

AEC EXCELLENCE AWARDS 2020

Reimagination
starts here



AEC
Excellence Awards
2020



Reimagination During Extraordinary Times



Where we work, how we work, why we work: the year 2020 introduced dramatic change to the most basic aspects of professional practice in the architecture, engineering, and construction industry.

Whether confronting COVID-19, climate emergencies, or simply the obstacles of international collaboration, AEC firms tackled unprecedented challenges with ingenuity, accelerating digital transformation to propel new solutions. Collaboration moved rapidly to the cloud, and technologies such as generative design and Design for Manufacturing and Assembly (DfMA) found wider adoption.

Most importantly, in the tense environment of 2020, the AEC industry engaged with the “why” of “why we work” with passion and pragmatism. They kept complex projects on track to serve the needs of communities, elevated the need for resiliency, and pivoted designs to address new health guidelines.

The 2020 AEC Excellence Award-winning projects featured here serve as exemplars of the industry’s ability to respond to adversity with resilience and initiative. They are stories of challenge, solutions, and insight – and they illustrate why I believe our industry is going to emerge better on the other side of this in ways we can’t even imagine now.

To the firms and people behind these projects: congratulations and thank you. The industry – and the world – needs your ingenuity. The future demands it.

A white, handwritten signature of Nicolas Mangon, written in a cursive style, positioned above his name and title.

Nicolas Mangon
Vice President
AEC Strategy & Marketing
Autodesk

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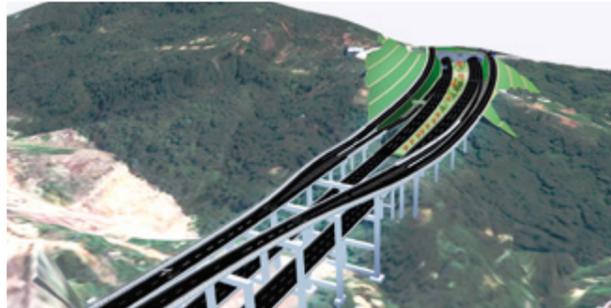
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Infrastructure Design

THE FINALISTS

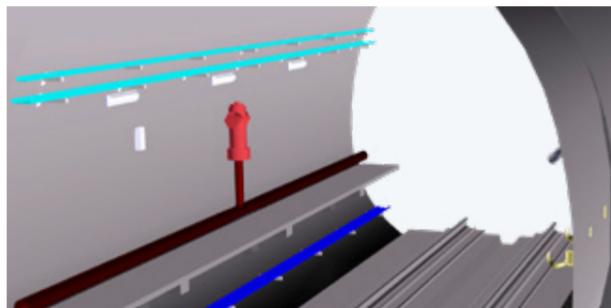
Large project



Conjunction Road Of Chongqing-Changshou Expressway Double-track

Chongqing Municipal Design and Research Institute Co., Ltd, China

Medium project



Ataköy-İkitelli Metro Line

Prota Engineering Project Design and Consultancy Inc., Istanbul Metropolitan Municipality, Aga Energy and Emay International Engineering and Consultancy Inc., Turkey

Small project



Jiangxia Sewage Treatment Plant

Central and Southern China Municipal Engineering Design & Research Institute Co., Ltd, China



Gordie Howe International Bridge

AECOM, Canada



Mersin Metro Line I

Prota Engineering Project Design and Consultancy Inc. and Metropolitan Municipality of Mersin, Turkey



Trinity-Sergius Lavra Infrastructure Restoration

ROSECO Ltd, Russia

Infrastructure projects are often some of the most complex, from the sheer scale to multiple stakeholders. The collaboration and coordination opportunities with BIM create unheralded efficiencies. The AEC Excellence Awards 2020 Infrastructure category winners delivered incredible new ways to communicate with their models and construction. See how these teams worked together for an underground railway line, wastewater treatment plant, and highway with the world's largest cantilever bridge of its kind.

THE WINNERS



Large project

[City Rail Link](#)

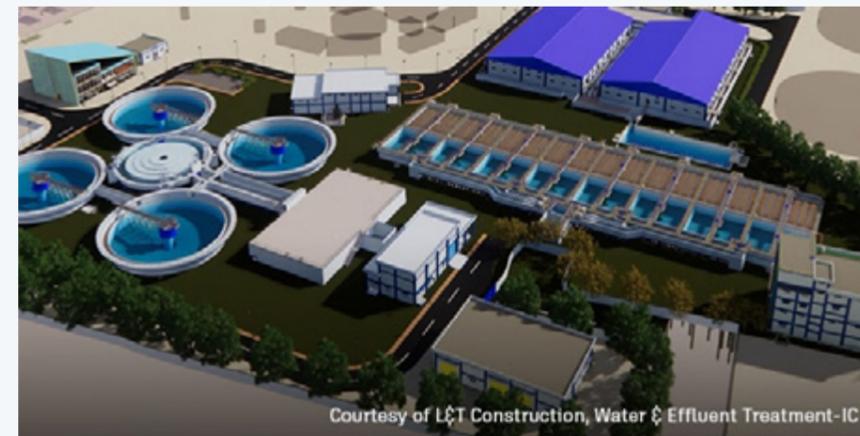
Link Alliance, New Zealand
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Medium project

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Norconsult, Norway
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Small project

[Chandrawal Water Supply Project 477 MLD Advanced Water Treatment Plant](#)

RWS & UWWM-EDRC, WWW SBG, WET-IC, L&T Construction, India
Pages 12-13

Courtesy of L&T Construction, Water & Effluent Treatment-IC

Courtesy of Link Alliance

Courtesy of Norconsult and Baezeni

City Rail Link

Company: Link Alliance

Location: New Zealand

Current phase: Design and Construction

Completion date: 2024

Software: Autodesk® AutoCAD®, Autodesk® BIM 360® Design, Autodesk® Civil 3D®, Autodesk® InfraWorks®, Autodesk® Navisworks®, Autodesk® ReCap™, Autodesk® Revit®



Image courtesy of Link Alliance

Challenges

City Rail Link is a first in many ways. It is the largest, most complicated transport infrastructure project ever attempted in New Zealand. It is also the country's first completely underground railway line. And it is the first major New Zealand infrastructure project to make an entirely new, comprehensive shift to a digital approach with BIM.

City Rail Link will allow the rail network to double public transportation ridership to Auckland's city center, meeting growing demand. Located in the heart of the city, the rail line is 3.5 kilometers long with a twin tunnel and three stations, including two new stations underground and an existing one above ground marked for redevelopment. One deep station must be mined from the surface; another is a long cut-and-cover station; and the existing one creates further complexity as it is located where City Rail Link connects with the existing system.

Collaboration is key for the project. The Link Alliance is a consortium of seven companies concurrently delivering design and construction of stations and tunnels for City Rail Link Ltd. International team coordination will involve up to 1600 people from 30 countries and 16 disciplines. Not all were skilled in BIM prior to the project, with many participants still in a 2D mindset. This required new training initiatives to execute a complete shift to the delivery of a complex infrastructure project to a BIM delivery method.



Image courtesy of Link Alliance

Solutions

In order to get every team member on board with BIM, the Link Alliance created intensive training materials and sessions to get everyone skilled in the technical interface and tools and working in the cloud.

The entire project is hosted on BIM 360. A common data environment has been critical for successful global collaboration, especially in light of COVID-19. During the shutdown and since, the project has experienced negligible downtime.

The complexity of the tunnels required Cesare Caoduro (Digital Engineering Manager Tunnels, Link Alliance) and the computational design team to develop a new approach incorporating computational design and generative design. Using Dynamo Studio and Revit, the Link Alliance can continuously update the tunnel design as construction proceeds. For example, when the project scope expanded to accommodate longer, nine-car trains, the team simply ran the computational design scripts again to update the 3D models instead of starting from scratch or making time-consuming manual modifications.

With Project Refinery, the team used generative design to create a model of the Tunnel Boring Machine that optimized segments based on the geometry of the tracks and identified elements to minimize deviations from the design intent.

Key Insights

- The project-specific Revit API tools—"LKA Express Suite"—developed by Roy Qian (Head of Digital Engineering – Building Services, Link Alliance) and his team allowed the project team to create a custom interface for data processing and documentation automation and computational design/modeling such as tunnel services, saving 3000 hours in design time. Its ease-of-use enables anyone—even those with limited BIM experience—to start working with it right away.
- The project team is ambitiously aiming for an Infrastructure Sustainability Council of Australia (ISCA) rating of 15% reduction in embodied carbon, 25% reduction in energy CO2 emissions, and reduced waste to landfill and construction/operational water use. With BIM 360 and Revit, the team adds material information into the 3D model, and monthly changes are communicated via Microsoft Power BI dashboards. The ISCA calculator, BIM model, and dashboard create a cohesive output to track project performance against sustainability targets.
- The Link Alliance benefits from virtual reality for many aspects of the project, from design reviews to site safety and training.

“ City Rail Link is an ambitious, first-of-its kind project for New Zealand. It will not only make a huge impact on our transportation system, but will also provide new standards and inroads for the use of BIM throughout the country.”

Jon Varndell
Design Director,
Link Alliance

“ Because our team is located around the world, we rely on a common data environment and BIM 360 Design to make collaborative design possible. With COVID, we had minimal downtime and the transition to remote working was seamless.”

