project team aligned behind overall goals. The team chose a Building Information Modeling (BIM) process to help everyone connect to insights that enabled choices that could keep the project on track.

4 years, 28 buildings, 1 site

Ambitious in scale, the project also has an aggressive timeline, with 2 years scheduled for design and 2 years for construction. Design for the 28 buildings and overall site had to advance simultaneously. A misstep or uniformed decision about siting could impact the whole project. A possible obstacle? Site safety. The team had to plan for the smooth flow of people out of the area in the event of an evacuation. Another hurdle? The project targeted an LEED® Gold rating.

BIM tools were the building block of team unity and insight. The leaders of the project turned to cloud-based BIM services to keep everyone connected to each other, to the latest models, and to project goals. Using intelligent models, the team mapped evacuation routes that all of the buildings could accommodate. Cloud-based BIM analysis tools helped architects and engineers stay on course to meet sustainability objectives. BIM also provided a real-time window into costs, with decision makers able to track planned material use.

The underground building structure shines as an example of how design models can be repurposed during operations. The vast underground parking facility links all of the above-ground buildings. Parking structure models will provide the basis for an intelligent parking lot regulation system, which will guide users through the structure and help operators to manage the structure.

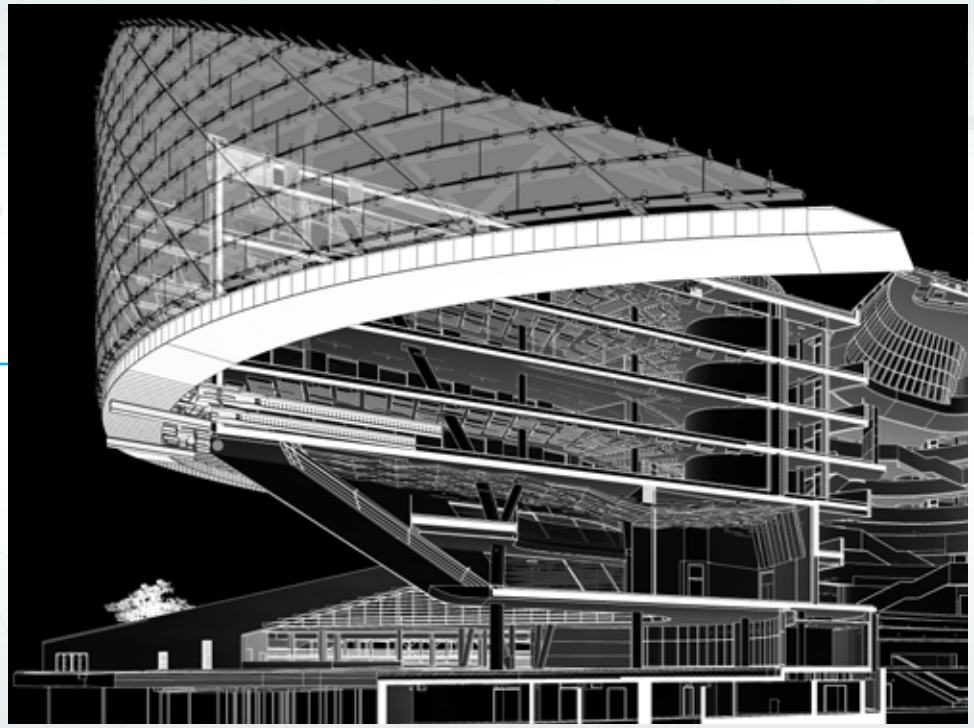
Applying insights to hit targets

As the Post-Expo Commercial Building District moves towards completion, BIM continues to play a role, with construction managers using cloud-connected mobile devices to connect to models. The project is on track toward its ambitious performance objectives in other ways, too. Its LEED® Gold rating is within reach, with smart design choices expected to reduce energy consumption by as much as 18%. Time and cost numbers also point to success—both are 5% lower than originally planned.

