Autodesk

Make Amazing Happen

Autodesk Hong Kong BIM Awards 2011

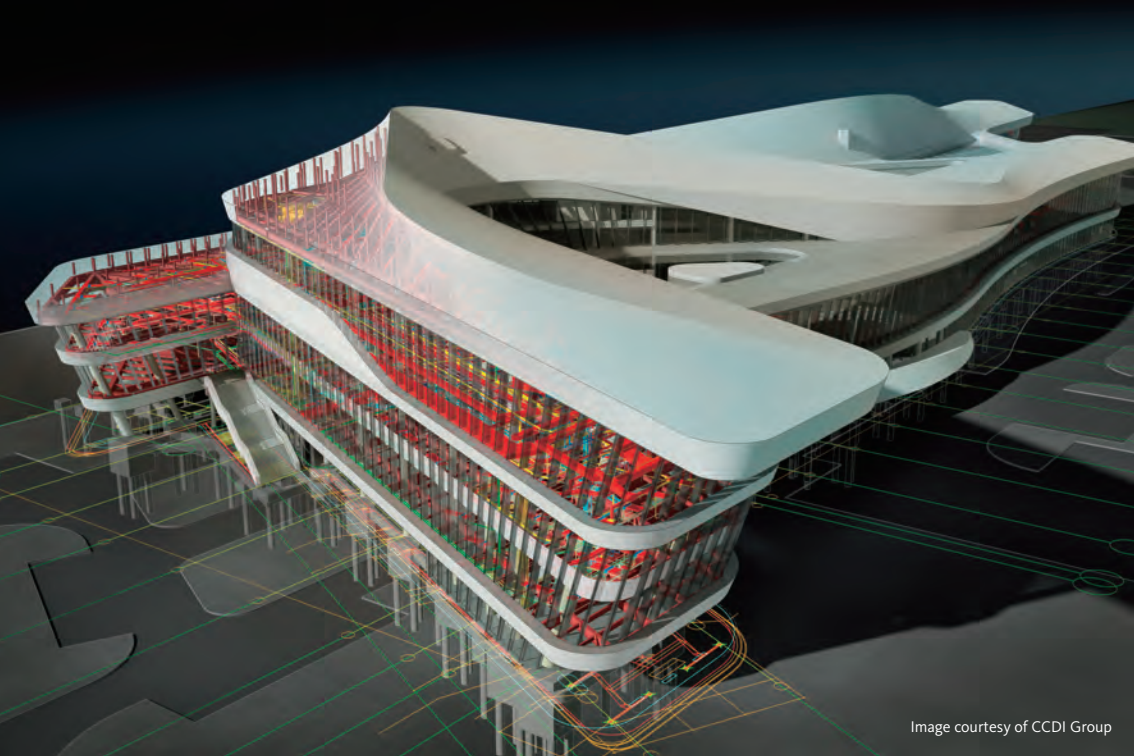

Image courtesy of CCDI Group

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Acknowledgement
Sincere thanks to the six awarded organizations, AECOM, Henderson Land Development Company Limited, HOK, Hong Kong Housing Authority, MTR Corporation Limited, Shui On Construction Company Limited, in providing such valuable information and pictures of their projects. Besides, we are extremely grateful of the contribution of the AIAB committee and members, Ms. Can Leung, Ms. Christy Wong, Mr. Elvis Li, Mr. Kenneth Lau, Mr. KY Li, Ir. Dr. Stewart Wan and Mr. Tim Ting, who are profiled in this booklet.

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Preface

It has been 9 years since Autodesk first introduced the concept of Building Information Modelling (BIM) in 2002. In Autodesk perspective, BIM is an integrated process that allows architects, engineers, builders, owners and other design professionals to represent the building process digitally. Currently, with the support of all stake-holders in AEC industry, this BIM concept is widely adopted in every single location in the world.

Benefiting from greater insight using Autodesk's intelligent model-based Building Information Modelling (BIM) solutions for planning, design, construction, and management of building, infrastructure, or plant projects, Autodesk's broad portfolio of tools for design, simulation, visualization, and collaboration can help all AEC stake-holders extend the power of BIM and remove the barriers to better business.

Without doubt, Autodesk BIM helps create a more sustainable and greener environment. Autodesk is always committed to strive for the best for our customers as well as for the environment that we live in. With another concept of Integrated Project Delivery (IPD), Autodesk BIM Solutions enable interdisciplinary design collaboration and digital Design-to-Fabrication processes. On top of that, IPD can truly make a difference in analyzing our building designs, as well as building performance that were not previously available in the traditional design process.

As reinforced in the theme this year 'Make Amazing Happen', Autodesk aims at helping our customers to make all amazing designs happen. It is the fifth year that we have the Autodesk Hong Kong BIM Awards. I strongly believe that without the participation and support from all of you, we would not have come so far. With this award, it celebrates building and construction industry professionals and educators in Hong Kong with their extraordinary designs and concepts. This year, we have a new category, with winners coming from tertiary institutes.

On behalf of the Autodesk team, I would like to congratulate all of the winners and I appreciate the support from all of you in today's event. I am sure that all of you are excited to find out how Autodesk BIM Solutions help AEC industry to make amazing happen.

Patrick Williams
Senior Vice President, APAC
Autodesk

Preface

Building Information Modeling (BIM) has been introduced by Autodesk since 2002 and Autodesk Greater China region has paid great effort to help our customers for adoption of BIM to Building and Construction Industry, in order to make our future a "greener", "more sustainable" and "better" world.

BIM, a new, creative and innovative approach from design to fabrication, re-engineers the traditional workflow in building and construction industry and is now widely adopted by all stake-holders in Greater China region.

BIM, in addition, provides the capability of analyzing the 3-dimensional models in building performance, and other environmental impact analysis. From this, we can be sure that the world will become better and better.

This is the fifth year in a row Hong Kong is having the BIM Awards, and it is without doubt BIM momentum grows tremendously each year. We all can see the participation from many stake-holders in the building and construction industry in Hong Kong, such as The Hong Kong Government, Property Developers, Architectural firms, Engineers, Consultants and Contractors, and it makes Hong Kong one of the most advanced cities in BIM adoption within Greater China.

The theme of this year's award is "Make Amazing Happen" and I would like to congratulate the six winning organizations, AECOM, Henderson Land Development Company Limited, HOK, Hong Kong Housing Authority, MTR Corporation Limited and Shui On Construction Company Limited. I am greatly impressed by their projects which make all amazing happen.

By reading this booklet, you will definitely feel the momentum of the innovative adoption of BIM in these six winning organizations. Once again, please join me in congratulating these six organizations for their outstanding projects being awarded.

Jim Huang
General Manager, Greater China Region
Autodesk

Preface

Since the Building Information Modelling (BIM) era begins in 2002, Hong Kong has developed themselves into one of the most advanced cities in applying BIM into building and construction industry. I am extremely proud of the growth that happened in the past 9 years.

BIM helps in visualizing the impact of design changes before building. In addition, clashes can be easily fixed in computer before it is being built. This can minimize costly errors during construction. As a result of that, the cost estimates for construction and operation can be calculated more accurately.

Since then, starting a few years ago, stake-holders in building and construction industry began to extend the usage of BIM from innovative design approach to fabrication and facility management. On top of that, many environmental impact analyses have been conducted in design stage during early process. This has been adopted very widely to make our environment a better place to live. Moreover, this helps to create a greener, most sustainable and more environmentally-friendly cities in Hong Kong and Macau.

This year, the six winning organizations of the Autodesk HK BIM Awards 2011 have demonstrated innovative use of BIM technology towards their projects in Hong Kong and worldwide. They all come in line with our theme this year, "Make Amazing Happen".

I wish to congratulate, once again, to all the winners of the awards: AECOM, Henderson Land Development Company Limited, HOK, Hong Kong Housing Authority, MTR Corporation Limited and Shui On Construction Company Limited. Go on reading this booklet and it will allow you to explore more creative and innovative ideas on the application of BIM, present and in future projects, and what Autodesk does to make this world a better place.

Wendy Lee
Branch Manager, Hong Kong and Macau
Autodesk

AECOM

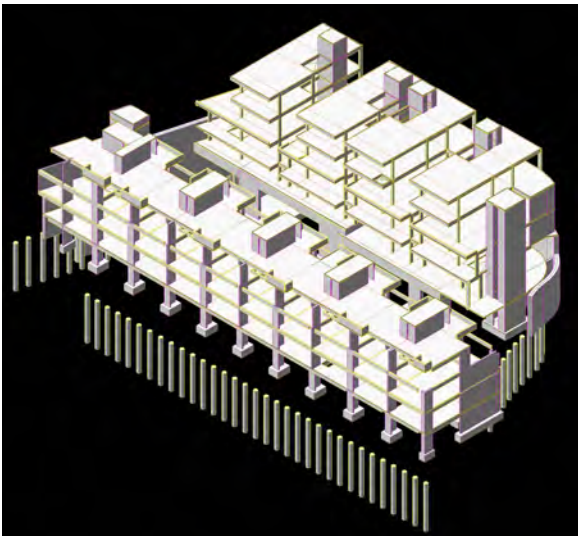
Projects:
- Proposed Commercial Development at No. 135-137, Hoi Bun Road
- Proposed Residential Development at 55-57 Bisney Road, Pokfulam

Location:
- Kwun Tong
- Pokfulam

Types:
- Commercial Development
- Residential Redevelopment

Scheduled Time of Completion:
- Hoi Bun Road - March 2013
- Bisney Road - September 2013

Faster Design; Enhanced Coordination



When Vital Success Development asked AECOM to work on the geotechnical and structural engineering for a new building in Kwun Tong, the architectural plans did not in themselves present a great challenge. The 26-storey, reinforced concrete building would be around 100 metres high, with four storeys for car parking, and 21 floors of office space.

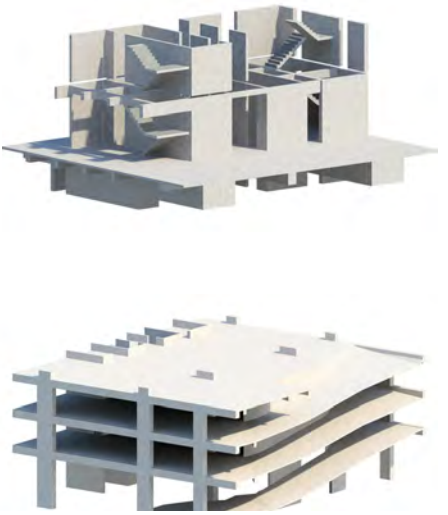
Yet Vital Success Development did have one challenging criterion: they wanted the building designed and built quickly. AECOM structural engineers recommended using BIM as a way to fast track the design process.

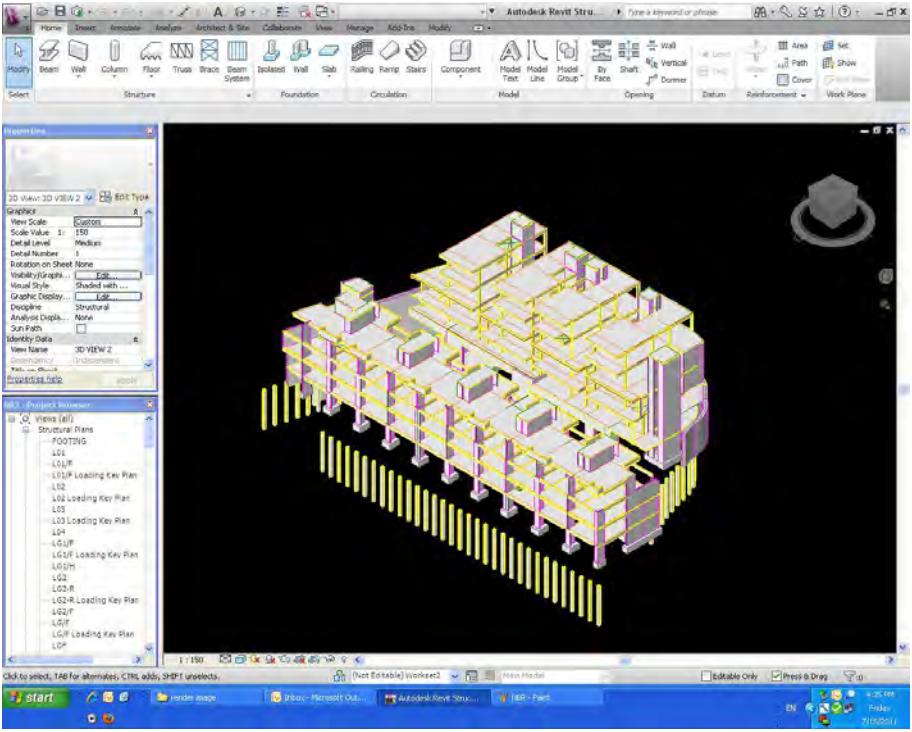
"The client had heard of BIM, but hadn't applied it in a project. They were impressed by an AECOM presentation." says Alan C H Yuen, Principal Engineer, Building Engineering (Structural), AECOM – and a member of AECOM's BIM & CADD Working Group Committee.