Dean Burke
Digital Engineering Lead,
Link Alliance

“ Linking the physical and digital worlds is a game changer. With BIM, we can take the data from construction and automatically update the models, allowing a real-time feed to continuously update the design for optimized scheduling, time, and cost.”

Brice Gaudin
BIM Manager,
Link Alliance

Company: Norconsult

Location: Norway

Current phase: Construction

Completion date: November 2021

Software: Autodesk® AEC Collection, Autodesk® 3ds Max®, Autodesk® AutoCAD®, Autodesk® BIM 360® Design, Autodesk® Civil 3D®, Autodesk® InfraWorks®, Autodesk® Navisworks®, Autodesk® ReCap™, Autodesk® Revit®, Autodesk® Forge

Route E39 – Coastal Highway



Image courtesy of Norconsult and Baezeni

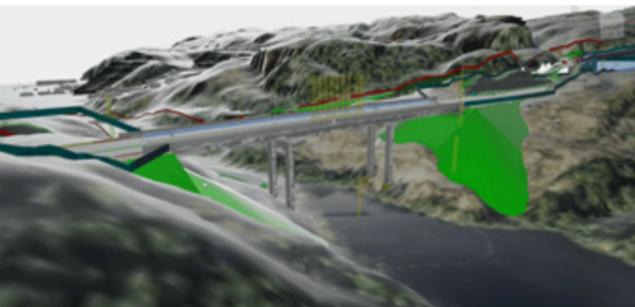


Image courtesy of AF Gruppen

Challenges

Roads, tunnels, and bridges are more than just infrastructure projects in Norway—they are strategic investments in the future. Connecting the entire country is paramount to its social and economic goals for growth.

A new Norwegian road authority with an eye on emerging technologies and sophisticated BIM techniques tapped Norconsult and AF Gruppen for the design and construction of Route E39, a 15-mile stretch of the 680-mile Coastal Highway project. This \$490 million project for the four-lane highway includes five road tunnels, several large interchanges, and bridges—including Trysfjord Bridge, the world’s largest, balanced concrete cantilever bridge of its kind.

The road authority attached an ambitious goal to the project: reduce the project’s carbon emissions associated with construction by 20%. Not only that, strict criteria were set for the model-based project’s digitalization with BIM Level 3 and BIM as a single source of information on the web for 2,000 project participants. Contractor AF Gruppen assigned Norconsult’s subsidiary, NoIS (Norconsult Informasjonssystemer), for the software development.

Solutions

For NoIS, Autodesk Forge delivered the perfect solution for building a new, web-based project collaboration tool with an integrated BIM viewer that eliminates any need for printing.

Named the ISY Project, this viewer makes it possible to access very large 3D models in a web browser. It also increases coordination between different disciplines and provides the ability for contractors and the client to access the designs anywhere and at any time—even if they are offline or on-site in a tunnel where service isn’t available. Seamless connection to data and the potentially 300,000 documents will be available through the integrations of 600 models, Sharepoint, a GIS engine, and health and safety information.

In order to meet the ambitious 20% carbon emission reduction goal, Norconsult turned to both Forge and generative design to reduce materials and waste and improve constructability. Detailed parametric design enabled a 15% reduction of CO2 emissions for the Trysfjord bridge alone. This is equivalent to the energy Norconsult as a company uses in an entire year.

Key Insights

- The team has reduced clashes and increased accuracy, while completely automating close to 70% of design updates when changes occur.
- The project has reduced over 90% of traditional drawings normally printed and produced for construction on a similar scale. The team has also increased model-based certifications that were only paper-based in the past.
- With Revit and Dynamo scripts, the team can design more details with more information in a shorter amount of time, resulting in design delivery close to 70% faster than before. For example, Dynamo scripts for the tunnels allow both the design team and the contractor to optimize the design closer to the beginning of construction.

“ The demands and rewards of BIM Level 3 require you to think in new, innovative ways for the design, model, and information management.”

Gjermund Dahl
BIM Strategist Infrastructure,
Norconsult

“ Autodesk Forge enabled our development team to create innovative, custom data integrations. We could now federate and visualize all the data across multiple platforms and provide consistent, up-to-date information to all project participants from a single source available on the web.”

Frode Tørresdal
Head of Development - BIM and Structural Engineering,
NoIS

“ For the E39 project, we needed the confidence to take a huge digital leap. Knowing we had the support and collaboration with Autodesk and with NoIS, we could meet all the customer demands—not only for this particular project, but for the entire AEC industry.”

Gjermund Dahl
BIM Strategist Infrastructure,
Norconsult

Company: RWS & UWWM-EDRC, WWW SBG, WET-IC, L&T Construction - India

Location: India

Current phase: Construction

Completion date: September 2022

Powered by: Autodesk® AEC Collection, Autodesk® AutoCAD®, Autodesk® Civil 3D®, Autodesk® Drive, Autodesk® InfraWorks®, Autodesk® Navisworks®, Autodesk® Revit®

Chandrawal Water Supply Project - 477 MLD Advanced Water Treatment Plant



Image courtesy of L&T Construction, Water & Effluent Treatment-IC



Image courtesy of L&T Construction, Water & Effluent Treatment-IC

Challenges

New Delhi is one of the largest and most densely populated cities in the world. Providing clean and safe drinking water is a monumental challenge—as well as finding the space for the actual water treatment plant.

The Chandrawal Water Supply Project - 477 MLD Advanced Water Treatment Plant—an engineering, procurement, and construction (EPC) project awarded by the Delhi Jal Board—is a first of its kind for ozonized disinfection in India at an output scale of 477 MLD (million liters per day). The L&T Construction, Water & Effluent Treatment-IC team took on the challenge of an EPC project along with operation and maintenance for 15 years in order to service the Chandrawal area, which often experiences intermittent water supply and is considered a “water stressed zone” of New Delhi.

The Engineering Design & Research Center (EDRC) of L&T Construction faced site constraints from the very beginning as it is an integration with an existing 182 MLD water treatment plant and 36 MLD recycling plant. The current plant serves 1.3 million people with a conventional treatment system that could not handle the toxic pollutants present in the raw water. The new treatment plant will serve 2.3 million people with continuous, uninterrupted water supply.

Also built within the limited space, the new administrative Centre Water Management Centre (CWMC) will completely control and monitor the entire water network, including all water treatment plants and connections for New Delhi.

Solutions

Due to the site and space constraints, it was extremely difficult to finalize the hydraulic design and installations for the project. It had to be matched with the existing 182 MLD units in order to maintain equal distribution to proposed or existing units. According to the team, they could only achieve the new additions and increasing the capacity of the plant within the current site by having the ability to view and see the 3D models with BIM.

But they aren't stopping there with 3D BIM.

4D BIM is being implemented for planning and scheduling, 5D BIM for cost monitoring during capital expenditures, 6D BIM for sustainability in the solar power energy management, and 7D BIM for operations and management.

To reach important sustainability goals set by the owner, the plant will be built with solar power generation. To create this energy efficient system, solar path analysis has been verified with the help of Revit for optimum location of panels. The use of the AEC Collection—including Civil 3D, Revit, Navisworks, AutoCAD, and Dynamo—is boosting quality construction and scheduling. Virtual construction, clash detection, and AR/VR reviews are completed before the release of any engineering deliverables.

Key Insights

- With a tight timeline and budget, the team realized 20% time savings (approximately 4500 hours) and \$300,000 USD with 3D BIM and concurrent design and engineering.
- 3D visualizations aided in seamless and easy approval from clients by transparent communication.
- With Dynamo, the team can control the parametric models in Revit, resulting in a larger number of iterations and options within a shorter period.

“ For the Chandrawal Water Supply Project, we had less than half the space typically required for a plant with this level of output. We could only approach this challenging infrastructure design by using BIM.”

M. Balasubramani
General Manager and Head of WSD - EDRC,
Water & Effluent Treatment – IC L&T Construction-India

“ We are proud to be leading these new innovations for infrastructure design and clean, safe water in India. By taking advantage of BIM and the AEC Collection, we can provide the best design and engineering options to our client and communities.”

M. Balasubramani
General Manager and Head of WSD - EDRC,
Water & Effluent Treatment – IC L&T Construction-India

“ Only with BIM, we were able to optimize the plant layout and engineering to save time for all of the deliverables and approval process.”