SIMULATION & ANALYSIS TECHNOLOGY WINNER

FIRM: SIDE – Studio for Information Design GmbH
PROJECT: ÖAMTC Headquarters
LOCATION: Vienna, Austria
OWNER: Österreichischer Automobil-, Motorrad- und Touringclub (ÖAMTC)

The new headquarters of the ÖAMTC in Vienna, Austria, combines a range of complex uses, such as a call center, a TV studio, and a helipad—and notable energy performance goals. Realizing that close collaboration and agile performance analysis and simulation would be essential on the project, the architects decided to connect the whole team to a cloud-based design model with help from SIDE. The shared model linked the team members to each other and to analysis and simulation tools. Working in concert and with an intelligent model, the team was able to optimize the design more automatically and advance the project toward objectives more quickly.



IPD OR COLLABORATION PROJECT WINNER

FIRM: HerreroBOLDT
PROJECT: Sutter Van Ness and Geary Campus Hospital
LOCATION: San Francisco, California, USA
OWNER: Sutter Health

The new, 274-bed, 740,000-square-foot Sutter Van Ness and Geary Campus in San Francisco presented a myriad of coordination challenges, many related to the hospital site's busy urban location. So the project team adopted a connected workflow that used BIM. Using a model to carefully choreograph a construction plan, HerreroBOLDT, the general contractor, kept the whole project team working in efficient unison. Despite being located in one of the highest-cost areas of the United States, the project is benchmarking against comparable hospital projects as among the lowest cost per square foot and per bed.

COMPUTATIONAL DESIGN WINNER

FIRM: China Architecture Design Group
PROJECT: Samuel Chao Chung Ting Science Museum
LOCATION: Rizhao City, China
OWNER: Rizhao City Construction Investment Group Co., Ltd.

In recognition of physicist Samuel Chao Chung Ting's lifetime of discovery and his ancestral roots in Shandong Province, China, Chinese leaders are building a museum in his honor. The architects at China Architecture Design Group created a design that reflected Ting's ingenuity and spirit—but it was very complex, considering they had only 3 months to complete the design. BIM-based computational design tools helped them to optimize and manage the building's many non-standard forms more automatically. Delivering a combination of efficiency and insight, BIM helped the team make cost-effective design decisions as they met their deadline.

DESIGN & FABRICATION WINNER

FIRM: Webcor Builders
PROJECT: San Francisco Museum of Modern Art Expansion
LOCATION: San Francisco, California, USA
OWNER: SFMOMA

The new San Francisco Museum of Modern Art (SFMOMA) Expansion adds more than 200,000 feet of space to SFMOMA, one of the world's leading institutions devoted to modern and contemporary art. Featuring a flowing exterior façade inspired by water and fog, the Snøhetta-designed expansion adds to and harmonizes with the 1995 Mario Botta-designed original. The expansion was designed and constructed following a BIM workflow, and Webcor Builders added fabrication to its connected, model-based process. Interoperability between BIM-based tools enabled the more connected delivery of the façade elements. As a result, fabrication of the complex façade advanced quickly and smoothly.

SMALL FIRMS WINNER

FIRM: Geotectura
PROJECT: The Michal and Avraham Kadar Media Lab Building
LOCATION: Ramat Gan, Israel
OWNER: Shenkar College

Housed in a 1920s building, Kadar Media Lab at Shenkar College was ready for a makeover. The labs needed updated spaces and resources, and much of the aging roof needed to be replaced. But all of this had to be done without damaging the delicate silicate walls. Geotectura, a one-person architecture firm that designed the renovation, used a BIM-based process to create a design that brought the lab spaces to life, while strengthening the old building and giving the interior a contemporary look. Successful from a time and budget perspective, the striking new interior also won the 2016 Israeli Design Award.

FEATURED PROJECT

FIRM: Open Project s.r.l.
PROJECT: New Factory for the Jewelry Brand Bulgari Gioielli S.p.A.
LOCATION: Alessandria, Italy
OWNER: Bulgari Gioielli S.p.A.