Accelerating design and drawing production

To accelerate the design and drawing production process, the AECOM team integrated a Revit BIM model with the structural computational programme that covered mainly structural elements. Construction details were included in Revit, such as installation details, and materials.

This process proved much faster than the traditional design process, in which the structural engineers would produce a detailed design based on architectural plans, and then sketches from which draftsmen prepare drawings. "The concept took around two months to develop, compared to perhaps three to six months with the traditional approach," says Ir Yuen. "And we completed the structural design in under two months – when we would

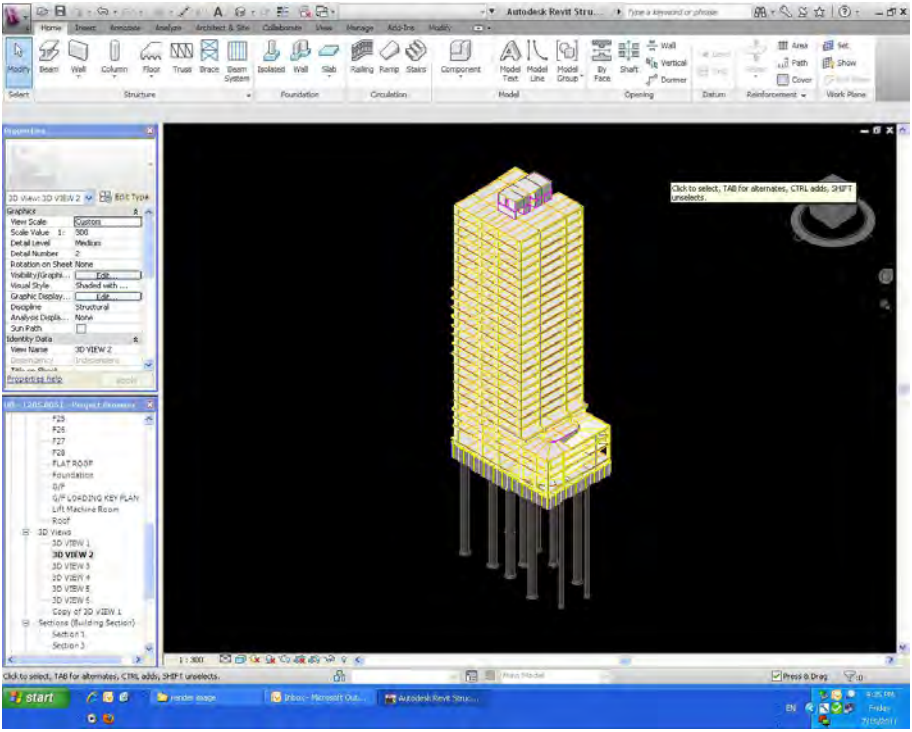




usually expect this to take three to four months for a building like this."

The main time saving was in drawing production. AECOM's working group used the project as a case study of the extent to which using BIM much faster this is with BIM. Based on experience with similar buildings, they estimated that 404 working hours would have been needed for delivering a set of structural drawings with a traditional approach. Yet by adopting BIM, they reduced the working hours to 252 – saving 152 hours, or 37% less time than for the traditional approach. This is mainly due to the information contained inside the BIM, which generated drawings automatically, and could include the building information into the drawing annotations.

With the BIM model, the number of structural RFI was reduced by 25% to 35%, and structural construction costs and time were reduced by perhaps 5% to 10%.



BIM Model Images Help Confirm Layout

During the schematic design stage, the team provided the client with a variety of potential structural schemes for consideration, aiming to achieve an efficient and economic structural design. The Revit model helped create the schemes, through re-arranging the elements, and produced consistent plans, sections, and 2D and 3D images.

With images from the BIM model, including a walkthrough, the client and architect readily understood the structural system, and ensured there was sufficient headroom – helping them confirm the building layout.

From estimating quantities to helping maintenance

The project also required an early assessment of quantities of materials required for the structure, for forecasting costs. Usually, a quantity surveyor would take two to three weeks to prepare a preliminary quantity measurement, yet with BIM, the team immediately and easily generated information on the amounts of concrete and steel needed.

The AECOM team also built a 4D construction simulation, presenting 3D “snapshots” of different stages of construction. This will help companies bidding for tenders to understand the construction sequences.

Once the office building is completed, the Revit models may also help the client with building maintenance.

Modelling site constraints to optimise building plans

AECOM is also working on a contrasting project in which BIM is playing an important role. This involves construction of five- and six-storey housing blocks in Pokfulam, for Chinachem Group. AECOM was appointed as structural, geotechnical and building service engineers, to carry out site formation, foundation, superstructure, and building services design.

"We face site constraints, such as existing buildings surrounding the site, along with retaining walls, roads, and paths," says Vito C Y Tso, Engineer, Building Engineering (Structural), AECOM. "Also, the land has a 10-metre level difference with difficult soil conditions. We need to explain these to other consultants."

The AECOM team created a BIM model with the site survey, architecture, and proposed structural design including socket piles for helping stabilise the site. Like the office building, the model helped speed up the design and drawing production process. Importantly, too, the 3D images helped make the client and architect clearer regarding the issues. "The architect could see places where the structure wouldn't work, and adjust the general building plans to suit our model," says Mr Tso.

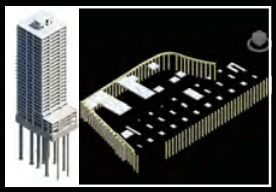
In 10 years BIM will be akin to CAD

Ir Yuen and Mr Tso are key members of AECOM's BIM & CADD Working Group Committee, which was established in 2008. The group trains staff to use BIM, and researches more effective ways of using BIM – which senior managers believe will be used as widely in 10 years as CAD is at present.

"Our engineers are impressed by the functionality of BIM, and it's not difficult to learn it," says Mr. Tso. Echoing the management team, he predicts that Revit structure will become like AutoCAD today, and always used in projects.

** All images in this article provided by AECOM*

AECOM



ABOUT AECOM

AECOM is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves.

AECOM provides a blend of global reach, local knowledge, innovation and technical excellence in delivering solutions that create, enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in approximately 125 countries and had revenue of $7.3 billion during the 12 months ended March 31, 2011. More information on AECOM and its services can be found at www.aecom.com.

Henderson Land Development Co. Ltd.

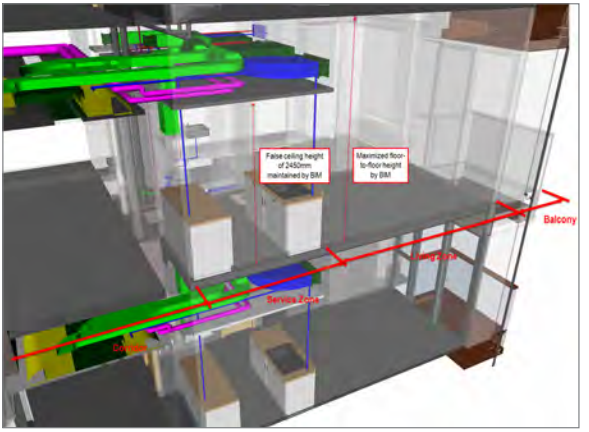
Projects:
- The Gloucester
- A Luxurious Boutique Hotel at 388 Jaffe Road

Location:
- 212 Gloucester Road, Wanchai
- 388 Jaffe Road, Wanchai

Types:
- Residential Development
- Hotel

Scheduled Time of Completion:
- 2012
- 2011

Optimising Designs for Compact Spaces



Following success with BIM in construction of the World Financial Centre in Beijing – completed in 2009 – Henderson Land Development Company Limited deploys BIM in its Hong Kong projects. Henderson Land is also expanding the ways it uses BIM, notably in two current projects involving an upscale residential property, The Gloucester, and a luxurious boutique hotel at 388 Jaffe Road yet to be officially named.

The Gloucester

The residential development is The Gloucester, and will be built on Gloucester Road, Wanchai. This will be a 34-storey residential tower on a three-storey car park podium, with an aquarium-style indoor heated skypool on the top floor as the building's iconic feature.

Iconic Skypool and an Oasis

Derek Leung, Project Manager, Project Management (2) Department, Henderson Land, says the aquarium-style indoor heated skypool design was complex, with the pool located above a filtration plant room. The BIM model helped with planning how to put all necessary equipment and water pipes inside the plant room, and introduce the acrylic parapet-edged pool design.

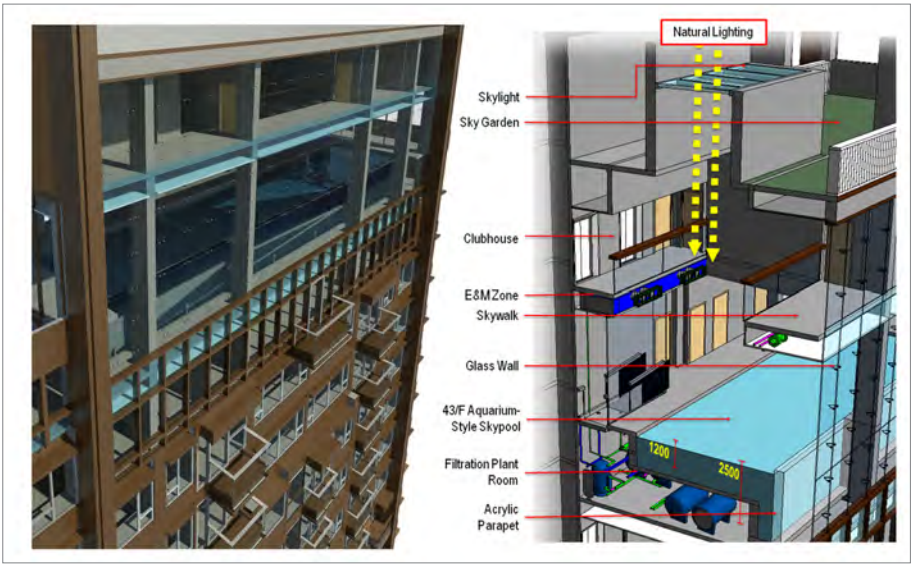
The Gloucester will also have an "oasis floor", a podium garden above the car park podium.

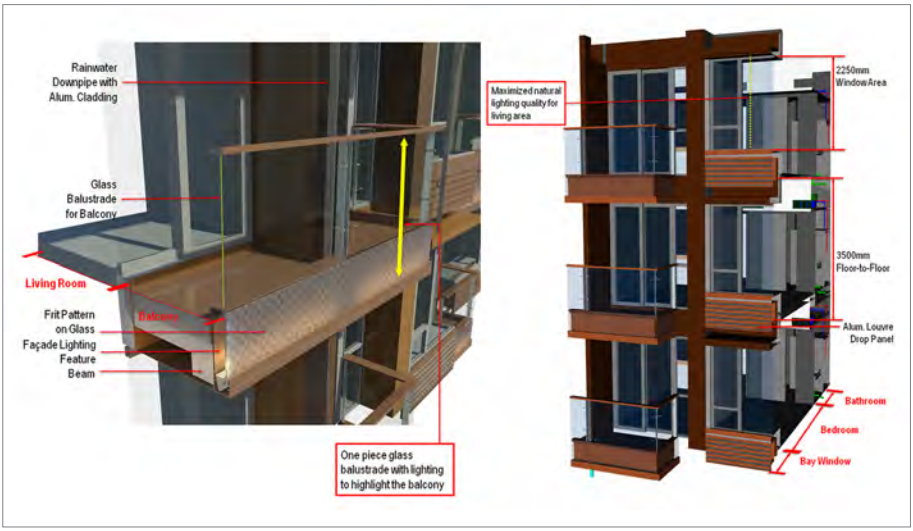
"BIM helped the team with designing the vertical greenery," says Derek. "We could walk through the model, and see where there were opportunities for greenery, as well as explain constraints in the best way we could." This greenery in turn contributed to The Gloucester becoming a BEAM Platinum Provisional Rated Residential Building.

