Autodesk Hong Kong

BIM Awards 2023

SPONSOR

SYNNEX

ACKNOWLEDGEMENT

Strategic Building Innovation

tagdigital

SUPPORTING ORGANIZATIONS

AIA Hong Kong
A Chapter of The American Institute of Architects

澳門建築師協會
ASSOCIAÇÃO DOS ARQUITECTOS DE MACAU
ARCHITECTS ASSOCIATION OF MACAU

AIAB
Autodesk Industry Advisory Board

CIAT

Hong Kong Alliance of Built Asset & Environment Information Management Associations
香港建設資產及環境信息管理聯盟

buildingSMART Hong Kong

香港珠海學院
HONG KONG CHU HAI COLLEGE

香港資訊科技聯會
HONG KONG INFORMATION TECHNOLOGY JOINT COUNCIL

HKITDA
香港創科發展協會

HKIPM

HKIUS 香港管綫專業學會
Hong Kong Institute of Utility Specialists

HKLG

IPP
公私營合作學會
Institution of Public Private Partnerships

CIOB
The Chartered Institute of Building

chartered ices

School of Architecture
THE CHINESE UNIVERSITY OF HONG KONG

The Hong Kong Institute of Building Information Modelling
香港建築信息模擬學會

HK Inst.E.S

HKIE
THE HONG KONG INSTITUTION OF ENGINEERS
香港工程師學會
Information Technology Division
資訊科技分部

香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

澳門工程師學會

Members of VTC Group VTC 機構成員

SHAPE

IVE

THE UNIVERSITY OF HONG KONG 香港大學
faculty of architecture 建築學院
Department of Real Estate and Construction
房地產及建設系

HKUSPACE
香港大學專業進修學院
HKU School of Professional and Continuing Education

Acknowledgement
Sincere thanks to all the winners – AECOM Asia Company Limited, Airport Authority Hong Kong, Architectural Services Department, HKSAR, AtkinsRéalis, Blue BIM Limited, China International Water & Electric Corporation, China State Construction Engineering (Hong Kong) Limited, Civil Engineering and Development Department, HKSAR Government, CRCC - Paul Y. Joint Venture, Drainage Services Department, HKSAR Government, Hong Kong Housing Authority, HKSAR Government, Kwan Lee – Chun Wo Joint Venture, Ming Hing Waterworks Engineering Company Limited, Paul Y. – CREC Joint Venture, Paul Y. - Qianhai Joint Venture, Shenzhen Yuegang Technology Company Limited, Shui On Joint Venture, TFP Farrells Limited, The Jardine Engineering Corporation Limited, Tyfron Consultancy Limited, Vircon Limited, Water Supplies Department, The Government of the HKSAR, WSP Hong Kong Limited, Chan Chi Chun, Chow Ho Cheung, Andrew, Gong Xingbo, Kwok Helen Hoi Ling, Xu Yuqing, Zhang Jiaying in providing such valuable information and pictures of their projects. Besides, we are extremely grateful for the contributions of the advisor - Dr. Calvin Kam and the AIAB committee and members, Kelvin Tam, Helen Chan, Kelvin Kuo and Dickson Lai who are profiled in this booklet.

Table of Contents

Embracing Innovation to Design & Make a Better World

Can software make our world – and even us – more resilient?

Such resilience is crucial to how we face and overcome the challenges of today and the future – from climate change to healthcare accessibility to the complexities of rapid urbanisation and many more. It will take sustained effort to design and make a more sustainable world. Those of us in the Architecture, Engineering, and Construction (AEC) industry have not only a front seat to many of the biggest such challenges, but also an excellent vantage point from which to tackle and solve them.

The winners of this year's Autodesk BIM Awards are perhaps the best examples of just what becomes possible when industry and technology join forces in a bid to build a more sustainable, livable built environment for all. According to Autodesk's State of Design & Make report, 79% of those surveyed agree that digital tools are essential for their growth. Our BIM Awards winners are proof that such tools can also have a huge impact on how we address the complex challenges of creating sustainable, future-proof buildings for our collective well-being.

At Autodesk, we have partnered with those in the AEC industry to navigate and gain new heights atop four waves of transformation. From revolutionising drafting with AutoCAD, then optimising modelling with BIM, to facilitating more effective collaboration with Autodesk Construction Cloud, and now driving automation with AI and Machine Learning – we have sought to help the AEC industry not just weather disruption but thrive on the opportunities it presents. All the while, forging collaboration and laying down data-driven foundations that make our AEC partners and their works more and more resilient to even the most intense change.

In Hong Kong: we have seen our BIM solutions leveraged in constructing world-class facilities supporting the stormwater storage and drainage work to upgrade the city's climate resilience. We have witnessed our partners complete hospital projects prioritising the community's welfare and revolutionising patient care quality through building design. Integrating advanced process automation, AI, Internet of Things (IoT), and Multi Trade Integrated MEP (MiMEP) has played a significant role in a range of projects that address the evolving needs of the community while contributing to the sustainable development of Hong Kong. All of these demonstrate just how the collective efforts of those Hong Kong's AEC industry have steadily transformed this city.

These BIM Awards winners all demonstrate this through the way they have partnered with us and many others to pursue ambitions that benefit far more than just the bottom line. They have displayed exceptional ability in collaboration, innovation, and execution that set a higher standard for the industry. On behalf of the Autodesk Asia Pacific team, I applaud each of them for their impressive accomplishments, and encourage us all to learn from them and one another.

Looking ahead, we will continue to equip our customers and industry partners with the tools and platforms they need to take on change with ingenuity, empathy, and adaptability. Together, we can make and design a better world.

Haresh Khoobchandani
Vice President, Asia Pacific and Japan, Autodesk

Autodesk Hong Kong BIM Awards 2023

Congratulations to all the winners!

AWARD WINNERS

建築署
Architectural Services Department

渠務署
Drainage Services Department

群利－俊和聯營體
KL－CW JV

瑞安建業
SOCAM DEVELOPMENT

FARRELLS

雲建 VIRCON

INDUSTRY INFLUENCER AWARD

香港房屋委員會
Hong Kong Housing Authority

HONORABLE MENTIONS

AECOM

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

AtkinsRéalis

中國建築工程(香港)有限公司
CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LIMITED

CEDD

中国铁建

渠務署
Drainage Services Department

香港房屋委員會
Hong Kong Housing Authority

明興水務
MING HING WATERWORKS

GDHK粵港科技
Yue Gang Technology

JEC

TYFOON

水務署
Water Supplies Department

YOUNG BIMER OF THE YEAR

CHOW Ho Cheung, Andrew

OUTSTANDING STUDENTS

The Hong Kong University of Science and Technology
GONG Xingbo, XU Yuqing, KWOK Helen Hoi Ling

The Hong Kong University of Science and Technology
ZHANG Jiaying, CHAN Chi Chun, KWOK Helen Hoi Ling

Award Winners

ORGANIZATION
Architectural Services Department, HKSAR
Shui On Joint Venture

PROJECT
Design and Construction of Drainage Services Department Office Building at Cheung Sha Wan Sewage Pumping Station

ORGANIZATION
Architectural Services Department, HKSAR
Shui On Joint Venture
WSP Hong Kong Limited

PROJECT
Redevelopment of Kwai Chung Hospital (Phase 2)

ORGANIZATION
Architectural Services Department, HKSAR
TFP Farrells Limited

PROJECT
Expansion of Museum Project at Tsim Sha Tsui East

ORGANIZATION
Drainage Services Department, HKSAR Government
Kwan Lee – Chun Wo Joint Venture
Blue BIM Limited

PROJECT
Sau Nga Road Stormwater Storage Scheme

ORGANIZATION
Paul Y. - Qianhai Joint Venture
Vircon Limited

PROJECT
Additional District Cooling System (DCS) at the Kai Tak Development (KTD)

BIM: The Foundation of Innovation in Construction

COMPANY

Architectural Services Department, HKSAR
Shui On Joint Venture

PROJECT

Design and Construction of Drainage Services Department Office Building at Cheung Sha Wan Sewage Pumping Station

LOCATION

Within the existing Cheung Sha Wan Sewage Pumping Station in West Kowloon

TYPE

Government Office

SCHEDULED TIME OF COMPLETION

Q1 2025

"BIM can be used for planning, design, construction, and operation of the facility. It helps architects, engineers, and constructors visualize what is to be built in a simulated environment to identify any potential design, construction, or operational issues.

Application of BIM can decrease project cost, increase productivity and quality, and reduce project delivery time. BIM simulates the construction project in a virtual environment. When completed, the building information model contains precise geometry and relevant data needed to support the design, procurement, fabrication, and construction activities required to realize the building. After completion, this model can also be used for operations and maintenance purposes."

—**Wan Wai Ho**
Senior Project Manager,
Shui On Joint Venture

BIM PARTNERS

Wong & Ouyang (HK) Limited
WSP Hong Kong Limited
WSP (Asia) Limited

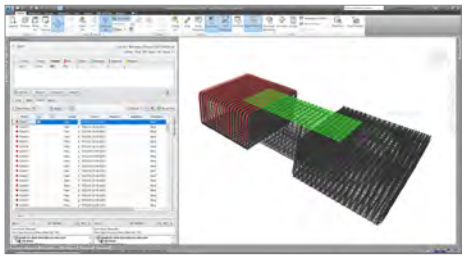
AUTODESK PRODUCTS USED

Autodesk® AutoCAD®
Autodesk® BIM 360®
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk® ReCap®
Autodesk® Revit®

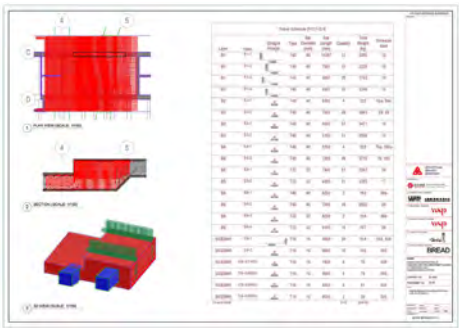
Isometric view of rendering.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

Project Background

The Drainage Services Department Building (DSD Building) at Cheung Sha Wan Sewage Pumping Station ("CSWSPS") is the new administrative centre to provide support to the operation of the urban drainage network in Hong Kong. It rationalizes the various DSD's satellite offices scattered around Hong Kong into one coherent complex. The DSD Building (21 storey) is an innovative, fit for purpose, and integrated government office building which accommodate the offices of the Drainage Service Department (DSD) upon completion and provides facilities for the joint-user, Social Welfare Department (SWD). It spans a site area of approx. 4,000 m^2 and a total Net Operational floor area of approx. 19,220 m^2. The project was commissioned to SOJV for the design and construction of the building in 2021 Q1.



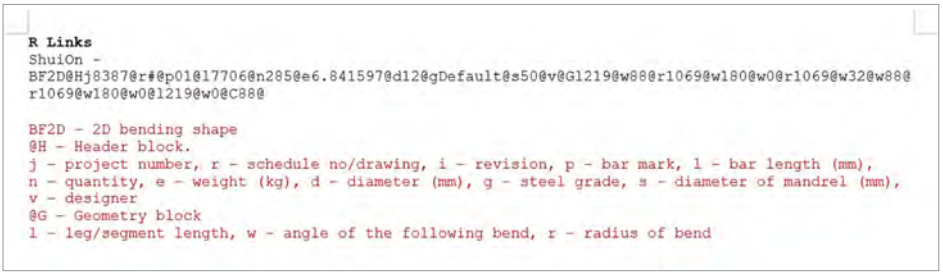
Confirm with fixer and engineer after clash detection of rebar model.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture



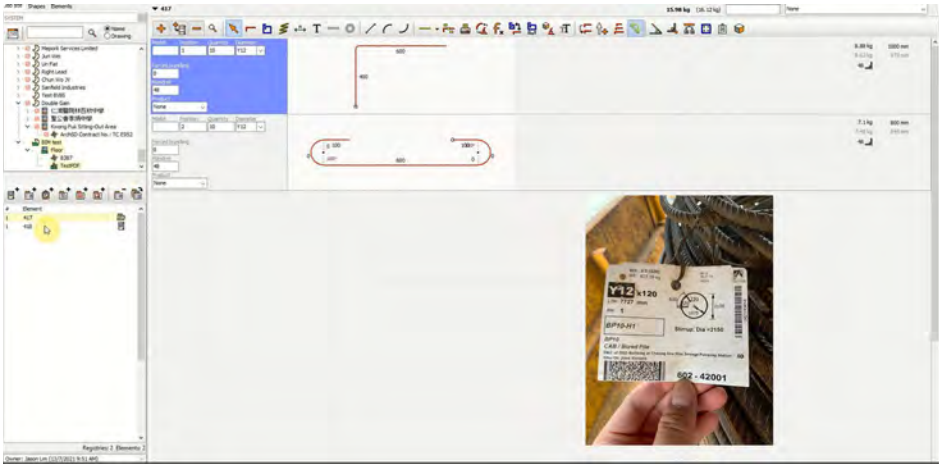
Bar Bending Schedule (BBS) are generated.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

BIM Adoption

In our project, the project team integrated BIM with innovation and technology during whole project life cycle, which includes Pre-fabricated Steel Reinforcement with BIM adoption on Bar Bending Schedule, MiC Design and Safety enhancement. The extensive use of BIM has the capacity to transform and enhance performance by decreasing inefficiencies, improving productivity and increasing collaboration among project stakeholders.

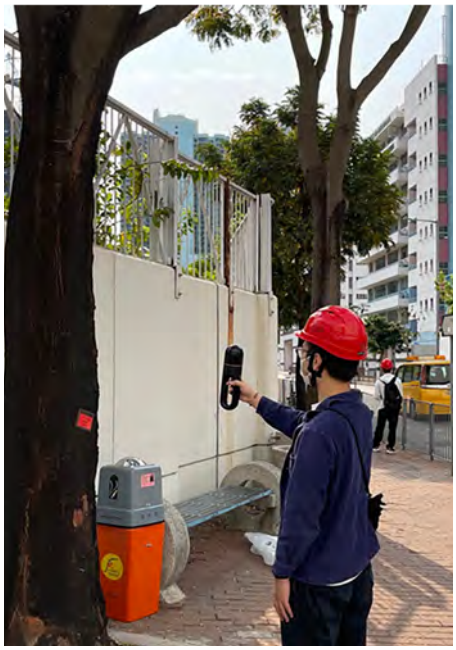


Export file into BVBS data format and distribute to prefabrication yard.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

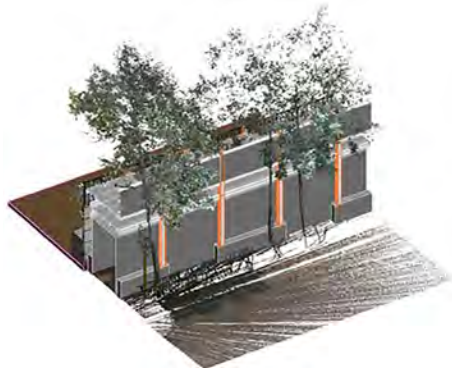


Upload the data and produce the production tag.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

Rebars are delivered from factory to site and fixed.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture



Leica Handheld Scanner for conducting 3D scanning works.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture



Isometric view of point cloud model of existing trees and BIM model of temporary hoarding.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

BIM Collaboration and Common Data Environment

A CDE (BIM 360) creates confidence and helps to build trust among the project participants to capture a complete record of the project with a unique data ownership model that eliminates barriers to collaboration, increasing adoption and data sharing across the entire project team. This trust results in greater adoption, which yields more project data and insights. It also creates an unalterable audit trail, helping to reduce disputes and drive faster resolution.

Pre-fabricated Steel Reinforcement with BIM adoption on Bar Bending Schedule

Processing steel reinforcement is an on-site activity that includes cutting and bending, which are time-consuming and uneconomical. When moving toward the construction automation, off-site prefabrication is important with the aid of Building Information Modeling (BIM) and Industry Foundation Classes (IFC) which are utilized as a collaborative approach to facilitate the fabrication workflow and data interoperability.

BIM and steel fabrication machine codes (BVBS) with openBIM standards are integrated to interoperate the computerized design and prefabrication automation of steel reinforcement. Therefore, rebar model is required to be generated according to the design drawing by Autodesk Revit first. After resolving the clash of rebars with structural engineer and fixer, rebar model can be finalized and Bar Bending Schedule is then generated. The information will be further utilized to generate fabrication machine codes (expressed in BundesVereinigung der Bausoftware or BVBS) and detailing drawings to facilitate the assembly with the aid of BIM.

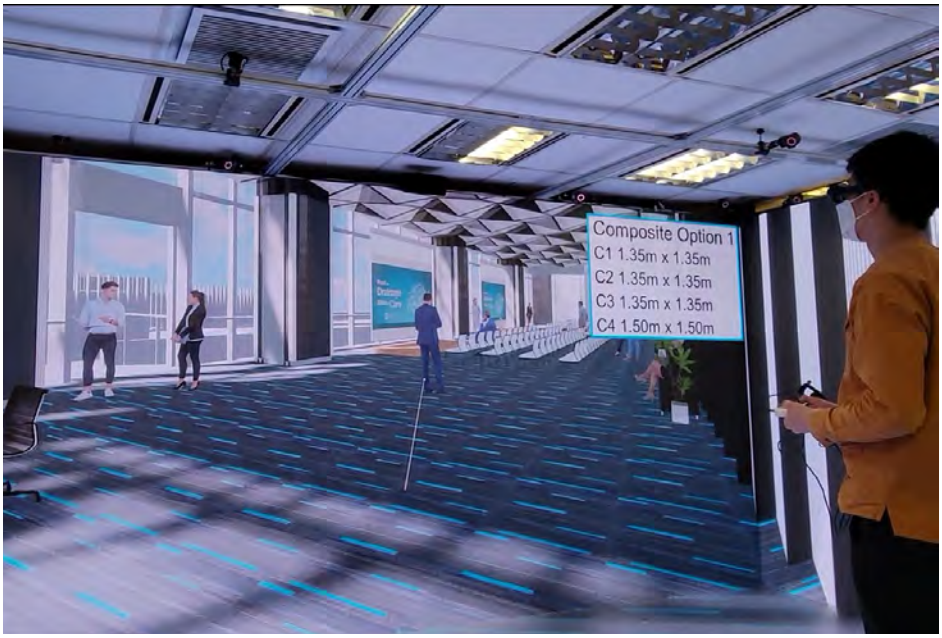
Based on this bar bending schedule, the BVBS machine codes can be generated by plug in software as it contains all required attributes for steel reinforcement cutting and bending. These codes then distribute to cut and bend services provider and input to the production system for processing and production by automatic bar processing machines with auto bar sorting and tagging functions. Pre-fabricated steel reinforcing bar products will be tagged in bundle for easy identification and tracking. It could also facilitate in products be delivered to site in the correct and agreed order to suit the site progress and construction sequence.

Coordination of Existing Trees and Temporary Hoarding

In order to study the conflict between hoarding and existing trees, revit model of hoarding and point cloud of existing trees (Prepared by Handheld Laser Scanner) are generated. The size of trees can be clearly indicated and well coordinated with temporary hoarding before actual installation. It is also a faster and safety method than the traditional survey method to record the size of the existing trees.

Visualize the entire building in AR (Hololens 2) and review the outlook on surrounding environment.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

Visualize the ELS works model at site by AR.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture



In the CAVE system, user can walk through the room and have a option to press or change the column sizes, partition wall options and features wall options.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

Upload the ELS model to Trimble Connect.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

Augmented Reality (AR) - Hololens 2

Microsoft HoloLens is a completely self-contained, wireless, holographic computer. It enables users to take a look at what is known as AR. In our project, Hololens 2 is used to visualize the entire building in AR and review the outlook on surrounding environment. Also, we can visualize the ELS works (BIM model) in the future at site and review any better safety measures should be provided.

3D Interactive Walkthrough by Unity at CAVE System

Using a game engine (Unity) can represent how efficient the volume of space is utilized in architecture than a simple rendering. While the user walkthrough the room, they can have a option to press and change the column sizes, partition wall options and features wall options. In this connection, the designer can provide various options to the client more efficiently.

建築署
Architectural Services Department

瑞安建業
SOCAM DEVELOPMENT

Overall view of DSD Building.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture

About Architectural Services Department, HKSAR

Architectural Services Department (ArchSD) was found in 1986 serving as one of the works departments under the Development Bureau of the HKSAR Government for the development and upkeep of public facilities.

Our aim is to provide efficient and cost-effective professional and project management services for the design, construction, maintenance and refurbishment of government buildings and facilities. We also provide professional and technical advice to the Government and quasi-government organisations.

Our vision is to serve and take care of our community by enriching the living environment through high quality professional services; and to promote best practices in the building industry.

About Shui On Joint Venture (HKSE 00983.HK)

A member of SOCAM Development Limited, SOJV is a joint venture of Shui On Building Contractors Limited and Shui On Construction Co., Ltd., combining solid and extensive experience in the construction of public housing, commercial and institutional projects for the government and major institutions.

SOJV has integrated the client, design consultants and various specialist contractors into a single work team so that the design intent and buildability are recognized by all parties throughout the entire development process.

The Shui On corporate culture is based on its commitment to integrity, quality, innovation and excellence, on a set of corporate governance principles, and it is our quest for perfection that has brought Shui On so far. The “Better Tomorrow 2021-2030” strategy sets out what SOJV aims to achieve, as the Company moves to create a positive impact on the economy, environment and the community.

COMPANY

Architectural Services Department, HKSAR
Shui On Joint Venture
WSP Hong Kong Limited

PROJECT

Redevelopment of Kwai Chung Hospital (Phase 2)

LOCATION

3-15, Kwai Chung Hospital Road, New Territories, Hong Kong

TYPE

Building Project

SCHEDULED TIME OF COMPLETION

2024

Build Green Build Smart Build Fast With BIM Technology

"Embrace the power of Building Information Modelling (BIM) in the Redevelopment of Kwai Chung Hospital Phase 2. We revolutionize how we design and construct this vital healthcare facility. BIM's collaborative approach enables efficient coordination and enhanced visualization and facilitates seamless information exchange for design optimization, off-site fabrication, logistic planning, etc. By harnessing the full potential of BIM, we can ensure the successful transformation from traditional project delivery to building innovation and help societies thrive sustainably."

—**Sofia Lau**
Senior Project Manager, Architectural Services Department, HKSAR

—**Eric Sze**
Project Manager, Shui On Joint Venture

—**Ricky Shum**
Assistant BIM Manger, Shui On Joint Venture

—**Aeon Yuen**
BIM Manager, WSP Hong Kong Limited

BIM PARTNERS

TFP Farrells Limited
Arup (Civil, Structural & Geotechnical)
AECOM Asia Company Limited
Southa Technical Limited

AUTODESK PRODUCTS USED

Autodesk® 3ds Max®
Autodesk® Architecture, Engineering & Construction Collection
Autodesk® AutoCAD®
Autodesk® BIM 360®
Autodesk® Dynamo Studio
Autodesk® Navisworks® Freedom
Autodesk® Navisworks® Manage
Autodesk® ReCap® Pro
Autodesk® Revit®

Redevelopment of Kwai Chung Hospital - creating a supportive environment for patient-focused mental healthcare
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited

Project Background

Redevelopment of Kwai Chung Hospital (KCH), Phase 2 calls for revolutionary design aiming to support the drive to shift psychiatric care towards a person-centred approach. The redevelopment involves demolishing existing buildings and constructing a new hospital campus that will offer a comprehensive range of psychiatric services. These services include inpatient wards, rehabilitation facilities, ambulatory centres, and outpatient specialty services. The project also includes provisions for pharmacy services, community health education and allied health and medical social services. Adopting Building Information Modeling (BIM) throughout all phases enables effective collaboration and visualization of innovative design. The redeveloped KCH will become the first local hybrid-mode psychiatric hospital, providing holistic patient-centred care that combines inpatient and community care services. The therapeutic village setting will create a supportive environment for patients. Overall, the project represents a significant advancement in mental health facility design and the delivery of psychiatric care, emphasizing a person-centred approach and efficient collaboration among stakeholders.

BIM enabled highly detailed visualizations of building and spatial relationship for coordination with users
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited

Surveying with 3D handheld scanner seamlessly integrating site condition into the BIM model.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited

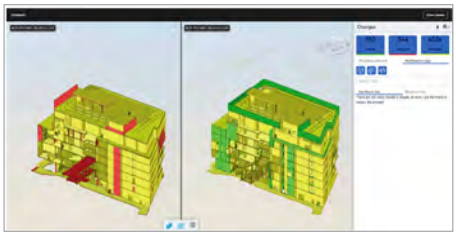
Advantages of BIM on the Design Stage

BIM offers significant advantages during the design stage of a hospital construction project. It enables enhanced collaboration among architects, engineers, contractors, healthcare professionals and facility managers, facilitating the integration

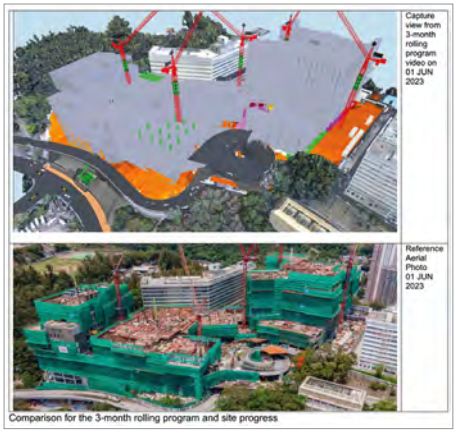
of various systems and requirements. BIM's clash detection capabilities help identify conflicts between structural, mechanical, electrical, and plumbing components, ensuring efficient coordination and reducing design errors. Detailed 3D visualizations assist in understanding the hospital's layout and spatial relationships, enabling stakeholders to optimize patient flow, staff efficiency, and operational workflows. BIM's data-rich models aid in accurate cost estimation, quantity take-offs, and scheduling, supporting budget management and timely project delivery. BIM's sustainability analysis also optimizes energy efficiency, ventilation and lighting, ensuring a patient-centric and environmentally friendly hospital design. Overall, BIM empowers stakeholders to create well-coordinated, cost-effective, and patient-focused hospital designs, improving healthcare delivery in the construction stage.

Project Innovation

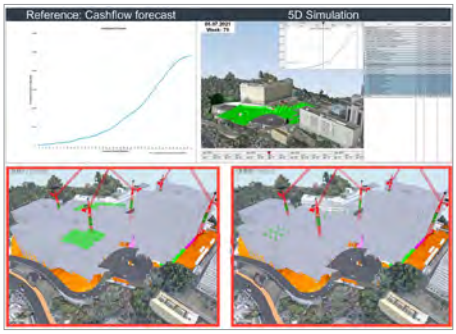
In this phase 2 of the Redevelopment of Kwai Chung Hospital, innovative technologies of 3D scanners, prefabrication components of MiC



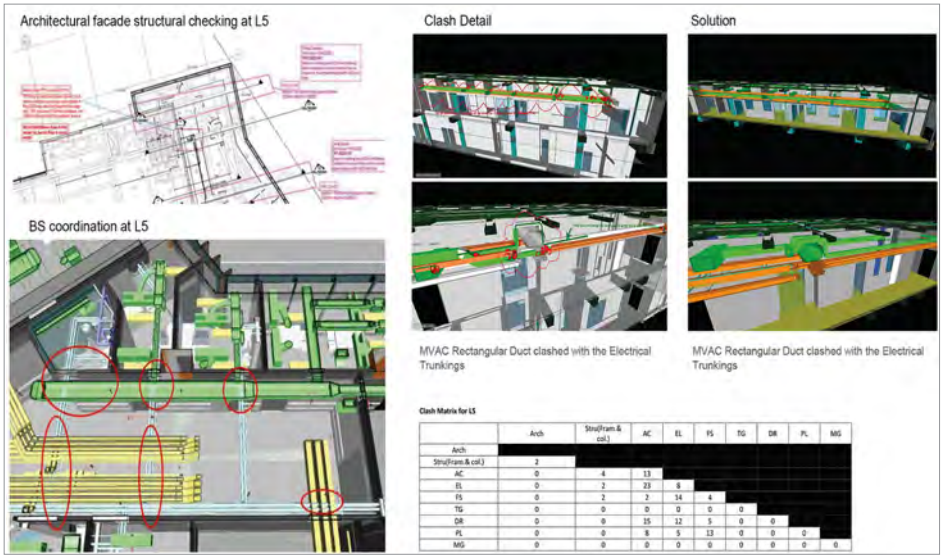
Track Changes for the Disciplined BIM Model
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited



4D Progress Comparison Report
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited



5D Cashflow Forecast Report
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited



Accurate design coordination with BIM enhanced design and construction efficiency.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited

BIM software to simulate the delivery, lifting and installation processes, providing clear picture and work flow for supervising staff and workers to minimize the risk.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited

ensuite toilet/consultation rooms, MiMEP (Mechanical, Electrical, and Plumbing) systems, and DfMA (Design for Manufacture and Assembly) construction methods, when combined with BIM, significantly raise construction efficiency. 3D scanners capture accurate as-built data, enabling seamless integration with BIM models for clash detection and coordination. MiMEP systems streamline the installation of complex building services, reducing installation time. DfMA construction methods promote off-site manufacturing and modular construction, leading to faster assembly on-site. These technologies enhance communication, minimize rework and uplift construction efficiencies.

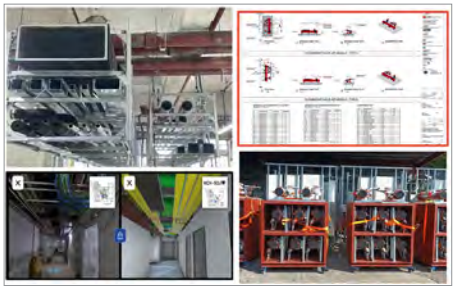
BIM on Site Safety and Planning

BIM plays a vital role in enhancing site safety during the construction process.