Arun Venkadesh
Senior Engineering Manager
- BIM and Digital
IC L&T Construction - India

Arun Krishna
Assistant Engineering Manager – BIM, WSD-EDRC,
Water & Effluent Treatment – IC L&T Construction-India



Image courtesy of L&T Construction, Water & Effluent Treatment-IC

Building Design

THE FINALISTS

Large project

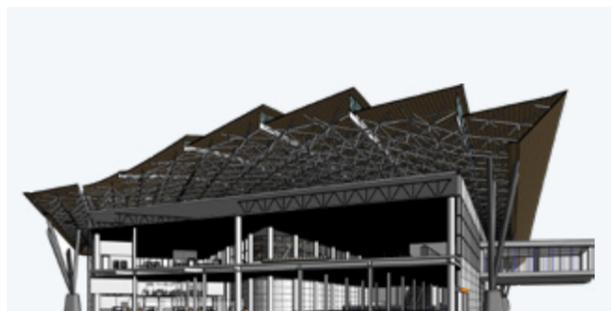


Kai Tak Sports Park
Hip Hing Engineering Co., Ltd. & Kai Tak Sports Park Ltd., Hong Kong

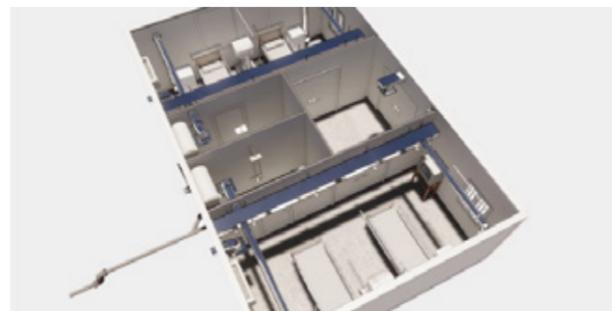


ES CON FIELD HOKKAIDO
Obayashi Corporation, Japan

Medium project



Panama Cruise Port
Mallol Arquitectos, Panama

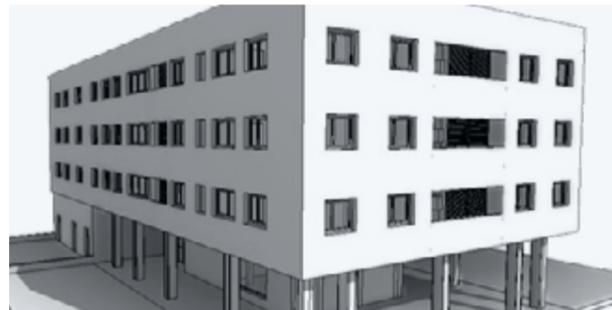


Wuhan Huoshenshan Hospital
CITIC General Institute of Architectural Design and Research Co., Ltd., China

Small project



Fuzhou Southeast Eye Hospital
Fujian BOYORK Architectural Design Co. Ltd., China



BIM for Public Rental Housing Management
Berrilan BIM, Spain

With BIM, the building design process benefits from new possibilities for increased efficiencies—including the advancements now available with generative design. The AEC Excellence Awards 2020 Building Design category winners showcase the tremendous advancements with an integrated technology approach. Discover the accomplishments from teams who designed a sustainable, human-made floating island; an office building with strict guidelines; and an in-patient center that was transformed into an emergency COVID-19 support hospital.

THE WINNERS

Large project



South Beach Psychiatric Center New Inpatient Building
STV - Architectural Resources, United States
Pages 16-17

Medium project



Wild
Katrina Urbanik AS, Norway
Pages 18-19

Small project



Vigentina 9
Lombardini22 S.p.A, Italy
Pages 20-21

Company: STV – Architectural Resources

Location: United States

Current phase: Commissioning and Handover

Completion date: April 2020

Software: Autodesk® AEC Collection, Autodesk® AutoCAD®, Autodesk® Civil 3D®, Autodesk® Navisworks®, Autodesk® ReCap™, Autodesk® Revit®, Autodesk® 3ds Max®, PlanGrid

South Beach Psychiatric Center New Inpatient Building



Image courtesy of STV – Architectural Resources



Image courtesy of STV – Architectural Resources

Challenges

The new 262-bed, 5-story, 221,000 square-foot South Beach Psychiatric Center New Inpatient Building will provide modern, inpatient care on a 51-acre campus. But the facility’s intended use has changed dramatically in the age of COVID-19. And its origins started from another devastating event.

In 2012, Hurricane Sandy ravaged the East Coast, leaving massive damage in its wake. The NYS Dormitory Authority and Office of Mental Health required one new center to replace the now obsolete buildings right by the ocean. However, it wasn’t a simple replacement and required intensive design problem-solving for STV – Architectural Resources.

The site is within a marshland rated as FEMA’s highest-risk flood zone. The developed plans raised the ground 20 feet above sea level, placing the building and all utilities on pilings. The recreation yards and grounds also needed to be raised above grade to a height above the 500-year floodplain. And the building design required optimized viewing angles at observation desks for patients’ and staff’s security and safety.

The final punch list was being completed when COVID-19 struck in March. Within two days, STV – Architectural Resources delivered plans to shift the behavioral health center into an emergency COVID-19 support facility for the Staten Island University Hospital.

Solutions

During the design phase, VR experiences from Revit models informed key stakeholders of design decisions, especially in terms of the radial design, patients’ rooms, and removing blind spots from the observation decks. In turn, full-size mock-ups were created for final sign-off.

The LOD 350 building information model of multiple trades (architectural, structural, mechanical, electrical, plumbing, fire protection, fire alarm, security, telecommunications, landscape, and furnishings) was developed in Revit and fully coordinated with precise information extracted from Civil 3D survey content via Navisworks Manage.

This coordination enabled the design of underground utilities with pile placement and a complex concrete-encased duct bank system that was surrounded by 20 feet of soil fill. Navisworks also enabled the coordination of code requirements, client patient safety standards, and the facilities’ maintenance needs using a clash detection protocol.

The results of the entire design process allowed for the creation of highly detailed construction documents that, when translated and handed to the construction team, reduced time in creating shop drawings, eliminated change orders, and abbreviated construction.

On top of it all, the expedited timeline to shift the facility to an emergency COVID-19 support hospital required immediate distribution of digital information and precise coordination of construction conditions—all of which was made possible with BIM.

Key Insights

- The STV – Architectural Resources team provided precise documentation and in-depth recommendations, such as locations for potential gas hook-ups and beds, to the Army Corps of Engineers to refit the center into a COVID-19 support hospital. Within two weeks, the hospital had been converted and was open to accept patients.
- Intelligent construction documents were provided to the entire project team with the use of PlanGrid and updated throughout construction, minimizing time required to distribute information. This was vital at the time the hospital was converted into a COVID-19 support hospital.
- Drawings, photos, and current conditions of construction were clearly documented so the transition team could make rapid decisions to support the change of use and the emergency construction. When the time comes, BIM models and documentation will help with the transition back to its intended use as a behavioral health facility.

“ From an engineering standpoint, it was a very intense challenge with fill and pilings. With BIM, we could easily coordinate the architecture, structural, and electrical teams to address the small variables and tolerances with the piles and running the utilities underneath.”

César A. Cedano
Director of Technology and BIM,
STV – Architectural Resources

“ One of the biggest challenges to a successful project is maintaining communication throughout the lifecycle. With BIM, we can all speak the same language—whether it is with the stakeholders, the contractors, or the engineers.”

Jared Oakley
AIA, Project Manager / Project Architect,
Architectural Resources

“ The true testament for the success of this project came when faced with the threat of COVID-19. The technologies used for its design foundation enabled the project to pivot and provide the means to save lives.”

Christina Whipple
AIA, Project Manager / Project Architect,
STV

Company: Katrina Urbanik AS

Location: Norway

Current phase: Architectural Design

Completion date: May 2025

Software: Autodesk® AEC Collection, Autodesk® 3ds Max®, Autodesk® BIM 360® Design, Autodesk® InfraWorks®, Autodesk® Navisworks®, Autodesk® ReCap™, Autodesk® Revit®

Wild



Image courtesy of Katrina Urbanik AS

Challenges

Imagine designing a self-sufficient, biodiverse floating island on the sea in one of the most northern portions of Norway. The Northern Lights are easily seen and there may be 24 hours of daylight or night depending on the time of year. This floating island also includes flexible housing, recreation, innovative greenhouses, large sloping roofs covered in solar panels, and workshops filled with 3D printers.

Katrina Urbanik AS is making this a reality with a bold vision for WILD—a new urban development with cabins and residential living areas on a 181-meter in diameter, human-made island with three “mainlands.” The idea for WILD is based on the need to provide solutions to simultaneous, worldwide crises and create a new urban life, based on a circular economy, that will empower cities and communities. Its design has the capability to produce its own power, fresh water, food, and heat as a closed biotope loop system.

Obscured from view, the bottom of the complex will include a car park, tidal energy plant, and turbines. Self-curing, bio-active concrete will not only absorb CO2, but also boost and encourage sea life. Local species of mussels will grow on the island facade. A vertical farm illuminated by LED lamps and tidal and solar energy will provide up to 60% of the food intake for the community.



Image courtesy of Katrina Urbanik AS

Solutions

Katrina Urbanik AS has long recognized the cost-saving benefits of generative design to develop optimized structures using parameters such as expected loads, available design space, and materials.

For WILD, they asked a new question: “How can we rapidly create building façade options and decide which façade to use through comparative analysis?”

The team developed a proprietary algorithm and a streamlined process with Dynamo and Revit. They then created a parametric, pattern-generating system that analyzes and compares façade options in relation to daylight penetration and solar insulation, improving the designer’s ability to rapidly create and test multiple project scenarios.

Katrina Urbanik AS also uses BIM 360 Docs and BIM 360 Design cloud-based services to connect project teams with centralized access to data for full project visibility, real-time project status, multi-discipline coordination, and design collaboration.

With the teams located in multiple places, they can collaborate efficiently with anytime, anywhere access—all with precise project control and quality management. Integrated models within a single environment allow for more effective communication and use of data.

As the WILD project nears completion of the review phase with the local government, the collaboration with BIM 360 has been even more important to their productivity and communication during the pandemic.