Using BIM, the designers maximised window heights, enhancing the quality of natural lighting within the building. There is an emphasis on glass balustrades, which are combined with drop panel louvres to make the façade appear elegant. These balustrades were again planned using the Revit model, and for coordinating the construction details with other building systems.

Compact Spaces, Packed Services

"There are a lot of compact units – like a





hotel," says Derek. Each of these has an open kitchen in the living room, together with a bedroom unit and a bathroom. These proved especially challenging for the design team, particularly as several electrical and mechanical services needed to be fitted into confined spaces. Initially, the architect was working in 2D drawings and try to coordinate services including sprinklers and exhausts required for open kitchens, along with hot water systems, and air conditioning. "It was not easy to visualise these elements," says Derek.

Adding to the difficulties, the project team wanted as much ceiling height as possible. The BIM model proved a massive help. Using it, everyone involved in the design could visualise how the services were arranged. With the multi-discipline BIM model, they studied clashes in Navisworks, assigning them red colour coding for easy identification. Over 50 major clashes were identified and resolved in the service zones of accommodation units, and the team succeeded in maintaining a minimum ceiling height of 2.45 metres (locally for bathroom and open kitchen only).

The Gloucester is one of the first few projects for Henderson Land, that BIM is used for the design process rather than just for visualisation. The active participation of a BIM consultant has strengthened communications between project teams from different disciplines, who hold regular BIM review meetings to identify and resolve problems. Efficiency and communication between project teams are greatly improved, and errors and conflicts that could arise during construction have been reduced.

A Luxurious Boutique Hotel at 388 Jaffe Road

Compact Services Integration within Confined Services Space

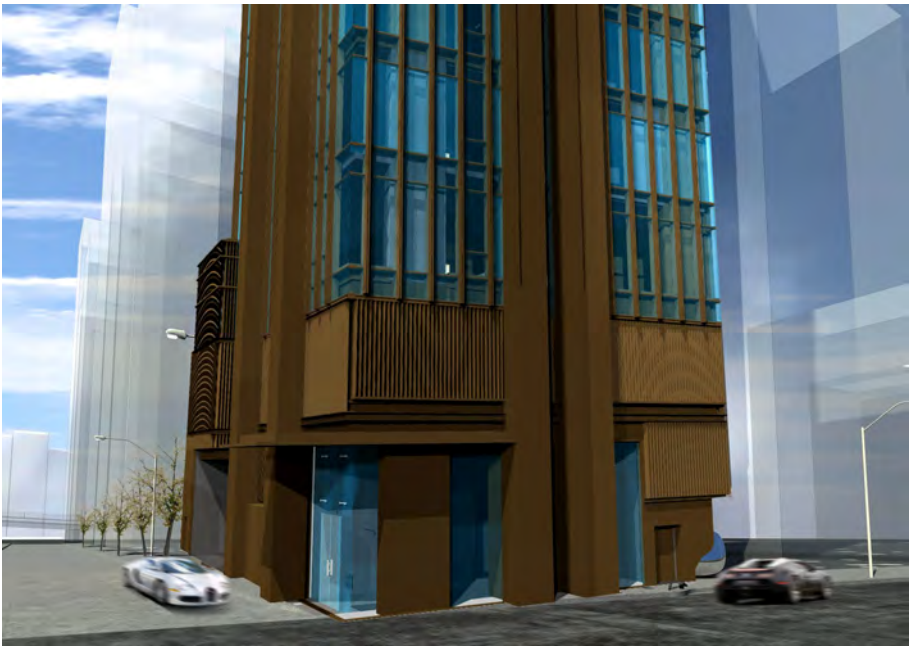
The boutique hotel is also compact, presenting challenges to the design team especially in the well-packed services installations within the ceiling voids. Here, too, BIM proves far better than the traditional method of trying to imagine what the overlapping lines of pipes and ducts will look like, based on 2D plans or sections. With BIM accommodating all the building information 3-dimensionally, the team can optimise use of the ceiling/duct spaces for various services without hassles or abortive site works.

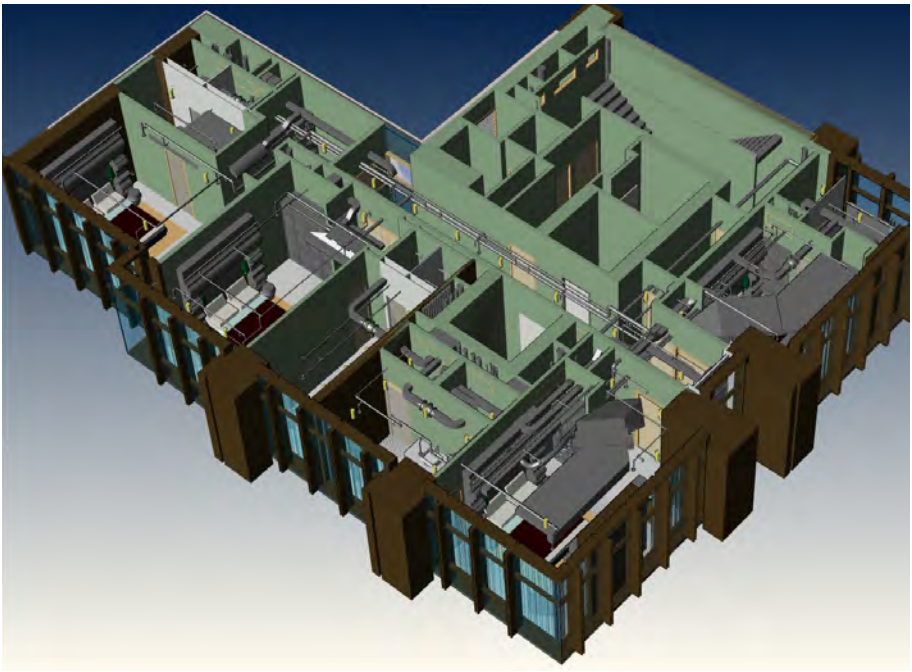
The BIM model also helped in the design process, as 3D images helped members of the senior management team to quickly assess and comment on the latest design ideas. Yet Henderson Land also has long-term plans for using BIM in the hotel project.

"Quick Fix"

The hotel is a lifespan investment for Henderson Land, which will remain involved throughout the operational phase. "We want to use BIM for facility management," says Project Manager Catherine Lau. "For example, if a repair is needed for air conditioning or water supplies, a technician can quickly find data and drawings."

The repair technician might have to find the fault, then return to an office to search for information. Yet the Henderson Land team have realised that the BIM model originally developed for contractors can also be converted to a facility model. They





are working on a digital building portal that will deliver all information necessary for facilities management, and aim to make this accessible through handheld devices such as mobile phones and iPads. Armed with this sophisticated technology, building managers can quickly identify operational problem and provide speedier maintenance services.

Managing the Project Graphically

Henderson Land is now looking at ways to expand use of BIM. "It's a catalyst for project innovation and a tool for speedier design development," says Kevin Ng, Deputy General Manager, Project Management (2) Department, Henderson Land. "We couldn't effectively and efficiently visualize 2-dimensional combined services drawings for complicated projects, but with BIM we can realistically appraise problems and opportunities." In addition to accelerating design production, Henderson Land is considering using 4D BIM to help site management to visualise sequencing of site work. Kevin believes the adoption of BIM can be assisted through the industry practitioners' recognition of its contribution, like the ISO certification, and their expansion of usage scope with the emergence of more skilled BIM consultants.

** All images in this article provided by Henderson Land Development Co. Ltd.*

ABOUT HENDERSON LAND DEVELOPMENT CO. LTD.

Founded in 1976 by its Chairman, Dr The Honourable Lee Shau Kee, GBM, Henderson Land Development Company Limited is a leading property group with a focus on Hong Kong and mainland China. Its core businesses comprise property development and property investment. In addition, it has direct equity interests in a listed subsidiary, Henderson Investment Limited, and three listed associates, The Hong Kong and China Gas Company Limited (which in turn has equity stakes in a listed subsidiary, Towngas China Company Limited), Hong Kong Ferry (Holdings) Company Limited and Miramar Hotel and Investment Company, Limited.

Henderson Land has been listed in Hong Kong since 1981 where it is one of the largest property groups. It has the largest agricultural land holding among all property developers in Hong Kong. Its land bank in mainland China is also rapidly expanding with 150.4 million square feet in attributable developable gross floor area by the end of December 2010.

With sustainability as a core consideration, the Group is conscientious in its approach to delivering attractive and efficient properties in unrivalled locations that contribute positively to their context. The Group has received numerous awards and accreditations recognizing its effort in sustainability. The Group's World Financial Centre ("wfc") in Beijing achieved a Platinum certificate in Leadership in Energy and Environmental Design ("LEED") by the US Green Council and wfc is currently the largest Platinum certified LEED office building in the world (Core and Shell).

HOK

Project:
Bengaluru International Airport Terminal 1 Expansion

Location:
Bangalore, India

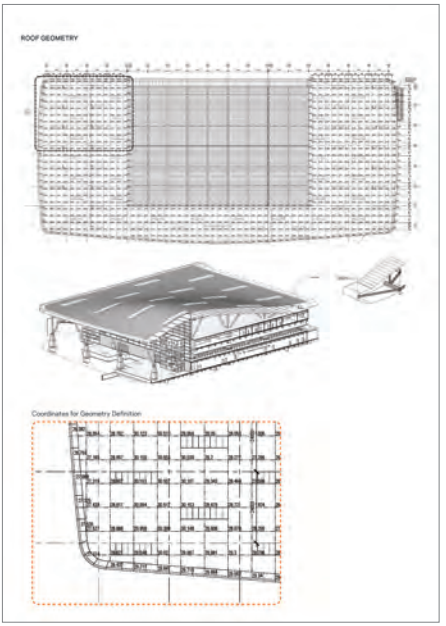
Type:
Airport

Scheduled Time of Completion:
2013 & 2015

Flying High with BIM

Airport design uses BIM's diverse strengths

Following a board decision to adopt Revit in 2006, architectural firm HOK now uses BIM on all projects worldwide. These include the Hong Kong team's current work on expanding Bengaluru International Airport in south India, a project that benefits in various ways from BIM's diverse strengths.



HOK is lead designer of the expansion, which is adding additional gates to the east and west of the existing Terminal 1 together with a new pier. These additions are unified with an elegant hyperbolic roof. Complexities of the project include the integration of new baggage handling systems, amendments to security arrangements and significant construction zones wrapping around the fully functional existing airport.

The design team has embraced the BIM approach for the entire project. "The client can get a better understanding of the design via Revit's inherent 3D environment, and therefore become more engaged with the design process," says Mr. Benjamin Thomas, Senior Design Architect, Associate with HOK.

The BIM model also helps the HOK team to work closely with other consultants involved in the airport expansion – notably Arup engineers, who are responsible for mechanical, electrical and plumbing systems (MEP); the façade; structural engineering; and the baggage handling system.