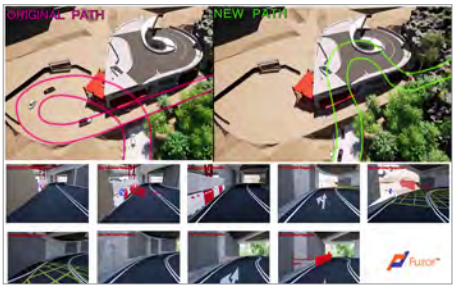
Virtual Safety Simulations: BIM allows for the creation of virtual construction simulations, enabling project teams to identify and mitigate potential safety hazards before they occur on-site. By visualizing the construction process in a digital environment, safety risks, such as clashes, falls, or material handling issues, can be identified and addressed, reducing the likelihood of accidents and injuries.

Construction Sequencing and Planning: BIM enables the creation of detailed construction schedules and sequencing plans. This helps project teams identify potential safety risks associated with construction, such as working at height, heavy lifting, or hazardous material handling. By incorporating safety considerations into the construction plan, proactive measures can be taken to mitigate risks and ensure a safe working environment.

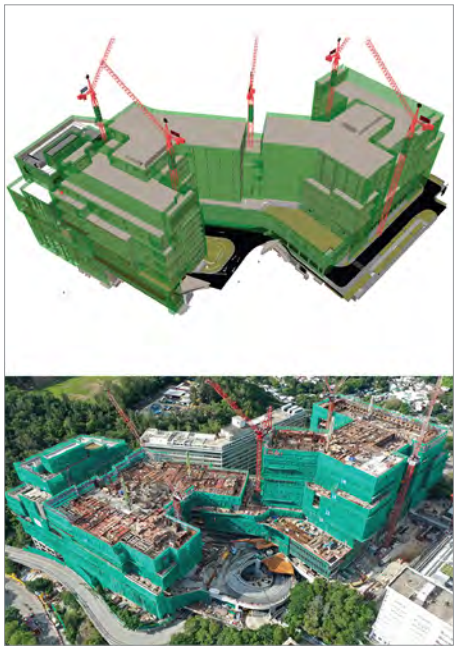
Enhanced Communication and Training: BIM provides a visual and interactive safety training and communication platform. Safety procedures, hazard identification, and emergency evacuation plans can be integrated into the BIM model, allowing workers to familiarize themselves with safety protocols before setting foot on the construction site. This improves overall safety awareness and compliance.



BIM facilitated accurate coordination for off site fabrication providing good quality and workmanship.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited



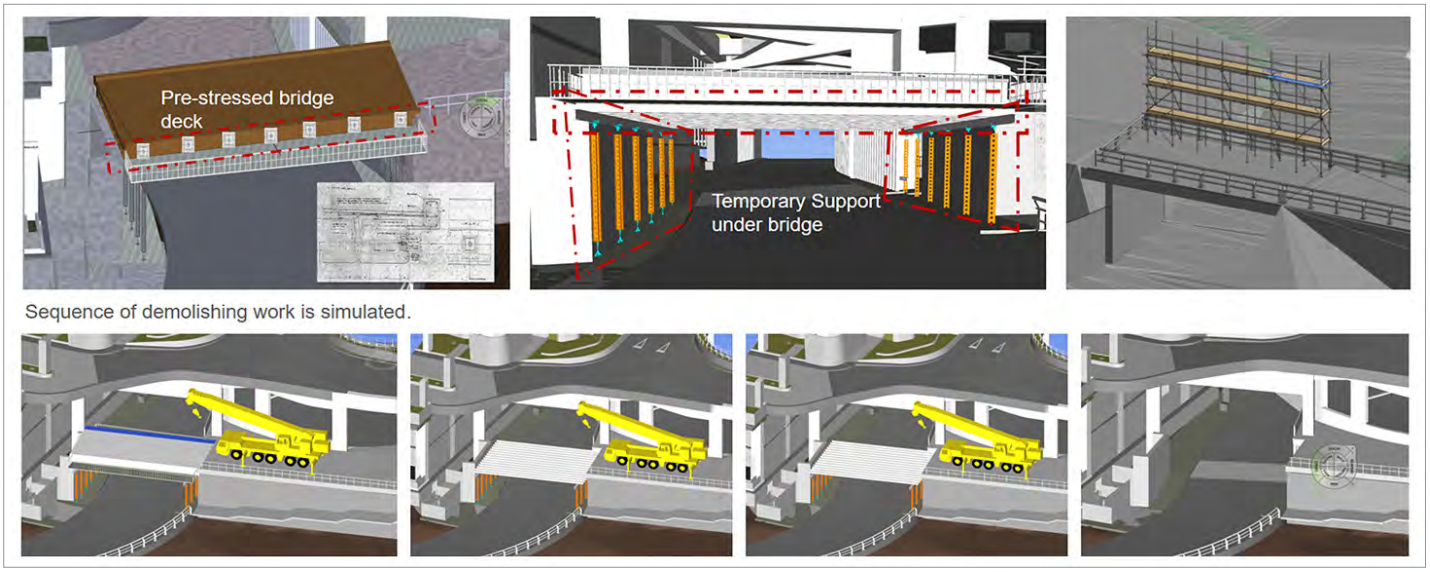
Traffic flow simulation by BIM technology for temporary traffic arrangement coordination with hospital users.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited



4-D BIM provided clear pictures of site conditions for bamboo scaffolding planning.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited

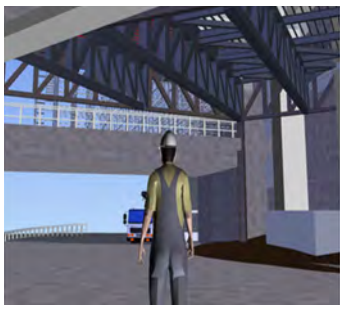
Site Logistics and Access Planning: BIM assists in optimizing site logistics, including material delivery, storage areas, and worker access routes. By carefully planning and visualizing these aspects, potential hazards, such as congested areas or unsafe access points, can be identified and mitigated, ensuring a safer working environment.

In conclusion, BIM significantly enhances site safety during construction by enabling virtual safety simulations, clash detection, improved coordination, construction sequencing and planning, enhanced communication and training, site logistics optimization, and ongoing safety monitoring.



BIM Technology to assist planning of demolition of existing pre-stressed bridge.
Image Courtesy of Architectural Services Department, HKSAR andShui On Joint Venture and WSP Hong Kong Limited

Block DE from Double Ring Road



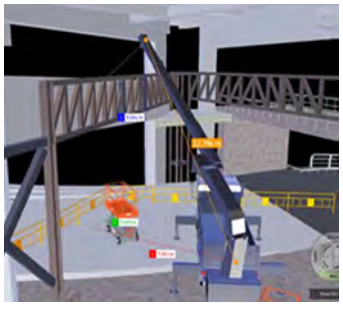
Double Ring Road temporary platform

Meeting with frontline staff

Site discussion before removal

Hospital blocks from Kwai Chung Hospital Road

Hospital blocks from north of the site



Simulation of removal work

Implementation of steel truss removal

Site Safety – Discuss the high risk activities among all workers and frontline supervising staff and simulate the procedures by BIM model and Naviswork walk through.
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited

建築署
Architectural Services Department

瑞安建業
SOCAM DEVELOPMENT

wsp

Redevelopment of Kwai Chung Hospital - creating a supportive environment for patient-focused mental healthcare
Image Courtesy of Architectural Services Department, HKSAR and Shui On Joint Venture and WSP Hong Kong Limited

About Architectural Services Department, HKSAR

Architectural Services Department (ArchSD) was found in 1986 serving as one of the works departments under the Development Bureau of the HKSAR Government for the development and upkeep of public facilities.

Our aim is to provide efficient and cost-effective professional and project management services for the design, construction, maintenance and refurbishment of government buildings and facilities. We also provide professional and technical advice to the Government and quasi-government organisations.

Our vision is to serve and take care of our community by enriching the living environment through high quality professional services; and to promote best practices in the building industry.

About Shui On Joint Venture (HKSE 00983.HK)

A member of SOCAM Development Limited, SOJV is a joint venture of Shui On Building Contractors Limited and Shui On Construction Co., Ltd., combining solid and extensive experience in the construction of public housing, commercial, and institutional projects for the government and major institutions. SOJV has integrated the client, design consultants, and various specialist contractors into a single work team so that the design intent and buildability are recognized by all parties throughout the entire development process. The Shui On corporate culture is based on its commitment to integrity, quality, innovation, and excellence, on a set of corporate governance principles, and it is our quest for perfection that has brought Shui On so far. The "Better Tomorrow 2021-2030" strategy sets out what SOJV aims to achieve as the company moves to create a positive impact on the economy, environment, and the community.

About WSP Hong Kong Limited

WSP is one of the world's leading engineering consulting firm, provides engineering design and technological services in the Transportation & Infrastructure, Property & Buildings, Sustainable Development & Environment, Digital & Smart. With our integrated service offerings across sectors, WSP develops creative, comprehensive and sustainable engineering solutions to uniquely complex problems, creating a future where both society and people can thrive. Our achievements have long been recognised by the industry through close partnerships with clients and awards. With ISO 19650 certification, we strengthen our BIM capability and operations as we step up our efforts in offering more innovative, integrated digital solutions, from new construction approaches to digital twin applications.

INTEGRATION

COMPANY
Architectural Services Department, HKSAR
TFP Farrells Limited

PROJECT
Expansion of Museum Project at Tsim Sha Tsui East

LOCATION
2 Science Museum Road and 100 Chatham Road South, Tsim Sha Tsui, Hong Kong

TYPE
Building Project (Expansion and A&A)

SCHEDULED TIME OF COMPLETION
2030

"The BIM process requires a paradigm shift involving changes in mindset and behaviour from all parties in the project team. We must see it as our opportunity to create new synergies and revolutionise the construction industry adopting smart innovative technologies that allow us to create better places."

—**Billy Law,**
Chief Project Manager, 302, Architectural Services Department, HKSAR

—**Jose Luis Dominguez,**
Senior Associate - Project BIM Manager, TFP Farrells Limited

BIM PARTNER
AECOM Asia Company Limited

AUTODESK PRODUCTS USED
Autodesk® AutoCAD®
Autodesk® BIM 360®
Autodesk® Dynamo Studio
Autodesk® Navisworks® Manage
Autodesk® Revit®
Autodesk® Vehicle Tracking

Aerial View of the Design Proposal for The Museum Expansion at Tsim Sha Tsui East (Design subject to future design development)
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited

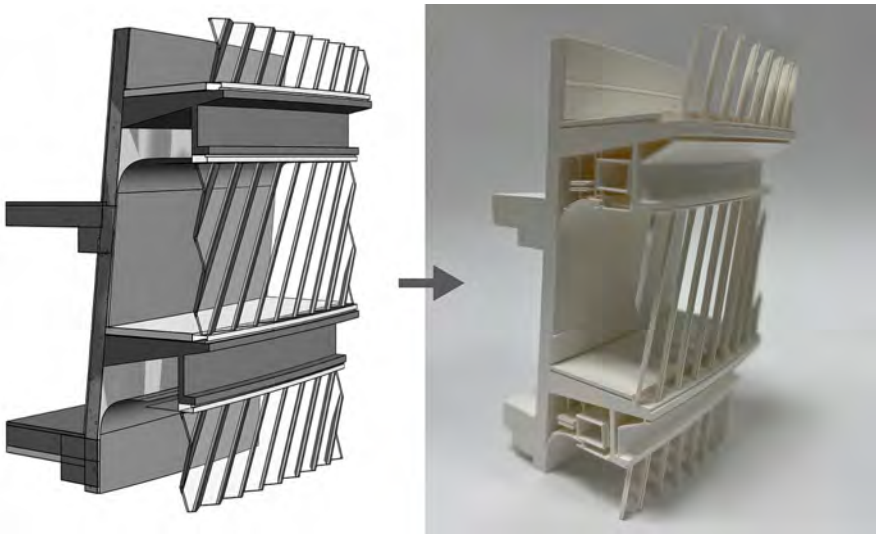
The Museum Complex

The proposed project is to expand the museum complex at Tsim Sha Tsui East by constructing new annex buildings with new facilities; and renovation of the affected and out-of-date facilities at the site. One of the challenges in this project is to maintain the museum partially open to public during the construction and renovation works.

The project consists of three annex buildings with 5 storey above 2-level basement, providing almost a double of existing exhibition spaces, new educational facilities, new supporting facilities, public open spaces, ancillary car park and roof garden. The existing façade will also be up-lifted to provide a holistic outlook to the overall museum complex.

BIM Models prepared for Future Operation Uses and Digital Twin
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited

Enhanced 3D Modelling Visualization
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited



Autodesk Revit Models to 3D Printing
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited

The existing outdoor spaces and approaches to the museum will be rejuvenated and re-organized, with an overall enhancement to accessibilities by the general public and disabilities. The design proposal creates better places for the public to enjoy and interact, offers more connectivity across the site and a more welcoming public realm at ground level.

BIM Integration

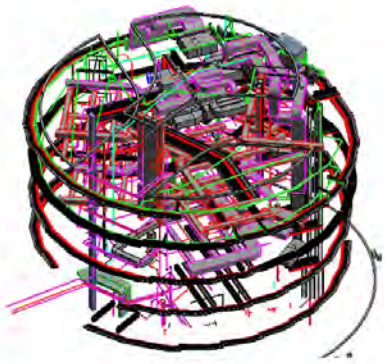
The proposed expansion of the museum complex and the new designed shared facilities will enhance the total museum experiences and will create new synergies and opportunities through the common goals of exploration, knowledge, inspiration and resonance. The same approach of Integration is the inspiration for the project team to embrace BIM opportunities. We believe that Building Information Modelling (BIM) is not just a tool, it is an attitude and commitment. It requires a paradigm shift involving changes in mindset and behaviour from all parties in the project team, as well as a clear definition of roles, responsibilities, and expectations. Integration of BIM in this project is not a one-time event, but a continuous improvement process that will adapt to the changing needs and demands of the project. BIM in this project is not intended to only support the integration of the various disciplines and systems, such as architecture, engineering, construction, and facility management, enhancing performance and quality but also to provide a comprehensive and dynamic representation of the project lifecycle, from planning to operation, enabling better monitoring and evaluation. There is the ambition of BIM Models prepared for future operation uses, for building a Digital Twin that will boost a better Asset Management and that will allow the Museum to step into Web 3.0 and Metaverse.

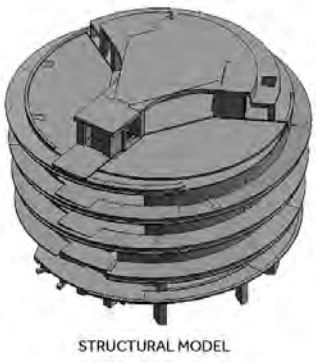
BIM Benefits

The implementation of a Common Data Environment (CDE) such as Autodesk BIM 360 allows the project team to work with a Single Source of Truth for storage and coordination of information and collaboration with others. The adoption of BIM has improved our collaboration and communication between the different project stakeholders, leading us to better decision-making and fewer errors in the design phase which will result in a potential return on investment (ROI) in terms of time and cost savings from reduced rework and change orders.

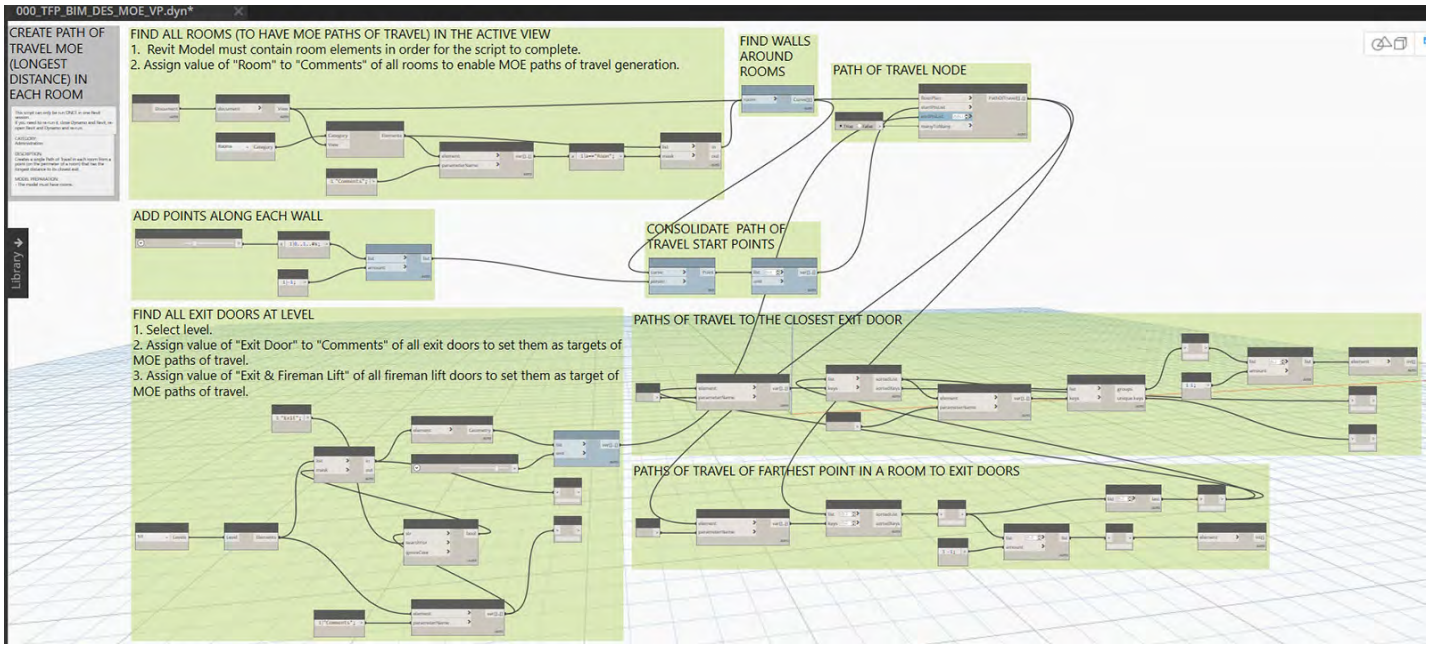
We work with enhanced visualization and analysis via the use of Autodesk technologies such as Revit, Navisworks and other Autodesk Add-ins (i.e: Enscape™). This allows the team to achieve a better design optimization, energy efficiency analysis, and clash detection, among other things. As a result, the project will gain benefit of a potential ROI in terms of improved

Design Team reviewing the project in BIM
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited





Interdisciplinary Model Set Up to Facilitate Project Team Collaboration
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited



Dynamo Automation Tool for Compliance Checking of Statutory Requirements
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited

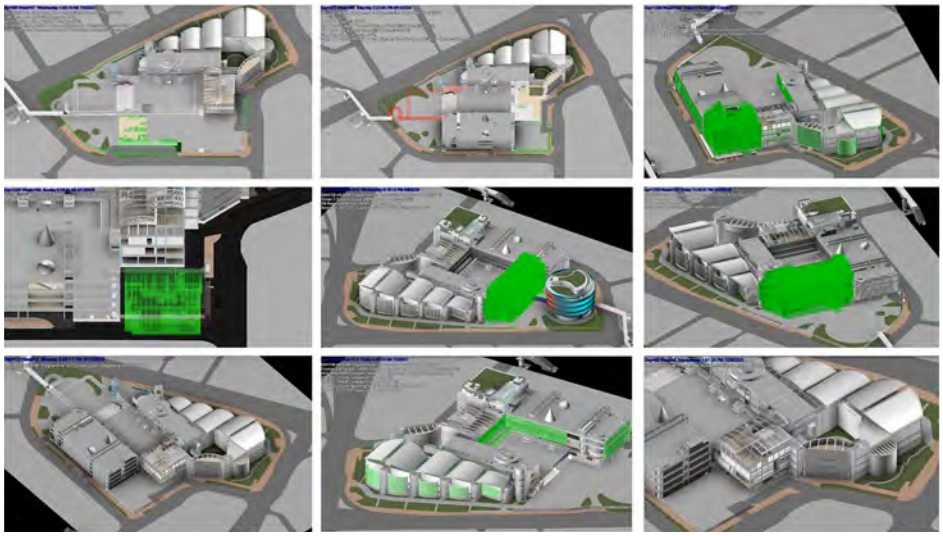
building performance, reduced construction errors and delays, and cost savings from optimized building systems.

Our commitment to reduce project risks and improved project efficiency is supported by the adoption of BIM in this project. Autodesk Software, Revit add-ins and the possibility of Autodesk software to be also used in an open BIM application workflow allows the team to streamline the design process, allowing for faster and more efficient design iterations and approvals which will result in a potential ROI in terms of reduced design time, improved design quality, and reduced project costs.

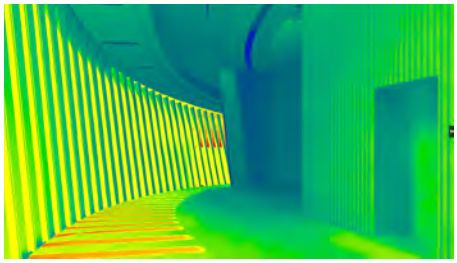
BIM automation tools such as Dynamo and other Autodesk plugins are used by the project team to check compliance with statutory requirements and automate traditional manual tasks; By allowing us to 3D printing from Autodesk Revit models, OpenBIM is a design review tool and communication with our client. The early adoption of BIM in the design stage of the project has enhanced the buildability and possibility of MEP DfMA – MiMEP Module (Modular Integrated Mechanical, Electrical and Plumbing services). The project team is also adopting the use of the different BIM technologies such as HAP E20 to calculate the cooling load of each space and model the annual energy performance.

The project team has adopted BIM to improve the project outcomes, improve the building performance and increase tenant satisfaction to ensure the final building meets the owner's requirements and expectations. BIM technologies have been implemented to add value for design including its complex phasing planning. In particular, LCSD has requested that the museums shall remain in operation during the course of construction. With the need for complicated phasing and sequencing during construction to suit operational needs, the use of BIM will definitely be beneficial to the programme and cost control, as well as future operation in long run.

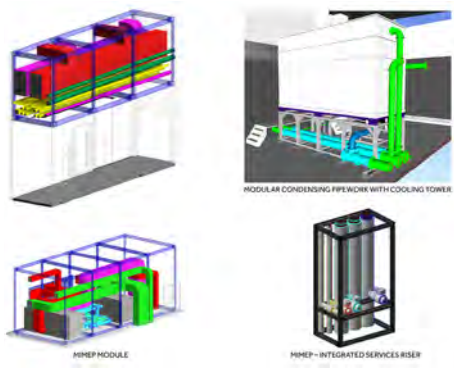
The adoption of BIM in this project is a key factor for its success and a new way of collaborating, innovating and delivering better outcomes for our client and the environment.



Phasing Planning Simulation - 4D BIM
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited



Lighting Study using Enscape™ as a plugin for Autodesk® Revit®
Image Courtesy of Architectural Services Department,
HKSAR and TFP Farrells Limited



MiMEP Modules – DfMA
Image Courtesy of Architectural Services Department,
HKSAR and TFP Farrells Limited

建築署
Architectural Services Department

FARRELLS

Design Proposal of The Museum Expansion at Tsim Sha Tsui East From Granville Square (Design subject to future design development)
Image Courtesy of Architectural Services Department, HKSAR and TFP Farrells Limited

About Architectural Services Department, HKSAR

Architectural Services Department (ArchSD) was found in 1986 serving as one of the works departments under the Development Bureau of the HKSAR Government for the development and upkeep of public facilities.

Our aim is to provide efficient and cost-effective professional and project management services for the design, construction, maintenance and refurbishment of government buildings and facilities. We also provide professional and technical advice to the Government and quasi-government organisations.

About TFP Farrells Limited

Farrells is an international firm of architects, urban planners and designers. Founded in 1965 by Sir Terry Farrell, an architect-planner and a leading proponent of urbanism, Farrells draws on its unique heritage to create human-centric places that work for the users, the environment and investors. With offices in Hong Kong, London and Shanghai, Farrells offers end-to-end services from concept to completion for projects spanning the spectrum of scales and sectors.

Spearheading Innovative BIM Applications in Urban Stormwater Storage Scheme

COMPANY

Drainage Services Department, HKSAR Government
Kwan Lee - Chun Wo Joint Venture
Blue BIM Limited

PROJECT

Sau Nga Road Stormwater Storage Scheme

LOCATION

Sau Nga Road Playground, Kwun Tong

TYPE

Urban Stormwater Storage Scheme / NEC3 Engineering and Construction Contract Option C, BIM

SCHEDULED TIME OF COMPLETION

2028

"DSD is always exploring new opportunities to expand our BIM applications. For this project, we've worked with Kwan Lee-Chun Wo Joint Venture and Blue BIM Limited to pioneer new BIM applications in streamlining interactive public outreach and engagement, and further promoting the mutual trust and collaborative spirit of New Engineering Contract. BIM has so far, allowed the project to proceed as scheduled with a friendly atmosphere between our project stakeholders."

— Ben YT Ho
Engineer, Drainage Services Department, HKSAR Government

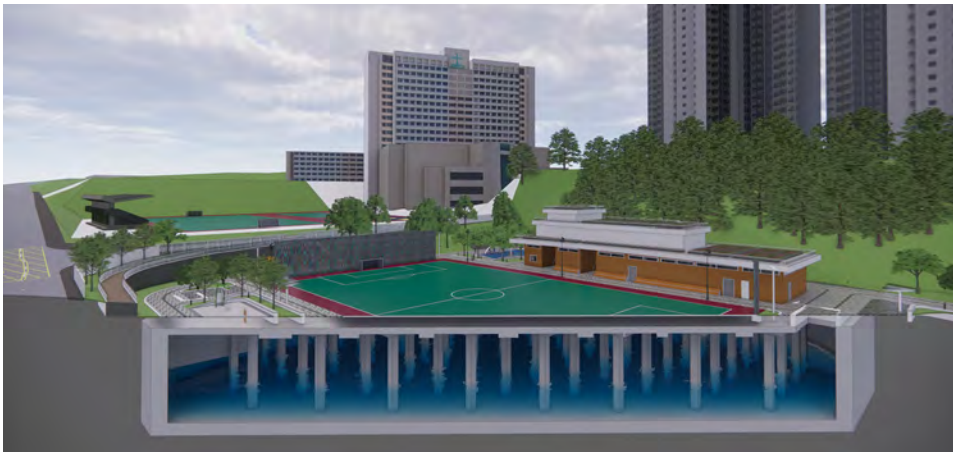
AUTODESK PRODUCTS USED

Autodesk® 3ds Max®
Autodesk® AutoCAD®
Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk® ReCap®
Autodesk® Revit®
Autodesk® Vault
COBie Extension for Revit
Model Checker for Revit

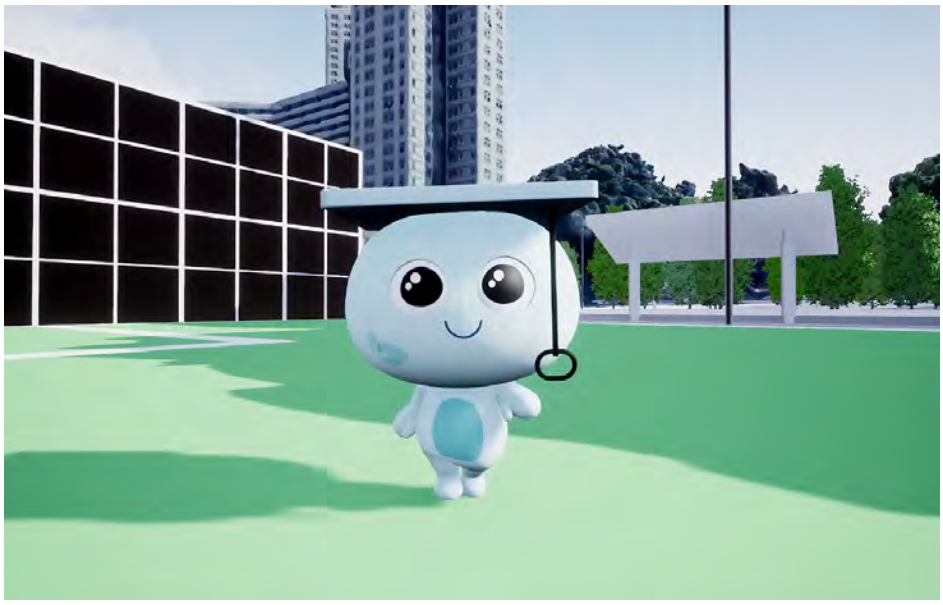
Overall View of the Sau Nga Road Stormwater Storage Scheme with Re-provisioned Sau Nga Road Playground
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

The Drainage Services Department (DSD) is responsible for providing world-class wastewater and stormwater drainage services, while enabling the sustainable development of Hong Kong. DSD continuously strived to upgrade Hong Kong's climate resilience with acquired noticeable achievement. As part of DSD's ongoing effort to combat climate change, DSD has commissioned the Kwun Tong Drainage Improvement Works, which include the design and construction of Sau Nga Road Stormwater Storage Scheme (SNRSSS). The SNRSSS is envisioned as an urban guardian angel, which will protect downstream areas in Kwun Tong from 200-years rainfall event. It will be constructed underneath the existing Sau Nga Road Playground, which will be re-provisioned above the underground stormwater storage tank with renewed playground facilities for public co-use.

Once completed, the underground stormwater storage tank will have a storage capacity of 64,000 m^3, equivalent to 25 standard swimming pools. Children playground, fitness area, soccer field, lavatory and changing room will be re-provisioned above the underground stormwater storage tank for public



Sau Nga Road Stormwater Storage Scheme will mitigate impact of 200 years rainfall event
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited



Drainy serves as user's avatar in our immersive, interactive experience
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

entertainment.