Key Insights

- With the Autodesk AEC Collection, the team has saved 30% of design time, while successfully meeting deadlines due to transparency and collaboration; avoiding miscommunications; and creating more thorough documentation.
- For WILD, BIM goes beyond the limits of what you might expect. For a floating island project, the design team could “go crazy” with ideas and easily check feasibility with other disciplines. They could even work with marine life specialists to discover the symbiosis of sea life with the construction and share those ideas with structural and materials engineers.
- Sustainability and evolution in action is critical to WILD. In order to ensure electricity demand, all buildings will be clad with 1500 square meters of solar roofs, which will provide 26,7 MWh annual production. This will save approximately 78,936 kilos of CO2 per year that equals the amount of carbon sequestered annually by 2000 square meters of forest.

“ The concept and design of WILD is to promote health and well-being for residents by creating positive engagements and an island that is completely self-sufficient.”

Katrina Urbanik
Founder and Principal of Katrina Urbanik AS and Idea and Design Principal for WILD

“ Undoubtedly, BIM brings a complete transformation for projects. It erases communication lags, maintains updated information, brings operational efficiency, improves coordination among departments, and gives an overall efficiency to the entire life span of the project. BIM is a must.”

Katrina Urbanik
Founder and Principal of Katrina Urbanik AS and Idea and Design Principal for WILD

“ I always appreciate that we can use BIM technology in the design process to coordinate and integrate with other disciplines and experts. This is the basis that makes it easier to challenge ‘impossible’ moments in design and make it possible—even for a sustainable, floating island.”

Katrina Urbanik
Founder and Principal of Katrina Urbanik AS and Idea and Design Principal for WILD

Company: Lombardini22 S.p.A.

Location: Italy

Current phase: Construction

Completion date: June 2021

Software: Autodesk® AEC Collection, Autodesk® ReCap®, Autodesk® 3ds Max®, Autodesk® AutoCAD®, Autodesk® Navisworks®, Autodesk® Revit®

Vigentina 9

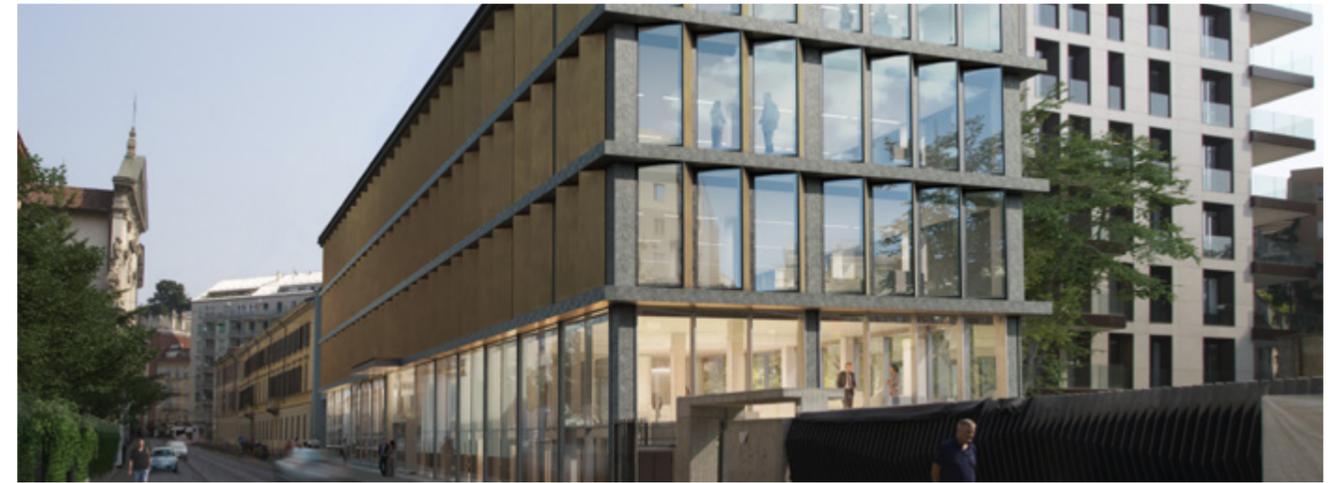


Image courtesy of Lombardini22 S.p.A

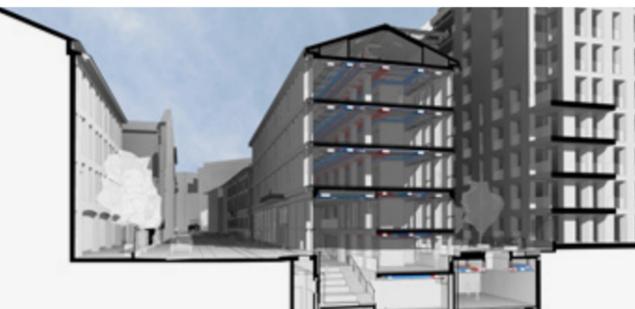


Image courtesy of Lombardini22 S.p.A

Challenges

Milan’s dense and historic streets charm visitors but can confound developers, who must grapple with strict preservation guidelines for the look and feel set by the Commission for Cultural Heritage. So when the Lombardini22 team set out to refurbish Vigentina 9 near Milan’s city center, it established a cross-disciplinary BIM process for collaboration.

The team was required to keep the structure intact while planning for safe demolition of the interior. The refurbishment of the existing building updated the indoor spaces and the façade, providing a new dynamism to the building while maintaining the structural framing of the original building.

Interior upgrades and new floor plans—including the removal of several sets of stairways to create a more open feel—will house offices for a private bank and an insurance company. The design is focused on connecting the outdoors with the indoors, from the street entry to interior garden.

For the Vigentina 9 project, the BIM design process needed to be adaptable to different scenarios and design phases while providing all the documentation needed to acquire permits and approvals. And this even included last-minute changes from both the commission and the owner who wanted to move from LEED Gold to LEED Platinum.

Solutions

At the outset of the project, a point-cloud survey with ReCap was completed to determine the exact shape and details of the existing building. The survey was imported into Revit to define the constraints and limitations. The design and models could then take shape with full knowledge and transparency of what could or could not be done.

From the beginning, data management was imperative. A coordinated model, database, and custom workflow with keynotes in Revit enabled clear communication, coordination throughout the design life cycle, resulting in less time and cost during construction. This workflow and management were especially important given the number of different documents and input, from government building permits to the Cultural Heritage’s supervision.

On the sustainability side, Revit and custom Dynamo scripts allowed the team to calculate credits quickly and accurately for the LEED Platinum goal, including surrounding density, building life cycle impact reduction, and minimum indoor air quality performance. The façade is also redesigned with three-dimensional triangular elements that minimize summer solar gain while reinterpreting the historical context of the original building.

Key Insights

- With BIM, efficient management of phases and data consistency was particularly helpful to adapt to different project variations during permitting documentation and to manage demolition phases and tendering. Cloud-based databases also granted access to multiple stakeholders and provided data consistency to effectively export a custom-mapped IFC model to control costs.
- An efficient workflow enabled the team to overcome site limitations and time schedule constraints while taking advantage of a cross-disciplinary BIM approach that enhanced the BIM-LEED implementation.
- Coordination across disciplines was performed with Revit for customized views and schedules and Navisworks for clash detection. In order to better coordinate at each stage, multiple models were created for different disciplines according to the project schedule design and construction.

“ With BIM, we could take different approaches to how a ‘new’ building could function within an existing structure and provide a more interesting work environment for the clients.”

Andrea Meneghelli
BIM Coordinator,
Lombardini22 S.p.A.

“ The AEC Autodesk Collection facilitated a continuous loop of incremental updates and feedback with the cross-disciplinary team, enabling coordination and design optimization to minimize changes during construction.”

Andrea Meneghelli
BIM Coordinator,
Lombardini22 S.p.A.

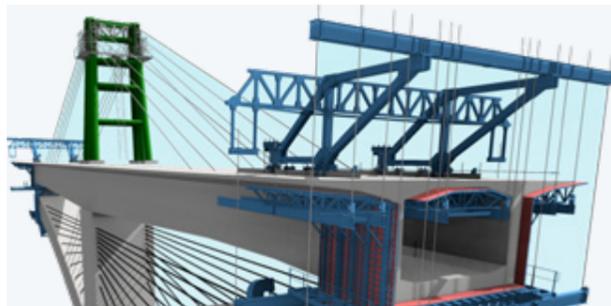
“ BIM methodology, especially with the use of Revit and Dynamo, was vital to manage data and documentation to keep track of specifications, quantity take-offs, and cost control throughout the design phases.”

Andrea Meneghelli
BIM Coordinator,
Lombardini22 S.p.A.