The new Bulgari Gioielli factory will be the largest jewelry factory in Europe and the largest LEED®-certified factory in Italy. Open Project, the architecture firm leading the venture, launched the project with a BIM-based design process that relied on an integrated model. This model helped the whole project team avoid clashes as they weaved the complex mechanical, electrical, hydraulic, and special plant systems around structural elements. Cloud-based information sharing kept the team united as they worked. The result was a more seamlessly coordinated design—and significant timesavings.

FEATURED PROJECT

FIRM: Allford Hall Monaghan Morris
PROJECT: 1 Oxford Street, London
LOCATION: London, England
OWNER: Derwent London

One of the busiest intersections in Europe—Oxford Street at Charing Cross Road in London—will soon be the site of 1 Oxford Street, a 275,000-square-foot mixed-use project. The project will be above a pair of high-traffic transit stations. With so much complexity in the area, the project architect chose a coordination process based around BIM and collaboration in the cloud. Success flowed from the connected, model-based teamwork—even though many contributors had almost no prior BIM experience. Together, the team was able to beat several scheduled milestones and find smart solutions to vexing issues.

FEATURED PROJECT

FIRM: WERFAU
PROJECT: Reconstruction of the Krasnoyarsk Regional Clinical Hospital
LOCATION: Krasnoyarsk, Russia
OWNER: Government Ministry of Health Care of the Region

The largest current hospital project in Russia—the reconstruction of the Krasnoyarsk Regional Clinical Hospital—involves 127,000 square meters of new construction, along with 58,322 square meters of reconstruction on existing facilities. WERFAU, which specializes in health care projects, is leading the project and using BIM to link and coordinate contributions from all disciplines involved. Cloud-based sharing facilitates fast access to the latest project information for every team member. BIM and connected teams are helping to advance the design as much as 60% faster for key processes—all while furthering the team's goal of zero clashes.

1ST PLACE LARGE INFRASTRUCTURE

InterCity Dovrebanen–Sørli-Lillehammer

2ND PLACE LARGE INFRASTRUCTURE

Shanghai Rail Transit Line 17

SMALL PROJECT WINNER

Improvement of Water Supply to Sheung Shui and Fanling

COMMUNICATION & COLLABORATION FOR LARGE PROJECT WINNER

vivaNext Bus Rapidway Transit System

COMMUNICATION FOR SMALL PROJECT WINNER

Risk Information Management (RIM) Process Implemented on the London Underground Tower Hill Step-Free Access Project

ENERGY & NATURAL RESOURCES WINNER

Vamma 12

FEATURED PROJECT

ELFF–on Great Western Railway Route Modernisation

FEATURED PROJECT

Barangaroo Reserve

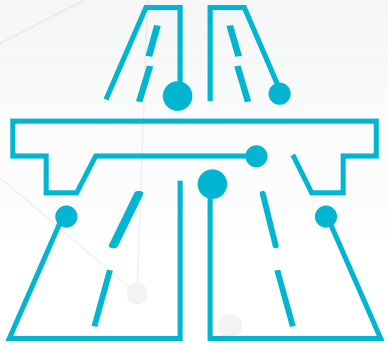
FEATURED PROJECT

Highway A1 Apeldoorn Azelo

FEATURED PROJECT

Singapore-Sichuan Hi-Tech Innovation Park BIM Consulting Service

Images courtesy of Jernbaneverket / Norwegian National Rail Administration (NNRA); Shanghai ShenTong Metro Group Co., Ltd.; Water Supplies Department, Hong Kong Special Administrative Region of the People's Republic of China; MetroLinx; London Underground; Hafslund; Network Rail; Aurecon; Rijkswaterstaat–Dutch Ministry of Infrastructure and the Environment; and Sino-Singapore (Chengdu) Innovation Park Development Co., Ltd. (SSCIP).