DSD is fully aware that the project will be developed in a highly congested area with developed community; thus, DSD has deployed its in-house project team with Engineer and Technical Officers for BIM-based detailed design during the project's design stage, and subsequently employed Kwan Lee – Chun Wo Joint Venture and its BIM Consultant, Blue BIM Limited for BIM implementation during construction stage.

During design stage of the project, DSD's in-house project team utilized Autodesk Vault as the in-house Common Data Environment for its functionality in tracking design process and maintaining version control. Besides modelling the facilities, DSD has pioneered the implementation of BIM-based interactive virtual reality public engagement. DSD used Autodesk Revit for the base model of the facility, and Autodesk 3Ds Max for recreation of DSD's key opinion leader, Drainy; both of which are then exported for further processing in Unity. Coding in Unity allows users to immerse themselves in a virtual environment with Drainy as the users' avatar and navigate the proposed playground facilities through Android / Mobile and Windows / Desktop devices. This application was immensely useful for DSD's engagement with younger and elderly audience, and provided our designers with valuable feedback from the community.

Furthermore, DSD applied the wheelchair simulation function of Fuzor to evaluate accessibility of the proposed re-provisioning of Sau Nga Road Playground, so that the need of our disabled users will be properly addressed. DSD's design for inclusiveness and accessibility has consistently been met warmly from community users.

As part of the risk mitigation efforts, DSD has also presented the project to other government departments and the academic regarding the project's design and BIM applications to obtain their feedbacks. Their constructive suggestions have enabled development of Key Performance Indicators for this project's BIM applications.

During construction stage of the project with Kwan Lee – Chun Wo Joint Venture and Blue BIM Limited, the project's BIM applications have been elevated to the next level. First and foremost, the construction team has fully embraced the project's New Engineering Contract's (NEC) spirit of mutual trust and cooperation, and elected to utilize BIM in preparation of its early warning matters and compensation events. The BIM models and simulations are regularly reviewed during early warning meetings to decide on actions to address early warnings; they are also utilized to evaluate the time and cost implications of compensation events and to substantiate quotations. A revised 4D master programme model is submitted with any major revision to the programme.

Besides 4D master programme, our construction team has strengthened the project's safety and logistic aspects through method statement simulation and maintenance works simulation. They first included more disruptive site works, including demolition of existing spectator stand of football pitch. The works was not only visually intrusive; the transportation of and occupation by construction plants may also negatively impact the neighborhood, and thus our construction team meticulously simulated every step of the method statement for coordination with nearby residents and schools to facilitate a construction process with minimal impact to daily lives of nearby residents.

Additionally, our construction team has proactively consulted DSD's O&M team for brainstorming future maintenance procedure, including the required access, equipment and vehicles, to ensure that sufficient provisions have been incorporated for ease and safety of maintenance after completion and commissioning of the facilities.

Furthermore, our construction team has applied BIM for the design and

Drainy is DSD's Key Opinion Leader (KOL)
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

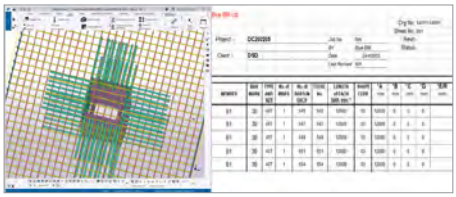
Virtual reality with Drainy is enjoyed by children, adults and elderlies alike
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

Maintenance Simulation with Fuzor
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

Early Warning Meeting with BIM
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

coordination of pre-fabrication modules. The modules are developed and validated through BIM to safeguard against on-site clashes, and then the design was issued to our off-site fabrication partner for module fabrication. The Modular-in-Construction module was then transported to site for installation, and greatly reduced amount of on-site works and enhanced construction productivity.

Overall, the project's blossomy BIM implementation has provided us with considerable return of investment in monetary and time consumption. DSD will continue to explore and develop other BIM applications in this project with our Contractor and BIM consultant, and the results will be documented in DSD's future BIM standards and shared with other works department and the academia.



Rebar Design and Quantity Take-Off
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

BIM-developed MiC Module
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

CAVE Coordination Meeting
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

渠務署
Drainage Services Department

群利－俊和聯營體
KL－CW JV

The public will be able to participate in soccer matches upon project completion
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

About Drainage Services Department, HKSAR Government

The Drainage Services Department (DSD) is a department of the Hong Kong Special Administrative Region Government responsible for drainage and sewerage works. DSD's vision is to provide world-class wastewater and stormwater drainage services enabling the sustainable development of Hong Kong.

To enhance its service quality, DSD fully supports development of BIM in Hong Kong. DSD has so far published its own DSD BIM Modelling Manual (2nd edition) with a 3rd edition in the works, and has participated in the sharing of DSD BIM objects through CIC BIM portal. DSD has also established its own BIM team, office and CAVE meeting room at DSD headquarter.

About Kwan Lee - Chun Wo Joint Venture

Kwan Lee - Chun Wo Joint Venture (KL-CWJV) is principally engaged in the core construction and property development businesses with the professional capability to undertake large integrated construction projects. To facilitate the construction effectiveness and productivity and encourage the innovation application in construction industry, KL-CWJV deploys enormous resources in BIM development and has attained outstanding performance (e.g. Autodesk HK BIM Award) in various government projects.

About Blue BIM Limited

Blue BIM Limited is a local BIM consultancy firm that focus on providing BIM support to statutory bodies on infrastructure projects, and has closely worked with DSD, WSD, Housing Authority, MTR Corporation and others.

Blue BIM's services include but not limited to model development, 3D survey, BIM training, asset management software retail, product support and plug-in / add-on development.

COMPANY

Paul Y. - Qianhai Joint Venture
Vircon Limited

PROJECT

Additional District Cooling System (DCS) at the Kai Tak Development (KTD)

LOCATION

Kai Tak Development, Kowloon

TYPE

District Cooling System

SCHEDULED TIME OF COMPLETION

Q3 2024

Digitalization in Construction - with full BIM Implementation, DfMA and MiMEP

"BIM is our key to support and drive the digital transformation of the local construction industry. We remain dedicated to enhance our BIM technology and utilize innovative approaches to meet the evolving needs of our clients while contributing to the sustainable development of Hong Kong."

— **Michael Kwan**
Deputy General Manager, Paul Y. Construction Company

AUTODESK PRODUCTS USED

Autodesk® AutoCAD®
Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk Forge®
Autodesk® Navisworks® Freedom
Autodesk® Navisworks® Manage
Autodesk® ReCap® Pro
Autodesk® Revit®

Additional District Cooling Plant
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

Introduction

The District Cooling System (DCS) at the Kai Tak Development is a large-scale centralized and energy-efficient district air-conditioning system which is also the first of its kind, in Hong Kong. It utilizes sea water to produce chilled water in central chiller plants and distributes it to customer buildings through an underground piping network for air-conditioning use. Compared to traditional air-cooled and water-cooled air conditioning systems using cooling tower, the DCS offers electricity savings by leveraging economies of scale and benefiting from efficient operation and maintenance.

Difficulty and MiMEP

In view of the shortage of construction workers, tight construction schedules and safety hazards which may arise

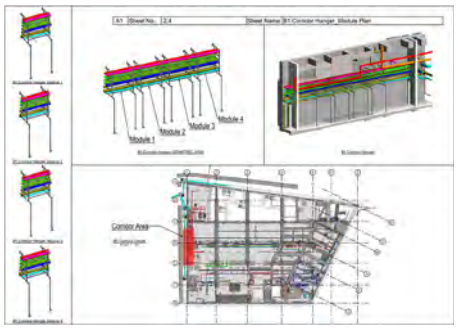
Bird's eye view of Additional District Cooling Plant
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

from limited space available during the construction of large-scale electrical and mechanical (E&M) Plants and installation of relevant equipment.

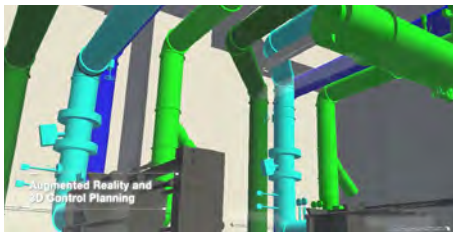
Paul Y. - Qianhai JV (PYQJV) applies an innovative construction method of "Design for Manufacture and Assembly" (DfMA) for carrying out "Multi-trade integrated Mechanical, Electrical and Plumbing" (MiMEP) works in the construction of an Additional Disctrict Cooling System (ADCS) at the Kai Tak Development. The ADCS plant at the Kai Tak Development accommodates large E&M equipment including 15 meter long Travelling Band Screens, integrated Air Handling Units and MiMEP Modules in the corridors. They are prefabricated off-site in a manufacturing plant under the concept of DfMA & MiMEP, with order of magnitude increase in quality control, and safer working environment.

BIM for DfMA & MiMEP

To effectively implement the MiMEP concept, the use of Building Information Modelling (BIM) is crucial. PYQJV has employed Vircon as a BIM consultant to advise on how to implement full BIM into the project. Starting from the design stage, BIM is fully applied by all stakeholders for design, coordination, and communication, including sub-contractors and manufacturers. The prefabricated modules can be designed and coordinated through the BIM platform to achieve a clash-free design, effectively shortening construction time and enhancing overall work efficiency.

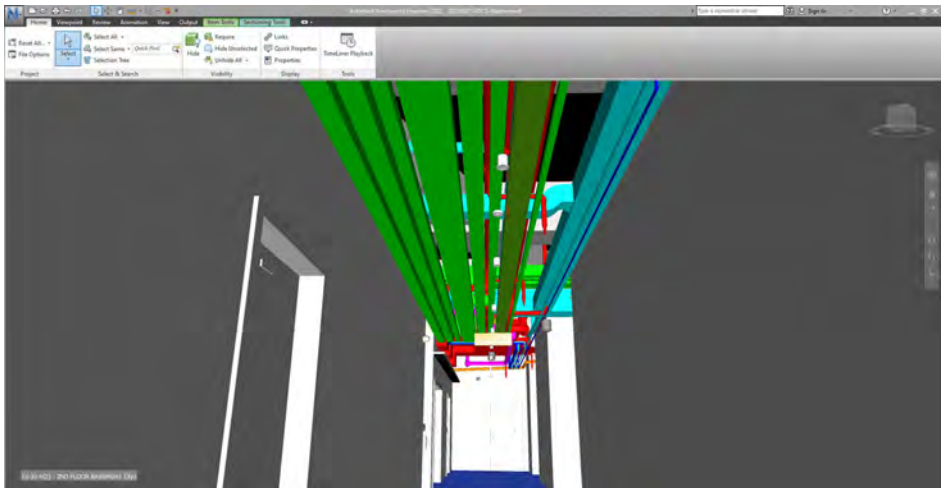


MiMEP module generated from BIM model
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

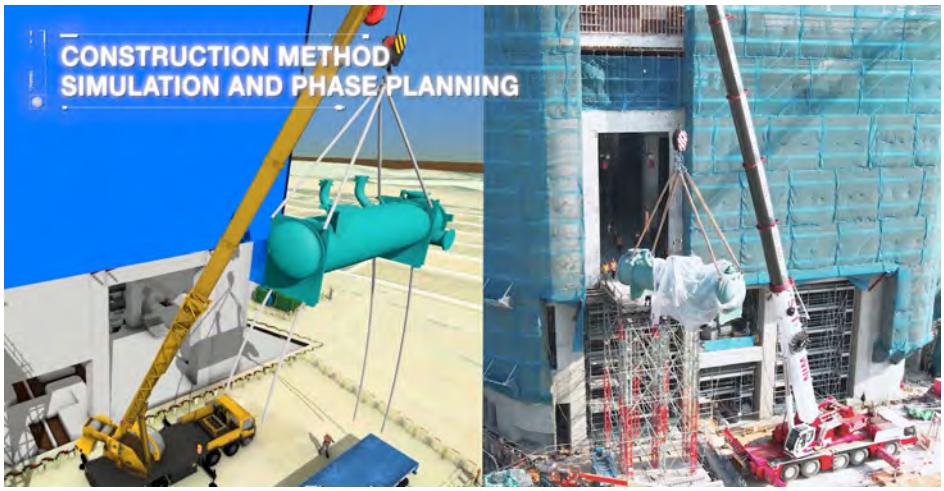


AR technology for on-site overlaying on BIM model
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

Cloud Collaboration (BIM 360)
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited



BIM Walkthrough – Navisworks
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited



Chiller Delivery - Planned vs Actual
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

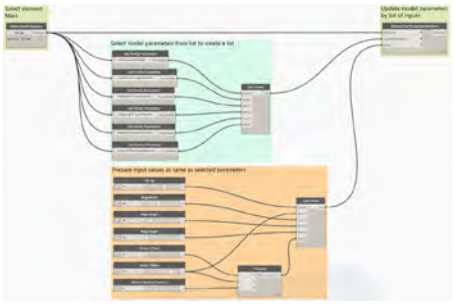
Design Review and 3D Coordination
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

With the progress of the works, engineers can plan, adjust, and optimize the modules to be built with the BIM models so as to increase the accuracy of the modules for on-site installation. During the early design stages, engineers need to estimate the working and installation space required for the delivery of modules. BIM is used to simulate the delivery process, ensuring that workers can assemble the modules in one go. This facilitates the transportation and assembly of prefabricated modules smoothly while enhancing workers' safety consciousness.

BIM Innovation

Augmented Reality (AR) can be employed during on-site construction by overlaying the BIM model on the actual construction site. This helps engineers and workers to visualize and understand complex modules and structures, reducing the need for physical mock-ups or prototypes and enhancing the understanding.

During the production process, BIM-QTO is applied all modules. Each module



Dynamo - for drawing production
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

As-built Modelling – BIM Standard Checker
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

will be affixed with a QR code to record packaging details, logistics and delivery status of the module for engineers to keep track of the status of each module in Cloud server.

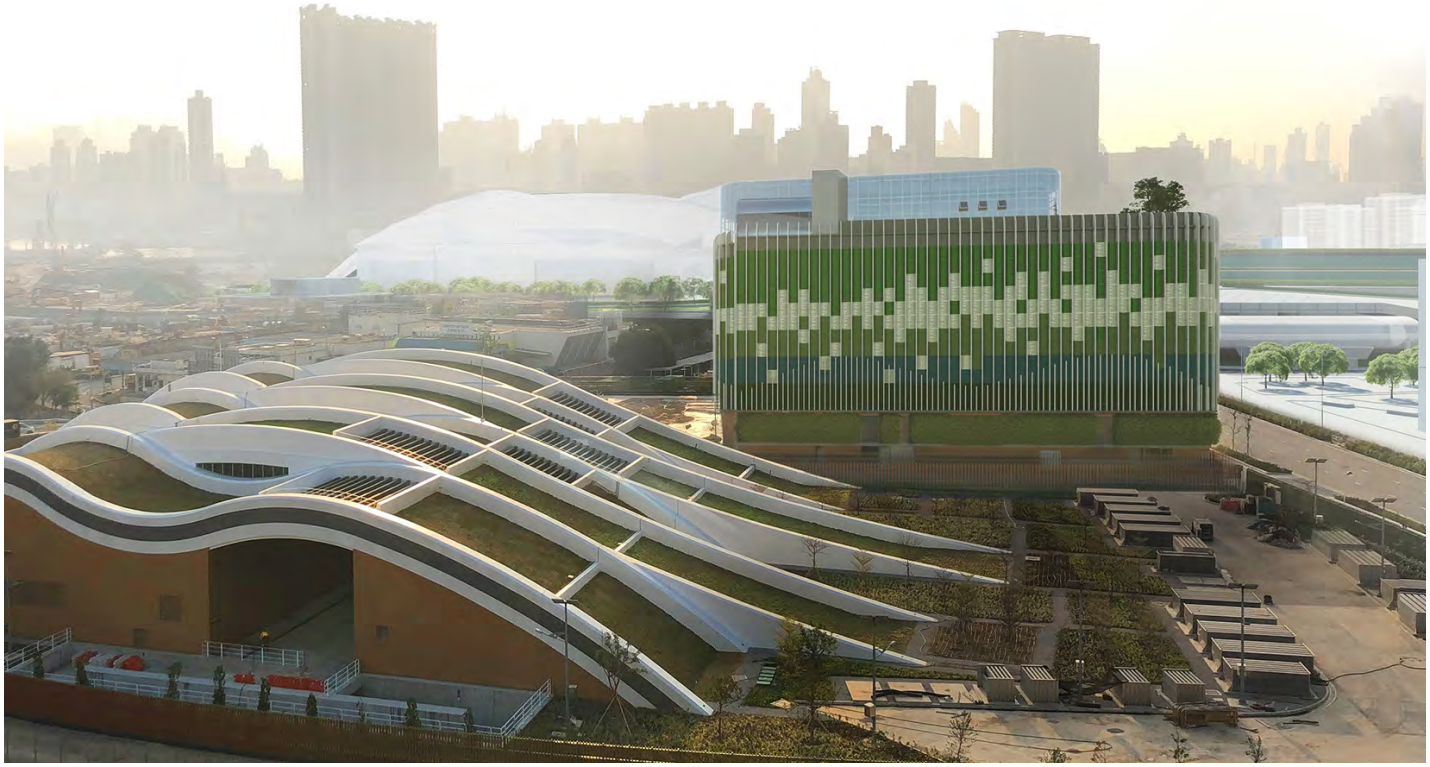
Carbon emission calculation is becoming increasingly popular worldwide. To accurately calculate carbon emissions, the BIM model is submitted to a third-party OpenBIM carbon assessment platform called iBEAM Unison. This platform allows us to measure carbon emissions and ensure that our projects are environmentally sustainable. Through the BIM model, technologies such as VR training, CFD simulation, and integrated BMS are implemented into the project. The BIM model is not only used for construction but also for asset management. To ensure accuracy, laser scanning and standard checker

As-Built Modelling – Automatic on-site BIM Model Checker
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

(Developed by Dynamo) are performed to verify geometry and information respectively. This enables smooth application of BIM-AM during the operation stage.

4D simulation for Installation
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

Simulation for Prefabricated pipe module Installation (Developed by Dynamo)
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited



Overall view of Additional District Cooling Plant at the Kai Tak development
Image Courtesy of Paul Y. - Qianhai Joint Venture and Vircon Limited

About Paul Y. – Qianhai Joint Venture

Paul Y. – Qianhai Joint Venture (PYQJV) is a joint venture formed by Paul Y. Engineering Group and Qianhai Energy Technology Development Co., Ltd., providing solid and professional services of District Cooling System construction and operation.

About Vircon Limited

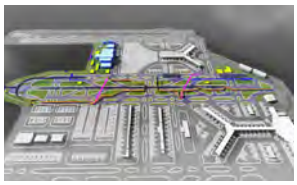
With over 20 years of experience, Vircon Limited is an ISO 19650 certified Hong Kong's premier Digital Twin & BIM solution provider. We have successfully implemented 500+ local and international projects. Vircon is dedicated to providing high quality services and products, customer satisfaction, and continual improvement of our processes. Our Digital Consultants and BIM Specialists help clients to improve safety, optimize production, reduce costs, and mitigate risk throughout the Building Life Cycle. We pride ourselves on supporting innovation, sustainability, and social impact.

Industry Influencer Award

ORGANIZATION
Hong Kong Housing Authority, HKSAR Government

PROJECT
BIM-enabled Systematic Approach to Foundation Design (BIM-SAFD) 2.0

Honorable Mentions



ORGANIZATION
Airport Authority Hong Kong
China State Construction Engineering (Hong Kong) Limited

PROJECT
Contract 3310 North Runway Modification Works

ORGANIZATION
China State Construction Engineering (Hong Kong) Limited

PROJECT
Main Contract Works for New Acute Hospital at Kai Tak Development (Site B)

ORGANIZATION
Civil Engineering and Development Department, HKSAR Government
AECOM Asia Company Limited
CRCC - Paul Y. Joint Venture
Tyfron Consultancy Limited

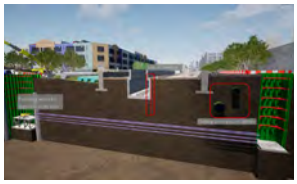
PROJECT
Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang)

ORGANIZATION
Drainage Services Department, HKSAR Government
AECOM Asia Company Limited
Paul Y. – CREC Joint Venture
The Jardine Engineering Corporation Limited

PROJECT
Yuen Long Effluent Polishing Plant - Stage 1

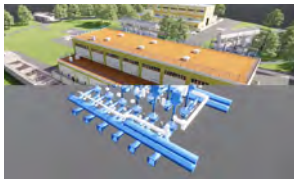
ORGANIZATION
Hong Kong Housing Authority, HKSAR Government

PROJECT
BIM SMA^{i}RT - Revolutionising Public Housing Design with the power of Artificial Intelligence



ORGANIZATION
Water Supplies Department, The Government of the HKSAR
AtkinsRéalis
China International Water & Electric Corporation
Tyfron Consultancy Limited

PROJECT
Contract no. 5/WSD/18 - Water Supply to New Housing Developments in Sheung Shui and Fanling – Mainlaying in Sheung Shui and Fanling areas



ORGANIZATION
Water Supplies Department, The Government of the HKSAR
Ming Hing Waterworks Engineering Company Limited
Shenzhen Yuegang Technology Company Limited

PROJECT
Revolutionizing Large Diameter Water Mains Management and Pumping System Control with AI-Driven BIM and GIS Integration

COMPANY

Hong Kong Housing Authority, HKSAR Government

PROJECT

BIM-enabled Systematic Approach to Foundation Design (BIM-SAFD) 2.0

LOCATION

Hong Kong

TYPE

Foundation Design, ELS, GI Works for Public Housing Development

SCHEDULED TIME OF COMPLETION

Varies, from 2021 to 2023

"Just a few clicks!" - BIM Automations for Efficiency, Accuracy and Quality of Foundation Works

香港房屋委員會
Hong Kong Housing Authority

About Hong Kong Housing Authority, HKSAR Government

The Hong Kong Housing Authority (HA) is a statutory body established in 1973 under the Housing Ordinance to provide subsidised public rental housing to low-income families, and to help low to middle-income families gain access to subsidised home ownership. The Housing Department is the executive arm of the HA to help the Government achieve its policy objective on public housing.

AUTODESK PRODUCTS USED

Autodesk® AutoCAD®
Autodesk® BIM 360®
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk® Revit®
Autodesk® Robot™ Structural Analysis Professional
Generative Design in Autodesk® Revit®
Twinmotion for Revit

Project Description

Building upon the remarkable achievements of BIM-SAFD 1.0, HA's self-developed BIM-SAFD has advanced to version 2.0 this year.

BIM-SAFD 2.0 harnesses generative design, intelligent BIM elements, high-quality rendering and advanced visual programming, to enhance foundation design efficiency, accuracy and quality. Improved BIM integration with generative design and structural analysis software through API streamlines the design process, optimises foundation performance and facilitates early-stage drillhole location planning for pile design. This upgrade epitomises a significant stride in HA's incorporation of BIM-enabled design automations into foundation design practices.

Project Challenges

HA faces numerous challenges when striving to achieve housing production targets, including tight construction schedules and increasingly complex geological conditions at project sites. Furthermore, several additional issues compound these challenges:

1. Inadequate automated foundation design tools customised to HA's in-house design practices, which facilitate adaptable foundation design to accommodate the dynamic nature of building design.
2. Data fragmentation disrupts the seamless exchange of information between BIM models, generative design tools, structural analysis software and smart BIM objects.
3. Comprehending the interdependencies among pile design, existing structures, drainage reserves, founding materials, and other factors often proves to be highly intricate.

Solutions for Challenges

BIM-SAFD 2.0 offers the following innovative solutions for the challenges faced:

1. Automated Design Tools: Engineers benefit from visual programming and generative design tools, swiftly generating optimal pile designs that adapt to dynamic updating of building requirements.
2. Integrated Data Management: Utilising APIs of approved structural analysis softwares, BIM-SAFD 2.0 facilitates seamless data exchange among BIM models, generative design tools, structural analysis software, and intelligent BIM objects. This eliminates data fragmentation, promoting efficient collaboration and information sharing.
3. High-Quality Rendering: Advocating high-quality rendering, BIM-SAFD 2.0 enhances pile proposal visualisation, aiding in understanding their relation to surroundings and founding materials.

How does BIM benefit the project?

Advanced features of BIM-SAFD 2.0 bring several key benefits to projects:

1. Efficiency: Generative design tools and collection of visual programming scripts expedite the foundation design process, reducing design lead times and optimising resource allocation.
2. Accuracy: BIM-SAFD 2.0 prioritises precision, tailoring foundation designs to specific project requirements, such as geological profiles, building configurations and imposed loads. This minimises errors, ensuring structurally sound foundations while complying design codes and standards.
3. Quality: Top notch rendering enhances visual presentations, facilitating effective design reviews, and ultimately delivering high-quality foundation designs, which aligned with project goals and constraints.

Better with BIM

BIM-SAFD 2.0 achieves a profound enhancement in collaboration and efficiency of foundation design by streamlining coordination and facilitating seamless design data sharing among stakeholders, promoting teamwork and reducing design discrepancies.

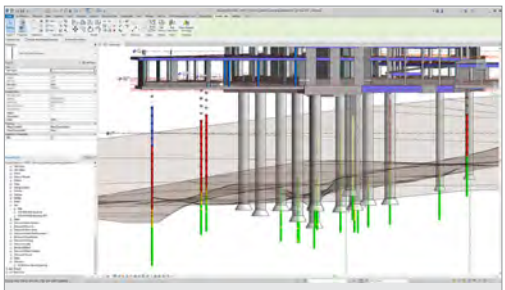
Through comprehensive BIM-enabled design automations, generative design and high quality renderings, BIM-SAFD 2.0 optimises foundation design, resulting in significant resource savings for timely project completion. Engineers also benefit from the computational power and artificial intelligence, enabling well-informed decision-making.

With just a few clicks, BIM-SAFD 2.0 generates foundation designs exemplifying efficiency, accuracy, and quality. This represents a unique BIM-enabled design automations for foundation works, pioneered by HA.

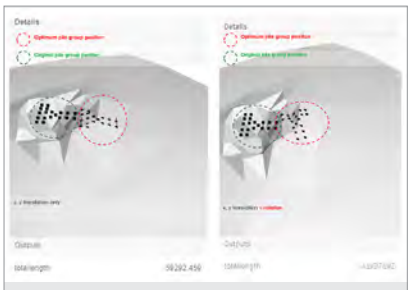
BIM-enabled Systematic Approach to Foundation Design (BIM-SAFD) 2.0

Applications to FULL Project Life Cycle for HA's foundation works

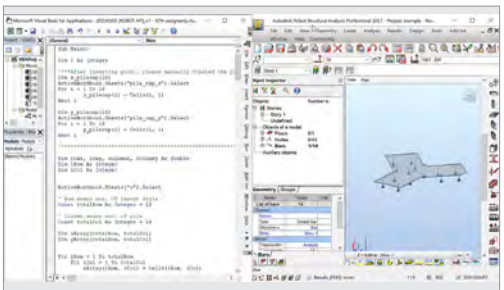
Planning Stage | Feasibility Stage | Schematic Stage



Smart GI Log Object



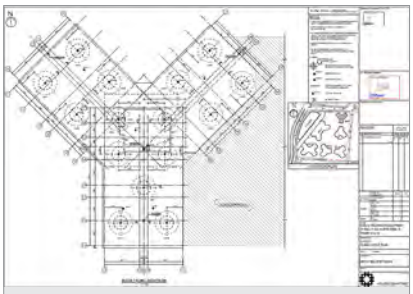
Application of Generative Design



Automated Structural Analysis with APIs

Tender Stage | Construction Stage | Completion Stage

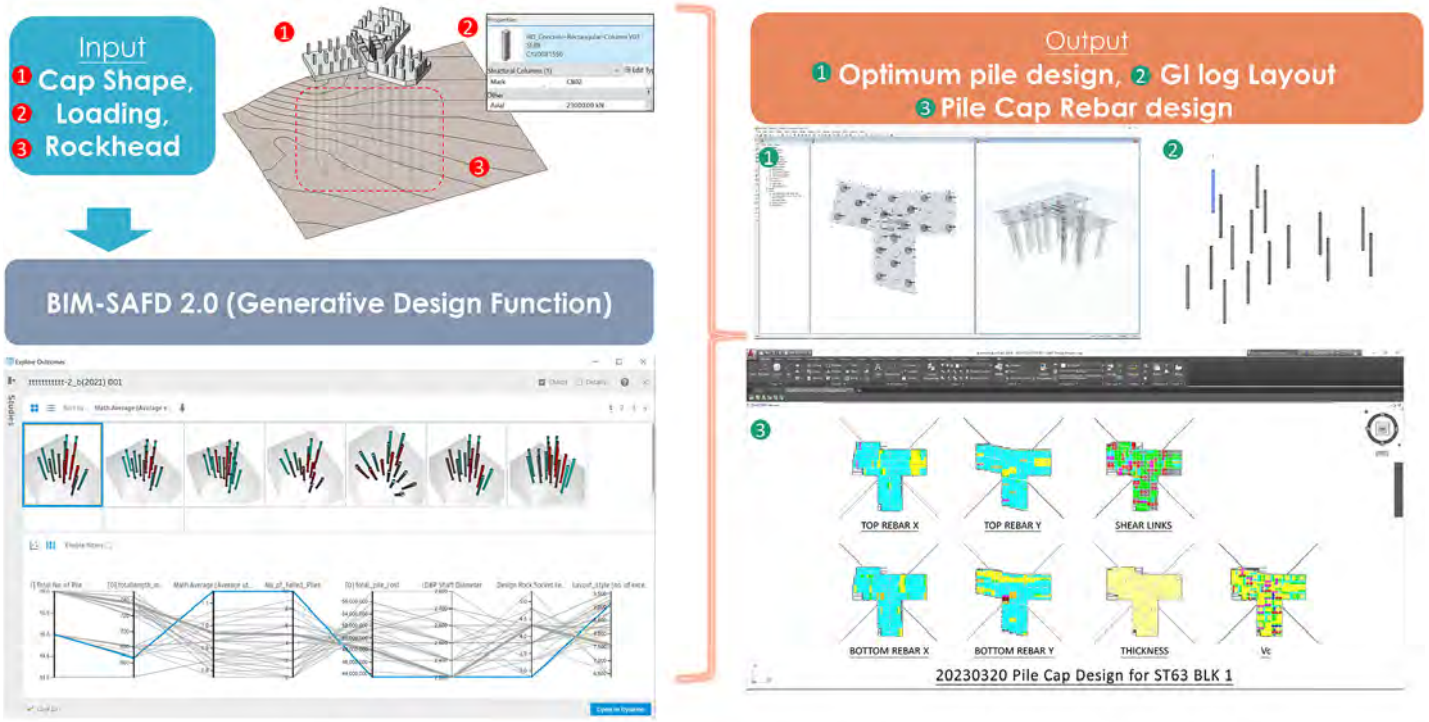
4D Video of Piling Works for Tenders



Production of Foundation Plan to ICU

Rendering for Pile Design Visualisation

Application of BIM-SAFD 2.0 to full project life cycle for HA's foundation works
Image Courtesy of Hong Kong Housing Authority, HKSAR Government



Generative design process for pile design with BIM-SAFD 2.0
Image Courtesy of Hong Kong Housing Authority, HKSAR Government

COMPANY

Airport Authority Hong Kong
China State Construction Engineering (Hong Kong) Limited

PROJECT

Contract 3310 North Runway Modification Works

LOCATION

Hong Kong International Airport, Lantau, Hong Kong

TYPE

Infrastructure/Civil

SCHEDULED TIME OF COMPLETION

Q4 2024

ONE BIM FOR ALL - Revolutionising Project Collaboration

About Airport Authority Hong Kong

The Airport Authority Hong Kong (AAHK) is a statutory body wholly owned by the Hong Kong SAR Government established in 1995. AAHK is responsible for the operation and development of Hong Kong International Airport (HKIA), aiming to strengthen HKIA as the leading international aviation hub and a key engine for the economic growth of Hong Kong. Currently, the Company is committed to the Three Runway System (3RS) Project, which is the largest complex infrastructure development in Hong Kong. The 3RS project comprises 650 hectares of reclamation, a new runway and concourse, expansion of T2, new Automated People Mover system and Baggage Handling system, and other related facilities. Upon commissioning, it enables the capacity of HKIA to increase to over 100 million passengers and 9 million tonnes of cargo by 2030, catering for the long-term air traffic demand in Hong Kong.