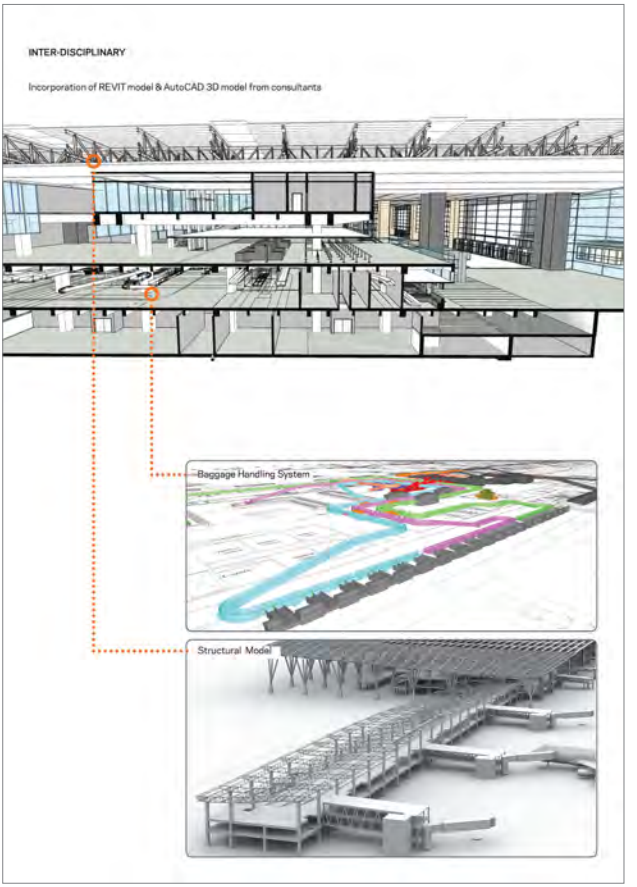
Baggage Handling System Pivotal to the Project

"The baggage handling system is one of the biggest components inside the airport," says Mr Thomas. "The planning of the BHS is critical to minimise the impact on other airport operations together with passenger and staff flow."

The baggage handling system was fixed early in the design process. Arup developed the system using intelligent blocks with a host of technical data, such as the speed, direction, orientation, and length of individual conveyors. They passed the MEP model to the HOK team, who imported it into the Architectural model to complete the design.

"The BIM model was a massive help in the design process," says Ir. Andrew Mole, Associate Director of Arup. "There is only so much information you can show in 2D drawings, since they must be interpreted to understand the full spatial information. 3D models communicate better." The BIM model allowed creation of multiple views of the airport design, with minimum additional effort. It was essential in assessing coordination issues, for example helping in ensuring that where required the baggage system could rise over corridors or dip below basements without clashes arising.

Additionally, rendered 3D views were used to review the design with baggage operations management and staff. Jonathan Roberts, Senior Consultant with Arup, explained, "The 3D images of the system enable non-technical stakeholders to far better understand the facilities that they will be getting. This results in far more valuable questions than had they seen only 2D drawings. In particular, the advantages and disadvantages of different options can be easily conveyed and very robust decisions can be achieved." For example, it was relatively easy to assess the spaces available for contingency handling, an issue of great importance because of the potential impact on the entire airport operation should the baggage system experience a major stoppage.



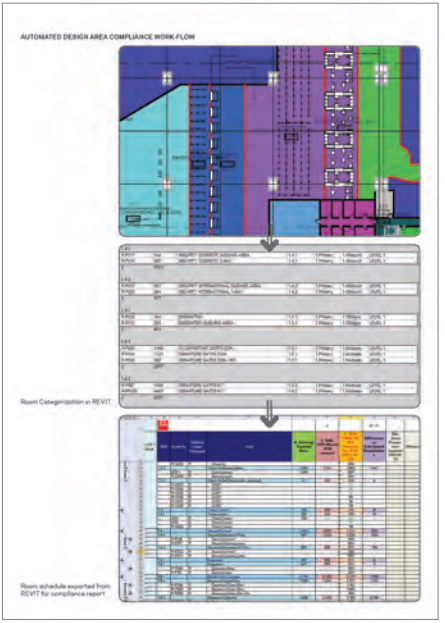
Well Coordinated Roof Structure

The roof structural steelwork was similarly imported into Revit, for coordination with the architectural model. "There was a considerable advantage to using the BIM model for the roof," says Mr Thomas. "For instance, we could effectively cut away portions of the model, to create 3D sections, and show how the roof form related to the rest of the project."

The ARUP team modelled the roof's truss structure, for coordination discussions with HOK on how it would fit within the architectural skin. ARUP also resolved roof drainage issues whilst maintaining the roof's aesthetic quality.

Modelling Lighting

By importing Revit data to Ecotect Analysis, the BIM model helped with determining



the position and number of skylights, as well as the materials used for the building facade. Ecotect allowed initial assessments of lux levels at different times of day and with varying sun positions, as well as ways materials with certain qualities would affect the quality of light.

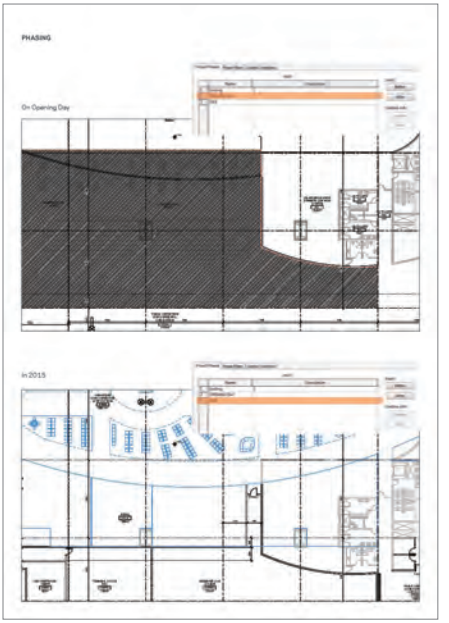
Rooms, Lifts and Staircases

"We have very specific area requirements for rooms and processing functions, such as those for immigration and security," says Mr Thomas. "We could efficiently cross check the configuration of the BIM design with the requirements, and present this data to the client." When changes are needed, such as moving an office to another location, Revit recalculates design information, and the new file can be exported to Excel for compliance and reporting.

The BIM model is also a boon for information on around fifty escalators, lifts and staircases between floors; designers can quickly see where these start and finish, coordinate with structural arrangements and then extract this information into a vertical transportation schedule.

Phasing the project with BIM

The building information model also helps with showing how the expansion will proceed in phases. The HOK team has produced each building component in the building information model with a 'time' of construction. When the designer wants to present the design for any phase of the project, only those building components belonging to that phase appear. Drawings can be prepared for contractors, according to different construction phases.



Throughout the design process, the HOK team found the client was very impressed with the 3D models. Revit enabled HOK to quickly update designs, whilst there were better communications with the client than had traditional 2D drawings been used.

No Going Back to 2D Design

Though the BIM model proved a boon for the project, no member of the team can imagine life without BIM. “Revit allows everyone to fully engage with the design process, allowing valuable coordination and input to result in a better designed product for the end user,” Mr Thomas adds. “Design is a very collaborative exercise – relevant input at all stages is critical and therefore I can see the future of this software evolving from a centrally based office network to one which allows people to roam and collaborate from remote locations using network clouds.”

Ir Andrew Mole likens the emergence of BIM to the earlier switch from paper to computer-aided design. “At first, it is not so efficient as people try to fit it into the old ways of working. But as they use it and become familiar with its strengths, they start to see the efficiencies, and there is better coordination.”

** All images in this article provided by HOK*

ABOUT HOK

HOK was founded in St. Louis by three principals – George Hellmuth, Gyo Obata and George Kassabaum in 1955. With the vision of being the world's leader in innovation for the built environment, they have successfully made their expertise available across the globe in the last 50+ years. HOK is currently operating from 25 established office locations with more than 1,800 employees and their projects can be found in almost every continent in the world.

Their continuous success has been regularly acknowledged by industry watchers, their 2010 recognitions include:

- #1 Architectural/Engineering Firm, Building Design + Construction
- #1 Architectural/Engineering Firm, Engineering News-Record
- #3 Green Design Firm, Engineering News-Record
- #4 Interior Design Practice, Interior Design
- #4 Architectural Firm, Building Design (UK)

Their ability to collaborate across markets and disciplines in every part of the world allow them to see the "big picture" and, because they approach design from so many different perspectives, gives them an unparalleled ability to innovate.

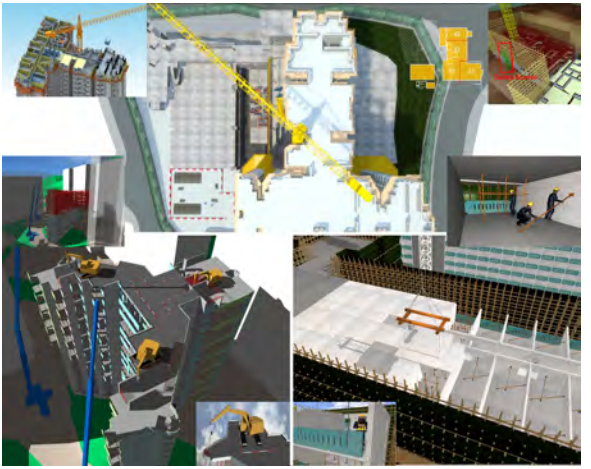
Hong Kong Housing Authority

Projects:
- Tai Pak Tin Street Public Housing Development
- Redevelopment of Lower Ngau Tau Kok Estate
- Redevelopment of So Uk Estate

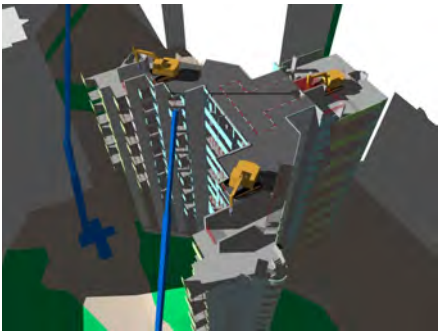
Location:
- Tai Pak Tin Street
- Lower Ngau Tau Kok Estate
- So Uk Estate

Type:
Public Housing

Versatile BIM / What You See is What You Can Do



The Hong Kong Housing Department, executive arm of the Hong Kong Housing Authority, is among the pioneers in the use of BIM in Hong Kong. Having worked on projects with BIM used in standard ways – such as reducing clashes during construction the Department has recently progressed to helping accelerate a construction project in Tai Pak Tin Street, and even demolished old buildings using BIM in Lower Ngau Tau Kok and So Uk.



Not as Easy as ABC! – Redevelopment of So Uk Estate

In Hong Kong, blasting is restricted for demolition, which instead involves manpower and machinery. This can present special challenges, particularly when buildings are non-standard and a unique 3D demolition method is presented in 2D drawings.

Philip Sham, Senior Structural Engineer, Housing Department, indicates the challenges arising in demolishing five 15- to 17-floor residential blocks in So Uk. The buildings had Y-shaped layouts, with four flats in each of the two narrow wings. “On top of the space constraints, the cantilevered corridors in each of the wings further restrict the operation of demolition equipment,” says Ir Sham.

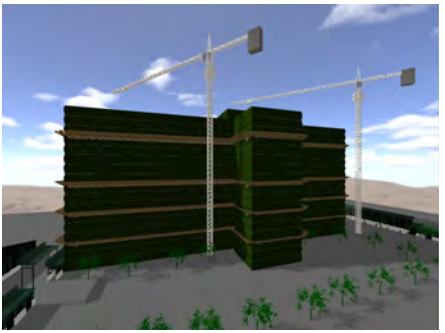
Ir Sham produces a black and white 2D drawing, to demonstrate that using only this, even experienced crews find it tough to grasp the demolition instructions looking at only a 2D drawing.

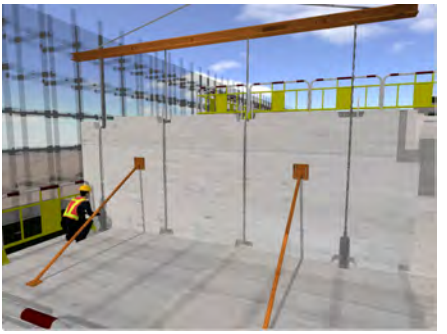
What You See is What You Can Do – Redevelopment of So Uk Estate

Then, Ir Sham shows the BIM model, rendered in Navisworks, on a computer screen. With 3D images and colour, the instructions make perfect sense. “The 3D sequence helps contractors to comprehend work details and the engineers’ intent,” he says. “It’s a whole new demolition method yet we can still optimize work efficiency and enhance cost estimates.”