INFRASTRUCTURE

1ST PLACE LARGE INFRASTRUCTURE

FIRM: Rambøll Sweco ANS
PROJECT: InterCity Dovrebanen—Sørli-Lillehammer
LOCATION: Norway
OWNER: Jernbaneverket / Norwegian National Rail Administration (NNRA)

Norway is known for its natural beauty. But the very terrain that makes it so famous can pose real challenges when it comes to infrastructure, as Rambøll Sweco ANS discovered when they were hired by the Norwegian National Rail Administration (NNRA) to contribute to a project to lay 75 kilometers of double track between Sørli and Lillehammer. Through the use of Building Information Modeling (BIM), the project team was able to overcome terrain challenges—as well as the tall order of getting approval from more than 100 stakeholders.

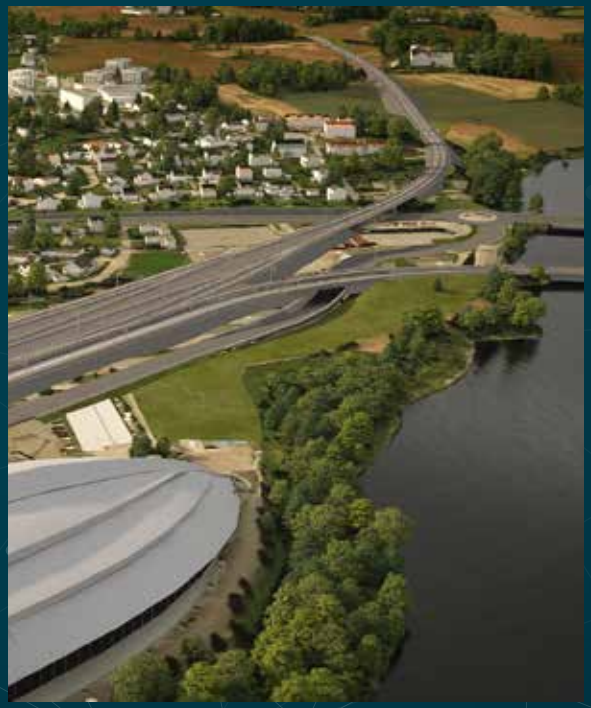
Negotiating a challenging environment

The project faced many challenges from existing and new infrastructure on the Dovrebanen section of the new InterCity line. In some cases, new track was planned; in others, existing track was to be rehabilitated or repurposed. The anticipated rail lines also had to navigate roadways. But the terrain posed the biggest challenge. The railway corridors cross several valuable landscapes that have significant environmental and cultural restraints, including an important nature reserve. In addition, rail lines would cross a lake, necessitating flood plain analysis. By using 3D simulations, BIM helped the team design, visualize, and negotiate these environmental complexities.

Connecting 120 stakeholders

The InterCity project planning also had to take into account the needs of local residents, an important factor in the work of the NNRA. From the beginning, Rambøll Sweco ANS had to preserve elements that were of historical significance and to keep environmental impact to a minimum, with the help of local agencies. External communication was a key factor, given the strong interest from media and local community groups, and the need to gain public and agency consent. BIM enabled changes to be easily understood at all stakeholder levels. A total of 120 design and approval participants contributed to the BIM process to design, propose, simulate, analyze, share, and comment throughout the entire project.

All told, the new InterCity line will mean shorter travel times, doubled capacity, and more freight traffic, benefitting huge numbers of travelers, as well as the economy. For more than 300 participants on the Dovrebanen project, BIM provided significant benefits: helping to reduce the environmental impact of the project, optimize designs across disciplines, and increase democracy and transparency in planning.



2ND PLACE LARGE INFRASTRUCTURE

FIRM: Shanghai Rail Transit Line Seventeen Development Co., Ltd.; Shanghai ShenTong Metro Group Co., Ltd.; and Shanghai Tunnel Engineering & Rail Transit Design and Research Institute

PROJECT: Shanghai Rail Transit Line 17

LOCATION: Shanghai Qingpu District, China

OWNER: Shanghai ShenTong Metro Group Co., Ltd.