About China State Construction Engineering (Hong Kong) Limited

China State Construction Engineering (Hong Kong) Limited started its construction business in Hong Kong since 1979. It's a vertically integrated construction powerhouse, engaging in building construction and civil engineering operations as well as foundation work, site investigation, mechanical and electrical engineering, highway and bridge construction, ready-mixed concrete, pre cast production and infrastructure investment. In July 2005, China State Construction was listed on the Main Board of The Hong Kong Stock Exchange (stock code: 3311). China State Construction is amongst the largest construction contractors in Hong Kong to deliver Buildings, Port Works, Roads and Drainage, Site Formation and Waterworks. China State Hong Kong plays an active role in the construction industry by means of quality management and has professional expertise capable of undertaking high quality and technically advanced projects. It has undertaken over 800 construction projects in Hong Kong and Macau over the past 40 years and has acquired substantial experience and capabilities in doing so.

AUTODESK PRODUCTS USED

Autodesk® Architecture, Engineering & Construction Collection
Autodesk® AutoCAD®
Autodesk® BIM 360® Docs
Autodesk® BIM Collaborate Pro
Autodesk® Civil 3D®
Autodesk® Dynamo Studio
Autodesk® Navisworks® Freedom
Autodesk® Navisworks® Manage
Autodesk® ReCap® Pro
Autodesk® Revit®

香港 HONG KONG 國際機場 INTERNATIONAL AIRPORT

中國建築工程(香港)有限公司 CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LIMITED

Project Description

Contract 3310 is one of the major Contract of Three-Runway System (3RS) Project involving an overall investment of over HKD5.2 billion. C3310 Works Area covers an extensive horizon over 5km in length and over 2,910,000 m^2 of land including the closure and modifications of existing North Runway, construction of additional taxiways and vehicular tunnels, and other essential infrastructure works required for the 3RS operation. AAHK and China State capitalise digital technologies to stay ahead of the curve with the concept of ONE BIM FOR ALL.

Project Challenges

This project faces different challenges due to tight deadlines to complete various site formation works, utiltity works, airfield pavement works, other infrastructure works, etc. The extensive scope of work adds demand on resources and schedules. Coordinating with numerous project intefaces and stakeholders further complicates the matter. The massive amount of information from different parties also needs to be properly managed to ensure all works are progressing according to plan. It will be an uphill task for the project team to overcome these challenges and deliver the project as scheduled.

Solutions for Challenges

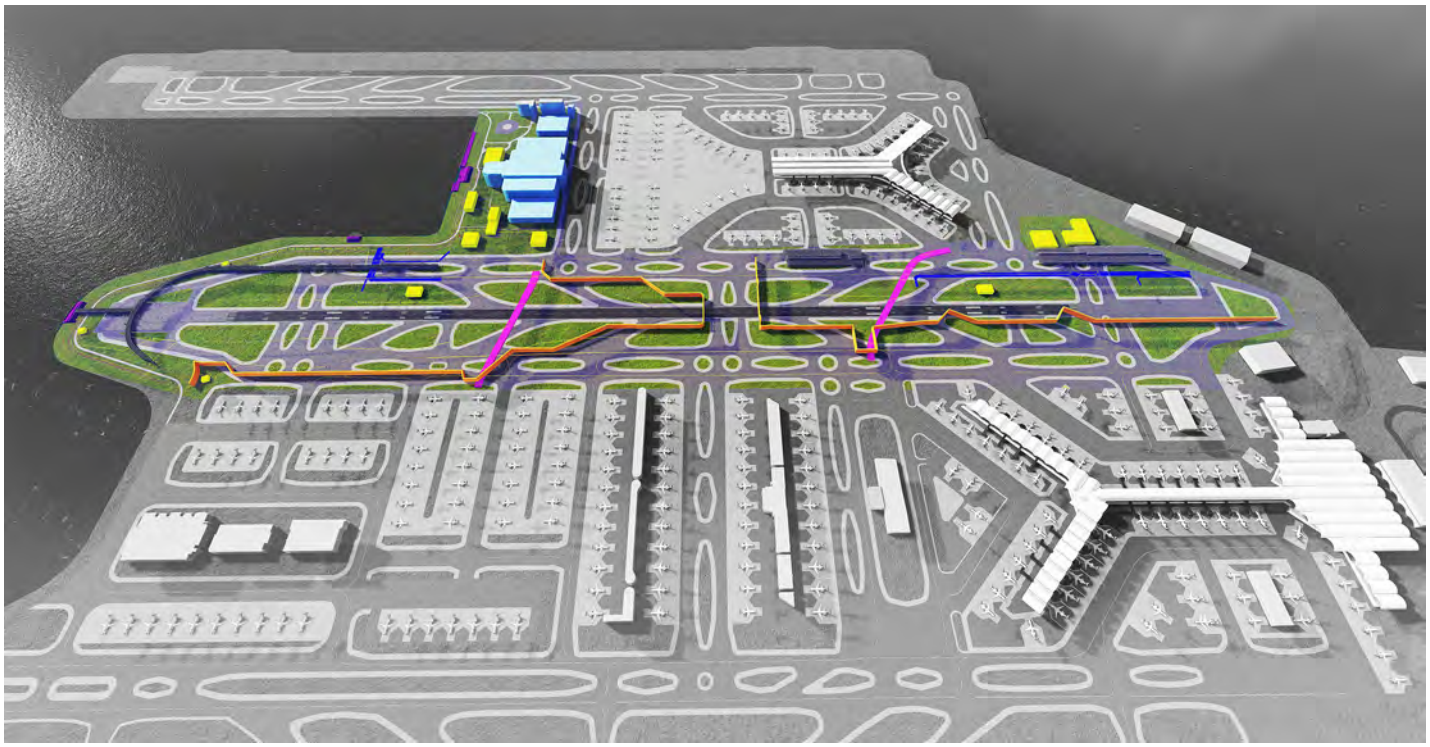
To address the project challenges, the concept of ONE BIM FOR ALL is adopted. This collaborative approach utilises integrated BIM technologies to develop a foreseeable information flow system. BIM and the accompanying use of a Autodesk BIM 360 form the bedrock of digital transformation for effective project management and efficient information exchange control throughout the project life-cycle. BIM automation is to ensure quality and flexibility in the large-scale civil project. Laser scanning technology is adopted for synchronisation between site data and BIM models. Machine control solutions are employed for accurate positioning of paving machinery (and subsequently asphalt paving), based on BIM models and GNSS systems.

How does BIM benefit the project?

The project team embraces a complete BIM workflow for airfield pavement works and underground utilities works, incorporating 3D, 4D, and 5D BIM, resulting in enhanced efficiency and accuracy. It reduces clashes by an impressive 98%, minimizing costly rework and delays. This comprehensive approach also envisions the project for better design review, planning, construction phasing and cost estimation. Lastly, BIM enables seamless collaboration among the client, main contractor, designers, subcontractors and the interface contractors. The unified BIM platform facilitates effective communication, coordination, and information exchange.

Better with BIM

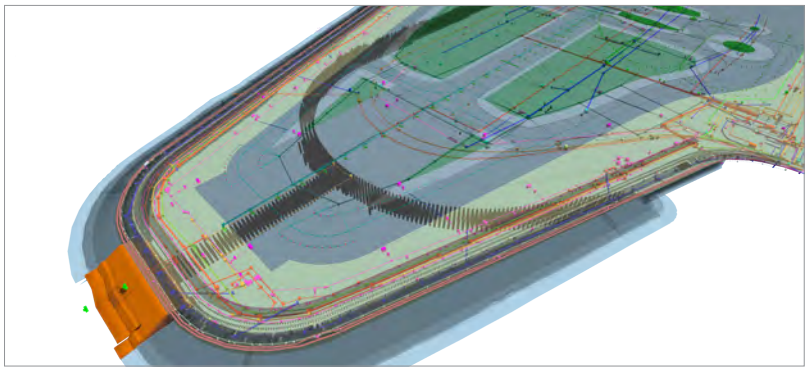
BIM allows all project stakeholders to visualise and collabrate in a 3D model environment from the start. This will facilitate early conflict detection and resolution. The model contains all necessary information which can be extracted and organised, helping to manage the massive data in a more structured way. Resources can be planned and tracked more efficiently with clear information exhange. BIM implementation not only connects data but also processes and people to deliver the extensive project scope with the strict deadline.



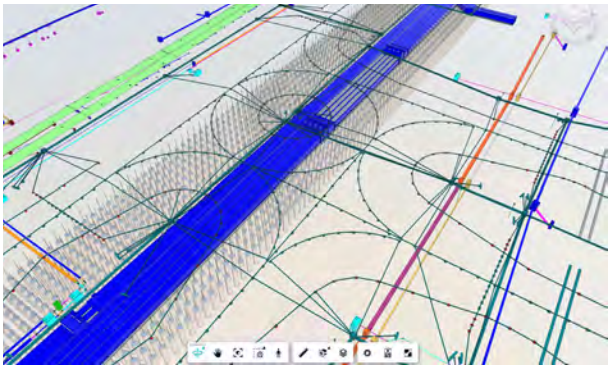
Contract 3310 Overview
Image Courtesy of Airport Authority Hong Kong and China State Construction Engineering (Hong Kong) Limited

Contract 3310 Runway
Image Courtesy of Airport Authority Hong Kong and China State Construction Engineering (Hong Kong) Limited

MEP Coordination with BIM Collabrate Pro
Image Courtesy of Airport Authority Hong Kong and
China State Construction Engineering (Hong Kong) Limited

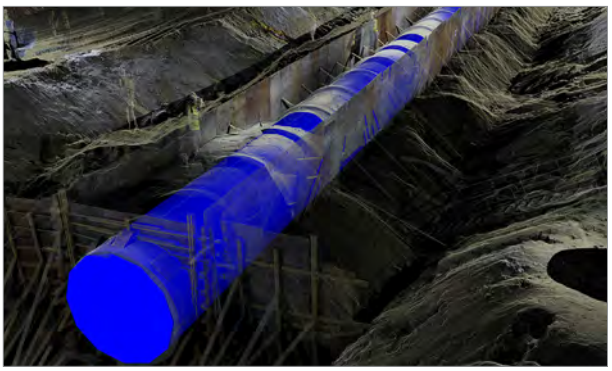


Digital Underground System
Image Courtesy of Airport Authority Hong Kong and China State Construction Engineering (Hong Kong) Limited



UU Coordination with BIM Collabrate Pro
Image Courtesy of Airport Authority Hong Kong and
China State Construction Engineering (Hong Kong) Limited

Extensive Project Scope: Structure Works
Image Courtesy of Airport Authority Hong Kong and China State Construction Engineering (Hong Kong) Limited



Scan to BIM for Underground Utilities
Image Courtesy of Airport Authority Hong Kong and
China State Construction Engineering (Hong Kong) Limited

COMPANY

China State Construction Engineering (Hong Kong) Limited

PROJECT

Main Contract Works for New Acute Hospital at Kai Tak Development (Site B)

LOCATION

Kai Tak Development Area

TYPE

Hospital

SCHEDULED TIME OF COMPLETION

04 Nov 2024

Collaborating in the Cloud: Smart, BIM and Hospital

中國建築工程(香港)有限公司
CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LIMITED

About China State Construction Engineering (Hong Kong) Limited

China State Construction Engineering (Hong Kong) Limited ("the Company" or "China State Hong Kong") started its construction business in Hong Kong in 1979. The Company engages in building construction and civil engineering works. China State Hong Kong is among the largest construction contractors in Hong Kong, and is approved by the Works Bureau, to be on the List of Approved Contractors (Group C) for Public Works in the five major categories of building and civil engineering works, namely, "Buildings", "Port Works", "Roads and Drainage", "Site Formation" and "Waterworks".

BIM PARTNERS

Hausner (Hong Kong) Limited
Chinese State Construction Science and Technology Limited
Leung's Wooden Company
Cemac (HongKong) Limited

AUTODESK PRODUCTS USED

Autodesk® 3ds Max®
Autodesk Construction Cloud®
Autodesk® Dynamo
Autodesk Forge®
Autodesk® Navisworks® Manage
Autodesk® ReCap® Pro
Autodesk® Revit®

Project Description

Announced in 2016 Policy Address, the Government of Hong Kong Special Administrative Region has set aside a dedicated provision of HK$200 billion for the implementation of a 10-year Hospital Development Plan (HDP) in the coming ten years.

The Kai Tak New Acute Hospital (NAH) will be one of the largest hospitals in Hong Kong with 2,400 beds, 37 operating theatres and a broad range of clinical services and facilities.

Project Challenges

The project faces several challenges including a high frequency of design and construction changes, the adoption of Modern Methods of Construction (MiC), Design for Manufacture and Assembly (DfMA), and prefabricated design and construction techniques. These challenges are further compounded by the presence of a large number of laborers and materials on-site. Additionally, there is a significant demand for the production of detailed drawings. Addressing these challenges requires effective change management processes, efficient coordination and collaboration among project stakeholders, the implementation of advanced construction methodologies, and the use of digital technologies such as BIM to streamline processes and enhance productivity.

Solutions for Challenges

For Huge of Laborers & Materials on site, the C-Smart Site Platform, integrated with BIM & AI technology, offers a Digital Works Supervision System for visual quality control and immediate hazard reporting.

For MiC, DfMA & prefabricated design & Constructions Adoption, BIM Team facilitated through early identification of design issues using BIM 3D models. 3D print models aid in visualizing and planning lifting and installation processes.

For Huge of Detail Drawings Production, BIM Team streamlines detail drawing production, significantly reducing time and manpower, while Revit and Dynamo enable efficient generation and modification.

How does BIM benefit the project?

Implementing BIM improves collaboration and communication, minimizing design discrepancies and enabling better coordination and clash detection. This reduces risks and costs by identifying issues early on. BIM improves sequencing and scheduling, optimizing project timelines. It enhances safety on construction sites through virtual walkthroughs and hazard identification. Streamlining facility management, BIM provides accurate information for efficient decision-making, reducing maintenance costs. Lastly, BIM strengthens the building handover process by providing comprehensive documentation and as-built models, ensuring a smooth transition to facility management and maximizing operational effectiveness throughout the building's lifecycle.

Better with BIM

China State embraces innovation in their smart city initiatives by implementing a digital and automated BIM asset management system and facilities maintenance platform. They leverage MS HoloLens 2 for online BIM coordination meetings and virtual site inspections, while utilizing robots for automated 3D laser scanning and comparing with BIM models to effectively manage project progress throughout the entire lifecycle.

Overview of NAH
Image Courtesy of China State Construction Engineering (Hong Kong) Limited

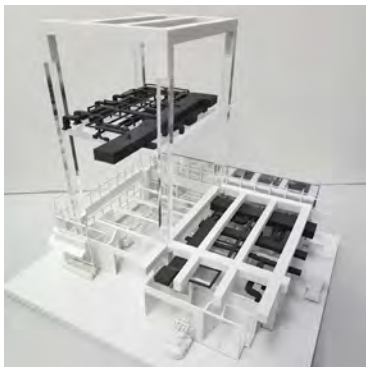
Rendering Image of NAH Project
Image Courtesy of China State Construction Engineering (Hong Kong) Limited

Rendering Image of Block D and Block E
Image Courtesy of China State Construction Engineering (Hong Kong) Limited

Smart Construction Platform for NAH Project
Image Courtesy of China State Construction Engineering (Hong Kong) Limited

Site Model of NAH Project
Image Courtesy of China State Construction Engineering (Hong Kong) Limited

NAH on Site C-Smart Center
Image Courtesy of China State Construction Engineering (Hong Kong) Limited



6-Bed Ward MiC 3D Print From Revit Model
Image Courtesy of China State Construction Engineering (Hong Kong) Limited

NAH Project Electronic Sand Table
Image Courtesy of China State Construction Engineering (Hong Kong) Limited

COMPANY

Civil Engineering and Development Department, HKSAR Government
AECOM Asia Company Limited
CRCC - Paul Y. Joint Venture
Tyfron Consultancy Limited

PROJECT

Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang)

LOCATION

Shung Him Tong and Kau Lung Hang, Fanling, New Territories

TYPE

Civil Project

SCHEDULED TIME OF COMPLETION

Early 2025

Integration of BIM Technology and Innovative Horizontal Rotation Method for Bridge Construction

About Civil Engineering and Development Department, HKSAR Government

CEDD of HKSAR Government is a leading organisation for development of Hong Kong who is committed to provide high quality high civil engineering services to meet its development needs. It missions include striving for engineering excellence, creating a safe, green and sustainable environment, partnering with the community in infrastructure development and building a caring and motivating working environment for staff.

About AECOM Asia Company Limited

AECOM is the world's trusted infrastructure consulting firm, delivering professional services from planning, design and engineering to program and construction management on projects of transportation, buildings, water, new energy and environment with our technical expertise in innovation, culture of equity and diversity, and commitment to environmental, social and governance priorities. AECOM is a Fortune 500 firm and its Professional Services business had revenue of $13.1 billion in 2022.

About CRCC - Paul Y. Joint Venture

China Railway Construction Corporation Limited (CRCC) was established in 2007 in Beijing and is now a mega size construction enterprise under the administration of the State-owned Assets Supervision and Administration Commission of the State Council. It was listed in Shanghai and Hong Kong in 2008 with a registered capital of 13.58 billion yuan. Paul Y. Engineering Group was founded in 1946 in Shanghai who is now one of Hong Kong's largest contractors and plays a vital role in shaping Hong Kong, Macau and Mainland China, with a growing clientele in the region and other parts of the world.

About Tyfron Consultancy Limited

Tyfron offers BIM consultancy and implementation services aiming to provide quality BIM management and digitalized solutions to stakeholders on various construction projects.

AUTODESK PRODUCTS USED

Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk® Navisworks® Freedom
Autodesk® Navisworks® Manage
Autodesk® Revit®

Project Description

The project mainly comprises construction of an approximately 2 km long dual two-lane elevated structures with two long-span bridges over the existing Mass Transit Railway (MTR) tracks, Fanling Highway and Ma Wat River in the section between Shung Him Tong and Kau Lung Hang, approximately 2.4 km long noise barriers, relocation of approximately 400 metres long existing noise barriers along Fanling Highway, and alteration and addition works to the existing Ho Ka Yuen footbridge.

Project Challenges

- Alignment of the bypass meanders over the existing Ma Wat River and located in close proximity to adjacent village houses and industrial buildings which induce constraints for bridge construction works and additional needs from the sensitive stakeholders.
- The bypass spans over the existing MTR East Rail Line and heavily-trafficked Fanling Highway, which are the major transport infrastructure serving the North District of the New Territories.

Solutions for Challenges

- Digital surveying methods such as photogrammtery and point cloud scanning were adopted to capture existing conditions of works areas and surrounding areas.
- To avoid disruption to MTR operation, different construction methods such as horizontal bridge rotation, form traveller and launching girder were adopted for viaduct construction spanning over MTR tracks, Fanling Highway and Ma Wat River, respectively.
- Simulated method statement with the plant and equipment arragement and TTA simulation were utilized to analyze the feasibility of the proposed construction methods which also allowed visualization of the induced constraints regarding the traffic impacts, safety, environmental and quality aspects.

How does BIM benefit the project?

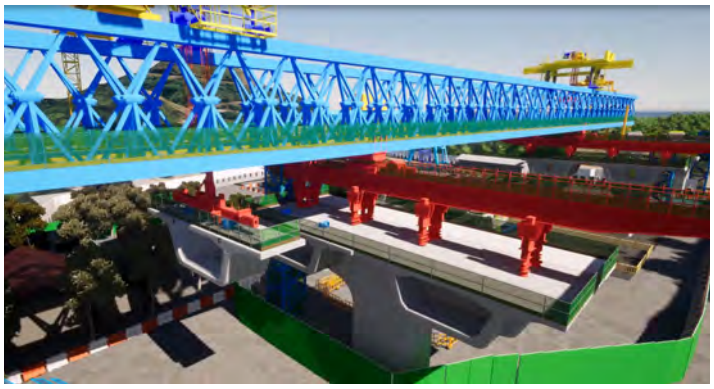
- Digital surveying results were utilized for production of existing conditions model to facilitate design and methodology studies.
- Prior to actual fabrication of large-scale formworks and temporary works, simulated construction methodologies and digital fabrication based on shop drawings were analyzed to determine the cost-effective production process.
- TTA simulation was also utilized for the development of TTA design aiming to minimize possible change to proposed TTA and reduce nightwork costs for implementation and nuisance to the public including safety hazards.
- Clash detection was carried out to produce a coordinated design which enabled minimization of abortive works on site.

Better with BIM

Collabration among project users were carried out through coordination workshops and project's Common Data Environment (CDE). BIM outputs as a result of collaboration would then be converted into Augmented Reality (AR) file format allowing frontline staff to visualize proposed works to be constructed on site. This project also implemented Centralised Management Platform (CMP) which enhanced management of massive project data. The use of smart technology was promoted where BIM models on CDE could be accessed through smart devices on site. Training workshops were conducted on smart device usage and CMP to ensure staff is able to work digitally without hassles.

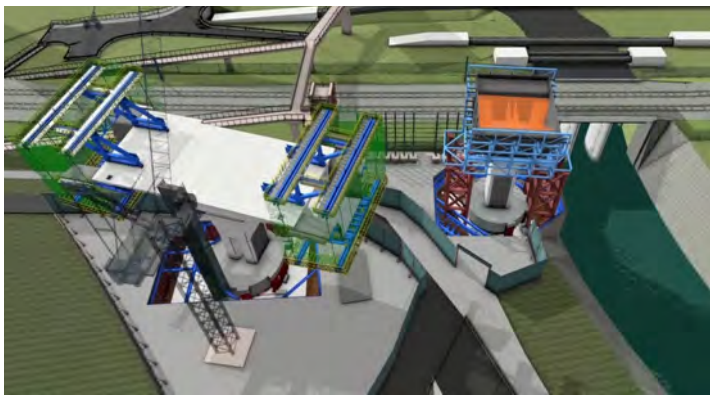
Overview of Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang)
Image Courtesy of Civil Engineering and Development Department, HKSAR Government and AECOM Asia Company Limited and CRCC - Paul Y. Joint Venture and Tyfron Consultancy Limited

Integration of 3D survey and photogrammetry data for design and methodology studies
Image Courtesy of Civil Engineering and Development Department, HKSAR Government and AECOM Asia Company Limited and CRCC - Paul Y. Joint Venture and Tyfron Consultancy Limited



Simulation of bridge construction by launching girder
Image Courtesy of Civil Engineering and Development Department, HKSAR Government and AECOM Asia Company Limited and CRCC - Paul Y. Joint Venture and Tyfron Consultancy Limited

Centralised Management Platform (CMP) for Site Management and Monitoring
Image Courtesy of Civil Engineering and Development Department, HKSAR Government and AECOM Asia Company Limited and CRCC - Paul Y. Joint Venture and Tyfron Consultancy Limited



Simulation of method statement with plant and equipment for bridge rotation
Image Courtesy of Civil Engineering and Development Department, HKSAR Government and AECOM Asia Company Limited and CRCC - Paul Y. Joint Venture and Tyfron Consultancy Limited

TTA simulation
Image Courtesy of Civil Engineering and Development Department, HKSAR Government and AECOM Asia Company Limited and CRCC - Paul Y. Joint Venture and Tyfron Consultancy Limited

Simulation of form traveller operation for bridge construction at Fanling Highway
Image Courtesy of Civil Engineering and Development Department, HKSAR Government and AECOM Asia Company Limited and CRCC - Paul Y. Joint Venture and Tyfron Consultancy Limited

Our Journey with BIM

COMPANY

Drainage Services Department, HKSAR Government
AECOM Asia Company Limited
Paul Y. – CREC Joint Venture
The Jardine Engineering Corporation Limited

PROJECT

Yuen Long Effluent Polishing Plant - Stage 1

LOCATION

Yuen Long

TYPE

Infrastructure Project

SCHEDULED TIME OF COMPLETION

2027

About Drainage Services Department, HKSAR Government

Drainage Services Department provides world-class wastewater and stormwater drainage services enabling the sustainable development of Hong Kong. Since the establishment in September 1989, DSD has strived to upgrade sewage treatment and flood protection levels in Hong Kong, and has acquired noticeable achievement and has committed to strengthening relationships with community, industry and worldwide counterparts.

About AECOM Asia Company Limited

AECOM is the world's trusted infrastructure consulting firm, partnering with clients to solve the world's most complex challenges and build legacies for generations to come.

About Paul Y. - CREC Joint Venture

Paul Y. Construction Company Limited, China Railway Group Limited, and China Railway First Group acting in joint venture under the name Paul Y. – CREC Joint Venture was awarded the project by DSD in Nov 2020 and has committed in delivering and completing this project successfully.

About The Jardine Engineering Corporation Limited

The Jardine Engineering Corporation Limited enables customers to operate their facilities at world-class standards by providing the contracting expertise to design, supply and install building and specialized processes; facility operation and management.

BIM PARTNERS

Syntegrate Limited
Tyfron Consultancy Limited

AUTODESK PRODUCTS USED

Autodesk® AutoCAD®
Autodesk® Docs
Autodesk® Civil 3D®
Autodesk® Navisworks®
Autodesk® ReCap® Pro
Autodesk® Revit®

Project Description

The existing Yuen Long Sewage Treatment Works (YLSTW) now serves Yuen Long Town, Yuen Long Industrial Estate and Kam Tin area with treatment capacity of 70,000 m^3/day at secondary sewage treatment level.

To cope with the population growth and development needs, YLSTW will be transformed into Yuen Long Effluent Polishing Plant (YLEPP) with treatment capacity of 100,000 m^3/day in stage 1 and at tertiary treatment level within the same tight footprint to meet the more stringent discharge requirements.

Project Challenges

The nature of the project is very unique with various challenges in design and construction including:

Design - The E&M design involves various types of sewage and sludge treatment processes which requires precise civil and structural design to support these system design not only during construction but also future operation and maintenance.

Construction - The existing sewage treatment plant is still in operation, thus the construction of the new sewage treatment facilities are carried out in phases with sophisticated temporary works design both in terms of civil and E&M works within the same footprint of the existing plant.

Solutions for Challenges

To overcome these challenges in both design and construction of the project, it takes tremendouse efforts from project team members across different disciplines to work closely and collaboratively. As such, an effective communication channel is established enabling project team members to exchange ideas, comments, drawings and information etc...By taking a proactive approach via a well established communication channels, each project team members are able to identify problems / conflicts early and solutions are developed jointly to overcome the problems efficiently and effectively.

How does BIM benefit the project?

Project team members of different disciplines including Client, Architects, Civil & Structural Engineers, E&M & Building Services Engineers, communicated using BIMs and Common Data Environment. They are able to evaluate designs for feasibility, functionality and aesthetics within an immersive environment. Changes become more easily identified and design options can be evaluated more quickly.

Using BIM models during construction phase enables the contractors to improve their works planning, construction phasing and method of construction by allowing the site information to be visualized in three dimensions. These also support other application e.g providing immersive experiences to partitioners to enhance their safety awareness.