The model shows the entire building block, which can be rotated by 360 degrees. It is possible to zoom in, to enter a flat and head along a cantilevered corridor. A 4D animation shows demolition proceeding over time. “This is a real simulation – ‘What you see is what you can do,’” says Ir Sham.

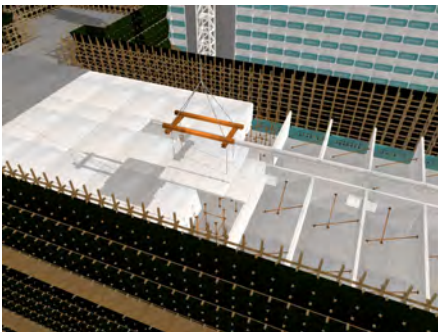
In briefing seminars, the demolition crews were impressed by the animation. Though the project had initially looked precarious and time consuming, the BIM model ensured it proceeded safely, and at around the same speed as for conventional demolition projects.





Safe and Effective Demolition – Redevelopment of Lower Ngau Tau Kok Estate

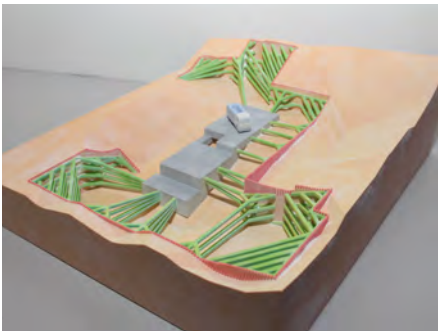
Different challenges arose with demolition of five 16-storey buildings in Lower Ngau Tau Kok Estate. These dated from the 1960s. "We have no as-built records of how they were built, no drawings – just a photo taken in about 1967 showing Lower Ngau Tau Kok Estate under construction," says Nandi Ip Kwong-fat, Structural Engineer, Housing Department. "We have no experience in demolishing precast buildings. The risk can be very high as any accidental fall of a pre-cast unit may trigger progressive collapse of the whole building."



With 2D plans, Ir Ip and his team could only imagine the developed demolition process in their minds. Instead, they opted to create a BIM model, for simulating the entire demolition process as well as the required safety measures.

From the model, the Housing Department project team developed a 10-minute video, with an animation showing the demolition sequence and safety measures. "The video was very useful – we could optimise this brand new approach to demolition. Both management and staff know what the demolition involved," says Ir Ip. "The contractors also found the video really helpful. Their workers could familiarise themselves with the demolition details."

The demolition work proceeded smoothly, with no accidents, or complaints of nuisance.



Efficient Excavation and Shoring Works – Tai Pak Tin Street Public Housing Development

Site and time constraints led to use of BIM for construction of a 40-storey non-standard housing block on Tai Pak Tin Street, Kwai Chung. Danny Chung Kwok-chuen, Senior Structural Engineer, Housing Department, explains that the site is very congested, with undulating terrain and bedrock profile, steep slopes on two sides and a busy road on a third. Substantial excavation and shoring works were required, and would take place in five stages.

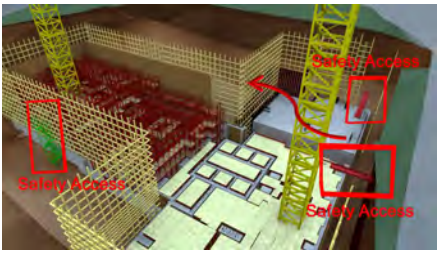
"The contractor had submitted 2D drawings, and cut many sections in an endeavour to show the works at various stages, including five layers of supporting struts," says Ir Chung. Yet even with the multitude of sections, it was hard to visualise, plan and monitor the work. A BIM model seemed a promising solution: it would allow creation of an infinite number of sections, show progress at every stage, and facilitate easy updating.

The BIM model led to creation of a 4D model – showing the works developing over time. Moreover, the Housing Department project team made 3D prototype models of the excavated site complete with struts, and even a dump truck. One of these was displayed in the construction site office, helping the contractor to fine-tune the work sequence, and efficiently carry out the excavation and shoring works.

Better Planned, Swifter Construction – Tai Pak Tin Street Public Housing Development

"We asked the Building Contractor to use BIM for more efficient planning and mitigate delay in the work," says Chimmy Chu Wai-ming, Senior Architect, Housing Department. The model indeed enhanced overall site planning, streamlined some work sequences, and accelerated work. Aided by a BIM simulation showing top-down construction would be most efficient, the contractor finished building the Lower Ground to Upper Ground floors four weeks earlier than originally planned.

Subsequent floors are likewise being constructed according to a BIM model. The construction schedule has been carefully planned in a 4D model, and BIM has been adopted for quantity take-off, which helps to monitor progress on site and provide more accurate materials orders. By virtue of a model walkthrough, site safety issues were identified upfront, and safety precautions were improved. The BIM model even enabled tower crane operators to optimise locations for CCTV cameras that will help them to safely lift precast façade panels.



"Using BIM, we have shortened the learning curve of the builders, and construction is proceeding exactly as planned in the BIM; and more importantly the BIM model helps to deliver a safer and healthier work plan that benefits all workers on site," says Ms Chu.

Note:

Tai Pak Tin Street –

The project consists of the construction of one 40-storey non-standard domestic block on a one-storey car-park / services podium including foundations, a multi-purpose hall and two pedestrian footbridges connecting to the adjacent On Yam and Shek Lei Estates.

Lower Ngau Tau Kok –

The project comprises the demolition of all existing structures of the estate including 7 nos. 16-storey domestic blocks and 5 of which were of precast construction, construction of a new road, and foundation to a footbridge and 33-storey domestic block.

So Uk –

The project requires the demolition of some existing reinforced concrete domestic blocks built in the 1960s.

** All images in this article provided by HK Housing Authority*

Hong Kong Housing Authority

ABOUT HONG KONG HOUSING AUTHORITY

The Hong Kong Housing Authority (HA) develops and implements a public housing programme which seeks to achieve the Government's policy objective of meeting the housing needs of people who cannot afford private rental housing. Approximately 30% of the Hong Kong population is now living in public rental housing units.

The HA plans, builds, manages and maintains different types of public housing, including rental housing estates, interim housing estates, and transit centres. In addition, the HA owns and operates some flatted factories and ancillary commercial and other non-domestic facilities.

The Housing Department (HD) acts as the executive arm of the HA to help the Government achieve its policy objective on public housing.

MTR Corporation Limited

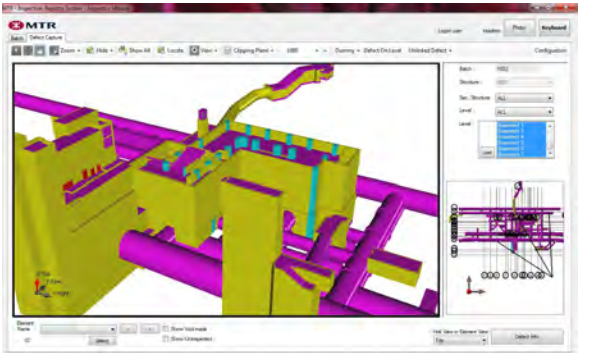
Project:
Re-Development of Inspectioin Registry System

Location:
Hong Kong

Type:
System Development

Scheduled Time of Completion:
2011

BIM-powered Inspection System All-new, All-BIM Inspection System



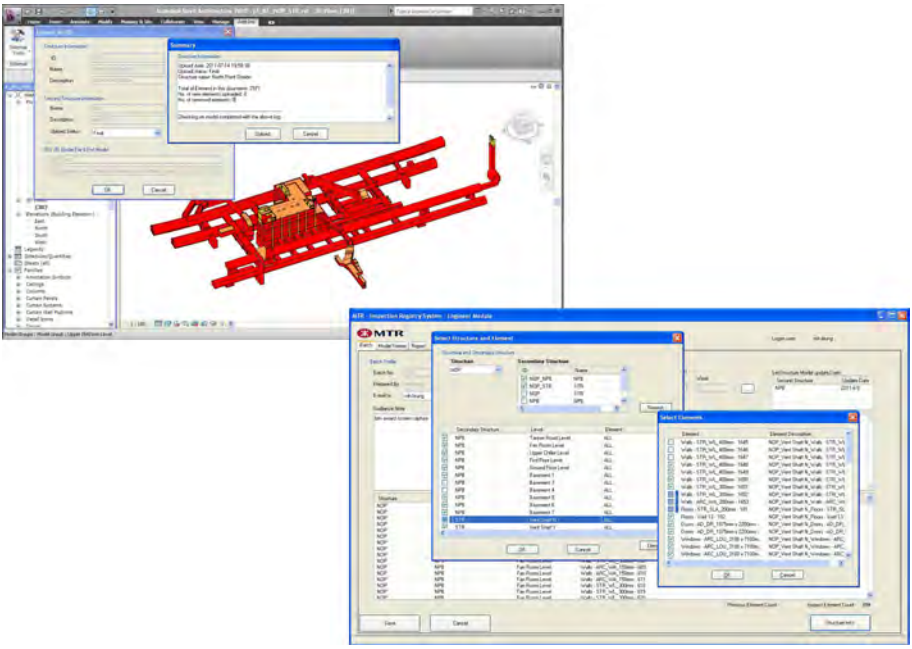
"We need to embrace new challenges and be flexible to adopt IT changes," says Dorian Leung, Structural Inspection and Investigation Manager, MTR Corporation. Compared to some models with their fancy architectural features and so forth, the 3D IRS system does look basic, with little but walls, columns and other structural elements. Yet the simple appearance belies the fact that this is a pioneering BIM project: the MTR team knows of no other instance of BIM being used for inspecting building defects.

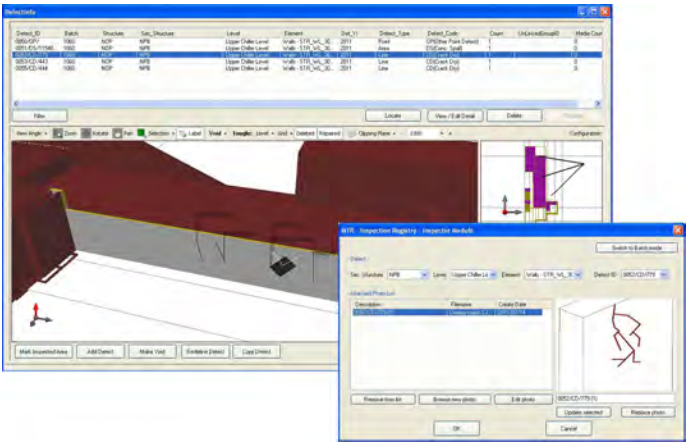
The project stemmed from a review of the old system for defect inspections, which had been in place since 1995. This system was based on a multitude of 2D drawings – sometimes hundreds of them for an individual station, making it challenging and time consuming for inspectors to find and record locations of defects. Plus, the system was prone to errors, partly as it was hard to correlate defeat by their real world coordinate on 2D drawings.

Revamping the inspection system

The review led to plans for a substantial revamp of the system. Members of the MTR Corporation's drawing office proposed using BIM for defect inspections and reporting: they had experience in manipulating station BIM models. Ms Leung and colleagues conducted a market survey, and could only find BIM being used for building design and construction. This proposition set to be the first time BIM would be applied in structural maintenance.

Work on the new Inspection Registry System was conducted by a cross-discipline task force within the MTR Corporation and the system developer, including Systems Analyst Dickson Luk. "We aimed to use new technologies with 3D models, and eliminate thousands of drawings," he says. The project team created a customised plug-in for Revit, to bridge 3D model preparation, system data storage and follow-up activities, and produced an initial BIM model for North Point station. With this model, they checked whether BIM could indeed be used for maintenance work.





The results were promising, and the team progressed to a more comprehensive trial, covering Fortress Hill station.