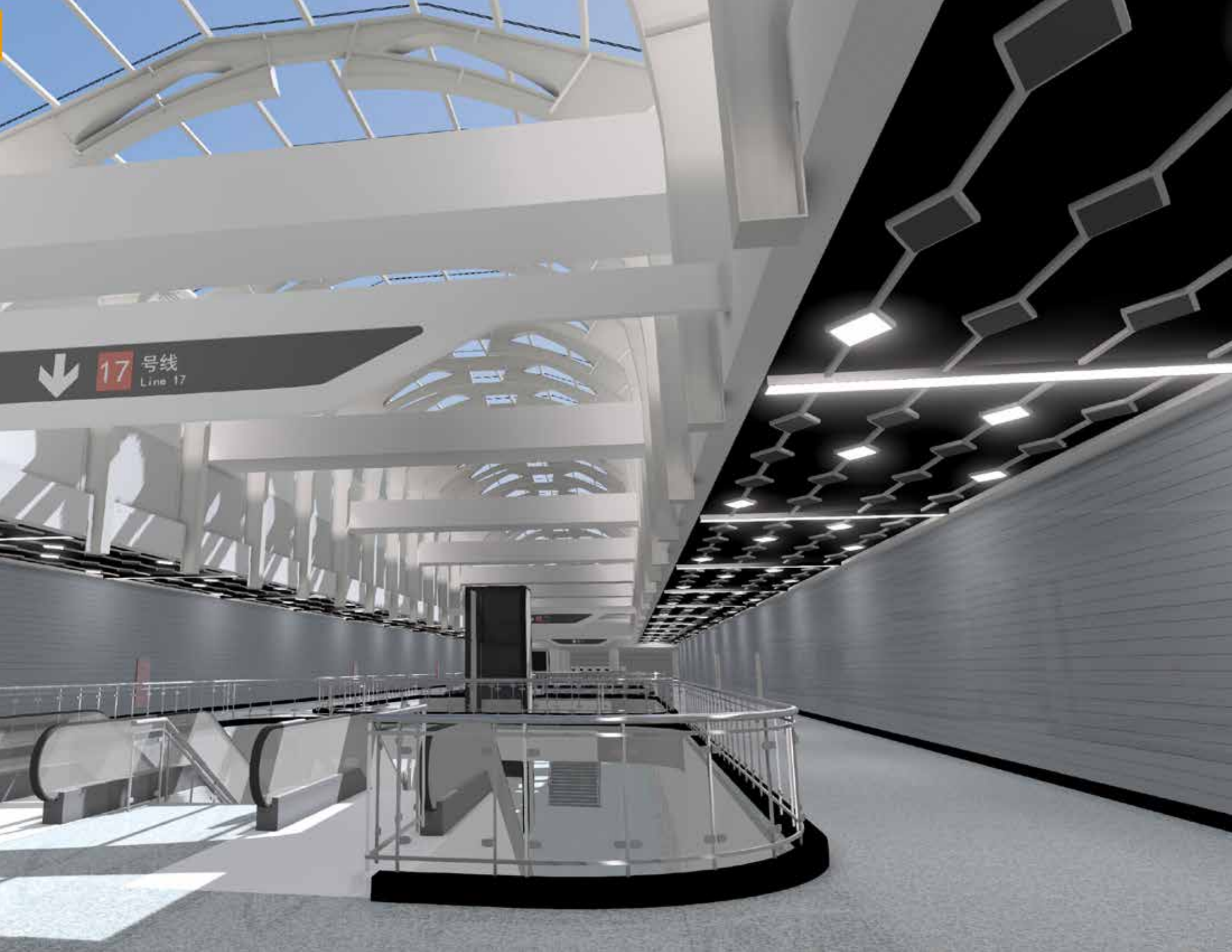
When the firms involved (Shanghai Rail Transit Line Seventeen Development Co., Ltd.; Shanghai ShenTong Metro Group Co., Ltd.; and Shanghai Tunnel Engineering & Rail Transit Design and Research Institute) conceptualized the project of building 35 kilometers of rail across the Shanghai Qingpu District—including 6 elevated intervals, 6 underground intervals, and 13 stations, parks, and substations—they used the tree as their metaphor. And they used Building Information Modeling (BIM) to tackle the complex project by beginning at the roots, gathering information via intelligent models that they would then use to guide the project. The supporting layer, or trunk, would come from BIM's supporting technologies and its collaborative platform that would keep all stakeholders on the same page. At the tree's top would be the application of BIM across the lifecycle of the project, from design to construction to operation and maintenance.