Construction

THE FINALISTS

Large project



PPP Project on the West Section of the Second Cross Line of Chongqing Highway
China Construction Tunnel Corp., Ltd. & China Construction Fifth Engineering Division Corp. Ltd., China

Medium project

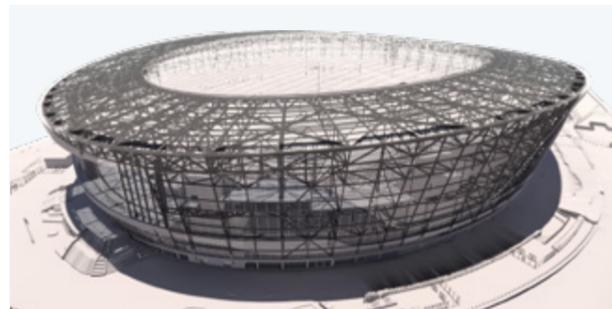


Manado Bitung Toll Road Project
PT PP (PERSERO) TBK, Indonesia

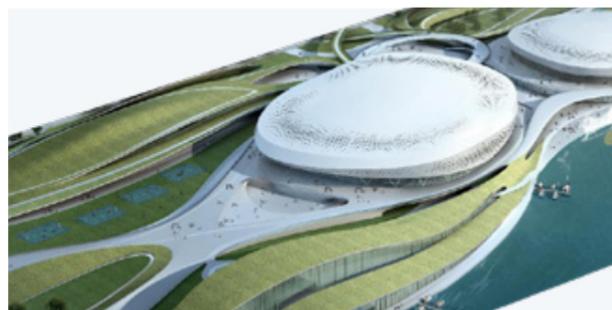
Small project



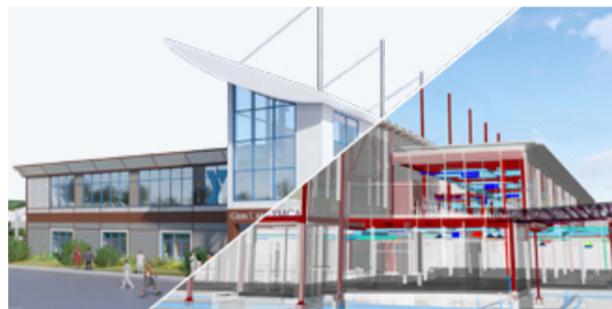
Dublin Hyperscale Data Center
Kirby Group Engineering, Ireland



Allegiant Stadium
Mortenson | McCarthy, Joint Venture, United States



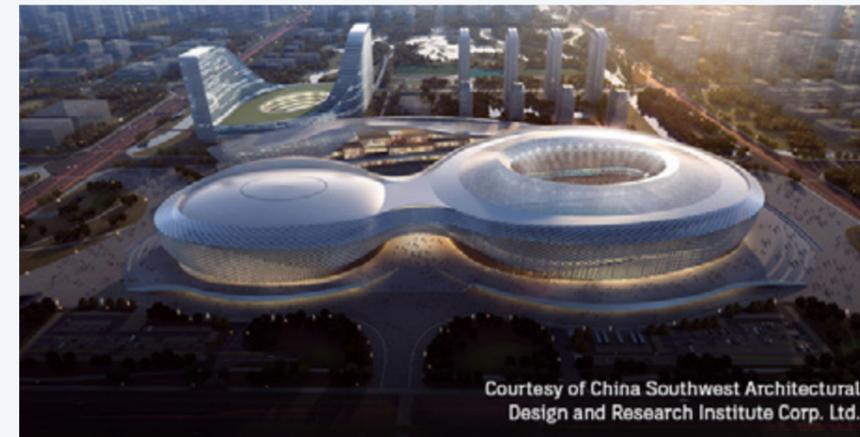
Jinjiang Second Sports Center
CSCEC Strait Construction and Development Co. Ltd., China



Fuller Mixed-Use Venture Development (FMUV)
Windover Construction, United States

With model-based workflows and integration capabilities provided by BIM, the construction industry benefits immensely from increased cost saving, better quality, and improved schedules across all project types and sizes. The construction category winners of the AEC Excellence Awards 2020 completely demonstrate this success and embracing technology both on and off the site. Explore how teams constructing a clinic, data center, and a stadium used BIM to meet and even exceed their project goals.

THE WINNERS



Large project

[Chengdu Phoenix Mountain Sports Park](#)
China Construction Eighth Engineering Division Corp. Ltd, China
Pages 24-25



Medium project

[Multinational Data Center, Malmo](#)
John Sisk & Son, Sweden
Pages 26-27



Small project

[Kallang Polyclinic and Long-Term Care Facility](#)
Tiong Seng Contractors Pte Ltd, Singapore
Pages 28-29

Company: China Construction Eighth Engineering Division Corp. Ltd.

Location: China

Current phase: Construction

Completion date: February 2021

Software: Autodesk® AEC Collection, Autodesk® 3ds Max®, Autodesk® AutoCAD®, Autodesk® BIM 360®, Autodesk® BIM 360® Design, Autodesk® Navisworks®, Autodesk® ReCap™, Autodesk® Revit®

Chengdu Phoenix Mountain Sports Park

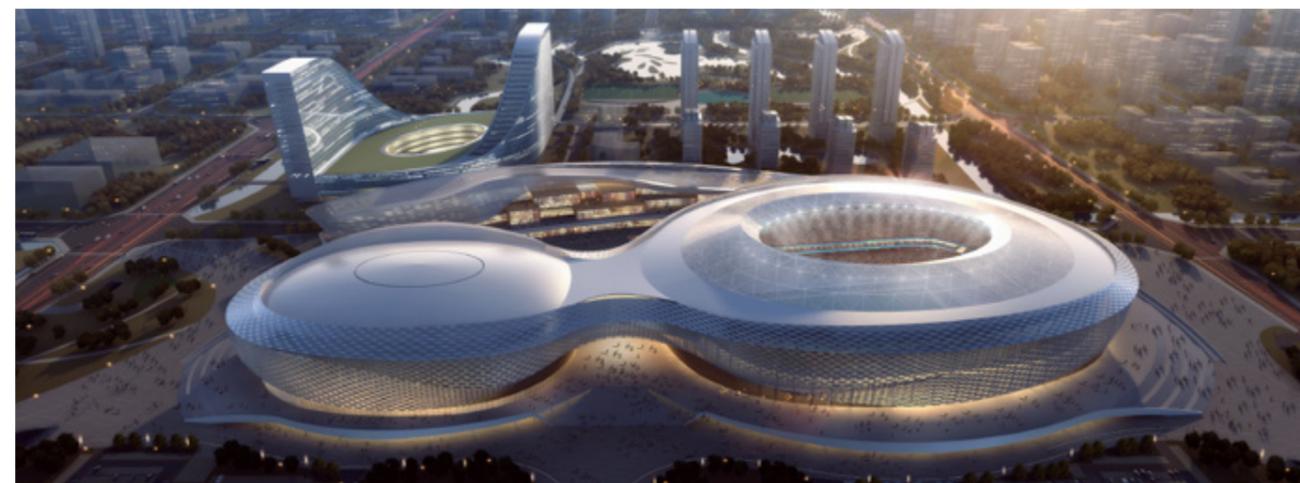


Image courtesy of China Southwest Architectural Design and Research Institute Corp. Ltd.



Image courtesy of China Construction Eighth Engineering Division Corp. Ltd.

Challenges

The construction of a stadium is a feat in and of itself. How about a complex with both a 60,000-seat stadium exclusively for football and an additional 18,000-seat arena? Not only that, the stadium boasts one of the world's largest curved, open cable domes.

China Construction Eighth Engineering Division Corp. Ltd. is leading this massive undertaking for the Chengdu Phoenix Mountain Sports Park. With a total area of 43.67 hectares, the complex will reach 456,000 square meters in total gross floor area and a construction cost of 4.49 billion CNY (\$657 million USD). The sports complex is intended for international sporting events with current plans to host the 2021 Summer World University Games and the Asian Football Confederation's AFC Asian Cup in 2023.

Of course, the large scale of the construction area, a tight schedule, and complex, technical construction challenges—including the stadium's groundbreaking roof—present unique challenges and opportunities.

“ The design and complexity of the Chengdu Phoenix Mountain Sports Park is a first of its kind for sports and stadiums.”

Aisheng Wei
Project Chief Engineer,
China Construction Eighth Engineering Division Corp.
Ltd. Southwest

Solutions

By using BIM and the Autodesk AEC Collection, the team could tap into diverse types of software to meet the needs and complexities of the Chengdu Phoenix Mountain Sports Park.

With a large, double-curved steel space frame, the massive, open cable dome roof of the football stadium is the first of its kind in the world with an ETFE membrane structure that has the largest area in the world.

All of the arc-shaped pipes, steel components, and membrane structures were completed with detailed designs in Revit and then exported to the factory for production. Once manufactured a digital pre-assembly is conducted to verify the construction process. During and after the installation, the team performed 3D scans of the roof to create a point cloud and verify construction quality.

While AutoCAD was used for preliminary design of construction drawings, Revit provided the in-depth models and design of the structures, MEP, and membrane structure. The team used Navisworks to integrate multi-discipline models, check for collisions, identify drawing problems or design defects, and create efficient scheduling.

And with many stakeholders for the project, BIM 360 cloud platform allowed the team to share BIM models and achieve 3D visualization of the design, progress, quality, and safety. Animation and renderings for better understanding were made possible with 3ds Max as well.

Key Insights

- With BIM and the AEC Collection, design and construction is being completed within 730 days, which is 30% less than a stadium project at a similar scale.
- BIM is shortening the construction period by 132 days.
- Projected cost reduction of more than 100 million CNY (\$14.5 million USD) with the use of BIM.

“ BIM is the core of digital construction, and it's the only way to achieve optimum quality, scheduling, accuracy, and time and cost savings.”

Qin Zhang
BIM Director,
China Construction Eighth Engineering Division Corp.
Ltd. Southwest

“ We are proud of the incredible quality and innovation for Chengdu Phoenix Mountain Sports Park. With BIM, we can make the vision a reality.”