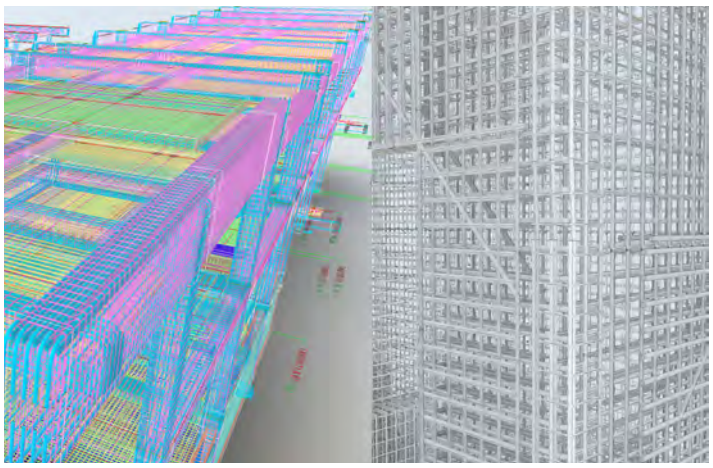
Better with BIM

With BIM, it is now possible to visualize the BIM model on-site at any time. The BIM model can be automatically and accurately mapped on-site, so that the user will be able to isolate focused digital information and understand the geometric relationship between BIM and the site.

Autodesk BIM 360 provided a excellent common data environment to allow multiple stakeholders to collaborate on the project, including;

1. Reduction of risk and increased reliability of data.
2. Streamlining the process of checking, versioning, and reissuing information.
3. Enhance collaboration and improve outcomes.

Overall View for YLEPP (with Artist Impression)
Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and Paul Y. - CREC Joint Venture and The Jardine Engineering Corporation, Limited

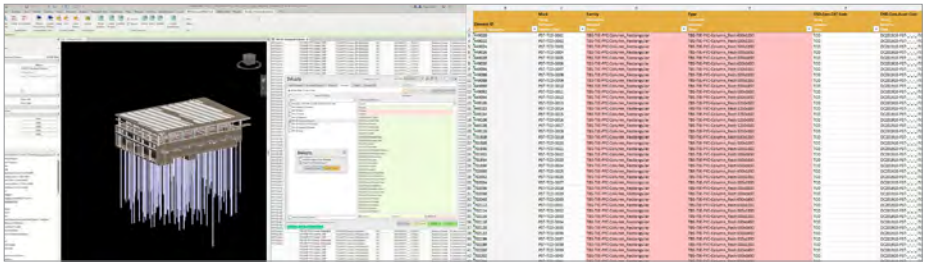


Bar Bending Schedule from BIM Model for Digital Fabrication
Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and Paul Y. - CREC Joint Venture and The Jardine Engineering Corporation, Limited

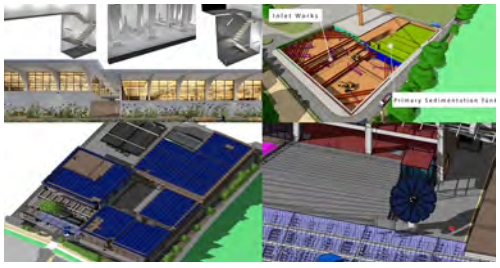
BIM with Innovative Technology
Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and Paul Y. - CREC Joint Venture and The Jardine Engineering Corporation, Limited

Existing Conditions Modelling using Point Cloud & 3D Photogrammetry
Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and Paul Y. - CREC Joint Venture and The Jardine Engineering Corporation, Limited

Clash Analysis and Comparison of 3D model in ACC
Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and Paul Y. - CREC Joint Venture and The Jardine Engineering Corporation, Limited



Revit Plugin for Data Management
Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and Paul Y. - CREC Joint Venture and The Jardine Engineering Corporation, Limited



Engineering Analysis
Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and Paul Y. - CREC Joint Venture and The Jardine Engineering Corporation, Limited

COMPANY

Hong Kong Housing Authority, HKSAR Government

PROJECT

BIM SMA^{i}RT - Revolutionising Public Housing Design with the power of Artificial Intelligence

LOCATION

Hong Kong

TYPE

Building Design and Master Planning

SCHEDULED TIME OF COMPLETION

Varies

The Next Chapter of Public Housing Design with the Power of Artificial Intelligence

香港房屋委員會
Hong Kong Housing Authority

About Hong Kong Housing Authority, HKSAR Government

The Hong Kong Housing Authority (HA) is a statutory body established in 1973 under the Housing Ordinance to provide subsidised public rental housing to low-income families, and to help low to middle-income families gain access to subsidised home ownership. The Housing Department is the executive arm of the HA to help the Government achieve its policy objective on public housing.

BIM PARTNER

isBIM Limited

AUTODESK PRODUCTS USED

Autodesk® AutoCAD®
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk® Revit®
Generative Design in Autodesk® Revit®

Project Description

The Hong Kong Housing Authority (HA) progressively takes steps to develop BIM SMA^{i}RT, one of its signature design automation tools, for the architectural design process of public housing projects. With the advancement of artificial intelligence (AI) and generative design technology in recent years, HA encourages in-house professionals and collaborates with its consultants, contractors and to apply a wider use of generative design technology for design optimization, which intends to revolutionise the design options generation process thus saving cost and time for highly repetitive, yet explorative design solutions. BIM SMA^{i}RT is a vivid example of how AI could venture into architectural regimes in the domain of public housing design.

Project Challenges

Every architectural design is a complex and sophisticated answer that transcends, inter alia, design parameters, statutory requirements and site-specific constraints into an appropriate design solution. Public housing design in Hong Kong is no exception. With a view to enhancing speed and efficiency, the team challenged the explorative use of generative design into the architectural regime, and meanwhile recipirically formulated appropriate design principles specific to public housing design. This aims to challenge the integration of advanced technology, applying generative design under the prevailing legislative and sustainable design framework that squarely suits the local public housing context.

Solutions for Challenges

Introspecting on the design thinking of our public housing design, which is standardised, modular and repetitive in nature, BIM SMAiRT promotes design optimisation across various areas with respect to the scale and spectrum of public housing design, resulting from integral considerations of building controls, customized Housing Authority's in-house design policy and project specific limitations. The algorithms of BIM SMA^{i}RT are programmed to reference the traditional public housing design trajectory, from micro to macro, from modular flat to floor composition, and from block layout to master planning. Design solutions are formulated, filtered, ranked and recommended based on analytical results and the responsive intents of designers.

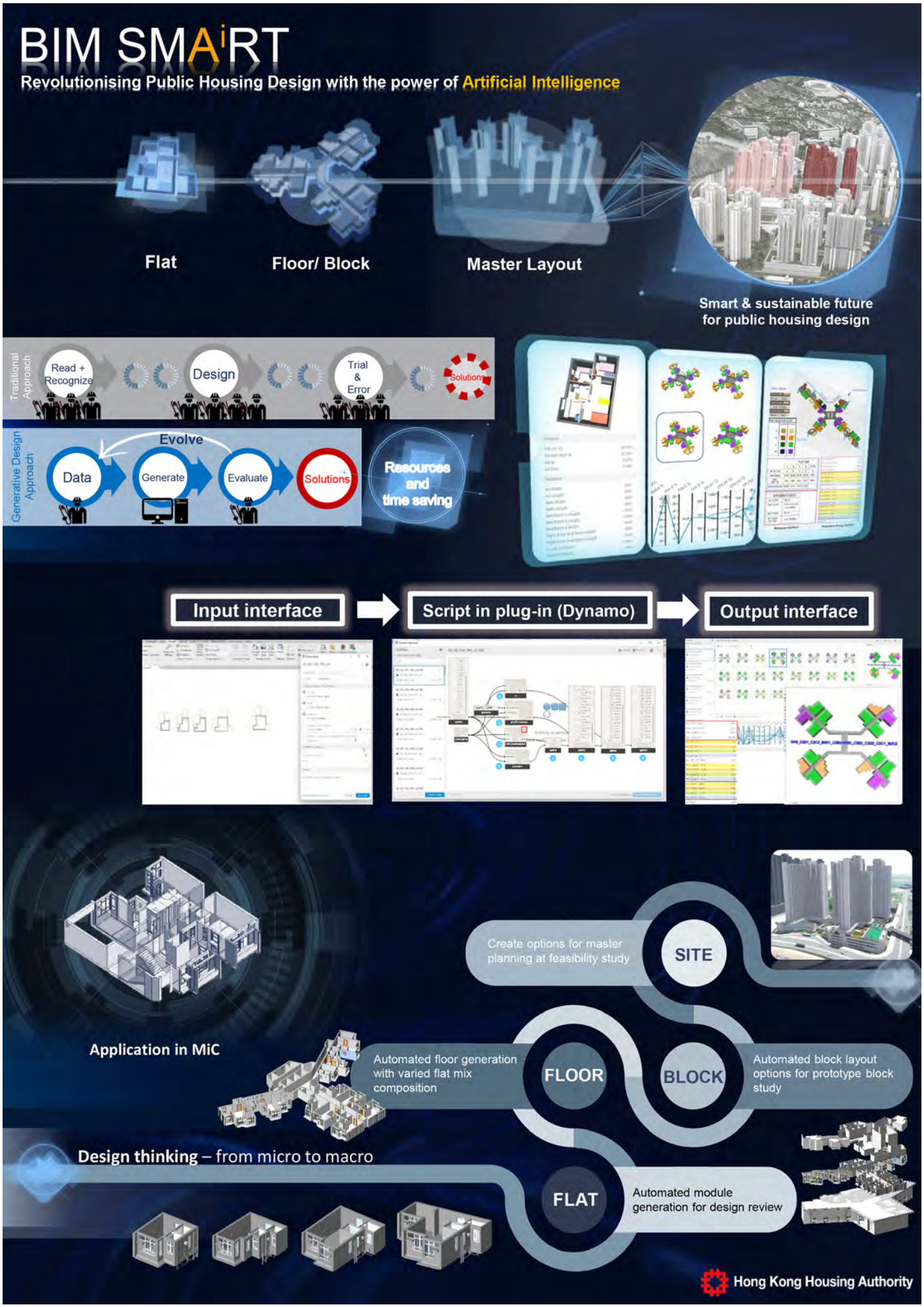
How does BIM benefit the project?

Features of BIM SMA^{i}RT bring the following key benefits to projects:

1. industrialise the design generation process from resources, time and cost-saving perspectives for highly analytical and fully explored design solutions. It's fast, precise and accurate!
2. enhance buildability not merely by detecting conflicts, but proactively avoiding and resolving them in the evaluation process. This shifting approach helps to ensure that design solutions are generally and duly considered, facilitating efficient and effective construction.
3. facilitate new construction methods such as modular integration construction (MiC). Any method of construction, no matter adopting a common traditional approach with prefabricated elements or the MiC approach, could be facilitated.

Better with BIM

The beginning of BIM SMA^{i}RT was initiated by our aspiration on striving ahead with the challenging housing production targets in the near future under the social situation that we lack construction labour-power compounded with a limited number of professionals shared by the entire industry. This mission inspires us with a strong determination in development and adoption of innovative technologies architecturally, as we believe, being the smartest and most sustainable way not only for the advancement and growth of our public housing development, but more significantly, impactful to the construction industry.



BIM SMAiRT – The signature design automation tool for the next chapter of public housing developments with the Power of AI
Image Courtesy of Hong Kong Housing Authority, HKSAR Government

COMPANY

Water Supplies Department, The Government of the HKSAR
AtkinsRéalis
China International Water & Electric Corporation
Tyfron Consultancy Limited

PROJECT

Contract no. 5/WSD/18 - Water Supply to New Housing Developments in Sheung Shui and Fanling – Mainlaying in Sheung Shui and Fanling areas

LOCATION

Sheung Shui and Fanling Areas

TYPE

NEC ECC Option C

SCHEDULED TIME OF COMPLETION

February 2024

A New Approach to Mainlaying in a Safe Environment under a Public Works Project

About Water Supplies Department, The Government of the HKSAR

Water Supplies Department (WSD) is responsible for providing quality water supply services in Hong Kong, with mission to adopt reliable and customer-oriented approaches in services while considering environmental responsibilities and striving for continuous improvement with efficient resources and technology.

About AtkinsRéalis

AtkinsRéalis (Atkins) is a world-leading professional services and project management company dedicated to engineering a better and sustainable future, that delivers end-to-end services across the asset lifecycle including design & engineering, project & construction management, operations & maintenance, etc.

About China International Water & Electric Corporation

China International Water & Electric Corporation (CWE), a subsidiary of China Communications Construction Group, is a renowned company in the water conservancy and hydropower industry and has ranked in ENR's lists of largest international contractors and engineering design companies, with a AAA credit rating in China.

About Tyfron Consultancy Limited

Tyfron Consultancy Limited (TYFRON) is headed by professionals, with BIM coordinate team and BIM production team, providing full management of BIM production for clients, consultants and contractors.

AUTODESK PRODUCTS USED

Autodesk® AutoCAD®
Autodesk® BIM 360®
Autodesk® Civil 3D®
Autodesk® Navisworks®
Autodesk® ReCap® Pro

Project Description

Laying of about 12km distribution mains with diameters ranging from 150mm to 700mm in the south-western part of Sheung Shui and Fanling areas and associated service connections. To provide the reclaimed water supply to Sheung Shui and Fanling areas for the existing and planned new housing developments.

Project Challenges

Pipe laying is a simple type of civil works but site planning to maximize the number of concurrent workfronts at public roads for timely project completion is crucial. During construction stage, it is commonly found limited workspace with congested existing underground utilities (UUs) from the available 2D drawings of record plans provided by others for the works. Also, project interface with other construction works, unforeseen site condition and prolonged period for obtaining approval from other parties for commencement of the works are the major project challenges. Therefore, developing an effective site management plan and safe working environment is vital to minimise impact to the construction programme.

Solutions for Challenges

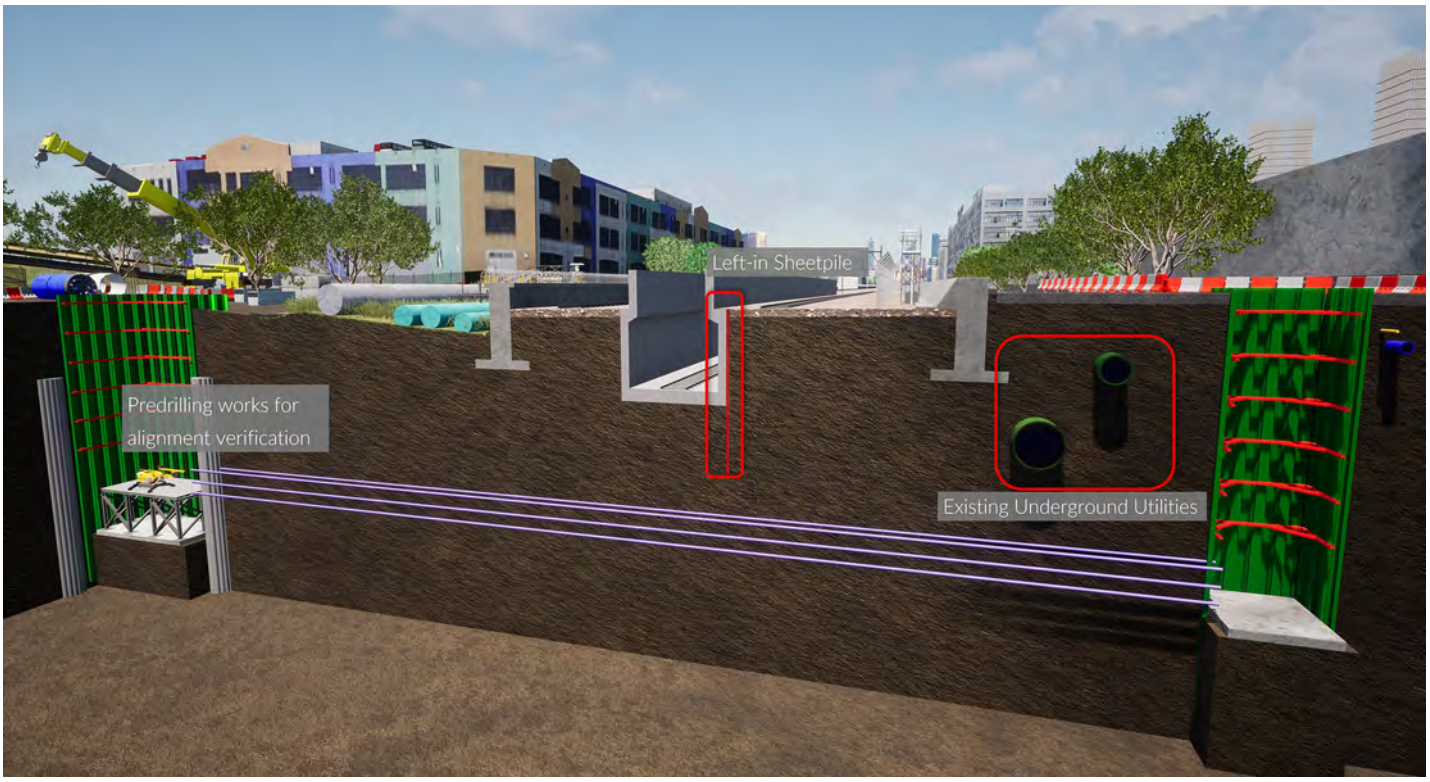
Traffic simulation models showing the designed pipe alignment, the extent of approved Temporary Traffic Arrangement (TTA) and other essential elements for complex pipe jacking works including the motions of construction vehicles can minimise the risk of insufficient working area and resolve the difficulties encountered at an early stage of the construction works. Besides, using 3D coordination analysis with Virtual reality/Augmented reality (VR/AR) technology to visualize the high-risk construction activities against the physical constraints can help the site planning and ensure the optimum plants and logistics arrangement for the works.

How does BIM benefit the project?

BIM enhances the design, methodology, programme and cost efficiency for the works. As completion of pipe laying for water supply to the developments is the main goal of the project, adopting the Design Resolution through BIM by identifying the key constraints and potential risks around the major works area becomes a fundamental platform.
Using BIM for transforming the integrated project programme to 4D timeliner, it helps to understand the programme sequence of logic for evaluating the constructability for project management, option comparison and works execution, which can benefit the project during the construction stage.

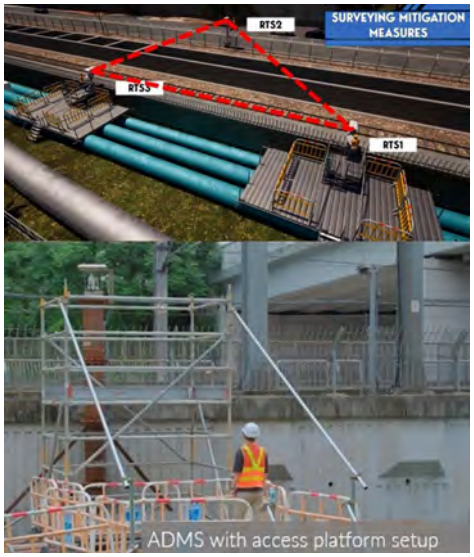
Better with BIM

BIM allows efficient review of design, methodology, cost, and Quality, Safety and Environment (QSE) studies by team members. Validated designs are visualized by the frontline supervisor and sub-contractor to evaluate the cycle programme, which enable proactive construction planning. BIM modeling with AR also helps to overcome site constraints by previewing the site control including plants and logistics arrangements. Integrating project information into a cloud-based Common Data Environment (CDE) also enables Global Positioning System (GPS) positioning to locate the alignment of watermains based upon the as-built information. Additionally, BIM provides VR safety training to promote safety awareness.

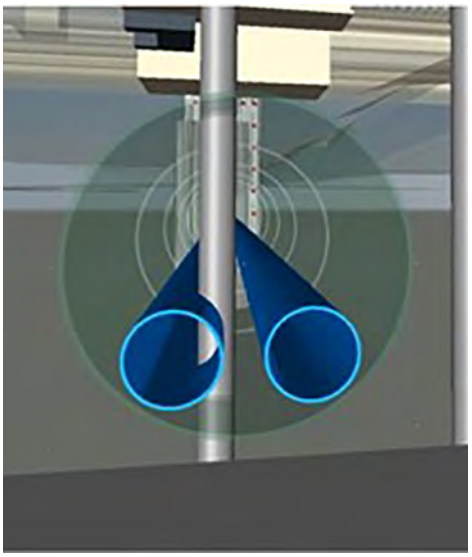


Review of Proposed Pipe Jacking Works at Critical Section by Model Simulation
Image Courtesy of Water Supplies Department, The Government of the HKSAR (WSD) and AtkinsRéalis (Atkins) and China International Water & Electric Corporation (CWE) and Tyfron Consultancy Limited (TYFRON)

Scope of Works – Mainlaying in Sheung Shui and Fanling Areas
Image Courtesy of WSD and Atkins and CWE and TYFRON



BIM Analyzation for the Optimum Position of ADMS Monitoring Points
Image Courtesy of WSD and Atkins and CWE and TYFRON



Clash Detection by AUTODESK NAVISWORKS in Design Review
Image Courtesy of WSD and Atkins and CWE and TYFRON

Visualization of Existing UUs or Planned Alignments by AR Technology
Image Courtesy of WSD and Atkins and CWE and TYFRON

Evaluation on Logistics Routing by AR Technology
Image Courtesy of WSD and Atkins and CWE and TYFRON

BIM-GIS-AM Integration with AI and IoT for Surface and Linear Assets

COMPANY

Water Supplies Department, The Government of the HKSAR
Ming Hing Waterworks Engineering Company Limited
Shenzhen Yuegang Technology Company Limited

PROJECT

Revolutionizing Large Diameter Water Mains Management and Pumping System Control with AI-Driven BIM and GIS Integration

LOCATION

New Territories East

TYPE

Water Works

SCHEDULED TIME OF COMPLETION

Q4 2024

About Water Supplies Department, HKSAR Government

The Water Supplies Department is responsible for operating and maintaining fresh water and flushing water supplies and distribution systems to ensure reliable water supplies to the customers. The fresh water supply system covers a total of 99.99% of Hong Kong's population, while the seawater supply network for flushing covers about 85% of the Hong Kong's population.

About Ming Hing Waterworks Engineering Company Limited

Ming Hing Waterworks is the first Company that integrates waterworks, technology, engineering and investment management into an efficient and diversified waterworks holding group. It has established its position as a major waterworks engineering services provider in Hong Kong and is currently accountable for maintaining the water supply system for over 55% of the Hong Kong population.

About Shenzhen Yuegang Technology Company Limited

Shenzhen Yuegang Technology Company Limited has contributed to the Digital Transformation initiative of Water Supplies Department since 2019 by implementing its suite of smart water technologies and systems to support different smart water projects of WSD.

BIM PARTNER

Summit Technology (Hong Kong) Limited

AUTODESK PRODUCTS USED

Autodesk® Civil 3D®
Autodesk® Navisworks®
Autodesk Platform Services
Autodesk® ReCap® Pro
Autodesk® Revit®
Autodesk® Vault
Infowater Pro

Project Description

The Water Supplies Department (WSD) has initiated the first stage of an ambitious program aimed at transforming the control and maintenance of the Dongjiang water trunk transfer network system. We have introduced several new programs, including the Smart Trunk Transfer Support System (STTSS), establishing new Asset Management Information System (AMIS), and AI Leakage Detection by leveraging BIM, GIS, AI, and IoT technologies. The project commenced on 2023 January and the funding is over 18 million.

Project Challenges

The traditional asset management system runs for already 20 years. It is a big challenge to transform an enormous amount of non-organized data to the new AMIS. Besides, as the project adopts BIM, GIS, AI and IoT technologies, interoperability among different software is also a major concern for data transfer. Standard Revit does not come with the function to export data in COBie format which achieve the WSD's BIM Standard.

Solutions for Challenges

The new AMIS system aims as a centralized asset repository for all WSD asset classes, ensuring timely access to accurate information. We have implemented a BIM-AM workflow for surface water treatment facilities, complete with an asset register to ensure an effective maintenance management cycle. To enhance interoperability, we adopted openBIM and openGIS file format, such as IDS, IFC, BSDD, and COBie. A custom-made API program is used to export the relevant asset data into the AMIS under WSD Asset Hierarchy Structure.

How does BIM benefit the project?

The BIM integration of 2D and 3D within AMIS and 3D water mains offers a more comprehensive and systematic view of our water supply assets. When combined with BIM, GIS, and IoT, dynamic data collected on-site can be displayed in both 2D and 3D formats. Asset categories are linked to WSD installation types, enabling informed decision-making and effective management of asset registers. Real-time sensor data also embeds with BIM asset.

Better with BIM

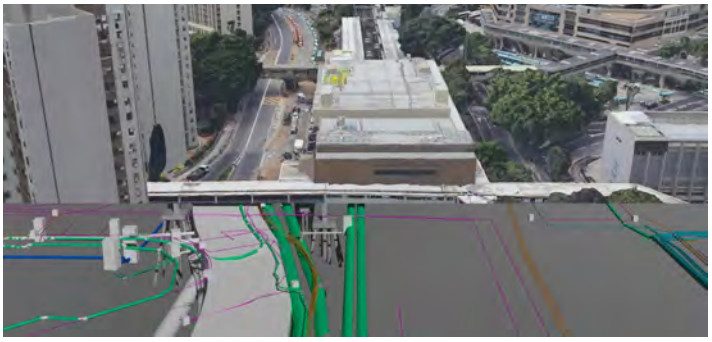
BIM facilitates the integration of data from various sources, enabling WSD to proactively identify potential issues in the system, optimize their asset management practices, and enhance the reliability and lifespan of their assets. This results in several benefits such as improved efficiency, reduced costs, and enhanced safety. BIM-AM in the AMIS enables visualise the assets and show status alerts, thus inspectors can quickly look for that asset for inspection. Inspectors can also make good use of AMIS to do simulations and make action plans for emergency.

Asset Register at Muk Wu Pumping Station
Image Courtesy of Water Supplies Department, HKSAR Government and Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

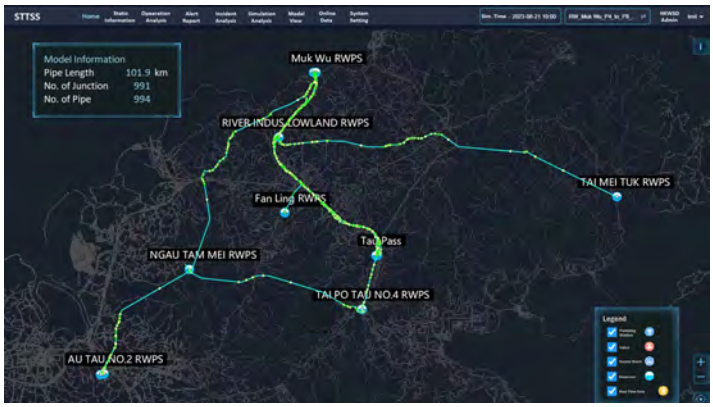
Adoption of BIM in AMIS for Asset Management
Image Courtesy of Water Supplies Department, HKSAR Government and
Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

Exploded View of BIM Model in AMIS
Image Courtesy of Water Supplies Department, HKSAR Government and
Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

Integration of BIM with IoT for Sensors at Water Treatment Works
Image Courtesy of Water Supplies Department, HKSAR Government and
Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited



BIM Integration of 2D and 3D within AMIS and 3D Underground Utilities
Image Courtesy of Water Supplies Department, HKSAR Government and
Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited



Adoption of GIS and Hydraulic for Dongjiang Water Mains in STTSS
Image Courtesy of Water Supplies Department, HKSAR Government and
Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

Analytics for AI Leakage Detection
Image Courtesy of Water Supplies Department, HKSAR Government and
Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

Advisors' Comments – Introduction

We would like to express our sincere gratitude, once again, to the local organizations that have supported us and the international BIM advisors who have been instrumental in guiding us on this year's Awards. The advisory panel, comprised of esteemed leaders from local supporting organizations, has generously granted us their time to discuss and review the shortlisted projects, and provided us with valuable insights vital for future growth and success. Inspired by the sharing and experiences of the international advisors, we will continue to innovate as we stride toward a more sustainable future.

Advisory Panel

Vicky Chan
Communications Chair,
AIA Hong Kong

Vincent Yeung
Manager (Building Information Management),
Hip Seng Construction Company Ltd

Ar Prof Ada Fung, BBS
President,
Hong Kong Alliance of Built Asset & Environment Information Management Associations
(The Hong Kong Chapter of buildingSMART International)

Ir Francis Leung
Convener of the Digital Construction Club (DCC)

Dr. Garfield Guan
BIM Representative,
Hong Kong Institute of Utility Specialist

Ir Steven Lai
Vice Chairman,
Institution of Public Private Partnerships

To Kin
Hub Committee Member,
The Chartered Institute of Building (CIOB),
Hong Kong

Nick Chan
Board Member,
The Hong Kong Institute of Building Information Modelling

Ir Raymond Lui
Committee Member,
The Hong Kong Institution of Engineers
(IT division)

Ryan Leong
Director, Board of Directors,
Architects Association of Macau

Simon J Gallagher
Director,
Chartered Institute of Architectural Technologists,
Hong Kong Centre

Henry Cheung
Council Member,
Hong Kong Information Technology Joint Council

Dr. Francis Chan
Chair of External Affairs and Professional Accreditation,
Hong Kong Institute of Project Management

Mike Chan
Group Admin,
Hong Kong Revit User Group

Dr. Calvin K. Kam, FAIA, PhD, CCBM, bSI Fellow
Founder and CEO,
Strategic Building Innovation · bimSCORE

Cordia Yu
Chairperson,
The Chartered Institution of Civil Engineering Surveyors
(Hong Kong Region)

Michael Leung
Head of BIM Affairs,
The Hong Kong Institution of Engineering Surveyors

Edison Lai
President,
The Macau Institute of Engineers

Advisory Panel - Award Winners

Architectural Services Department, HKSAR
Shui On Joint Venture

Project: Design and Construction of Drainage Services Department Office Building at Cheung Sha Wan Sewage Pumping Station

The Drainage Services Department (DSD) Office Building at Cheung Sha Wan Sewage Pumping Station is the new administrative center supporting urban drainage network operations in Hong Kong. The use of BIM greatly enhanced the efficiency and effectiveness of the design and construction process, which is particularly important for projects with a complicated scope of work.