The many branches of BIM

On the Shanghai Rail Transit Line 17 project, the "roots" were particularly tangled. The modeling phase needed to account for the line structure—which was complex, due to the combination of elevated and underground sections—as well as for the long distances between stations. But the team used BIM to visualize through simulations and optimize for safety.

The supportive core of the project came from BIM's collaborative platform. The Line 17 project included 3 design companies, 5 BIM consulting companies, and 10 construction companies and construction supervision companies—and they all had to be able to share data and collaborate. Thanks to BIM's cloud technology, all project participants could access, edit, and share the design data anywhere.

Once the Line 17 project was planned, the team relied on BIM to launch it into the construction phase. The guidance that the models had already provided the team translated into reduced construction waste, and it shortened the construction period and optimized progress. Construction materials could be tracked via quick reference (QR) codes, leading to increased efficiency and precision—so much so that the project's timeline was slashed by 15 days, or 25%. Cost was also notably reduced, as BIM helped the team to save RMB ¥1 million—a 30% savings. And as millions of travelers use Rail Transit Line 17 for years to come, BIM will continue on, helping to monitor remotely the real-time status of equipment into the future.


17 号线
Line 17

SMALL PROJECT WINNER

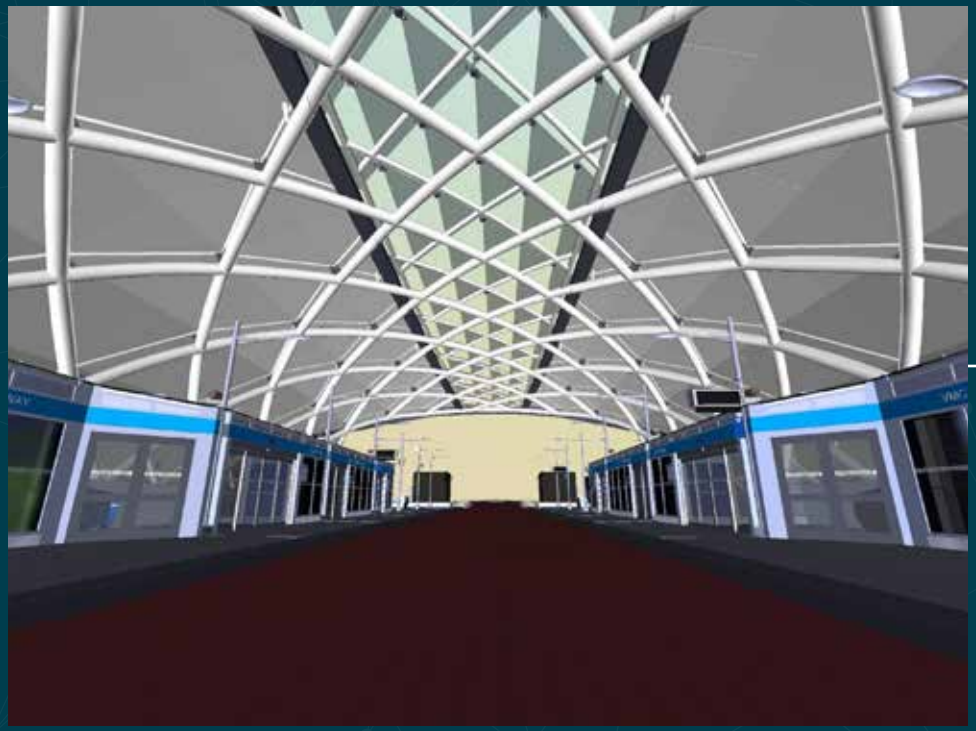
FIRM: Water Supplies Department, Hong Kong Special Administrative Region of the People's Republic of China

PROJECT: Improvement of Water Supply to Sheung Shui and Fanling

LOCATION: Hong Kong, China

OWNER: Water Supplies Department, Hong Kong Special Administrative Region of the People's Republic of China

To cope with increasing water demand, the Water Supplies Department of Hong Kong Special Administrative Region of the People's Republic of China needed to build a new service reservoir with a storage capacity of 24,000 cubic meters—and an accompanying 4.2 kilometers of freshwater mains. BIM helped the team to identify water main clashes with existing underground utilities, and to build with minimal visual impact and maximum attention to environmental harmony. The improved workflow meant that this first-time use of BIM would not be the last.