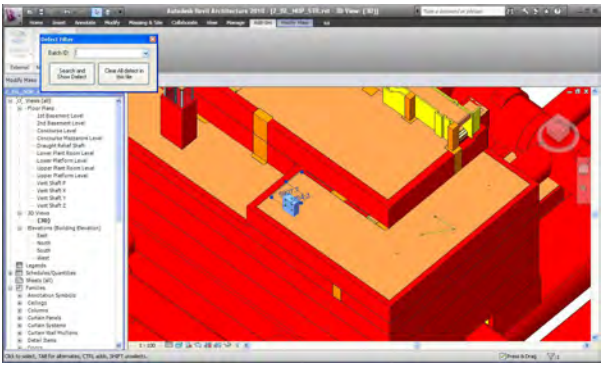
This trial was also successful, and the BIM-based Inspection Registry System will be expanded to cover all the MTR stations, depots and ancillary buildings.

One model is for all

Inspectors who have been trained to use the new system – in courses lasting just half a day, followed by practice in stations – find it not difficult to use, and can already see the benefits. New inspectors benefit the most, as the model gives a visual view of the structure of a station, making it easier to understand.

No longer is it a great advantage to have prior knowledge of a station, in order to navigate on a notebook computer to a particular drawing that covers a location. Instead, says Mr Luk, "On a single model, an inspector can easily turn on and off floor levels as required – such as turn off everything but the concourse, and move around in 3D to find the location."

Also, instead of dozens or hundreds of 2D drawings, there is one BIM model for each station. "One model is for all, so inspectors can work efficiently," notes Ms Leung.

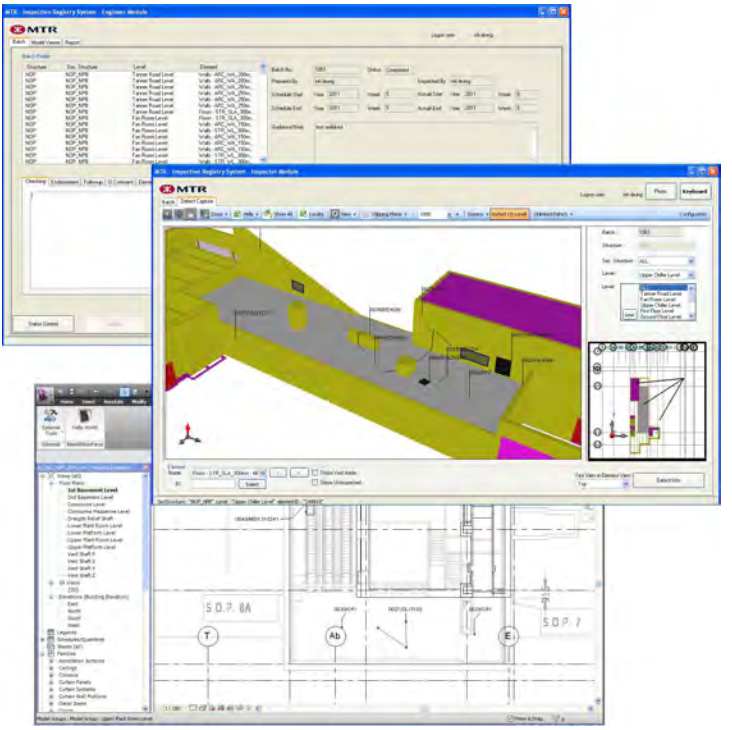


Tight collaboration and time saving

An inspector assigned to a station downloads that station's BIM model to a notebook computer. On finding a defect, such as a crack on an external wall, he or she can record the location on the BIM model, together with a description, and perhaps attach a photo or video. The inspector can then update the BIM model in the server. The engineers retrieve information from the system for evaluation of the structural condition and arrange necessary follow-up action.

The BIM model is used in stages of work, from preparing inspection orders, through on-site inspections, to follow-up maintenance – and is updated after structural modification work. This helps ensure tight collaboration across different teams. Hence, the need for rework is minimised, and subsequent work will always be based on the latest BIM model.

The new system is far more efficient than the time-consuming and error-prone 2D processes. It slashes the time needed from draughtsmen by around 50%. This is because it is no longer required to prepare a 2D drawing for each surface of a structure in order for inspectors to mark defects; and draughtsmen are no longer required to verify locations of previous defects on revised 2D layouts.



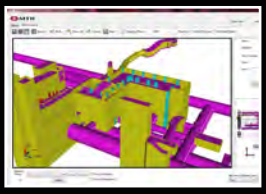
Engineers save about 10% of their time, partly as it is far easier to check one 3D model rather than hundreds of 2D drawings, and locating structural defects is more straightforward. Inspectors too save about 10% of their time, as they can more quickly find where to input defect records, and easily locate structural defects.

For more than BIM professionals

Though other teams that conduct various station inspections are not yet utilising BIM, Ms Leung and Mr Luk consider that the new Inspection Registry System may provide insights for them, perhaps encouraging similar system revamps. Plus, BIM models are progressively used in construction and renovation projects of stations – and eventually, the structural defects system will be able to share the same BIM models with other teams achieving synergy within the Corporation.

"I think BIM will become more popular in the long term," says Mr Luk. "Now, it is mainly used by BIM professionals. In future, inspectors, engineers and managers will gain more and more access to BIM models – which will enhance our expertise in managing the Corporation's railway assets."

** All images in this article provided by MTR Corporation Ltd.*



ABOUT MTR CORPORATION LIMITED

Carrying an average of 3.9 million passengers every weekday, the MTR is regarded as one of the world's leading railways for safety, reliability, customer service and cost efficiency.

The MTR Corporation was established in 1975 as the Mass Transit Railway Corporation with a mission to construct and operate, under prudent commercial principles, an urban metro system to help meet Hong Kong's public transport requirements. The Company was re-established as the MTR Corporation Limited in 2000 after the Hong Kong SAR Government sold 23% of its issued share capital to private investors in an Initial Public Offering. MTR Corporation shares were listed on the Stock Exchange of Hong Kong on 5 October 2000. It marked another major milestone on 2 December 2007 when the operations of the other Government-owned rail operator, the Kowloon-Canton Railway Corporation, were merged with the MTR Corporation, heralding a new era in the Hong Kong railway development.

The merged rail network comprises nine railway lines serving Hong Kong Island, Kowloon and the New Territories. In addition, a Light Rail network serves the local communities of Tuen Mun and Yuen Long in the New Territories while a fleet of buses provide convenient feeder services.

The Corporation also operates the Airport Express, a dedicated high-speed link providing the fastest connections to Hong Kong International Airport and the city's newest exhibition and conference centre, AsiaWorld-Expo.

Shui On Construction Company Limited

Project:
The Innovation Tower, The School of Design Development for The Hong Kong Polytechnic University

Location:
The Hong Kong Polytechnic University, Hung Hom, Kowloon

Type:
Academic Building

Scheduled Time of Completion:
2012

BIM Vital for Freeform Building

In a corner of the Hong Kong Polytechnic University campus, Kowloon, work is underway on creating Hong Kong's first major freeform building, the aptly named Innovation Tower, which will house the School of Design.

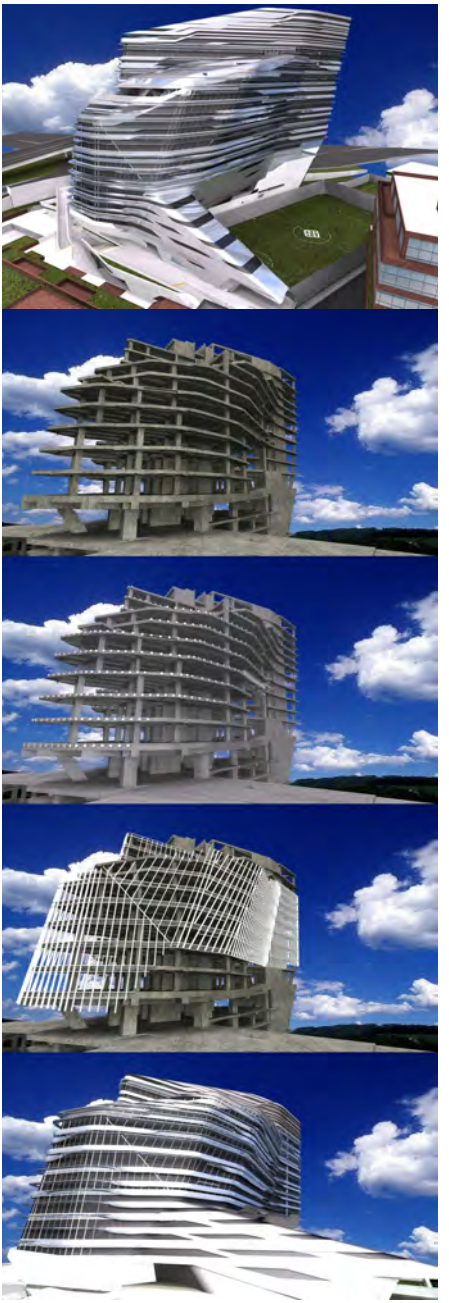
There is little to see but a construction site at present, yet 3D computer models show a futuristic 16-storey tower, with a base like the bow of a ship, on which sits a structure more like a sculpture than a regular building, with a glass façade that wraps around, its surface restlessly curving in here, curving out there.

"The information in the architect's model was insufficient for the construction works," says Chan Tsang Shing, Senior Engineer of the contractor, Shui On Construction (SOC). "The main problem was that we could not easily identify the setting out points, including relationships between the façade and superstructure, based on traditional 2D drawings. We decided to use BIM, which could help us with setting out and coordination work, so we asked isBIM to put all the building systems in a single model." With this model, correlations between various disciplines would be far clearer than with 2D drawings and sections, and Shui On could construct Innovation Tower as envisaged by the architect.

"The façade is unique, and very hard to visualise using 2D CAD," says Anthony Lam, Project Manager, isBIM. The isBIM team developed the BIM model in Revit, using another 3D model, plus layout plans and sections, from the architect and consultants.

Coordination in construction details

The initial BIM model combined architecture and structure – and revealed a great many clashes. The majority arose because of the complexity of the façade and the curving floor edges: in places, there was too much space between floor structure and façade, and in others the plans would result in the floor protruding through the façade. The project team resolved these clashes, chiefly through revising the structural plans – and so eliminated a host of potential issues that would have been very hard to discover with 2D plans, so would otherwise have arisen during



building construction. These changes in turn led to revisions to the architect's 3D model.

The clash analyses cannot be done without BIM. Mr Lam shows a sample view from the early BIM model: it's a cross section of just one, typical floor, with nine red ovals around nine sites where there were clashes between floor and façade.

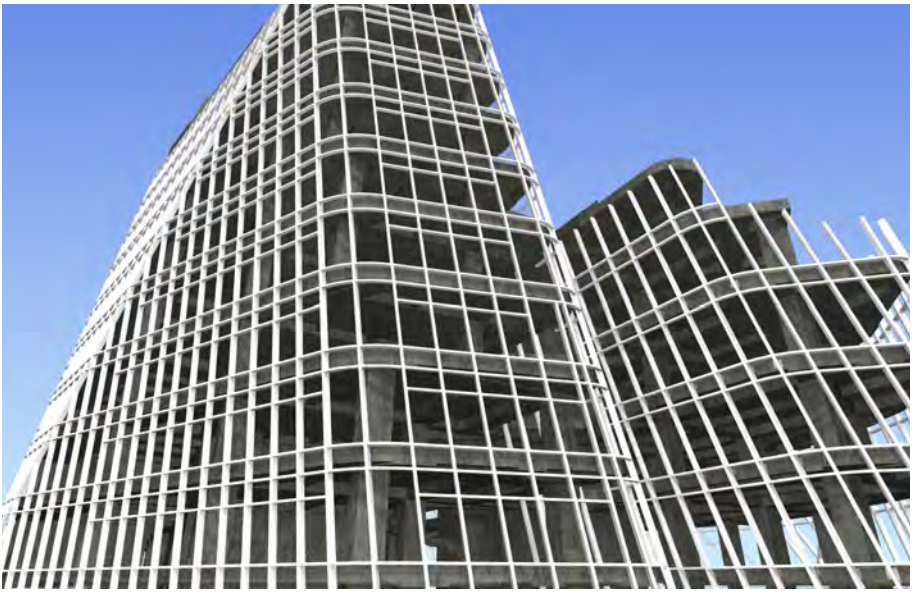
Making complex designs practical

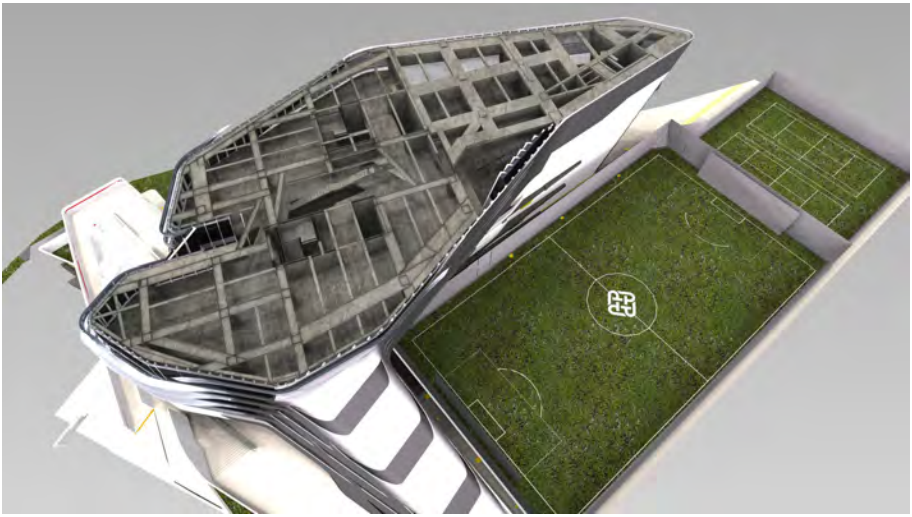
The mullions and transoms – vertical and horizontal structural members – would also be very hard to check using 2D plans. This is particularly the case for the mullions, which tend to be set at angles, and are not arrayed throughout the building in a neatly ordered pattern. In some cases, the BIM model showed where a planned mullion was not quite as long as was actually required.