Huoming Liu
Project Manager,
China Construction Eighth Engineering Division Corp.
Ltd. Southwest

Company: John Sisk & Son

Location: Sweden

Current phase: Construction

Completion date: December 2020

Software: Autodesk® AEC Collection, Autodesk® 3ds Max®, Autodesk® AutoCAD®, Autodesk® BIM 360® Design, Autodesk® Civil 3D®, Autodesk® Revit®, Autodesk® Recap®, Autodesk® Navisworks®

Multinational Data Center, Malmo



Image courtesy of John Sisk & Son



Image courtesy of John Sisk & Son

Challenges

From the exterior, a data center may look like a straightforward structure. The combination of its complex infrastructure and mechanical and electrical demands, however, makes it one of the most complex construction projects.

The Multinational Data Center will house and run a vast array of networks and servers for massive data processing and storage. That means state-of-the-art mechanical and electrical installations and precise attention to the smallest of details for construction and handover are necessary. Everything must be accounted for.

The John Sisk & Son team has years of experience in data center construction and brings a fine-tuned digital project delivery approach to this type of project. On this Multinational Data Center, the team faced the challenge of an aggressive baseline schedule and a fast-tracked construction phase. Complex underground services infrastructure added another layer to this challenge.

Meeting all these demands for a complex data center was one thing. It was quite another when COVID-19 struck and true collaboration would be put to the test.

Solutions

While completing the site mobilization, Sisk spearheaded preconstruction coordination for the underground services infrastructure. They automated the process of aggregating the design team's BIM models by integrating Navisworks clash detection tools with BIM 360. The cloud-based BIM approach helped optimize the design and resolve all issues, helping to significantly reduce the risk of onsite issues.

Sisk also placed a major focus on understanding and meeting their client's requirements through a process of "beginning with the end in mind." This ensures information can be used effectively throughout the project and lifecycle of the data center. Thanks to Sisk's management team, they achieved a common data environment for information management, 3D visualizing, quality control, change management, and the ability to support the project's huge amount of data and BIM models detailed at LOD 500.

With the vast quantity of electrical services, Sisk relied on BIM to reach a new level with DfMA for efficient coordination, prefabrication, and installation.

For example, every single bracket supporting the electrical cable trays—the main services in the building—was tagged with its exact location in the BIM model. In order to reduce time and waste, a new, systematic approach with BIM brought the electrical and mechanical contractors together very earlier in the process. The elements were then fabricated in Ireland for shipment to Sweden.

Key Insights

- The Sisk team built dashboards that stored live clash trend reports to track progress weekly, resulting in a 50% efficiency increase in the BIM management process compared to traditional, manual methods of construction coordination without the automating power of the cloud.
- The tight integration between BIM 360 Docs, Microsoft Power BI, and Sisk's own "Design Changes Control" dashboards provided the commercial teams a faster way to visualize the cost and/or schedule impacts, reducing the overall takeoff by a potential of 40%.
- By using BIM 360, the project continued uninterrupted as construction continued in Sweden during the COVID-19 pandemic.

"Our collaborative working environment would not be possible without Autodesk BIM 360. More importantly, it comes down to the Sisk team and our innovation, passion, and consistency to deliver the best project outcome for our clients."

Cillian Kelly
Head of Digital Project Delivery Ireland and Europe/CSD,
John Sisk & Son

"Due to the project's size, complexity, and the enormous amount of model data to be developed to LOD 500, Sisk and the wider project team relied on the BIM 360 cloud-based platform and the integrated BIM tools in the Autodesk AEC Collection to improve collaboration, efficiency, and stakeholder engagement."

Jose Carlos Peñas
BIM Engineer Malmo,
John Sisk & Son

"Every business in the construction industry has been in some way affected by COVID-19. Sisk chose to implement Autodesk cloud-based platforms to enable a seamless, collaborative working environment during COVID-19 and maintain productivity using Autodesk BIM 360 from multiple locations across Europe."

Warren Judge
BIM Lead - Data Centers,
John Sisk & Son

Company: Tiong Seng Contractors PTE LTD

Location: Singapore

Current phase: Construction

Completion date: March 2021

Software: Autodesk® AEC Collection, Autodesk® BIM 360® Design, Autodesk® Navisworks®, Autodesk® Revit®

Kallang Polyclinic and Long-Term Care Facility



Image courtesy of RDC Architects

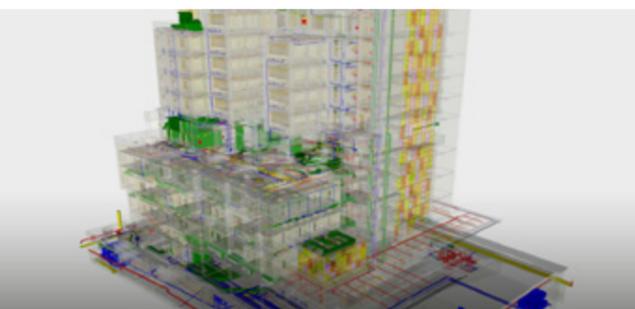


Image courtesy of Tiong Seng Contractors PTE LTD

Challenges

No two healthcare facilities are alike—and that’s especially true for the Kallang Polyclinic and Long-Term Care Facility in Singapore. In fact, it is a hybrid of two healthcare components in a single building.

The building consists of a Polyclinic with a wide range of clinical facilities and a Long-Term Care Facility that provides resident care. Since the design, purpose, and end users of the two areas are very different and with multiple stakeholders for decision-making, the construction process posed an even bigger challenge.

The employer’s requirement for detailed floor plans and drawings—known as a “room book” in Singapore—is unique and essential for a well-coordinated project delivery. The room book drawings must detail every aspect of a room, from the ceiling height down to the placement of the bed and even the paint color. All these details must have final sign-off before any construction can begin.

A growing demand to use PPVC (Prefabricated Prefinished Volumetric Construction) in Singapore was another factor. The two different uses of the facility dictated two different construction processes where prefabrication could be used much more extensively in one area than the other.

Solutions

Tiong Seng Contractors PTE LTD took a thoughtful approach to both uses of the facility. Since every detail of the building must be approved from the outset, a seamless feedback and sign-off cycle was imperative.

Using BIM and Integrated Digital Delivery (IDD) together brought a new level of coordination for the team, including shorter review cycles and more visibility via Revit models and an in-depth, six-sided view of each room. The team developed a “digital progress claim” system on Autodesk Forge for site engineers to report and accomplish tasks. And VR experiences helped both the owners and end users, such as the actual doctors and nurses, to visualize the rooms and provide feedback for faster adjustments and approvals.

For the construction, Levels 1 to 5 required a more conventional approach due to the individuality of each room and needs. However, prefabrication was used as much as possible for structural elements, including precast columns, slabs, and the façade.

DfMA and prefabrication were perfectly suited for levels 6 to 9 due to the regularity of each room’s layout and use. The team deployed more than 130 units of PPVC, which were fully coordinated through BIM and IDD before being fabricated in the factory and delivered to the site.

Key Insights

- Using BIM and IDD achieved 25% reduction in construction time while meeting high-quality construction expectations.
- More than 100,000 assets in the project required documentation, such as the type of furniture, its location, and the serial number. Dynamo and Python scripts were used to generate detailed, six-sided views to aid in the complex asset management and stakeholders’ room book approvals, saving the team more than 1,000 hours.
- By harnessing the capabilities of BIM and IDD, collaboration sessions among stakeholders further optimized PPVC modular units. The project team was able to further reduce the numbers of modular unit types, shortening the fabrication/construction timeline by 25% and saving more than 5,000 hours

“ Even with the unique challenges and requirements from the start, we were able to tackle them with BIM, collaboration, and new integration processes.”

Lim Tee Yoke
Head of Productivity,
Tiong Seng Contractors PTE LTD

“ BIM and IDD help integrate our entire process together because it isn’t as simple as getting a room done in the factory and then swinging it in. Before that can be done, we need all the stakeholders to come together and make sure that everything is well coordinated.”

Edwin Lee
Business Unit Head,
Tiong Seng Contractors PTE LTD

“ With Autodesk AEC Collection and BIM 360 solutions, the collaboration between project stakeholders is seamless. We saw a 33% improvement in resolving coordination issues as compared to past projects where BIM 360 was not adopted.”

Ye Zaw Lin
Corporate BIM Manager,
Tiong Seng Contractors PTE LTD

Company: Build Health International

Location: Haiti

Completion date: October 2019

Powered by: Autodesk® AEC Collection, Autodesk® AutoCAD®, Autodesk® BIM 360® Design, Autodesk® BIM 360®, Autodesk® Civil 3D®, Autodesk® Insight™, Autodesk® Revit®

Saint Rock Hospital

As this year’s recipient of the Better World award for the AEC Excellence Awards 2020, Build Health International truly embodies what it means to build a better world with the Saint Rock Hospital project in rural Haiti. Responding to the region’s urgent need for expanded health services, this new 13,600-square-foot nonprofit health facility will include emergency and maternal health services, as well as expanded facilities for in-and out-patient care, mental health counseling, dental care, HIV treatment, and volunteer accommodations.

Challenges

Non-profit Build Health International (BHI) believes that every person has the right to dignified healthcare and recognizes that inadequate infrastructure often stands in the way of high-quality care. BHI is taking on this challenge by collaborating with frontline healthcare nonprofits to deliver the medical structures critically needed in many low resource areas around the world.