The adoption of BIM in the Modular Integrated Construction (MiC) process for the Electrical and Mechanical (ELT & ELV) Rooms eliminated the need for hot works and reduced the on-site installation time for the building. This project exemplifies an outstanding case of a BIM working environment where all stakeholders actively participate. It's worth noting that the project has successfully extended the use of BIM to MiC and utilized it for site safety purposes. The commendable efforts to bridge the gap between the digital and physical realms are noteworthy. It was an excellent idea to develop a program that can be used with BIM to enhance its usage.

Architectural Services Department, HKSAR
Shui On Joint Venture
WSP Hong Kong Limited

Project: Redevelopment of Kwai Chung Hospital (Phase 2)

The redeveloped Kwai Chung Hospital will become the first local hybrid-mode psychiatric hospital, providing holistic patient-focused care that combines inpatient and community care services. The redevelopment project presents an opportunity to leverage BIM to enhance the hospital's facility management, maintenance, and daily operations by integrating asset information, equipment specifications, and maintenance schedules within the BIM model. The project represents a significant leap forward in mental health facility design, emphasizing effective stakeholder collaboration to achieve sustainability and coordination.

Applying the Common Data Environment (CDE) collaboration platform in this project improved efficiency in resolving issues. The application of BIM enhanced the quality of MiC in the design stage, and the simulation of delivery, lifting, and installation processes provided a clear picture and workflow to workers to minimize safety risks. BIM was also utilized for staging visualization and separating public access and site. Overall, the BIM application in this project was mature, and the composition of KPI is a good reference for other projects.

Architectural Services Department, HKSAR
TFP Farrells Limited

Project: Expansion of Museum Project at Tsim Sha Tsui East

The project aims to expand the museum complex at Tsim Sha Tsui East by constructing new annex buildings with new facilities and renovating the affected and out-of-date facilities at the site. An extensive use of BIM in the project offers significant values. OpenBIM was fully utilized for lighting, structural, and traffic analysis during the project's design stage, and the deployment of Dynamo in creating the foundation model from the piling schedule also streamlined the process which improved efficiency and accuracy. The project is also a good example of extending BIM to an actual 3D model using a 3D printer for visualization and coordination. It helped the stakeholders keep track of the schedule with a clear phasing of the project. The power of BIM was fully unleashed in areas including coordination, visualization, 3D modeling, 3D printing, and energy analysis, providing useful information for decision making and supporting sustainability goals.

Advisory Panel - Award Winners

Drainage Services Department, HKSAR Government
Kwan Lee – Chun Wo Joint Venture
Blue BIM Limited

Project: Sau Nga Road Stormwater Storage Scheme

The Kwun Tong Drainage Improvement Works include the Sau Nga Road Stormwater Storage Scheme (SNRSSS) designed to protect Kwun Tong from rainfall events. The SNRSSS will be built beneath the existing Sau Nga Road Playground and will feature new playground facilities for public use.

The project team utilized advanced BIM modeling and data from underground utility surveys to effectively plan and execute the pipe laying works. BIM-based Robot Control was successfully piloted for on-site automation machines, demonstrating the team's commitment to innovation and efficiency. In addition, the integration of BIM with technology such as blockchain illustrates the team's focus on data safety, which is a crucial aspect of any successful project. The team also explored the use of desilting robots to minimize underground works and planned to integrate them with the BIM model to report real-time status, which is a testament to their relentless efforts in addressing the complex requirements of the project.

Paul Y. - Qianhai Joint Venture
Vircon Limited

Project: Additional District Cooling System (DCS) at the Kai Tak Development (KTD)

The Kai Tak Development's District Cooling System (DCS) is a large-scale centralized and energy-efficient district air-conditioning system, the first of its kind in Hong Kong. The project team used DfMA, MiMEP, and BIM to enhance productivity and safety. Common Data Environment (CDE) was used as a medium for collaboration, and blockchain technology was integrated for data security. The project utilized innovative technologies such as AR and Digital Twin for safety and zero-carbon calculation to enhance quality.

Autodesk solutions were utilized for modeling and coordination. BIM was implemented for collaboration and coordination among stakeholders, identifying conflicts between different components of the District Cooling System such as pipes, valves and equipment. The project also used BIM-MiMEP, 4D Phase Planning, and Construction Methodology simulation for a successful outcome.

Advisory Panel - Industry Influencer Award

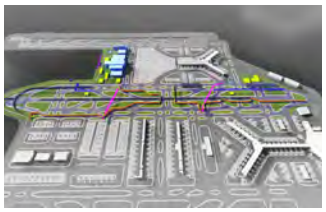
Hong Kong Housing Authority, HKSAR Government

Project: BIM-enabled Systematic Approach to Foundation Design (BIM-SAFD) 2.0

Hong Kong Housing Authority's self-developed BIM-SAFD has significantly transformed since its inception. Building upon the success of its previous version, BIM-SAFD 2.0 has integrated Generative Design, intelligent BIM elements, high-quality rendering, and advanced visual programming to enhance the overall efficiency, accuracy, and quality of foundation design. With improved BIM integration and structural analysis software through API, the design process has been streamlined, enabling the optimization of foundation performance and early-stage drill hole location planning for pile design. This upgrade represents a significant step forward in HKHA's incorporation of BIM-enabled design automation into foundation design practices.

HKHA's BIM-enabled approach to foundation design is a model for future projects. The adoption of Generative Design and BIM for analytics and validation also led to sustainable and enhanced work and reduced production time. Overall, HKHA deserves full praise for their innovative approach to foundation design.

Advisory Panel - Honorable Mentions



Airport Authority Hong Kong

China State Construction Engineering (Hong Kong) Limited

Project: Contract 3310 North Runway Modification Works

C3310 Works Area covers over 2,910,000 m^2 of land and stretches over 5km. It involves the closure and modification of the existing North Runway, constructing additional taxiways and vehicular tunnels, and other essential infrastructure works necessary for the Three-Runway System (3RS) operation. The Airport Authority Hong Kong and China State are leveraging digital technologies to remain ahead of the curve with the "ONE BIM FOR ALL" concept.

Using BIM in this project improved outcomes, reduced risks, enhanced collaboration, and facilitated efficient resource management. With BIM, the project team optimized design, construction sequencing, cost estimation, and project coordination, leading to a successful runway modification project. The advanced BIM application enhanced various workflows, including progress tracking via Point Cloud, QTO, and asset management. BIM data is extracted and delivered through 3D control machines, making this project an example of extreme BIM usage.

China State Construction Engineering (Hong Kong) Limited

Project: Main Contract Works for New Acute Hospital at Kai Tak Development (Site B)

Upon completion, the Kai Tak New Acute Hospital (NAH) will be one of the largest hospitals in Hong Kong, with 2,400 beds, 37 operating theatres, and a broad range of clinical services and facilities. Healthcare construction is a complex process. It involves unique physical constraints and specific protocols to ensure patient safety. The process also requires expensive equipment and the work of specialty contractors. However, applying CAVE (Cave Automatic Virtual Environment) technology can help minimize rework and modifications required during construction. In addition, using BIM in this large-scale project is crucial for optimizing time, cost, and other resources. With over 5,000 SoA Rooms, generating 2D drawings from the BIM model enhances the efficiency and accuracy of the drawings. The project team also demonstrated the adoption of different ways to enhance traditional workflows, such as doing an auto BIM audit and developing a Digital Twin for daily operations. This project is a terrific example of how BIM is a valuable tool used in hospital projects to help ensure site safety and aid in facilities management by integrating asset information, maintenance schedules, and equipment specifications.

Advisory Panel - Honorable Mentions

Civil Engineering and Development Department, HKSAR Government
AECOM Asia Company Limited
CRCC - Paul Y. Joint Venture
Tyfron Consultancy Limited

Project: Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang)

The project involves building dual two-lane elevated structures that extend approximately 2km, including two long-span bridges over the Mass Transit Railway (MTR) tracks, Fanling Highway, and Ma Wat River between Shung Him Tong and Kau Lung Hang. Erecting bridge segments over the MTR railway is a crucial aspect of this project, which required the project team to leverage 3D survey data, photogrammetry, and BIM to capture the site's condition. By utilizing 4D simulation and Common Data Environment (CDE), the project team can visualize and evaluate the potential benefits of various options.

The project is an excellent example of how visualization can be used for phasing and staging works during construction, and how IoT technology can be used for site condition monitoring. By implementing BIM, the project was able to design and monitor mechanized construction, reduce risk and minimize traffic interruptions. The innovative use of BIM helped with time control, logistics, production efficiency, and clash detection, as well as identifying and resolving conflicts in the early design stage. Overall, this project is worth noting and serves as a great example of the power of BIM in successful project delivery.

Drainage Services Department, HKSAR Government
AECOM Asia Company Limited
Paul Y. – CREC Joint Venture
The Jardine Engineering Corporation Limited

Project: Yuen Long Effluent Polishing Plant - Stage 1

The Yuen Long Sewage Treatment Works (YLSTW) currently serves Yuen Long Town, Yuen Long Industrial Estate, and Kam Tin area. It has a treatment capacity of 70,000 m^3/day at the secondary sewage treatment level. However, due to the growing population and development needs, YLSTW will undergo transformation. It will become the Yuen Long Effluent Polishing Plant (YLEPP) with a treatment capacity of 100,000 m^3/day in stage 1 and at the tertiary treatment level.

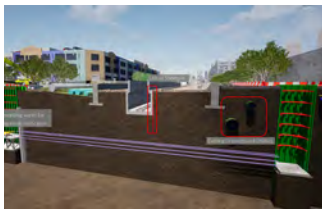
The Yuen Long Effluent Polishing Plant - Stage 1 project demonstrates an excellent application of smart technologies for site management, personnel safety, and progress monitoring. The project also utilized BIM effectively throughout, facilitating the integration of diverse design disciplines and optimizing the plant's layout, functionality, and operational efficiency. By leveraging BIM, the project has enhanced productivity, reduced risks, and ensured the successful implementation of a modern and sustainable wastewater treatment facility that meets the region's environmental needs.

Hong Kong Housing Authority, HKSAR Government

Project: BIM SMA^{i}RT - Revolutionising Public Housing Design with the power of Artificial Intelligence

The use of Generative Design technology has proven to be cost-effective in modular flat design by automatically generating optimum architectural layouts. With advancements in computing power, more constraints and requirements can be included in the computing process to enhance the design process. BIM SMA^{i}RT enabled more efficient design and construction and integrated well with Modular Integrated Construction (MiC). By combining AI algorithms and BIM technology, this solution offers significant advancements with AI-driven algorithms analyzing vast amounts of data, including demographic information, environmental factors, and user preferences, which generated optimized design solutions for public housing developments.

Advisory Panel - Honorable Mentions



Water Supplies Department, The Government of the HKSAR
AtkinsRéalis
China International Water & Electric Corporation
Tyfron Consultancy Limited

Project: Contract no. 5/WSD/18 - Water Supply to New Housing Developments in Sheung Shui and Fanling – Mainlaying in Sheung Shui and Fanling areas

The project involves laying distribution mains with varying diameters between 150mm to 700mm, covering approximately 12km in the south-western part of Sheung Shui and Fanling. The mains are to supply reclaimed water to existing and planned new housing developments in these areas. The project team has demonstrated an impressive use of Augmented Reality by integrating data from BIM. The utilization of BIM-to-field concept facilitated the onsite construction process, from underground utility visualization to logistic routing to inspection.

At an early stage, the project team fully utilized 4D simulation on construction sequence, which helped mitigate risks during the execution of the project. The team also used BIM to visualize and simulate the water supply network, optimize design, and provide information on underground utilities. The use of BIM in this project enhanced project efficiency, reduced risks, and ensured the successful implementation of a reliable and sustainable water supply system for the new housing developments in Sheung Shui and Fanling.

Water Supplies Department, The Government of the HKSAR
Ming Hing Waterworks Engineering Company Limited
Shenzhen Yuegang Technology Company Limited

Project: Revolutionizing Large Diameter Water Mains Management and Pumping System Control with AI-Driven BIM and GIS Integration

The Water Supplies Department (WSD) has embarked on an ambitious program aimed at overhauling the control and maintenance of the Dongjiang water trunk transfer network system. The program, which began in January 2023, involves several new initiatives such as the Smart Trunk Transfer Support System (STTSS), the Asset Management Information System (AMIS), and AI leakage detection by leveraging BIM, GIS, AI, and IoT technologies.

The project team used OpenGIS and Cobie concepts in the existing Asset Management system, leading to the realization of the benefits of OpenGIS. The data of the infrastructure was exported and used for the raw water pumping station (RWPS) monitoring system and STTSS. Data was also used, in conjunction with artificial intelligence, for demand forecasting.

This project showed innovation in combining GIS and IoT data with BIM for a holistic lifecycle management system. The integration has revolutionized large diameter water mains management and pumping system control, paving the way for a more sustainable water infrastructure management system.

Dr. Calvin Kam

FAIA, PhD, CCBM, bSI Fellow

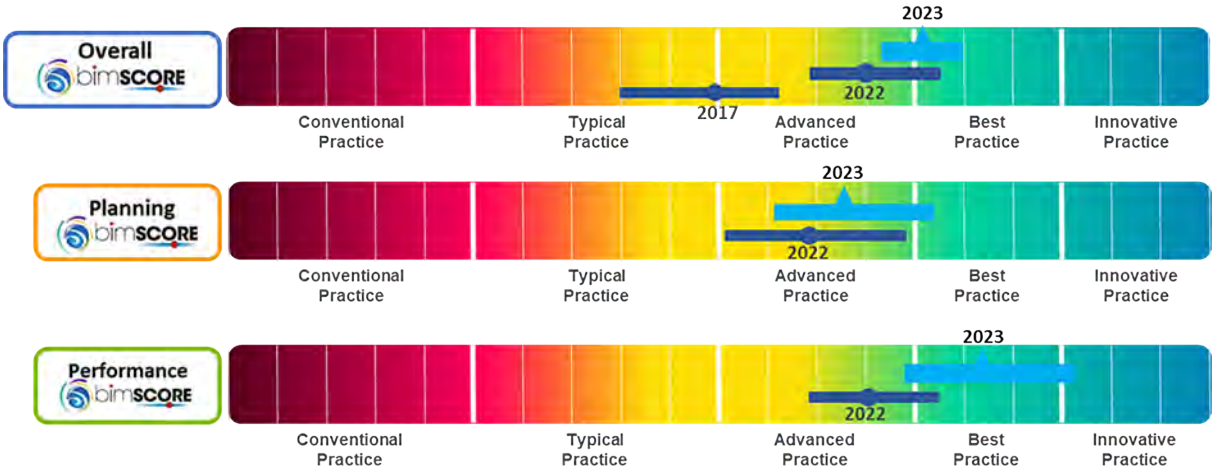
Overview

The 2023 Hong Kong Building Information Modeling (BIM) Awards showcased diverse projects demonstrating innovative and creative use of Building Information Modeling (BIM) and openBIM®-enabled technologies. These projects included application of advanced process automation, artificial intelligence (AI), Internet of Things (IoT), Multi Trade Integrated MEP (MiMEP) and more. Award winners ranged from large-scale air-conditioning systems to Urban Stormwater Storage Schemes, all showcasing the power of BIM technology to drive innovation.

Some past Hong Kong BIM Award winners from 2017 to 2022, including ArchSD and Vircon, continued to excel in BIM-based collaboration and project optimization by implementing Common Data Environment (CDE) and cutting-edge BIM technologies like MiMEP and Design for Manufacture and Assembly (DfMA) to enhance project performance.

Our international management consulting team at Strategic Building Innovation · bimSCORE (SBI) developed an evaluation framework used for preliminary assessments of the candidate projects. Projects were benchmarked against a global knowledge base representing hundreds of projects from over 16 countries, categorized into five maturity tiers ranging from "Conventional" to "Innovative" Practices [as shown in the diagram]. The 2023 winners generally fell between "Advanced" and "Best" Practices within the global context.

The winning projects were further analyzed in four evaluation areas: Planning, Performance, Adoption, and Technology. Data shows that this year's winning projects exhibited a tighter range of scores with an overall increase in average scores compared to previous years.



*** Projects were evaluated based on the materials submitted by the applicants without interviews.*

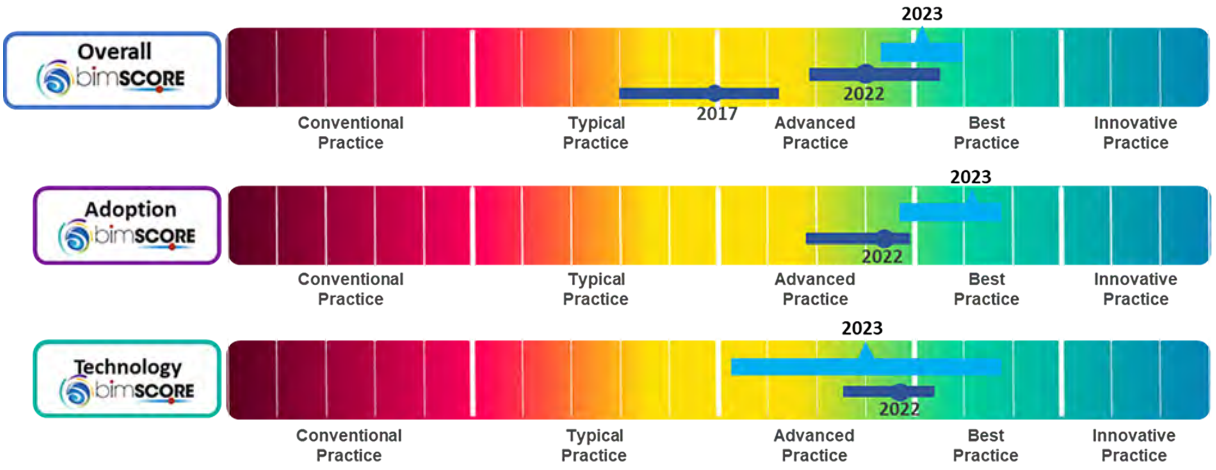
Planning and Performance

Planning for BIM implementation involves setting clear objectives with both quantitative and qualitative performance targets, supporting teams to success with tools, training, and standards, and fostering collaboration among project teams. ***Performance*** monitoring is enhanced through BIM and automation for tracking project metrics to inform design and project management decisions. The award-winning projects explored openBIM use to achieve project goals and information exchange processes. For example,

- Drainage Services Department (project: Sau Nga Road Stormwater Storage Scheme) used openBIM to perform advanced rebar modeling in Revit and Tekla with exchanges via Industry Foundation Class (IFC) to accelerate rebar drawing generation and Quantity Take-Off Processes.
- PaulY and Vircon (Project: Additional District Cooling System at the Kai Tak Development) integrated openBIM with CDE and blockchain technologies for BIM uses supporting Zero Carbon Calculation and Digital Twin for Safety & Issue Management.
- Shui On JV & WSP (Project: Redevelopment of Kwai Chung Hospital – Phase 2) achieved significant savings: 64% on labor cost, 80% on 2D drawing generation time, 63% on overall project duration, 30% on capital cost, and 40% on waste reduction.

In formal bimSCORE evaluations, Performance score record qualitative responses of stakeholders (such as user emotion) and 3rd party auditing of performance figures. In collaboration with organizations including Hong Kong Development Bureau (DEVB), SBI formulated BIM KPIs and recommended a BIM Measurement Framework to track and report BIM adoption. Since these measures were not included in award application packages, the confidence level of the Performance scores is relatively low. Performance assessment, showed variations among projects in the qualitative and 3rd party auditing aspects.

***SBI encourages organizations to establish BIM-based objectives with targeted measures of success, and track these with input mechanisms that include both quantitative and qualitative metrics reported by multiple stakeholders. This approach will produce performance reporting and analysis that can be confidently used to inform management decisions, demonstrate progress, and help drive advancement.**



*** Projects were evaluated based on the materials submitted by the applicants without interviews.*

Adoption and Technology

Adoption of BIM is measured across the project lifecycle and with various stakeholders to gauge the degree of BIM implementation. ***Technology*** measurements consider informed selection of BIM and related tools that support interoperable information exchanges and information-rich models. Many projects this year implemented MultiTrade Integrated Mechanical, Electrical & Plumbing (MiMEP), Design for Manufacture & Assembly (DfMA), Common Data Environment (CDE) and openBIM for smoother information exchange and workflows.

- Shui On JV & WSP (Project: Redevelopment of Kwai Chung Hospital – Phase 2) used AI for safety monitoring and VR-based training.
- ASD (Project: Drainage Services Department Office Building at Cheung Sha Wan Sewage Pumping Station) automated tasks with Visual Scripting to save time and costs. They also developed a video-based danger alert system for construction safety.
- Drainage Services Department (project: Sau Nga Road Stormwater Storage Scheme) used BIM for "Compensation Event Assessment" due to design changes and developed an immersive, interactive experience for public outreach.
- PaulY & Vircon (Project: Additional District Cooling System at the Kai Tak Development) used "Automatic Comparisons" between As-built conditions and construction BIM Model, V-Auditor Platform for BIM Standard Checking, and Security-minded "Blockchain Platform" for Building Data Management.

Compared to the 2022 awardees, the 2023 winners displayed a broader spectrum of technological implementation, ranging from lower "Advanced Practice" to "Best Practice." BIM implementation now covers more project areas, from design to operations/ maintenance.***SBI encourages project owners to strike a balance between the breadth and depth of BIM use based on project and client goals, team capabilities, and market dynamics. Emphasizing organizational processes, involving stakeholders, providing appropriate tools and training, and supporting teams to success across all project stages are all vital elements contributing to successful BIM adoption.**

Dr. Calvin K. Kam
FAIA, PhD, CCBM,
bSI Fellow

Founder and CEO,
Strategic Building Innovation·bimSCORE; PlanMeetDone.com

Adjunct Professor
Center for Integrated Facility Engineering, Stanford University

Dr. Calvin Kam is the Founder of Strategic Building Innovation (SBI) and bimSCORE.com – the "GPS Navigator" for any enterprise or project team charting courses for construction innovation. Dr. Kam teaches undergraduate, graduate, and professional courses and leads research as an Adjunct Professor at Stanford University's Center for Integrated Facility Engineering, where he partners with industry members in areas such as Building Information Modeling, Virtual Design, and Construction as well as Smart and Sustainable Developments. Calvin was a former National Chairman of the Center for Integrated Practice and the Technology in Architectural Practice Knowledge Community (supported by 10,000+ professionals) with the American Institute of Architects (AIA), for which he had also served on the Board Knowledge Committee.

Dr. Kam has worked with the Construction Industry Council, Development Bureau, English Schools Foundation, Hong Kong Housing Authority, Lands Department, Sun Hung Kai Properties, University of Chicago, Walt Disney Imagineering, and was invited to present and facilitate at both the 2014 and 2015 APEC workshops and to author two APEC publications. In 2011, the Singapore government's Building & Construction Authority appointed Calvin as an international expert to advise its construction productivity and BIM roadmap. In 2013. In 2015, Calvin was appointed an Expert Advisor to the Shanghai government's BIM advancement center.

Calvin is honored by elevation to the title of Fellow in both buildingSMART International and the American Institute of Architects. He is a recipient of many awards including ENR's "20 under 40" and BD+C's "40 under 40". Calvin is a Registered Architect, Professional Engineer, and LEED AP in the USA with a Ph.D. from Stanford University. Dr. Kam has presented at 100+ industry events/universities across 18 countries and regions and published several book chapters and journal publications. Calvin has served as an Expert Advisor for the Hong Kong AIAB BIM Awards since 2008.

Chow Ho Cheung, Andrew
MSc (BIMM&IPD), MHKIBIM, MHKICBIM, CCBC

Andrew Chow is the Project BIM Manager of Dragages Hong Kong Limited, leading the building department's on-site BIM teams into BIM implementation, ISO-19650 CDE solutions, digital transformation, and construction innovation across governmental and private development design-and-build projects in Hong Kong.

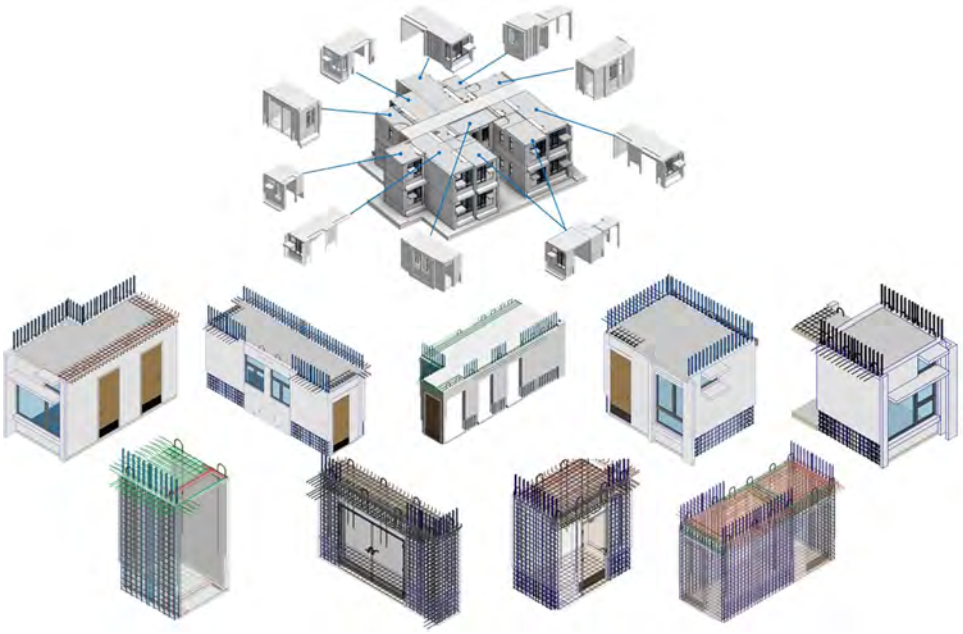
During Andrew's 3-year serving period for Dragages Hong Kong Limited, he utilized his extensive BIM management experience in setting up, nurturing, and supervising the project-specific BIM teams' daily operations, as well as designing and auditing the information exchange workflows, methods, and procedures across project stages in both building and mega infrastructure projects.

Andrew holds a Master of Science in Building Information Modelling Management and Integrated Project Delivery. He is the CIC-certified BIM Coordinator and a professional member of HKIBIM and HKICBIM. He is also a helper of the HKCA Young Members Society, aiming to promote BIM for future AEC industry pillars.

Rebar Detailing Design for MiC Modules to Facilitate Digital Fabrication and Generate Rebar Bending Schedule

Introduction

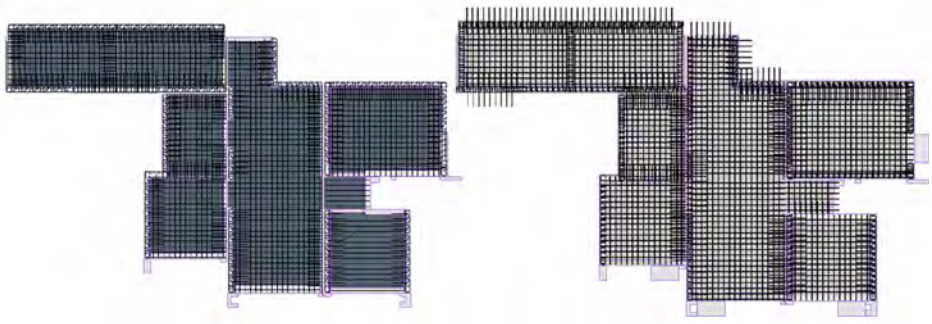
Dragages Hong Kong Limited (DHK) used Autodesk AEC Collection and Autodesk Construction Cloud in the design and construction of the Fire Station-cum-Ambulance Depot with Departmental Quarters and Facilities in Area 72, Tseung Kwan O (Contract No.: SS K506). The design and fabrication of the rebar arrangement of MiC modules were particularly challenging due to the complexity of rebar intersection amongst the interfacing MiC modules and between MiC modules and cast-in-situ elements. Given that few typical sections of rebar details were provided during tender stages, DHK design, methods, and BIM teams decided to prepare 3D geometrical MiC modules and interfacing cast-in-situ structural elements using Autodesk Revit for better visualizing the rebar connection details, identifying rebar clashes and eliminating unforeseen MiC installation interferences.



Individual MiC Modules' Rebar Modelling
Image Courtesy of Dragages Hong Kong Limited

Rebar Detailing

The rebar modeling process was better enhanced in terms of efficiency and proficiency after understanding the design intent from the structural engineers by deeply interpreting the notes, schedules, and other information relevant to rebar detailing, supplemented by Request for Information (RFI) for missing information and ambiguous situations. The BIM Manager was responsible for template configuration (rebar cover, general reinforcement settings, etc.) and parameters' and families' management, including sheet/view templates, rebar tagging, bar marks and numbering, partition and bar locations for paving the future needs of generating rebar detailing, methods and fabrication drawings. The 3D modeling know-how and DHK methods team's expectations were conveyed to BIM coordinators and modelers to facilitate modeling accuracy.