The BIM model is also proving a great help in planning construction of the base of the tower, which will have a fair face concrete wall extending from the ground floor to the third floor. The wall will lean outward, and will be curved – viewing the BIM model from one end of the building, it looks like the bow of a ship. The Shui On team will rely on BIM to help ensure they have data for exact setting out and the arrangement of plywood.

More effective meetings

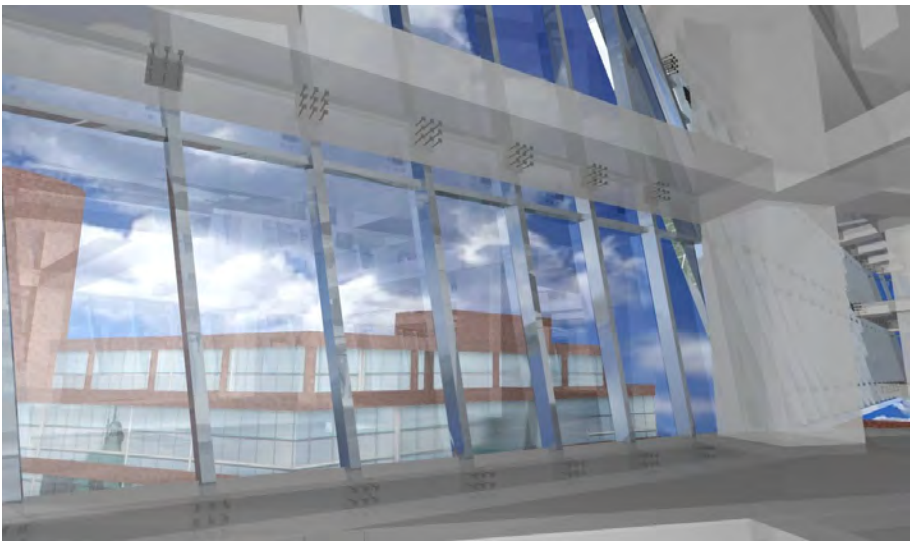
Project team members are making great use of the BIM model in coordination meetings. The computer output is projected on a screen, and team members request that the model of the building exterior is rotated to show a view from a certain angle, or zoomed in – even to the extent of showing views inside the building. Elements such as concrete, glass





and mullions are clearly distinguishable, each with its own colour. This makes meetings more effective and efficient than if massive 2D drawings were being used.

Later, Mr Lam and his colleagues in isBIM will add architectural fixtures and selected building services, to make the model more comprehensive. This will further help with



detecting clashes before construction work, reducing costs and time for corrections.

As well as significantly helping to shorten the time spent on design coordination and drawings vetting – and resolving potential problems at an early stage – the BIM model was used for calculating the volumes of concrete for each floor.

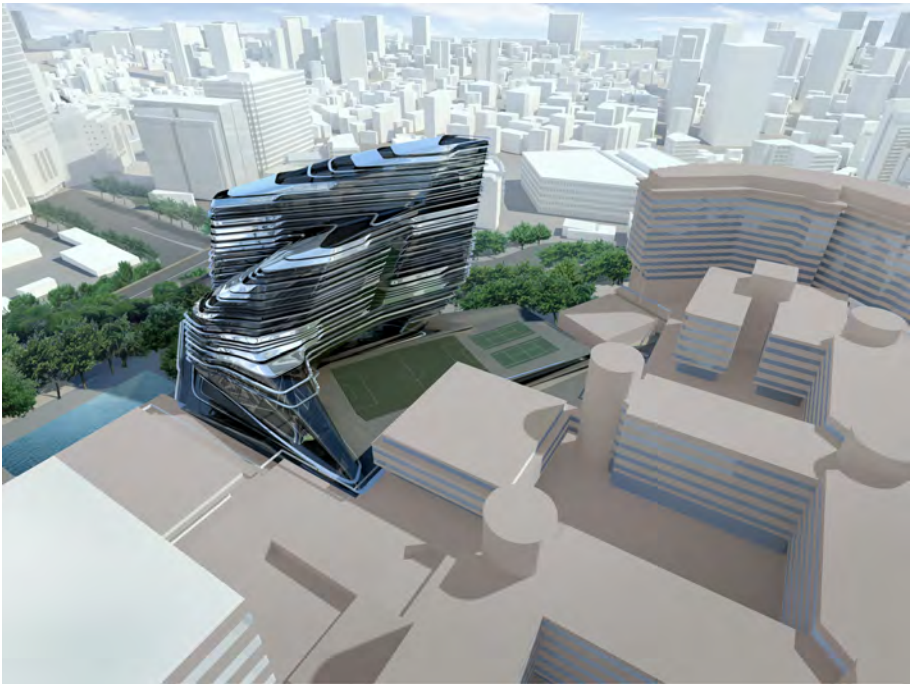
This helps with planning on floor construction cycles, based on the concrete volumes for each zone. "When the design of the MEP systems and interior layouts are in place, we will include them in the BIM model, so that the whole building will be coordinated before it is built,' said Mr Chan.

Helping shape future buildings

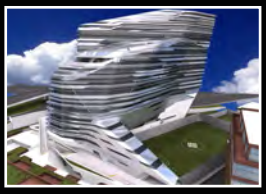
Mr Chan says Shui On is now training staff to use BIM, and they find that Revit helps them easily visualise construction projects in 3D. "Most colleagues find it very useful, and know there's a trend to use BIM," he adds.

"It seems that every day there's a new technique for using BIM – and sometimes when you use it in real life, it's quite amazing," says Mr Lam. "You can see that architects' designs are more and more complex compared to 30 years ago. I think buildings in future will look different because of BIM."

** All images in this article provided by Shui On Construction Co. Ltd.*



瑞 安 建 築 有 限 公 司
SHUI ON CONSTRUCTION COMPANY LIMITED



ABOUT SHUI ON CONSTRUCTION COMPANY LIMITED

Shui On has extensive experience in the construction of commercial and institutional projects for the Government, major institutions and private developers, with many well known developments to its credit. These range from major luxury hotels, office buildings and shopping centres to sports and arts facilities, hospitals, schools, universities and recreational parks.

With its wide range of experience and professional project management capabilities, Shui On has also been highly successful in carrying out design-and-build contracts. Major completed projects include Customs Headquarters Building, ICAC Headquarters Building, North Point Government Offices, Shui On Centre, Manulife Tower and "Private Sector Participation Scheme" of the Government of the HKSAR at Bauhinia Garden, Richland Gardens, Hong Sing Garden and Tai Po Plaza in Hong Kong.

Over the years Shui On has won many prestigious awards in recognition of its outstanding achievements in construction quality and project progress. As a key player in Hong Kong's construction industry, Shui On always gives priority to and also prides itself on winning awards for its performance in safety, occupational health and environment campaigns every year.

Advisors' Comments

Introduction

This year, we are extremely honored to receive the invaluable support from the local supporting organizations and overseas BIM advisors. An advisory panel was formed by the representatives of local supporting organizations to discuss and review the selected projects, and their comments together with the advice from overseas BIM experts were consolidated and recorded.

Supporting Organizations

- Chartered Institute of Architectural Technologists, Hong Kong Centre (CIAT)
- Hong Kong Information Technology Joint Council (HKITJC)
- The American Institute of Architects, Hong Kong Chapter (AIAHK)
- The Chartered Institute of Building, Hong Kong (CIOB)
- The Chartered Institution of Civil Engineering Surveyors (ICES)
- The Hong Kong Institute of Architects (HKIA)
- The Hong Kong Institute of Building Information Modelling (HKIBIM)
- The Hong Kong Institute of Facility Management (HKIFM)
- Autodesk Industry Advisory Board (AIAB)

Advisory Panel -Representatives of Supporting Organizations

Mr. Hermann Fong
Chairman,
Chartered Institute of Architectural Technologists, Hong Kong Centre

Ms. So Ching
Chair, Board of Practices,
The Hong Kong Institute of Architects

Mr. William Poon
Member
Hong Kong Information Technology Joint Council

Ir. Francis Leung
Chairman,
The Hong Kong Institute of Building Information Modelling

Mr. Bernard Chang
Vice President,
The American Institute of Architects, Hong Kong Chapter

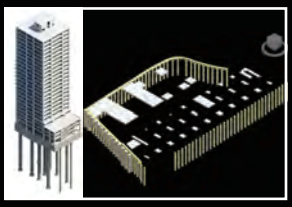
Dr Eric K S CHAN
President,
The Hong Kong Institute of Facility Management

Mr. HF Wong
Vice President,
The Chartered Institute of Building, Hong Kong

Mr. David Yau
Chairman,
Autodesk Industry Advisory Board

Mr. Honby Chan
Chairman,
The Chartered Institution of Civil Engineering Surveyors, Hong Kong Region

Advisors' Comments from Supporting Organizations



AECOM

The construction workflow is intelligently and logically ordered and demonstrated in the project. Appreciate that engineers take the initiative to use BIM technology. The building information model is used to provide design integration with the structural model (ETABS) so that the resultant building should be optimized and reduced superficial design bulk. The Revit model further assisted the designers in the site pre-construction planning and would help to enhance the program, save time and provide better safety / risk analysis. The structural consultant successfully integrates the architectural plan into BIM format for engineering design which can speed up the structural design coordination.

HENDERSON LAND DEVELOPMENT CO. LTD.

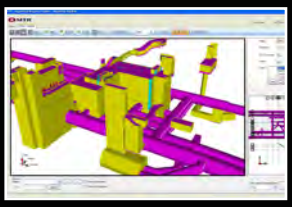
The project team has done a good job in combining the information in the construction programme with BIM. This has advanced the usage of information and facilitated the construction sequence decision which improves in the pre-fabrication practice. Also, the enhanced RFI process helps to clarify the construction details and reduce abortive work. More efficient usage of building material in turn helps in protecting environment.

HOK

The BIM application to an airport project is informative and innovative to provide an overall view of the construction site. The basic approach of developing the validated 3D model which the design team used to create and prove design alternatives in a short time allowed them to support the client effectively. The project had demonstrated the usage of BIM design approach which enhanced the communications between all parties. The design application in BIM can speed up the client's design approval process and facilitate the integration of designs originating from different disciplines.