Take, for example, their current project for the Saint Rock Haiti Foundation – Saint Rock Hospital in the Carrefour commune of Ouest, Haiti. Even though the community is located just 10 miles from Port-au-Prince, it can take villagers more than two hours to reach medical care due to its mountainous location and treacherous, unpaved roads. In addition, many services—especially maternal care—are either nonexistent, unreliable, or cost-prohibitive in the region.

The current, three-room primary clinic in the area has seen patient numbers rise from 100 in 2002 to more than 50,000 today. Those seeking care may arrive before sunrise and wait all day to be seen. And Haiti’s maternal mortality rate is the highest in the Western hemisphere.

In order to increase the capacity of the clinic, expand services, and solve limitations such as its energy supply, BHI partnered with Saint Rock Haiti Foundation to construct a new 13,600-square-foot primary care hospital down the road from the current clinic. Not only that, it all must be done with a very limited budget and a site located—quite literally—on the side of a mountain.



Image courtesy of Renato Kasai/BHI

Solutions

From site grading and construction to internal communications and design iterations, every stage of the Saint Rock Hospital project benefited from and was made possible by Autodesk software and the AEC Collection.

The team efficiently addressed the immense challenges with the site grading in Civil 3D, including the design of roads to ensure emergency vehicle and pedestrian traffic and the coordination of underground electrical, wastewater drainage, and utilities.

Showing the proposed design iterations in a 3D form to stakeholders—including staff of the clinic—allowed the design team to demonstrate the intended circulation flow of patients, staff, and materials, as well as the grade of roads and paths to ensure accessibility. Through Revit’s 3D views, renderings, and aerial perspectives, BHI could share significant detail about each space even for non-technical users, leading to improvements for privacy, security, and cultural preferences.

The sustainability of Saint Rock Hospital was a key design goal, keeping in mind its already low operational budget. A solar microgrid will be installed in the late phase of construction to help supply consistent electricity when the hospital is in full operation. BHI also used Insight 360 to iterate multiple options and maximize energy efficiency through natural daylighting and passive ventilation. With Revit, the team could design for the construction methods that are most prominent in Haiti, ensuring that construction can be carried out by a local team with local materials.

Key Insights

- In building the new Saint Rock Hospital, BHI will expand the community’s healthcare capacity by 400%. The new hospital will be able to treat 200 patients a day, with increased quality of care, expanded maternity care, and a wider range of services on an environmentally and fiscally sustainable campus.
- With the challenging topography, BHI leveraged drones for a detailed site survey followed by a second survey after the preliminary earthwork. The drone data informed BHI’s site models in Revit and grading design in Civil 3D as the team tested various design configurations to maximize the site and reduce construction costs.
- BIM 360 was an essential tool for file sharing and coordination, particularly when the design team was forced to work remotely due to the COVID-19 pandemic. Despite this unexpected challenge, the BHI team completed a successful drawing package submission to the client.



Image courtesy of Renato Kasai/BHI

“ Collaboration is at the core of all of our work. With a heavy reliance on the AEC Collection, the Saint Rock Hospital project demonstrates how healthcare infrastructure transformation can become a reality under even highly challenging logistical, geographic, and budgetary conditions.”

Allison Denisky
Sr. Architectural Designer,
Build Health International

“ We always have to keep iterating and adapting to overcome the challenges. Sometimes it can seem impossible at first, but we can always make it possible with Autodesk software.”

Fatlum Troshani
Project Engineer,
Build Health International

“ According to estimates from the United Nations, a woman in Haiti has a one in 80 chance of dying due to pregnancy or childbirth. We’re incredibly proud to help contribute to the creation of the new Maternal Center of Excellence within Saint Rock Hospital and the vital services it will provide to women in the region.”

Jim Ansara
Managing Director,
Build Health International

Company: Skanska USA

Location: United States

Completion date: March 2022

Powered by: Assemble, Autodesk® BIM 360, Autodesk® Navisworks®, Autodesk® ReCap™ Pro, Autodesk® Revit®, Autodesk® Revit®

Georgia Institute of Technology, Kendeda Building for Innovative Sustainable Design

As this year's recipient of the Sustainability Innovation award for the AEC Excellence Awards 2020, Skanska USA has accomplished an incredible feat with the Georgia Institute of Technology, Kendeda Building for Innovative Sustainable Design. While most construction projects experience challenges of all types, what makes the Kendeda Building for Innovative Sustainable Design extremely unique is that it is built to the rigorous sustainability guidelines of the International Living Future Institute's Living Building Challenge 3.1 standard and LEED Platinum status.

Challenges

Is a net-positive, sustainable, urban building really viable in the hot and humid Southeastern United States? The Kendeda Fund and Georgia Tech sought to prove it's possible with the new Kendeda Building for Innovative Sustainable Design.

The 36,978 square foot education and research facility includes a 170-person auditorium, classrooms, maker spaces, a green roof outdoor space, cisterns for rainwater collection and reuse, and integrated plantings around the site to provide food for students throughout the year. The project achieves a net-positive footprint for energy, water, and waste with sustainable elements such as composting toilets, solar roof panels, and wetlands to naturally treat runoff.

Salvaged materials were an important component to meet 90-100% recycling requirements. Materials even came from the campus itself, such as the original 1880s pine joists discarded after a tower renovation and reused in a stairway.

With only 11 fully certified Living Buildings in the United States, nothing could be taken for granted with the project and its requirements. Design obstacles and changes required a new level of agility for planning. Every material was exhaustively researched and documented—not only for what it contained on the Red List, but also the entire supply chain and how it was sourced. To help further reduce carbon emissions as a result of construction in the future, Skanska USA worked with Autodesk and other industry leaders to develop and launch the Embodied Carbon in Construction Calculator (EC3).



Image courtesy of Jonathan Hillyer

Solutions

To comply with the 20 Living Building Challenge requirements and meet the client's goals, Skanska USA explored multiple design options for a regenerative building. Early phases of the project also underwent major shifts to meet the program and the budget.

The team used Revit and Assemble to model and price these complex, evolving designs accurately and quickly. Skanska USA went a step further with real-time rendering in VR to visualize the choices for the client. The team could show the sustainable material, the cost associated, and toggle through the options to really experience the differences. For example, a VR demonstration revealed that 45% glazing of the façade allowed adequate natural light at a cost that was still within budget.

Skanska USA also relied heavily on Navisworks for coordination and clash detection of the facility, from the underground utilities up through the second floor. This included fire protection, MEP, prefabricated piping, and additional systems such as potable water.

Once construction began, the team used BIM 360 to stay on schedule and within budget and to communicate the latest information being generated in the office to subs in the field.

Key Insights

- During construction, Skanska USA used drones to capture project progress photos and videos. With Autodesk Recap Photo, Skanska processed drone photos to create interactive 3D point cloud and mesh models to share site conditions for the schedule.
- A new walk-out green roof for the Georgia Tech Urban Honey Bee Project was added to the scope during the schematic design phase. After evaluating different solutions with Revit and Assemble that wouldn't impact the sustainable guidelines already met, the team made space for the green roof by relocating two classrooms to another section of the building and lowering the ceiling of the auditorium.
- At turnover, Skanska delivered a COBie-formatted construction asset database, a requirement outlined by Georgia Tech. This was a structured collection of commissioning data pulled from BIM 360, warranties, as-built drawings/models, and construction submittals. This organized database helped provide day-one operational readiness to facility managers.



Image courtesy of Jonathan Hillyer

“ Often during the Kendeda Building for Sustainable Innovation project, one change would have a cascading effect on all of the imperatives we needed to meet for the Living Building Challenge. We simply couldn't have met this goal for a regenerative building without BIM and Autodesk technology.”

Jimmy Mitchell
Director of Project Solutions,
Skanska USA

“ No matter the type or size of project, BIM can help you achieve sustainability goals. Always think about the opportunities not to waste, even in terms of becoming a paperless project.”

Jimmy Mitchell
Director of Project Solutions,
Skanska USA

“ Going into this project, we couldn't just rely on past experiences or say 'I did this on my last job.' There are no comparisons. You had to look at it differently with a new mentality and approach.”

Matthew Williams
Senior Project Manager,
Skanska USA

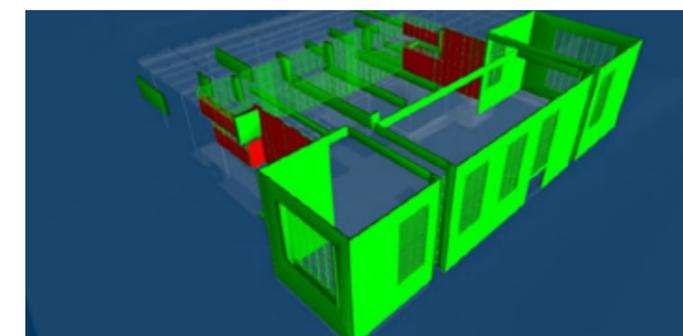


Image courtesy of Skanska USA

Innovator of the Year

The Innovator of the Year award honors AEC practitioners reimagining the design and construction practice through the use of technology. This year we recognize an individual who is adopting emerging technologies and processes to transform design and construction processes for their project, company, and industry in a positive way.