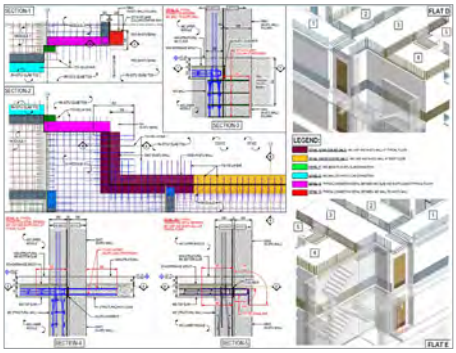


Rebar Intersections across MiC Modules
Image Courtesy of Dragages Hong Kong Limited

3D Rebar Visualization for Design and Construction Coordination

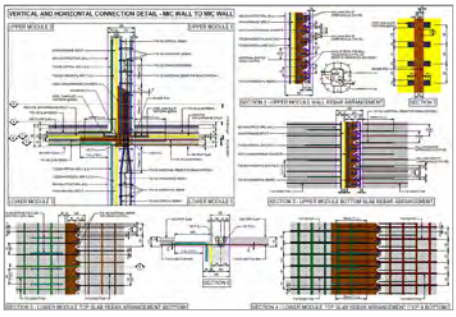
The individual MiC modules were virtually installed using the federated BIM model for design consultants, and the DHK methods team to optimize the design intent, as only reviewing plans, sections, and typical details was not sufficient for visualizing and decision marking. After subsequent BIM models' revisions, the DHK BIM team further generated rebar connection detail drawings with 3D models for stage approval.

Methods Drawings and Shop Drawings Production



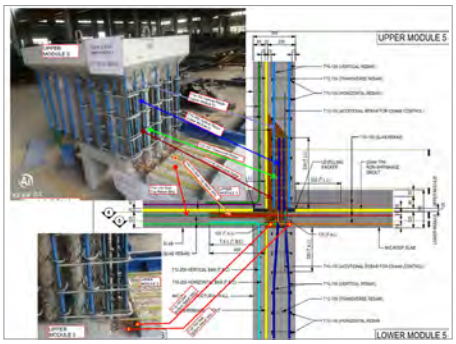
3D visualization of MiC Modules for Design and Construction Coordination
Image Courtesy of Dragages Hong Kong Limited

The rebar connection detail drawings were further developed into methods drawings, with the presentation styles preferred by the methods teams to prepare the methods statement to clearly explain the critical installation sequences to project stakeholders and future guidance for on-site construction workers to comply with.



BIM Methods Drawings for Vertical and Horizontal Connection Detailing
Image Courtesy of Dragages Hong Kong Limited

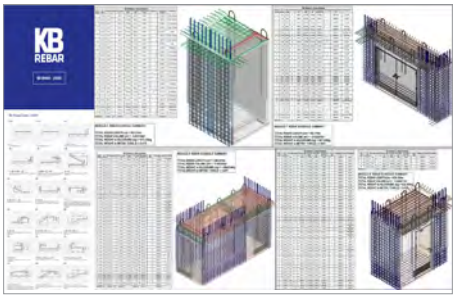
The DHK BIM team further produces individual MiC shop drawings for sub-contractors to fabricate on-site to ensure the quality of molding and concreting. Periodic communications with photos were adopted amongst project delivery teams to audit the MiC rebar arrangement and the BIM shop drawings for auditing the rebar arrangement.



MiC Modules' Shop Drawings for sub-contractor off-site Fabrication
Image Courtesy of Dragages Hong Kong Limited

Rebar Bending Schedule

From Quantity Surveyors' (QS) points of view, utilizing BIM for MiC modules' rebar quantity take-off would be ideal for a better cost-effective estimation. Besides assisting QS in estimating the weight of rebar required, the DHK BIM team further utilized the Revit Schedule to formulate rebar schedules using the confirmed data, including the cutting, bending, and placement of rebars. Complying with BS 8666-2000, the rebar bending schedule provided a detailed list of the size, shape code, and rebar-bending images for construction.



Rebar Bending Schedule and Quantity Take-Off for MiC Modules' Rebar Arrangement
Image Courtesy of Dragages Hong Kong Limited

Conclusion

Considering the captioned project is the first DHK MiC project with the Architectural Services Department (ASD), DHK pledges to fully utilize BIM for the design and fabrication of the MiC modules from project end to end, even the project team has encountered enormous technical challenges during the process. We believe being innovative is not only creating something wholly new and different. Instead, the corporate work culture is to preserve sustainable improvement by doing the things we do daily a little better. This Young BIMer of the Year Award is not considered an individual recognition but a massive compliment to the project team's efforts for the past year.

GONG Xingbo

XU Yuqing

KWOK Helen Hoi Ling

INSTITUTION

The Hong Kong University of Science and Technology

PROJECT NAME

BIM-based Automated Embodied Carbon Quantification and Analysis for Typical Buildings

PROJECT LOCATION

Sha Ling, North District, Hong Kong

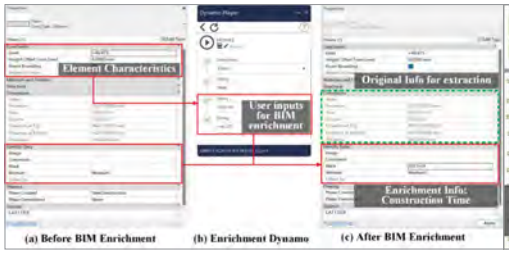
TYPE

Embodied carbon quantification and analysis

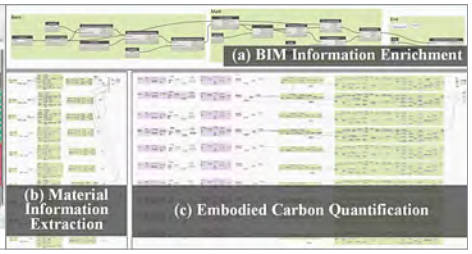
AUTODESK PRODUCTS USED

Autodesk® BIM 360®
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk® Revit®
Autodesk Viewer

BIM-based Automated Embodied Carbon Quantification and Analysis for Typical Buildings



Dynamo plug-in for carbon information enrichment
Image Courtesy of The Hong Kong University of Science and Technology



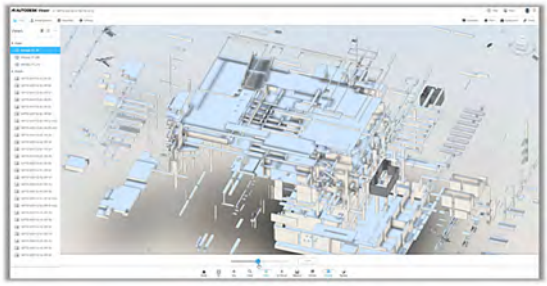
Dynamo-based automated BIM-based embodied carbon quantification solution
Image Courtesy of The Hong Kong University of Science and Technology

Project Background

The building and construction industry is among the leading industries contributing the largest carbon emissions. The importance of reducing carbon emissions associated with materials and construction processes throughout the whole lifecycle of a building (usually called embodied carbon) has been recognized rapidly. However, the process of quantifying embodied carbon is complex and time-consuming, requiring much manual effort and repetitive work. As a digital information management tool, building information modeling (BIM) has been studied in facilitating embodied carbon quantification. Based on the data stored in BIM, information required in embodied carbon quantification, such as material quantity take-offs, can be extracted automatically.

Project Challenges and Solutions

The first challenge is that there are too many data sources required for embodied carbon quantification. To solve this challenge, we designed a comprehensive ontology-based knowledge data model in the field of embodied carbon quantification. Secondly, due to the limited information for embodied carbon analysis that can be extracted from BIM models, we developed a plug-in based on Dynamo to enrich information in BIM models, especially for adding time information to conduct 4D embodied carbon analysis. Thirdly, since the existing embodied carbon quantification is not automated and customized enough, we proposed a user-friendly carbon emission statistics and analysis approach based on Dynamo for automated one-click quantification of embodied carbon. The last challenge is the difficulty of information collaboration to update the latest embodied carbon results during design stage. In this case, we designed a collaborative workflow for low-carbon design based on BIM360, which enables more efficient design and cross-departmental collaboration.



BIM Model Sharing Using Autodesk Viewer
Image Courtesy of The Hong Kong University of Science and Technology

How does BIM help for your project?

BIM provides project stakeholders with a common data environment for efficient embodied carbon quantification and analysis, which facilitates low-carbon material selection and green construction activities during green building design and construction stages. The BIM model developed in Autodesk Revit consists of different types of information required for embodied carbon quantification and analysis. In the project, we adopted Dynamo to develop an automated and customized workflow for comprehensive embodied carbon quantification, which significantly improves the accuracy of carbon quantification and avoids large amounts of manual work. Moreover, during the project collaboration process for embodied carbon analysis, BIM 360 provides a collaboration environment for all team members. At the same time, Autodesk Navisworks allows stakeholders to implement building analysis and upload to the BIM 360 cloud, while Autodesk Viewer supports easy BIM + CAD viewing and sharing for carbon analysis, which will be also uploaded to the cloud for collaboration.

Enhancement of HVAC systems for Improved IAQ and Occupant Thermal Comfort using BIM-Supported Computational Approach

ZHANG Jiaying

CHAN Chi Chun

KWOK Helen Hoi Ling

INSTITUTION

The Hong Kong University of Science and Technology

PROJECT NAME

Enhancement of HVAC systems for Improved Indoor Air Quality and Occupant Thermal Comfort using BIM-Supported Computational Approach

PROJECT LOCATION

FWD HOUSE 1881, Tsim Sha Tsui, Hong Kong

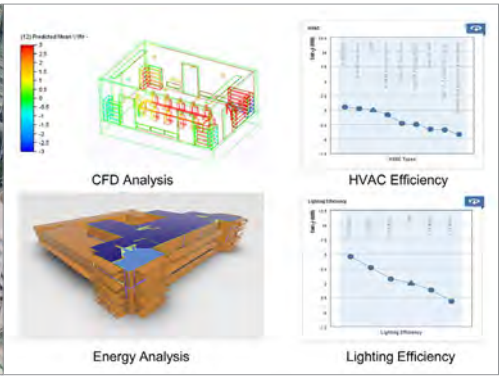
TYPE

Heritage Building

AUTODESK PRODUCTS USED

Autodesk® AutoCAD®
Autodesk® BIM 360®
Autodesk® CFD
Autodesk Construction Cloud®
Autodesk® Insight™
Autodesk® Revit®

Aerial view of FWD HOUSE 1881 Heritage
Image Courtesy of The Hong Kong University of Science and Technology

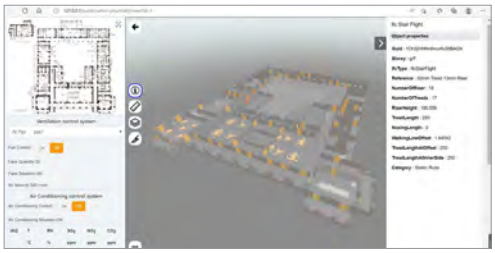


CFD and Autodesk Insight for HVAC system operation and occupant comfort
Image Courtesy of The Hong Kong University of Science and Technology

Project Background

FWD HOUSE 1881, regenerated from the former Hong Kong Marine Police Headquarters, is a declared monument serving as a cultural and commercial landmark in the heart of Tsim Sha Tsui. The building is exposed to salinity and moisture from the ocean and air pollutants emitted from nearby roadside traffic. Due to unsatisfactory air quality, oxidation signs, wood discoloration and aging marks are observed there. This commercial heritage building has a complex building layout and space offering hotel, office and fine dining services.

Autodesk BIM 360 supports cross disciplinary and regional team collaboration
Image Courtesy of The Hong Kong University of Science and Technology



A digital twin of FWD HOUSE 1881 Heritage
Image Courtesy of The Hong Kong University of Science and Technology

Project Challenges and Solutions

Firstly, Standardized BIM procedures cannot be applied directly to heritage buildings because of their non-homogeneous features and complex morphology. Historic buildings are characterized by the lack of clear traceable construction records such as drawings and construction processes because heritage buildings go through different usages and eras against the changes and advancements in technologies and regulations over multiple time periods. An approach was proposed to address the lack of information by integrating documents, information and graphics into an Heritage Building Information Modeling (HBIM) model for heritage building preservation. Secondly, the lack of the functionality of BIM to support heritage building preservation and an HBIM modelling approach for supporting Computational Fluid Dynamics (CFD) simulation of heritage buildings need to be addressed. This project proposed HBIM approach supports CFD simulations with a refined HBIM modeling method. Based on the proposed digital modeling process, HBIM geometric model is simplified strategically to reduce computational cost while retaining sufficient accuracy for CFD simulations.

How does BIM help for your project?

To enhance HVAC systems for improving indoor air quality and occupant thermal comfort, BIM integration with Geographic Information System (GIS), Virtual Reality (VR), Internet of Things (IoT), CFD simulation, EnergyPlus and Autodesk Insight builds a digital twin of FWD HOUSE 1881 for environment management and heritage building preservation improvement. Autodesk BIM 360 and Autodesk Construction Cloud support interdisciplinary and cross regional team collaboration. The fusion of IoT and BIM visualizes environmental data at different locations of heritage building. Integrated BIM and GIS supports CFD simulation of the surrounding fluids of heritage buildings. BIM-based CFD simulation analyzes the effect of the ancient HVAC equipment under different condition setting and layout on the environment to improve building heritage protection and personnel health. Combining BIM with EnergyPlus and Autodesk Insight for energy simulations achieve accuracy improvement for saving energy and carbon emissions, and support carbon neutrality and sustainable operation.

A I A B
Autodesk Industry Advisory Board

About **AIAB**

AIAB (Autodesk Industry Advisory Board) is formed by a group of experts who are willing to share their valuable experience from Building, Civil, Media and Entertainment industry.

Mission

Autodesk Industry Advisory Board (AIAB) is an informal and non-profit making interest group that acts as a bridge between the industry and Autodesk for solid and bidirectional communications. AIAB, as its title suggests, has an advisory role. Its main objectives include, but not limited to:

- Act as a platform for technology exchange and experience sharing
- Advance the professional standards on Autodesk products
- Express and share opinions and views on technology development
- Promote the development, usage and awareness of design technology in HK, mainland China and Macau
- Provide cross-border technology exchange/visit
- Provide latest technology update

Follow us on:

Website of AIAB

AIAB

Autodesk Industry Advisory Board - AIAB - Hong Kong

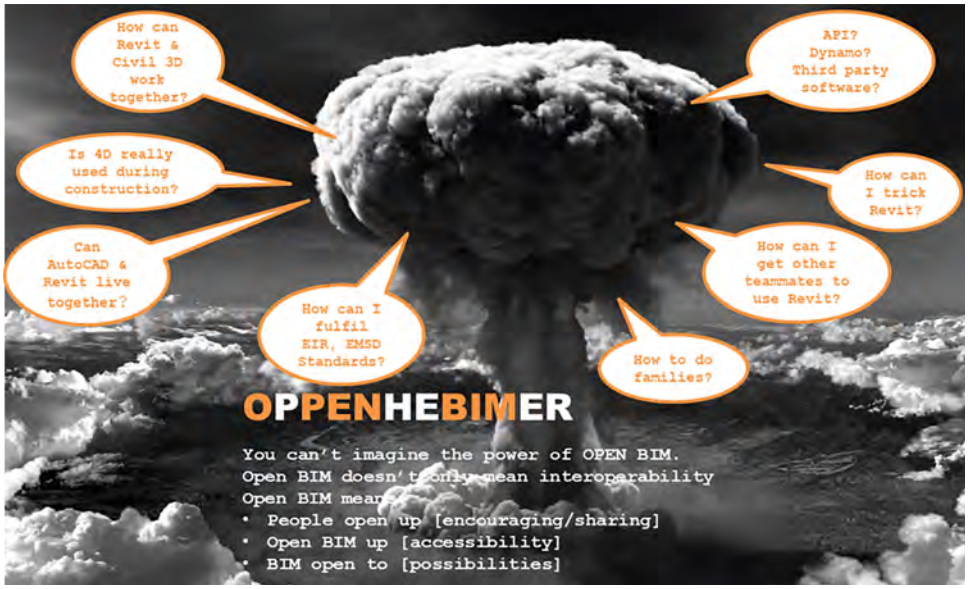
Want to know more about AIAB?

Together, We BIM Up

Kelvin Tam
Chairman, Autodesk Industry Advisory Board

Kelvin Tam is a well-experienced US Registered Architect, CIC Certified BIM Coordinator, CIC Certified BIM Manager, HKIA BIM Professional with over 20 years of project experience across the USA, Middle East and Asia. He has been a BIM user and leader since 2005. Over the years he has been a BIM leader in corporate architecture firms in the USA, Hong Kong, Qatar, Abu Dhabi and Singapore; leading the effort of migrating from 2D CAD to 3D BIM practice by implementing BIM process in projects, making firm wide BIM strategies and standards, coaching and mentoring internal users. For the past 15 years, he has been focused on the development, implementation and support of advanced BIM/VDC technologies to continuously improve the delivery process to clients.

Mr. Tam is a BIM expert well-known in this field and loves to share his knowledge and expertise with fellow BIM learners. Since 2010, Mr. Tam has been actively speaking in major international BIM conferences such as Autodesk University Las Vegas, Autodesk University Extension Dubai, Revit Technology Conference (Australasia, North America, Europe, Asia), Hong Kong Institute of Building Information Modeling Conference, BILT Asia and BILT North America. Mr. Tam is the founder of the Hong Kong Revit User Group, chairman of Autodesk Industry Advisory Board, BIM Accreditation Assessor of the Hong Kong Institute of Architects and assessor of the CIC BIM Certification and Accreditation Schemes.



AIAB is grown up! For 18 years, the Autodesk Industry Advisory Board (AIAB) has been actively promoting Building Information Modelling implementation with Autodesk products. Thank you for all the contribution from professionals of all disciplines in the AEC industry, AIAB is now the largest BIM community in Hong Kong. Our members are from all age groups, all levels of experience of a variety of backgrounds. To make a true open to public community, we welcome anyone who is interested or passionate in digital practice transformation in the industry to join without any membership fee.

We believe only cooperation can escalate BIM execution among ourselves. We build up the foundation at user technical level by bringing up modellers' skills through experience and knowledge sharing in AIAB discussion forums. This year we have established 4 discussion forums, each is dedicated to a particular discipline: **Architectural BIM Forum**, **Civil & Structural BIM Forum**, **MEP BIM Forum**, **and Contractor & BIM Consultant Forum**. The forums are platforms for users to discuss everyday usage of BIM software, raise questions when they are facing challenges in modelling and drawing production, and voice out flaws and bugs in the software. We hope our members would learn from each other by trouble shooting technical issues together and on the other hand make advices to software developer in areas that users wish to be improved.

AIAB as a cooperative, is created by the users and for the users. We are so excited to see group effort help the community and the growth of BIM execution through the years with increasing number of projects winning awards. We are looking forward to more exciting and successful BIM projects in the next Autodesk BIM Awards.

Helen Chan

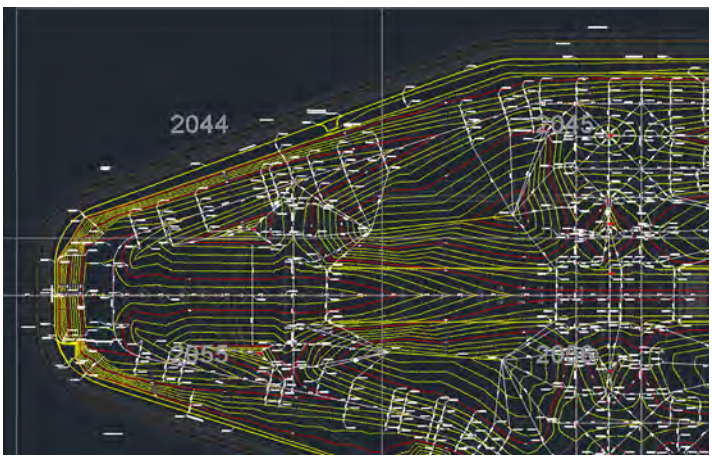
Helen is the Deputy BIM Manager at China State Construction Engineering Hong Kong Limited, driving digital transformation in BIM processes and initiating the application of BIM across various domains, design, construction, surveying and quantity survey in large-scale civil projects. With a specialization in Civil BIM, she possesses knowledge and experience in executing Civil BIM projects, establishing and implementing BIM standards, developing Scan to BIM workflows, creating BIM databases, and delivering comprehensive training programs. Her contributions have been recognized as she achieved BIMer of the year in CIC BIM Achievement 2022 and Rising BIM Star in HKIBIM BIM Award 2021. In addition to her professional role, Helen also serves as a guest lecturer at the Department of Land Surveying and Geo-informatics in Hong Kong Polytechnic University.

Transforming Project Outcome

Building Information Modelling (BIM) and the accompanying use of a Common Data Environment (CDE) form an integrated information system for effective project management and efficient information exchange control throughout the project life-cycle. Information is key in this implementation process, and changes are unavoidable. BIM data proves effective in facilitating and tracking changes within the model. However, it also has limitations, such as the absence of a comprehensive change deviation report and linkage issues between BIM and external analysis software. The way we communicate, identify, and manage information changes can have a significant impact on the overall project's success.

A collaborative environment fosters efficient communication. CDE centralizes all data to achieve underground utilities and building services collaboration anytime and anywhere, with the help of intuitive 3D models, progress tracking functions, and clash detection tools. The project team can fully utilize the one-stop CDE platform to exchange information regarding design changes, construction updates, and other project-related matters. This ensures everyone is working with the most current data.

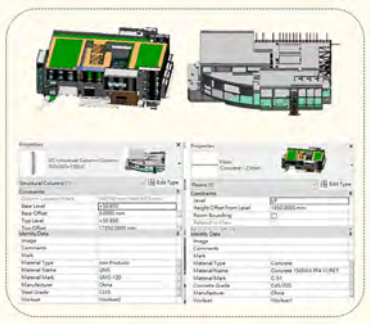
My current project embraces the concept of intelligent data management to identify design changes with the use of BIM automation. Each pavement type with various pavement materials is modeled in Civil3D. Airfield Ground Lighting (AGL) canisters link with the pavement corridor model, as the canister height depends on the material thickness. Dynamic programming language bridges the pavement corridor model and each AGL canister together to provide fast and accurate calculations, solving the problems of modeling practices and quantity extraction. Once there is a change in the pavement model, the AGL canister will automatically change to calculate the canister height and generate pavement material thickness for construction. The application makes it possible to compare visualization and parameters of the AGL model. The project team can easily track the changes and evaluate the financial implications of the proposed changes in an accurate and fast way.



Mr. Kelvin Kuo
CCBM, MRICS, MHKICBIM, MHKIBIM, FCInstCES
BIM Manager of China State Science and Technology Limited

Mr. Kelvin Kuo has 20 years of Quantity Surveying and Project Management experience in the construction industry among the discipline of Building, Civil and Interior Design and has 13 years of BIM project management experience. With the professional knowledge and experiences in Quantity Surveying, Kelvin has involved in developing and promoting the integration of BIM services to current QS practices since 2011, he is handling BIM5D (Quantitative Information Modelling, QIM) projects in public housings and private sectors of Hong Kong, China, Singapore, Malaysia and Japan. To contribute his professional knowledge to the industry, he has presented CPD/ training to RICS, HKIS, CICES, University of Macau, Hong Kong Institute of Vocational Education (IVE) and Technological and higher Education Institute of Hong Kong (THEi). Now, Kelvin is the BIM Sub-Committee Chairman of CICES and member of HKIS QSD BIM Sub-Committee.

Leveraging BIM Quantity Take-off (QTO) for Carbon Emissions Calculation and Reduction



Building Information Modelling (BIM) has become a valuable tool in the construction industry for optimizing project efficiency and sustainability. By integrating BIM Quantity Take-off (QTO) capabilities, professionals can accurately calculate carbon emissions and implement effective strategies to reduce them. This essay explores the potential of BIM QTO in assisting carbon emissions calculation and outlines strategies for leveraging this technology to curtail emissions.

BIM QTO enhances data accessibility, streamlines documentation, and enables real-time tracking and updates. It facilitates the extraction of precise material quantities from digital models, allowing for comprehensive assessments of a project's carbon footprint. This technology integrates data such as material specifications and manufacturing processes to perform accurate carbon emissions calculations, including embodied and operational carbon.

BIM QTO empowers professionals to optimize material selection, utilize prefabrication and modular construction, analyse energy efficiency, and reduce waste.

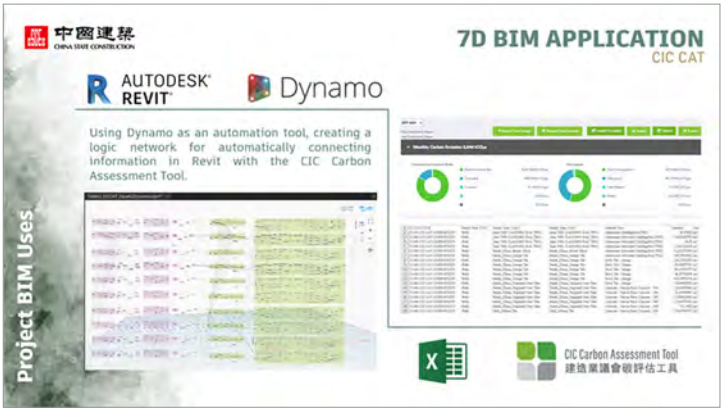
Integrating life cycle assessment (LCA) data into BIM models enables professionals to evaluate the environmental impact of materials. By considering low-carbon alternatives and optimizing quantities, embodied carbon can be minimized.

BIM QTO facilitates the design for off-site construction and prefabrication. This approach significantly reduces material waste, construction time, and associated carbon emissions. Accurate estimation of material quantities enables efficient planning and utilization of prefabricated elements.

BIM QTO integrates energy analysis tools to assess operational carbon emissions. By simulating and analysing different design scenarios, professionals can optimize energy-efficient features, reducing the building's long-term carbon footprint.

BIM QTO estimates the quantities of construction waste generated, enabling improved waste management. Identifying waste reduction opportunities, such as recycling initiatives and optimizing material usage, minimizes waste disposal and associated carbon emissions.

BIM QTO, in conjunction with BIM technology, provides construction professionals with a powerful tool to enhance carbon emissions calculation and reduction. Accurate estimation of carbon emissions enables proactive identification of hotspots and the formulation of targeted reduction strategies. By leveraging BIM QTO for material optimization, prefabrication, energy efficiency analysis, and waste reduction, the construction industry can play a vital role in reducing carbon emissions and fostering a greener future.



Dickson Lai
CCBC, AHKICBIM
Hip Hing Construction Company Limited

Mr. Lai Tik Long (Dickson) has been devoted to the BIM industry for over 7 years. During this time he has been involved in two iconic mega-scale and high complexity projects in Hong Kong: Kai Tak Sports Park (KTSP) and Tuen Mun – Chek Lap Kok Link (TMCLKL – C4).

Dickson is enthusiastic in implementing database driven BIM and digital transformation in the construction industry. His Extensive portfolio of experience includes project coordination, BIM automation solutions (Dynamo, API, Python and A.I.), CDE and Digital Twin development, software and workflow customization and the delivery of a wide range of BIM Training.

Digital Transformation – Automate Construction

While the construction industry is massively recruiting young talents, we are facing challenges with talent retention due to the fast-paced and demanding working environment and the large volume of laborious documentation works. Moreover, according to CIC's BIM Adoption Survey in 2020, over 70% of sub-contractors are BIM Laggers, which hinders the full adoption and value that can be achieved via BIM. As a leading contractor, Hip Hing recognized these pain points and asked ourselves: How can we improve the efficiency of routine operations? After years of exploration, our answer became clear: "BIM Process Automation".

We began with a large-scale project challenge, which required the coordination of 5,000 rooms and submission of 50,000 shop drawings in 6 months. To enhance overall productivity, we established a Digital Transformation team and developed tools for "Automated Virtual Design and Construction" that auto-generate wall elevations, reflected ceiling, and tiling layout plans. Our innovation became the industry's first use of BIM automation for Interior Design and Fitting Out (IDFO) drawings.

To facilitate such automation, we aligned design principles with the architects and then refined the installation designs based on sub-contractors' requirements. After that, we programmed the tool to generate optimal setting out of E&M switches for all different wall layouts. This resulted in a significant time saving of 4 weeks per floor, achieving a 300% productivity gain compared to traditional workflows. Our automation tool has also been successfully patented as a computer software copyright for our company.

In conclusion, the following are the keys to success in automation:

1. Early engagement and dedicated resources from all knowledge experts including sub-contractors
2. Open communication with a shared vision between the management and operation teams
3. Realistic and pragmatic goals to create "small wins" over time
4. Regular review mechanisms

We believe that our strategies and solutions for continuous improvement will encourage the industry to embrace and pursue the notion of innovation. Our team is always enthusiastic about new challenges without hesitation. We all bear a mindset: TIME TO CHANGE NOW!

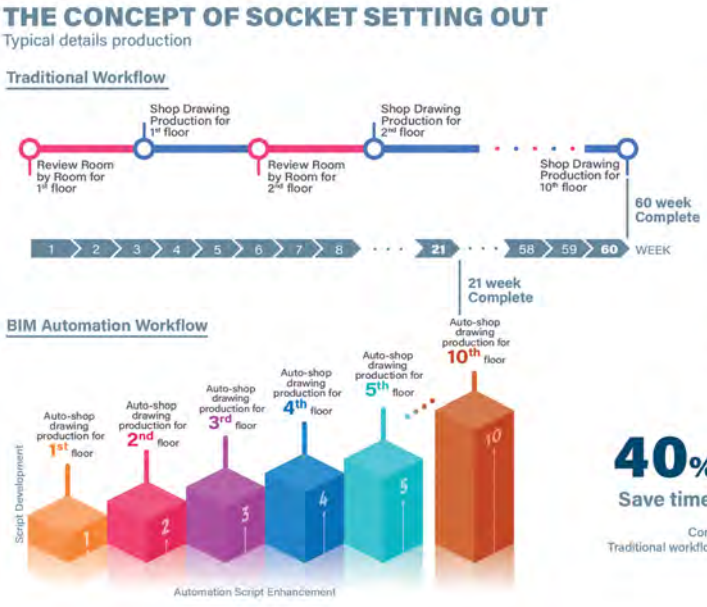


Fig.2 Comparison between Traditional workflow and BIM Automation workflow

Fig.1 Patent Certificate of Wall MEP Fixtures Automation

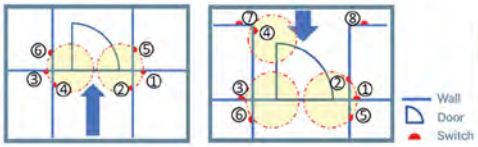


Fig.3 Combined scenarios analogy of design rationale

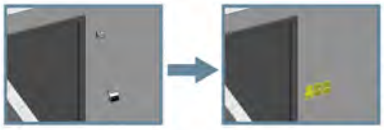


Fig.4 Virtual Design and Construction Automation for Wall E&M Provision

More Detail:

ACAD Solutions Limited *Since 1987 .....*

2815 9565

Our Company proudly won

The GLOBAL Autodesk Platinum Club 2022 Award

It's a recognition to reward the Top Autodesk Partner who stands out for the best sales performance growth and high-quality service provision.