COMMUNICATION & COLLABORATION FOR LARGE PROJECT WINNER

FIRM: EllisDon

PROJECT: vivaNext Bus Rapidway Transit System

LOCATION: Vaughan, Canada

OWNER: MetroLinx

When the vivaNext Bus Rapidway Transit System project was first proposed, planners knew that installing Bus Rapid Transit (BRT) on dedicated lanes along Highway 7 in Ontario, Canada, would impact commuters and pedestrians. The goal for EllisDon, the construction company on the project, was to minimize that impact through efficient planning and swift execution. BIM enabled early identification of issues: Simulating traffic helped EllisDon see closures and set efficient schedules. Identifying clashes with trees, wells, and pre-existing structures meant early resolution of issues. The result? The design was delivered 3 months ahead of schedule.

COMMUNICATION FOR SMALL PROJECT WINNER

FIRM: Tony Meadows Associates
PROJECT: Risk Information Management (RIM) Process Implemented on the London Underground Tower Hill Step-Free Access Project
LOCATION: London, England
OWNER: London Underground

The goal of the London Underground Tower Hill Step-Free Access Project is to provide increased access for people with restricted movement by delivering 2 step-free lifts at the Tower Hill tube station, near the Tower of London. Tony Meadows Associates was tasked with using Risk Information Management (RIM) processes to identify health and safety risks—3D models enabled first-person viewpoints of risk areas and could be filtered based on discipline. Combining RIM with BIM technology resulted in improved health and safety risk management and communication, reduced accidents and injuries during construction, lower costs, and fewer delays.

ENERGY & NATURAL RESOURCES WINNER

FIRM: Norconsult
PROJECT: Vamma 12
LOCATION: Østfold, Norway
OWNER: Hafslund

When Vamma, Norway's largest river hydropower plant, needed an upgrade—complete with new turbine, generator, control system, and switchgear—Norconsult used reality capture to combine real-world context with 3D design. This helped Norconsult uncover potential problem areas that, if modeled in the traditional ways, would've been discovered only during the construction phase. Where previous projects might have required multiple models to be built, the firm used BIM to create a single source for any type of analysis, whether structural, mechanical, or solar. And the analysis could happen much earlier in the process than was previously possible.

FEATURED PROJECT

FIRM: Furrer+Frey
PROJECT: ELFF—on Great Western Railway Route Modernisation
LOCATION: United Kingdom
OWNER: Network Rail

Plans for the Great Western Railway Route Modernisation entailed the electrification and improvement of more than 1000 kilometers of pre-existing train track—to the tune of £5 billion. Teams working in different disciplines and designers working in 12 different countries needed to be able to collaborate in order to plan the project and identify risk. Electrification company Furrer+Frey combined their own BIM-based software with other BIM solutions, so clients and contractors were able to work together in the cloud using common visual language. By offering feedback on models, even British residents will have partaken in the collaboration.

FEATURED PROJECT

FIRM: Aurecon
PROJECT: Barangaroo Reserve
LOCATION: Sydney, Australia
OWNER: New South Wales Government

In 2012, the Barangaroo Reserve redevelopment initiative was launched to change an ugly, largely derelict section of Sydney's harbor foreshore into an easily accessible public domain that would embody world-class design excellence and demonstrate maximum sustainability. BIM facilitated the construction of the 1.4-kilometer sandstone foreshore through the extraction and replacement of 6,600 sandstone blocks. BIM was also used to document, plan, and track the progress of the Cutaway, a 75,000-cubic-meter subterranean cultural space—one of the largest subterranean spaces in Australia. All told, BIM saved the project more than 4 months and AUD$40 million.