NOMINEES

Bowmiga Nagarajan
Arunachala Institution, India

Dusko (Duke) Barac
John Holland, Australia

Gerard Teo
ID Architects, Singapore

Jason Hickam
JE Dunn Construction, United States

Lotta Wibeck
Skanska, Sweden

Michael Hodge
Tvsdesign, United States

Do Hai Nhan
Hoa Binh Construction Group Joint Stock Company, Vietnam

Rajendra PrajaPat
Gea Process Engineering, India

Shahenda Shokry
Orascom Construction, Egypt

Suresh BV Iyer
KalaSindhoo Architecture, India

Tiago Ricotta
Athie Wohnrath, Brazil

Von Lee
Expand Construction Pte Ltd, Singapore

Brooke Gemmell
Skanska USA Building, United States

Elizabeth Hausler
Build Change, United States

Heather Wishart-Smith
Jacobs, United States

Jing Yu
China Construction Second Bureau No. 1 Construction Engineering Co. Ltd., China

Madhunarasimha Golla
Tata projects Ltd, India

Michael Murphy
MASS Design, United States

Osama Yasser
Hassan Allam Construction, Egypt

Ramy Day
Bangalore International Airport Limited, India

Shih-Chi Liu
Hathaway Dinwiddie Construction Company, United States

Takaaki Miyauchi
Daiwa House Industry Co.Ltd., Japan

Uğur Çelik
EMAY International Engineering and Consultancy Inc., Turkey

Wajdi Mereb
Roads & Transport Authority (Dubai RTA), United Arab Emirates

Cameron Schaefer
HDR, United States

Erdan Zhou
China Construction Eighth Engineering Division Corp. Ltd., China

Hilda Espinal
Cannon Design, United States

Jiyang Li
The Third Construction Co. Ltd, China

Marc Boas
Restoration Science and Engineering, LLC, United States

Navdeepsingh Marwaha
Gnarling University, India

Paloma Olivares
OHL, Chile

Saniye Oktem
Prota Engineering Design and Consultancy Inc., Turkey

Shinya Sugiura
Obayashi, Japan

Tee Yoke Lim
Tiong Seng Contractors Private Limited, Singapore

Vivek Ln
Essae Digitronics Pvt Ltd., India



A Champion of BIM Strategy and Implementation for Digital Transformation



Image courtesy of Wajdi Mereb

Meet the AEC Excellence Awards 2020 Innovator of the Year: Wajdi Mereb

As this year’s Innovator of the Year for the AEC Excellence Awards 2020, Wajdi Mereb clearly demonstrates how a commitment to BIM makes the difference. Leading a digital transformation at Dubai’s Roads and Transport Authority (RTA), Mereb is driving the organization to become a fully intelligent, integrated data-driven asset owner and building an ecosystem to deliver smart and agile transportation solutions.

Getting started with BIM

Five years ago, when Wajdi Mereb joined the governmental Roads and Transport Authority (RTA), Dubai’s transportation projects were still being designed in two dimensions.

The move to three-dimensional modeling in BIM was imperative. After studying architecture, earning his master’s degree with a thesis on BIM implementation quality assurance/quality control in construction, and working as a BIM manager on large projects for an infrastructure team, Mereb proved to be an ideal champion for the strategy.

“The idea of using BIM isn’t always an easy decision when it’s a large, government entity,” Mereb says. “RTA set out a strategic road map to see how BIM technology could help us. During the implementation we set certain KPIs to check if we were receiving the benefits. From there, we could begin to standardize more and more.”

Today, Mereb is the Chief Specialist for the assets department at RTA. He’s responsible for objectives that led to the first BIM Level 2 compliance protocol in the Middle East, and enabled RTA to become the first organization to achieve the BSI kitemark certifications “PAS 1192-2,3,5” & ISO 19650 worldwide. The RTA team has also set up the first “BIM Center” for training and collaboration in the region.

He has made exceptional efforts to facilitate change within RTA toward a full commitment to digital transformation and adoption of Fourth Industrial Revolution concepts. Driving support for the digital twin ecosystem and maturity has also enabled structured asset optimization for complete and reliable oversight and transparency in an accessible, traceable, modifiable, and configurable style.



Route 2020. Image courtesy of RTA.



Image courtesy of RTA

“RTA is a regional benchmark for other entities. It has led to a market and culture change as far as digital transformation phenomena is concerned because we are looking at the full picture of the asset—not just the design, construction, or handover,” Mereb says. “It’s all about the full lifecycle. At the end of the day, we are the asset owner who will manage it from concept to operations and even disposal. With BIM, we have all the data we will need.”

An ambitious infrastructure project takes ambitious plans

Over the past five years, Mereb’s BIM leadership and vision have truly been on display through the Route 2020 project. The new, multi-billion railway extension connects to the world exhibition event Expo 2021 and will serve hundreds of thousands of commuters every day.

This massive project provided the opportunity to take full advantage of BIM and real-time collaboration and coordination processes as well as support the implementation of Fourth Industrial Revolution technologies. This included digital site inspections performed with AI and scan-to-BIM; federated 3D models supporting successful VR/AR integration with CDE and CMMS; and accessing reliable data via BIM-GIS interoperability and integration into workflows with ArcGIS. And the results are definitely in the numbers:

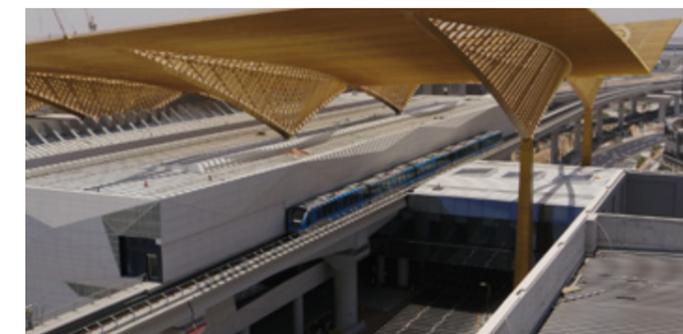
- 18% ROI
- 30% reduction in data exchange efforts
- 95% clash-free, multi-disciplinary models
- 30% reduction in decision-making time
- 40% less time of generating material take-offs
- 30% decrease in shop drawing submission time
- 20% reduction in risk and mitigation process
- 25% improvement in productivity and efficiency during construction sequence

Looking toward the future

Over his 15-year career, Mereb has seen the transformative possibilities of BIM as the AEC industry embraces technology. He sees more and more people inquiring about how to use it and take advantage of the success RTA is finding. Looking forward, he anticipates this happening even more quickly during the pandemic.

“COVID is devastating, but it has accelerated digital transformation in AEC,” Mereb says. “Our team could still work from home and we didn’t have any setbacks. I think many people in the industry were afraid before of using some solutions such as the cloud-based platforms. But, because of the pandemic, many organizations know there isn’t any other choice but to move forward and keep doing their jobs.

“I think in five years we will see more and more adaptation of Fourth Industrial Revolution solutions,” he continues. “We will also see more integration and collaboration between different stakeholders. And I know we can all move toward delivering smarter and more agile transport solutions.”



Route 2020. Image courtesy of RTA.

Meet the Judges

The AEC Excellence Awards relies on the expertise of an international, independent group of thought leaders and practitioners to honor the innovative people and projects submitted to the competition. This year we welcome both new and returning judges for the AEC Excellence Awards 2020, and we're grateful for their commitment to the difficult job of determining the winners from a wide field of incredible submissions.

Aileen Cho

Senior Transportation Editor,
Engineering News-Record

Anil Sawhney

Director, Infrastructure Sector,
Royal Institution of Chartered Surveyors

Anthony Frausto-Robledo

Founder and editor
of Architosh

David Sokol

Contributing editor at Architectural
Record and Cultured magazines

Donna Laquidara-Carr

Industry Insights Research Director
at Dodge Data & Analytics

Jack Cheng

Associate Director, GREAT
Smart Cities Institute

Jeong Woo

Professor and the Department Head of
Construction Management at California
Polytechnic State University

Keiichiro Taniguchi

Architect & Assistant Professor,
University of Tokyo

Koshy Varghese

Dean Administration at Indian Institute
of Technology Madras

Lachmi Khemlani

Founder and editor of AECbytes

Luke Faulkner

Director of Technology Integration,
American Institute of Steel Construction

Max Labecki

Engineering Officer CAD,
Ausgrid

Monica Schnitger

President and Principal
Analyst, Schnitger Corp.

Nobuyoshi Yabuki

Professor at Osaka University,
Japan

Noha Saleeb

Associate Professor, Construction &
Creative Technologies, Middlesex University

Pardis Pishdad-Bozorgi

Associate Professor at Georgia
Institute of Technology

Paul Wilkinson

Chair of the UK BIM Alliance's
Technology Group

Rajiv R. Mishra

Director at Directorate of Art –
Government of Maharashtra

R. Raymond Issa

Distinguished Professor and Director,
Rinker School of Construction
Management, University of Florida

Ryota Ieiri

BIM & Construction ICT Journalist

Sheng Liming

President, China Railway
BIM Alliance

Todd Danielson

Editorial Director, Informed
Infrastructure and V1 Media

Wang Yi

Vice president and Chief Engineer at
China IPPR International Engineering
Company

Zulfikar Adamu

Associate Professor of Strategic
IT in Construction at London
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