ACAD SOLUTIONS LIMITED
AutoCAD Authorized Reseller & Trainer since 1987

AUTODESK Gold Partner

CITF 建造業創科基金

BUY AEC Collection at $6,xxx
with **17** software

Major products included in the collection:

- AutoCAD
- Navisworks
- 3ds Max
- Revit
- Civil 3D
- Autodesk Docs

LAST CALL

BUY BIM SOFTWARE AT 70% OFF

Problems in CAD, BIM, CSD Coordination ?

- Rush & urgent project peak time ?
- Too costly on maintaining permanent drafting staff ?
- Time consuming on draftsman recruitment ?
- High draftsman turnover rate ?
- **AutoCAD & PDF drawing conversion ?**
- **BIM Models & Family cannot be created ?**
- **Inadequate Building Services Co-ordination ?**

For more details, please contact:
Ms Heidi Chan, Sales Manager
heidi@acadsolutions.com
(852) 2815 9565

We provide CAD, CSD DRAFTSMAN & BIM MODELER OUTSOURCE Service!!
*** For Building, Construction, MEP, Architecture, Interior Design & Civil discipline.... ***

Formed in 1987, ASL is a leading firm to provide AutoCAD software/hardware resell & drafting, programming as well as (Building Information Modeling) BIM services in Hong Kong. ASL has always been concentrating on the CAD/CAM/CAE/P6/BIM services and applications. Aim to bring the latest technology to this region.

AUTODESK Gold Partner

ACAD Solutions Limited 2310006
Address : Room 2815, New Tech Plaza, 34 Tai Yau Street , San Po Kong, Kowloon, Hong Kong.
Enquiry : (852) 2815 9565 **Email :** heidi@acadsolutions.com **Website :** www.acadsolutions.com

Advanced Construction Information Development Ltd.

Advanced Construction Information Development Limited (A.C.I.D.) has been dedicated to providing clients with highest quality Architectural and Project Information Management services by applying advanced technologies like BIM, computational application and parametric modelling and platform developments since 2014. Clients will be offered efficient and feasible solutions on complex designs and workflow.

We provide BIM Implementation services for Clients, Design team, Contractors and FM operators. Projects varies from government, commercial, residential, institutional, entertainments and infrastructure.

We strive to offer professional industry-wide BIM training courses. Most of our courses are on CITF and RTTP lists. We have also become the course provider for CIC-Accredited BIM Manager course in 2021. A.C.I.D. is also fully committed to the preparation of BIM standards in Hong Kong, China and worldwide. We are the first company in Hong Kong obtained ISO 19650-1:2018 and ISO 19650-2:2018 BIM Certification in 2019. Our achievement has been recognized by the industry and was presented with outstanding organization awards from HKIBIM and CIC in the past years.

PROFESSIONAL BIM TRAINING

AUTODESK Learning Partner

AUTODESK Authorized Training Center

ELIGIBLE FOR FUNDING (CITF/RTTP) A.C.I.D. courses are pre-approved and eligible for being subsidized by **government fundings**. We also offer support and recommendation on the funding application procedures.

FLEXIBILITY For company-wide training, we can offer customisation to the training other than the typical course outline to best fit your needs. We can also offer further **follow-up implementation / coaching services** for BIM adoption to actual projects.

hongkong@a-c-i-d.com www.hkacid.com ACID BIM Studio ACID BIM Studio A2, 35/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, Hong Kong

Computer Services & Management (HK)

AUTODESK Gold Partner

Autodesk x HP ZBook G10

建築・工程・設計建造

HP ZBook G10 擁有超卓GPU表現，配合 Autodesk AEC Collection讓建造業設計者更輕鬆執行繪圖工作。Autodesk用戶可透過搭配使用AutoCAD與Revit，輕鬆配合Autodesk Construction Cloud (ACC) 使用，有助跨團隊進行溝通，以更快、更精確交換及傳送檔案，提升生產力。Revit同時可滿足控制視圖圖像的高度要求，用戶能在3D視圖模式下多次模擬設計，更逼真的建築設計體驗促進設計及創作效益。

配備全尺寸SD插槽，方便快速保存文件及圖像檔案

AUTODESK® **ARCHITECTURE, ENGINEERING & CONSTRUCTION COLLECTION**

Navisworks AutoCAD AutoCAD Civil 3D 3ds Max Revit and more...

ZBook Firefly 14 G10

Z1 G9 Tower

NVIDIA A550		NVIDIA Geforce RTX 3070
Intel i7-1365U	處理器	Intel i7-13700 16C
NVIDIA RTX A500 (4GB GDDR6)	圖像控制卡	NVIDIA Geforce RTX3070
14吋全高清 (1920 x 1200) WUXGA UWVA顯示屏	顯示屏	-
16GB DDR5-5200	記憶體	16GB DDR5-4800
1TB 4x4 SSD	儲存裝置	512GB PCIe Gen4x4 SSD + 1TB SATA HDD
Wi-Fi 6E + BT	無線	WiFi 6E vPro+BT

特價發售

Autodesk AEC Collection

立即索取優惠

2557 8431 info@csm.com.hk

BIM TECH ASIA TRAINING CENTRE 建模亞洲培訓中心
Continuing Professional Education Limited

BIM TECH

CITF 建造業創科基金
CITF Pre-approved Course

建造業創新及科技基金
Construction Innovation and Technology Fund (CITF) 預先批核名單
Pre-approved List – BIM Training Course

詳情請瀏覽建造業議會網頁
http://www.citf.cic.hk/?route=search-key
select: Continuing Professional Education Limited

- PBT19-064 - Autodesk Advanced Certificate in BIM Revit Architecture
- PBT19-065 - Autodesk Advanced Certificate in BIM Revit Structure
- PBT19-066 - Autodesk Certificate in BIM Revit MEP
- PBT19-067 - Autodesk Advanced Certificate in BIM Revit MEP
- PBT20-014 - Autodesk Civil 3D Professional Course-Highways
- PBT20-015 - Autodesk Civil 3D Professional Course-Survey
- PBT20-016 - Autodesk Civil 3D Professional Course-Drainage & Utilities
- PBT20-017 - Autodesk Naviswork Practical Course
- PBT20-018 - Autodesk Revit Architecture Fundamental
- PBT20-019 - Autodesk Revit MEP Fundamental
- PBT20-020 - Autodesk Revit Structural Fundamental
- PBT20-021 - BIM Adoption in Government Project
- PBT20-022 - Navisworks in BIM
- PBT20-023 - Autodesk Revit Families Fundamental
- PBT20-024 - Basic BIM for Project Management (1D-5D)
- PBT20-034 - Creation of Revit MEP Families
- PBT20-035 - Documentation, Annotation and Work-sharing in Revit
- PBT20-036 - MEP Families & Collaboration in Revit
- PBT20-037 - Project Collaboration in Revit (Fundamental)
- PBT20-038 - Revit Documentation & Annotation (Basic)
- PBT22-001 - Certificate in BIM- Digital QS Measurement in Construction
- PBT22-002 - Certificate in BIM – Administration of Contract in Construction
- PBT23-010 – Certification in BIM Revit Architecture

Autodesk 指定培訓中心 (Quality Assured)
採用全新 i7 高端個人電腦　一人一機

AUTODESK
Authorized Training Center

免費專業實務教材，由豐富經驗導師教授

另有其他 BIM 專業課程，均列入 CITF 預先批核名單。
無可抗拒的優惠，名額有限，first come first served

請即致電 2512 6281
或填寫表格並電郵至

info@cpegrouphk.com

報名及上課地址:
10/F, Chi Wo Commercial Building, 20 Saigon Street,
Jordan, Kowloon, Hong Kong
九龍 佐敦 西貢街 20 號 志和商業大廈 10 樓

https://www.cpegrouphk.com/index.php/citf-bim

Certificate for Autodesk

AutoCAD & 3ds Max

Autodesk AutoCAD 為 Autodesk 最熱門的產品，亦是世界上最流行和專業之 CAD 設計軟件，其應用的範圍非常廣泛 。

Autodesk 3ds Max 為 Autodesk 最熱門的產品，亦是世界上最流行和專業之 3D 立體模型創作及動畫設計軟件，其應用的範圍非常廣泛，包括廣告影片、工業設計、教育、商業動畫、娛樂、電玩遊戲、建築及室內景觀設計。

針對市場對 AutoCAD 及 3ds Max 設計需求日益增多，我們特別開辦 Certificate for Autodesk AutoCAD & 3ds Max 證書課程，並由專業的設計師設計及教授，從最基本教授，深入淺出，利用不同的方案教授實用的 CAD 及 3ds Max 技巧，直直正正做到市場需求。課程內容涵蓋工程施工圖，產品設計圖到環境設計圖等等，務求令每學員了解在現實中的需求及技巧，提升能力，從而達至專業。

~~$9,000~~ 15堂 45小時

$1,800

(政府持續進修基金減免後學費)

完成課程並成功畢業後
可獲持續進修基金發還80%學費

FEVA WORKS IT EDUCATION CENTRE

AUTODESK Authorized Training Center

免費課程首堂試讀體驗，即上
fevaworks.com/cef3dcad

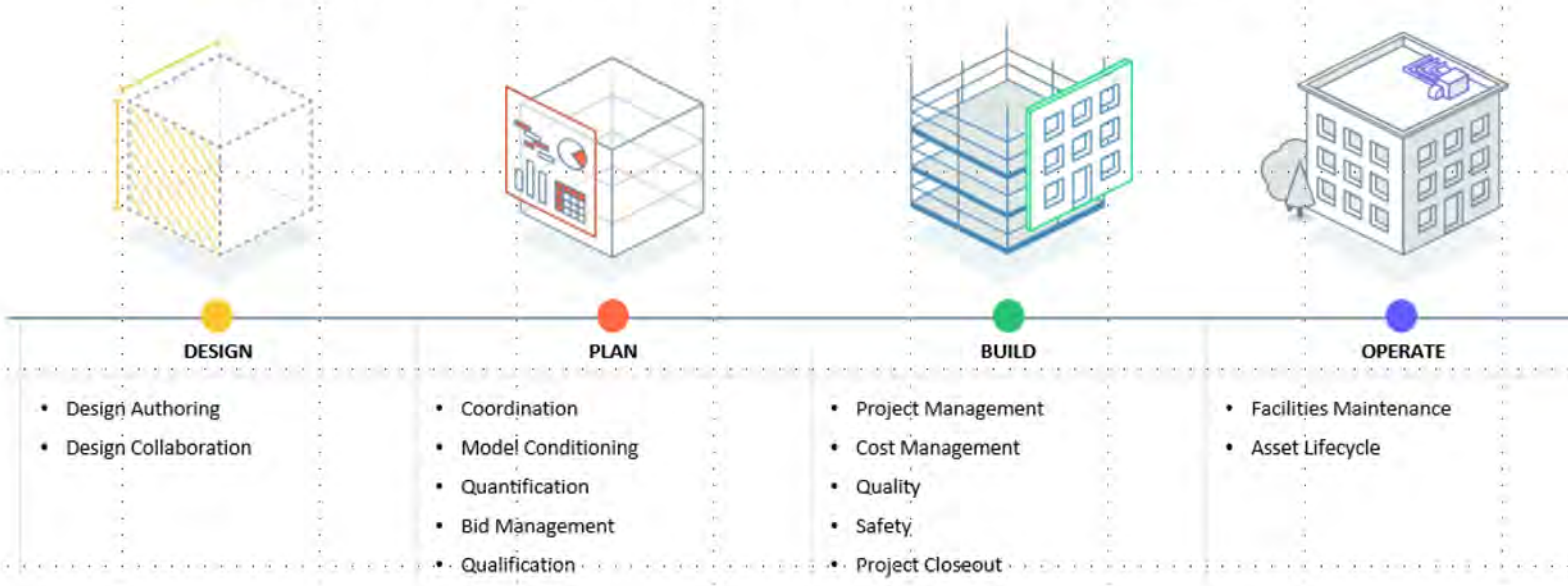
3106 8211
course hotline

FORIDA LIMITED

- Enhanced Efficiency
- Seamless Collaboration
- Data Empowerment

All-in-One CDE Platform For Construction Information Management

Autodesk Construction Cloud



DESIGN

- Design Authoring
- Design Collaboration

PLAN

- Coordination
- Model Conditioning
- Quantification
- Bid Management
- Qualification

BUILD

- Project Management
- Cost Management
- Quality
- Safety
- Project Closeout

OPERATE

- Facilities Maintenance
- Asset Lifecycle

Our Services

PLANNING & ADVISORY SERVICE

IMPLEMENTATION & CONFIGURATION SERVICE

TRAINING & COACHING

CUSTOMIZATION & DEVELOPMENT SERVICE

info@forida.com.hk www.forida.com.hk 2412 4590

AUTODESK Gold Partner

AUTODESK Construction Cloud

AUTODESK Authorized Training Center

2021

CIC ACCREDITED
BIM MANAGER COURSE
建造業議會認證建築信息模擬經理課程

CIC ACCREDITED
BIM COORDINATOR COURSE
建造業議會認證建築信息模擬協調員課程

Professional Certificate in BIM Management/ Coordination
榮獲
CIC Accredited BIM Manager/ Coordinator Course
培訓業界認可的專業精英。

2023

Certificate In Advanced CDE with Autodesk Collaborate Pro
CDCP新紀元

2020 — 不同的BIM課程榮獲CITF及RTTP認可, 政府大力支援及資助BIM教育

2018 — 榮獲HKIBIM Merit Award in Training Institution, 增設BIM交付管理課程系列, 強化業界實踐BIM標準

2017 — 增設課程 "BIM for Constrcution Managers", 讓工程管理者更有效融入BIM流程

2013 — 擴充BIM培訓系統, 常設MEP, Strcuture及Navisworks等課程, 讓學員更全面學習BIM應用

2012 — 成為Autodesk Ahthorised Academic Partner, 推動學界應用Autodesk軟件於專上教育。

2008 — 提供教授Revit的持續進修基金認可課程。同期亦引入Autodesk專家認證服務。

2007 — 榮獲Autodesk頒予香港區最佳認可培訓中心榮銜。

2006 — 開設 Civil 3D 課程, 並獲持續進修基金 (CEF) 認可。是本港最早期的BIM訓練課程

2003 — Welkin Systems Limited 成為Autodesk Authorise Training Centre, 提供Autodesk認可培訓服務

Form•Welkin 天行•凝方

專業・專注・BIM培訓

We teach the Autodesk Way

AUTODESK Learning Partner

AUTODESK Authorized Academic Partner

formwelkin.com | 3605 3322

Welkin Welkin Systems Limited

九龍旺角彌敦道585號富時中心3樓 (信和中心對面)

METRO Education 高途教育

AUTODESK Authorized Training Center

BIM EDUCATION

Jumpstart Your BIM Career
Stimulate Imagination Analyze and Build

METRO EDUCATION CENTER

www.metro.edu.hk | Enquiry hotline: 852 3565 6724

AUTODESK REVIT	BIM Revit Architecture and Engineering Professional Certificate
AUTODESK® CIVIL 3D®	BIM AutoCAD CIvil 3D Civil Engineering and Construction Advanced Certificate
AUTODESK® REVIT® STRUCTURE	BIM Revit for Structural Engineering Advanced Certificate
AUTODESK NAVISWORKS	Advanced Certificate in Simulation and Clash Detective with BIM Navisworks
AUTODESK® BIM 360™	Advanced Certificate in BIM Engineering Operation and Quality Management

香港室內設計建築學院
HONG KONG INTERIOR DESIGN AND ARCHITECTURE INSTITUTE

RTTP
政府創新科技署認可課程
「再工業化及科技培訓計劃」

CITF 建造業創科基金

hrwallingford

Innovyze
An AUTODESK company

HR Wallingford are partners of Innovyze in Hong Kong

www.hrwallingford.com

Global leaders and independent experts in how to live and work sustainably with water.

Supporting the Hong Kong water industry for more than 45 years.

We distribute hydraulic simulation software including the world-leading packages:

- InfoWorks ICM
- InfoWater Pro
- InfoDrainage

We offer specialist consultancy services and training in hydraulic engineering.

Contact: Juan Gutierrez (jga@hrwallingford.com)

isBIM

make technology accessible

to

the built world

AUTODESK Reseller

AUTODESK Learning Partner

ISBIM LIMITED : WWW.ISBIM.COM.HK
23828380 : SOLUTION@ISBIM.COM.HK

bsi BIM Design and Construction KITEMARK™

HKQAA CERTIFIED COMPANY

GET STARTED IN ENGINEERING & DESIGN

MAIEC
澳門人工智能教育中心
Macau Artificial Intelligence Education Center

AUTODESK
Authorized Training Center

Computer Aided Design (CAD) professionals with such skill sets are not abundant in Macao. These skills are in high demand abroad.

Early introduction to CAD will impact students career paths. Aeronautical engineering, mechanical engineering, electrical enginnering and aerospace engineering all require a high level of CAD expertise - complimenting the high starting salaries.

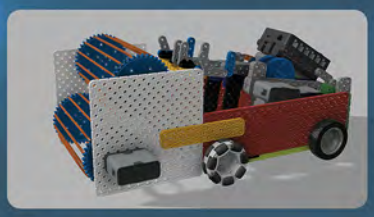
Computer-aided design (CAD) is used by engineers, architects, designers, and drafters to create digital 2D and 3D drawings. It can be used to design something as simple as a perfume bottle or as complex as a jet engine.

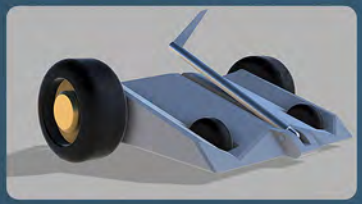
Robotics is a topic that offer opportunities to introduce students to complex subjects like programming and engineering; but in a way that's fun and interactive.

Being comfortable around computers and technology of any kind will not just be a boost for your future, but a necessity. With this in mind, it's essential to introduce yourself to as many different types of technology as possible, such as autonomous programming and artificial intelligence.

AUTODESK® INVENTOR®

AUTODESK® FUSION 360™





Macau Artificial Intelligence Education Center
澳門人工智能教育中心 @maiec.ai.mo

652 652 66 (English)
653 886 53 (中文)

Gary Lai
WeChat ID: gary_laii

Nutech

Tel: 2305 9898
sales@nutech.hk

We are a leading specialist in software and hardware re-selling for over 19 years, with particular focus on CAD, BIM, media & design visualization products and VDI solutions. Our clients cover a widespectrum of large corporations in multi-locations.

EXPERIENCE EFFICIENCY AND RELIABILITY WITH OUR PROFESSIONAL SERVICES. GET STARTED TODAY!

WHY US?

Nutech is a leading BIM (building information modelling) training specialist. Nutech has been partnering with Autodesk in providing BIM training for over 12 years and has been appointed as Autodesk Business Partner since 2004. We have been providing advance BIM training courses to the HKSAR Government departments, property developers, contractors and consultants since the development of BIM. With a team of BIM training experts, each with over a decade of training experience in this field, Nutech offers unparalleled BIM training in the market.

www.nutech.hk

AUTODESK
Reseller

Spatial Technology Limited
Your Trusted Partner for Spatial Data Solutions

Smart Site Safety System (SSSS)

The True Digital Platform for Real Time Safety Monitoring

- Real time data geo-referenced from Smart Safety Devices
- True data integration with BIM/DWSS
- Role-based configurable dashboards for preventive analytics*
- Workflow based digital PTW & asset tracking
- Autonomous AI safety monitoring

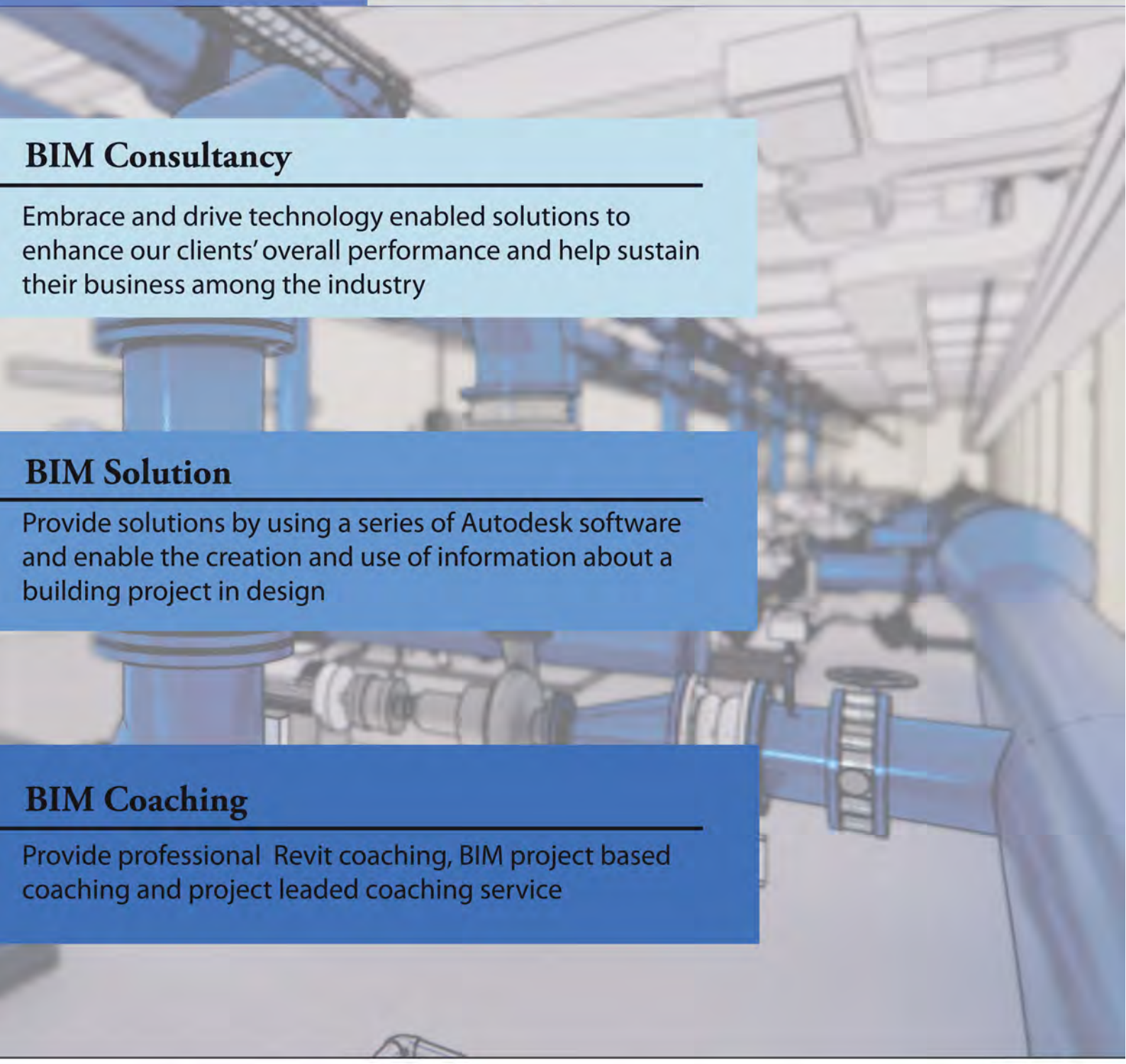
Spatial Technology Limited

2636 6102

info@spatial-technology.net

We devote to facilitate BIM culture

Architecture, Engineering & Construction Collection



BIM Consultancy

Embrace and drive technology enabled solutions to enhance our clients' overall performance and help sustain their business among the industry

BIM Solution

Provide solutions by using a series of Autodesk software and enable the creation and use of information about a building project in design

BIM Coaching

Provide professional Revit coaching, BIM project based coaching and project leaded coaching service

雲峰 Summit

Summit Technology (Hong Kong) Ltd.
Room 1503 , Aitken Vanson Centre,
61 Hoi Yuen Road, Kwun Tong, Hong Kong
Tel: (852) 2926 0002 Fax: (852) 2359 3649
Website: http://www.Summit.hk

AUTODESK
Gold Partner

Specialization
Architecture, Engineering & Construction

AUTODESK AutoCAD 2024

Trusted by millions. Built to accelerate creativity.

New in AutoCAD 2024

Activity Insights
Stay informed of relevant file changes and access throughout your project lifecycle with details of multi-user activities in a DWG file, conveniently requiring almost no setup for files on LAN, local, and cloud servers.

Smart Blocks: Replacement
Smart blocks replacement helps you quickly find the blocks you need by replacing one or more blocks via machine learning-based suggestions, recently used blocks, and manual substitute block selection.

Smart Blocks: Placement
Smart blocks placement lets you automatically place blocks in your drawing based on where you've inserted the same ones thus far in your DWG file, reducing the number of clicks and saving you time in the process.

Connected Paper Updates
Make cross-platform markup workflows faster through expanded machine learning capabilities & essential experience improvements. Share and annotate drawings safely and securely across desktop, web, or mobile devices.

Streamlined collaboration

With an AutoCAD subscription customers can edit their drawings anytime, anywhere.

- View, edit, markup, and share drawings from virtually any device.
- Make assessments and changes in the field, enabling real time feedback and collaboration.
- Easily add blocks, manipulate layers, and take measurements wherever they are.
- Access up-to-date working files in AutoCAD and cloud storage.

Recent AutoCAD features

Trace
Add design change notes and markups without altering your existing drawing from AutoCAD desktop in addition to the web and mobile apps.

Sheet Set Manager
The Sheet Set Manager now enables you to open sheet sets quicker than ever before. Using the Autodesk cloud platform, sending and opening sheet sets to and from teammates is quicker and safer.

Markup Import and Markup Assist
Import feedback and incorporate changes to your drawings automatically when collaborating with teammates and reviewers, without additional drawing steps.

Floating windows
Pull away drawing windows to display them side by side or on multiple monitors without opening another instance of AutoCAD.

Count
Count automates the counting of blocks or objects within a selected area or throughout your *entire drawing with a menu to identify errors* and navigate through your counted objects.

Specialized toolsets

Seven specialized toolsets for architecture, mechanical design, 3D mapping, and more are included with an AutoCAD subscription.

- Across seven studies, customers increased productivity by 63%* on average for tasks completed using a specialized toolset in AutoCAD.*
- Access libraries of 750,000+ symbols, parts, and detail components.
- Automate floor plans, sections, elevations, and more.

SYNNEX

synnex-adsk.com

AUTODESK
Value Added Distributor

AUTODESK

AutoCAD 2024

AutoCAD 2024

Subscribe to AutoCAD® 2024 including specialized toolsets for architecture, mechanical design, 3D mapping, and more. Access AutoCAD anytime, anywhere with included web and mobile apps.

Enables:

- 2D drafting, drawings, and documentation
- 3D modeling and visualization
- Customization of your software, including built-in programming capabilities
- Ability to set CAD standards
- Working from anywhere with the included AutoCAD web and mobile apps

You can:

- 2024 Automatically place blocks based on where you've previously placed them
- 2024 Find and replace blocks based on other blocks in your drawing
- 2024 Stay informed of relevant file changes with details of multi-user activities in a DWG file

Includes:

- AutoCAD on mobile
- AutoCAD on the web
  - » Exclusive web functionality for AutoCAD subscribers including AutoLISP API on the web and batch plot to PDF(s)
- Seven specialized toolsets
- Access to the Autodesk App Store

EXCLUSIVE TO AUTOCAD SUBSCRIBERS

Seven specialized toolsets give you industry-specific capabilities to speed up your work.

- Architecture
- Plant 3D
- Mechanical
- Map 3D
- Electrical
- Raster Design
- MEP

- Access libraries of 750,000+ symbols, parts, & detail components
- Automate the creation of floor plans, sections, elevations, annotations, layers, & properties
- Easily create details and views from 3D models, and simply generate schedules, lists, & tables
- Create rules-driven workflows to enforce design standards

SYNNEX

synnex-adsk.com

AUTODESK
Value Added Distributor

About AUTODESK

Autodesk is changing how the world is designed and made. Our technology spans architecture, engineering, construction, product design, manufacturing, media and entertainment, empowering innovators everywhere to solve challenges big and small. From greener buildings to smarter products to more mesmerizing blockbusters, Autodesk software helps our customers to design and make a better world for all. For more information, please visit **www.autodesk.com.hk**

Follow Autodesk Hong Kong:

Autodesk Authorized Reseller

Find a local partner that understands your unique business and industry needs.
Autodesk Hong Kong resellers can be found at **www.autodesk.com.hk/resellers**

DISTRIBUTOR:

SYNNEX

VALUE ADDED RESELLER: GOLD PARTNERS

ACAD Solutions Limited 港華系統有限公司

Computer Services & Management (HK)

FORIDA LIMITED

Spatial Technology Limited
Your Trusted Partner for Spatial Data Solutions

雪峰 Summit

VALUE ADDED RESELLERS:

hrwallingford

isBIM

Jadason Technology Ltd. 特新科技有限公司

Nutech

Autodesk Far East Ltd.
Room 1528, 15/F, AIA Central,
1 Connaught Road Central, Central
Tel: +852-2824-2338
Fax: +852-2824-3228
www.autodesk.com.hk

AUTODESK