FEATURED PROJECT

FIRM: Royal HaskoningDHV
PROJECT: Highway A1 Apeldoorn Azelo
LOCATION: Apeldoorn, Netherlands
OWNER: Rijkswaterstaat–Dutch Ministry of Infrastructure and the Environment

The A1 motorway in the Netherlands was due for an overhaul. A major economic thruway, it suffered from frequent bottlenecks and needed an extension. With a tight deadline and set budget, engineering consulting firm Royal HaskoningDHV used BIM to link myriad shareholders, from designers to the Dutch Ministry of Infrastructure and the Environment. Virtual reality enabled stakeholders and team members to make better decisions on the project's outcome. Best of all, BIM facilitated significant timesavings–while projects of this scope usually take 6 to 12 months to design, the highway expansion project's baseline design was completed in just 8 weeks.

FEATURED PROJECT

FIRM: Sichuan Communication Surveying & Design Institute
PROJECT: Singapore-Sichuan Hi-Tech Innovation Park
LOCATION: Sichuan Province, China
OWNER: Sino-Singapore (Chengdu) Innovation Park Development Co., Ltd. (SSCIP)

Before construction began in May 2012, the Sichuan Communication Surveying & Design Institute knew that the creation of the Singapore-Sichuan Hi-Tech Innovation Park ran the risk of being chaotic–with multiple contractors, several design teams, and a complex underground network of pipes. With BIM, the Institute could simulate different solutions for drainage and other infrastructural elements, and the mobile terminal streamlined project management and design collaboration.

WINNER

“Fun and Intelligent Cabin” Project of Primary School in Huining County of Gansu Province

Images courtesy of Tianjin Architecture Design Institute (TADI).

PHILANTHROPIC

WINNER

FIRM: Tianjin Architecture Design Institute (TADI) and Nina Maritz Architects

PROJECT: “Fun and Intelligent Cabin” Project of Primary School in Huining County of Gansu Province

LOCATION: Gansu Province, China

OWNER: Center School

All schoolchildren deserve a warm, safe, and inviting space in which to learn. When the children of Hepan in rural Huining County—in China’s Gansu Province—were donated a cabin to use as their schoolhouse, they got much more than that. Their “fun and intelligent” cabin needed to be environmentally friendly and ecologically sustainable, not to mention affordable. Tianjin Architecture Design Institute (TADI) and Nina Maritz Architects turned to Building Information Modeling (BIM) to make these goals a reality.

Working with nature—and smart design

To better ensure that the cabin makes the most effective use of its environment, the team used BIM for building performance analysis, creating intelligent 3D models that integrated a wide range of environmental data, including details about sunlight, ventilation, and temperature. The team knew the cabin had great potential for solar energy and would not get too hot in summer, but they faced the challenges of a cold winter and a water shortage. To solve the latter problem, they built a dry toilet that will create organic waste for nearby fields. And by modifying the models based on different conditions, the team was able to find ways to conserve energy—and generate money. Solar power supplies electricity and water heating, so the annual power conserved will make a profit of RMB ¥8,200. The initial investment is on track to be paid back in approximately 10 years.

One of the project’s goals was ease of duplication. Shanghai Adream Charitable Foundation, the nonprofit that donated the Gansu schoolhouse, supports education in China, especially in rural and impoverished areas. The foundation wanted the sustainable Gansu cabin to be designed in such a way that it could be easily replicated in possible future projects. By employing a model-based workflow, the team guaranteed that all design plans could be easily used again by future teams. And the level of detail captured by the performance analysis will help demonstrate the advantages of reusing the design on other projects.

Overall, there were many tangible wins that BIM facilitated on the cabin project, including timesavings and a cost savings of RMB ¥73,300. But the best win can’t be quantified: the feeling of building a place that will give confidence and joy to children, present and future.

AUTODESK.