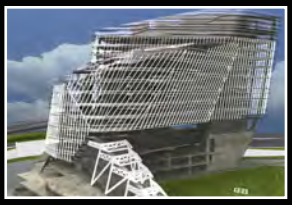
HONG KONG HOUSING AUTHORITY

BIM provides added value to the project progress and expedites the overall construction works; achieve sustainable construction and site safety; showcase how BIM can be used in pre-construction to investigate the optimum and safe methods for demolition. Followed by the foundations and excavations and lateral support; such that not only is the construction program assured but also safety of workers is considered. The subsequent 4D simulations allowed the contractors to use it as a training tool for workers and enable them to get up to speed quicker. Positive application of BIM for site planning and management, method of demolition and construction, sequencing of works, site safety and facilities management for easy understanding by all levels of project team members.



MTR CORPORATION LTD.

This system demonstrates how BIM can be a very useful tool in data management and system development. It adds value and creates opportunity for the project to resolve complicated processes. This project further demonstrates the value of BIM, especially in the operational stage that would be of benefit to the applicators. This project shows that having converted the 2D information into BIM will assist in providing MTRC with a tool which will enhance their maintenance identification and rectification. The application of BIM in inspection registration is a new move which can speed up the easy understanding of maintenance team for reparation. It would be beneficial to the company with more creative ideas such as using mobile device in the working field or interpolate BIM model with actual environment.

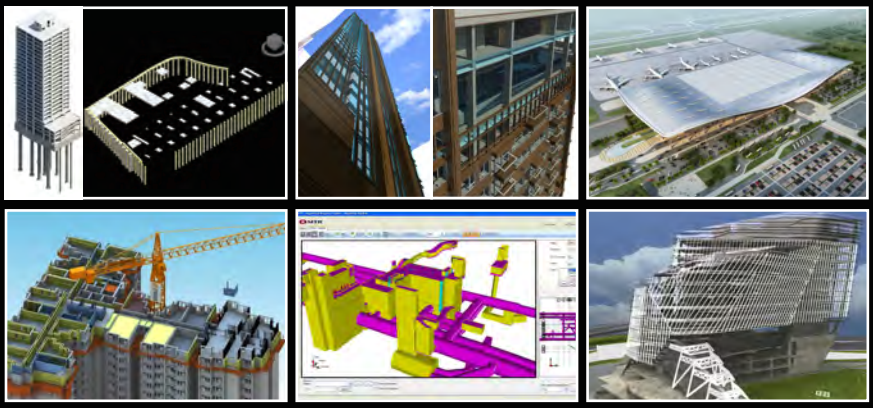


SHUI ON CONSTRUCTION CO. LTD.

Exemplary use of BIM for complicated irregular building.

Advisors' Comments

Dr. Calvin Kam



Diversity and Maturity

The 2011 Hong Kong BIM Award is a testament of the leadership by the Hong Kong building industry in the regional and global BIM movement. The 2011 winners include public and private owners, architects, engineers, contractors and BIM consultants. Benefits and values of BIM were showcased throughout the facility lifecycles—from design through operation. Past winners are honored with newer explorations, finer collaboration, further adoption, and more mature technology applications.

Quantifiable Savings

AECOM articulated clear organizational, process and technology solutions to integrate BIM into structural concrete design, analysis and construction. The evidences on quantifiable savings of BIM are one of the best among the 2011 HK BIM Award winners.

Life-Cycle Benefits

From conceptual visualization, design coordination to a web-portal based facility information repository, Henderson Land Development along with BIM consultants Forida and Tecton have demonstrated how BIM supports a private developer to make informed decisions throughout the full life cycle of its hotel and residential projects.

Safety First

Safety in construction is a prerequisite and should never be an afterthought. Leveraging BIM to optimize safety protocol, to promote training, to reinforce safety messages are best

demonstrated by the use cases led by the Hong Kong Housing Authority, its partners Hip Hing Engineering, China State Construction Engineering, and Summit Technology.

Terminal to Baggage Belt

From automating organic 3D form into building information model to extracting information from the baggage handling system, HOK and Arup have aligned BIM with strategic model use cases for the Bengaluru airport project in India.

Operation BIM

MTR and Forida's development of an Inspection Registry System is unique in that it is an enterprise-driven BIM effort to integrate BIM in inspection, registry, and operation protocol. Inspection and assessment information can be integrated through BIM for more visual, more integrated and more scalable management during the facility operation phase.

Form & Reality

Shui On Construction and isBIM are instrumental in translating a free-form and unconventional design intent into a numerically-controlled and constructible system. Achieving constructability in a way that could not be done without BIM has been one of the core propellers of innovation in the global BIM movement, the Innovation Tower at the Hong Kong Polytechnic University is one of them.

Outlook

Congratulations to Hong Kong for showcasing a number of award-winning cases of success. Having served 15 years in the global BIM movement with my research, industry and professional capacity, I would encourage the HK leaders to build upon these valuable experiences in order to:

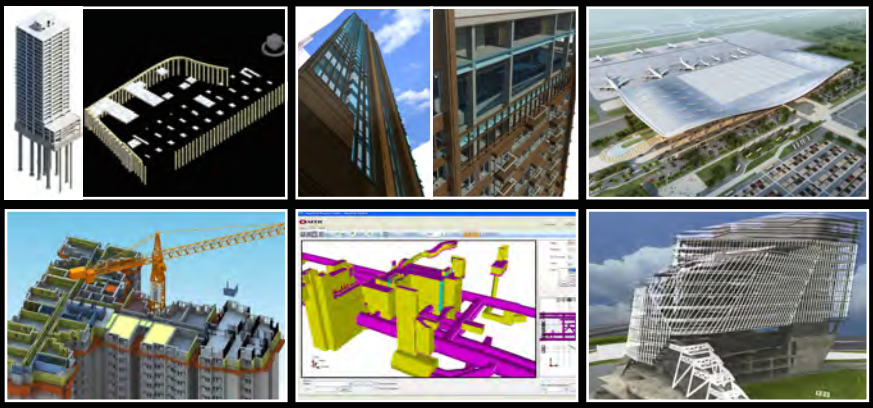
- Document BIM objectives and quantify performances throughout the facility lifecycle
- Broaden the adoption of BIM across different project stakeholders and project phases
- Introduce BIM-based evidences to proactively inform real estate, design, construction and operation decisions
- Contribute to international and regional developments to integrate BIM into legislation, standards, and contracts
- Participate in international BIM conferences and awards competition

Dr. Calvin Kam *PhD, AIA, PE, LEED AP*

Dr. Calvin Kam is the Director of Industry Programs and a Consulting Assistant Professor at Stanford University's Centre for Integrated Facility Engineering (CIFE), where he works with CIFE global members on strategic and innovative programs in areas such as BIM, Virtual Design and Construction and sustainable developments. He is the 2010 & 2011 Chairman of the AIA Technology in Architectural Practice National Knowledge Community in the U.S. Dr. Kam is the 2011 National Chair of AIA Center for Integrated Practice. He is the founder and currently a Senior Program Expert with GSA's National 3D-4D-BIM Program. Under Calvin's management, GSA has required BIM submission in its multi-billion capital program; published the GSA BIM Guide Series; successfully influenced multiple BIM software vendors to incorporate open standard according to GSA business rules; formalized international agreements with public owners in Finland, Norway, Netherlands and Denmark; while earning a number of national and international awards from AIA, BuildingSMART, CoreNet Global, FIATECH, IAI, NIBS, and the U.S. government.

Advisors' Comments

Mr. Phillip G. Bernstein



AECOM

The Hoi Bun Road Project is an exemplary use of a sophisticated BIM workflow combined with structural and analytical tools to solve the design and construction sequence of a complex project in a challenging site. The drawing-based deliverables took advantage of the full capabilities of BIM's ability to coordinate a tightly constrained siting and structural problem. The resulting solution is both elegant and buildable.

HENDERSON LAND DEVELOPMENT CO. LTD.

For the Hotel at 388 Jaffe Road, the team's use of BIM technology to wedge this elegant tower into a tiny site with minimum floor-to-floor heights while achieving the design objectives necessary for a premium hotel is superb. Anticipating future of BIM information delivered to mobile devices for the building's operation is an early leadership example of BIM for facilities management and will set an example for Hong Kong.

The Gloucester is an excellent example of the possibilities made real in difficult technical objectives for this residential development project. The integration of a sophisticated building enclosure on the front and rear elevations, combined with the technical and aesthetic achievement of the skypool, prove that this team fully understands and can implement the real potential of a BIM-enabled project.

HOK

BIAL Air Terminal is an excellent example of the integration of Revit Architecture and Structure by a cross-disciplinary team of designers to accomplish the integration of an elegant structural solution and the complexities of airport infrastructure systems.

HONG KONG HOUSING AUTHORITY

HKHA fully exploits the potential of BIM to define and clarify complex construction sequencing and 4D analysis. These three projects share very high demands for builders to plan, in three dimensions, their construction approach in order to maintain good site discipline and order, schedule and safety. The use of BIM to evaluate options and control the sequence of construction is very advanced and an excellent example of construction-enabled BIM for the Hong Kong construction industry.

MTR CORPORATION LTD.

This is the first example that I have seen where infrastructure management systems based in 2D CAD have been entirely replaced by BIM-based information systems. This project is a wonderful example of the possibilities of future use of technology to advance the efficiencies and insights needed to take care of national assets like those run by the MTR. The innovative approach, in both the use of technology and the re-invention of work processes, suggests that MTR is one of the world's most advanced owners and keepers of public assets.

SHUI ON CONSTRUCTION CO. LTD.

The Innovation Tower project demonstrates that BIM is a necessary component to complete architecture with the highest technical and aesthetic aspirations. This elegant and complex building, with numerous challenges in layout, coordination and systems integration, relied on BIM for its realization and is an excellent example of how BIM makes design real.

Mr. Phillip G. Bernstein *FAIA, RIBA, LEED AP*

Vice President, Industry Strategy and Relations, AEC Solutions, Autodesk, Inc.
Lecturer, School of Architecture, Yale University

Phil Bernstein is the Vice President of AEC Industry Strategy and Relations for Autodesk, Inc. With a Masters degree in architecture from Yale University, he is also an adjunct professor at the Yale School of Architecture. He was formerly an associate principal at Pelli Clarke Pelli Architect. He is a Fellow of the AIA (The American Institute of Architects) and a LEED (Leadership in Energy and Environmental Design) Accredited Professional.

About AIAB

AIAB (Autodesk Industry Advisory Board) is formed by a group of experts who are willing to share their valuable experience in BIM (Building Information Modelling) to the public. We currently have members from Hong Kong and Macau regions.

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 bi-directional 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 CAD/CAE/BIM technology development
- Promote the development, usage and awareness of CAD/CAM/BIM design technology in HK, China and Macau
- Provide cross-border technology exchange/visit
- Provide latest technology update (e.g. Building Information Management)

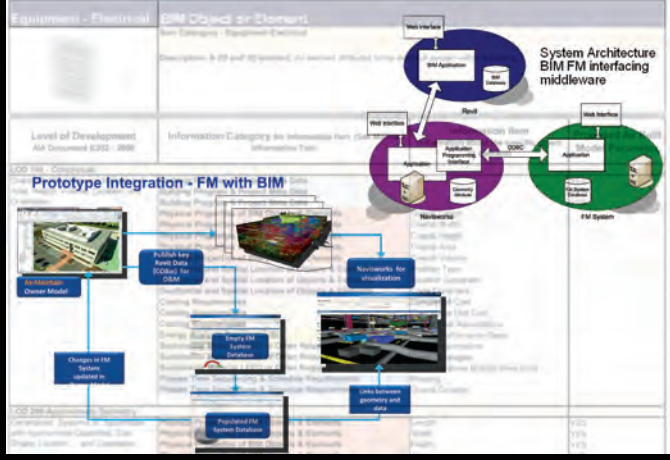
Want to know more about AIAB?

Contact us now!

Eric Tang, AIAB Supervisor

Email: eric_tang@cn.synnex-grp.com

AIAB web site: http://www.aiab.org



BIM – Facilities Management, now and beyond...

Most nowadays building projects require the handover of documents containing essential information to support the operations, maintenance, and the management of the facilities assets by the owner and/or facilities manager. Such today's standard practice complicates the work required to capture and record project handover data. Knowing the BIM model contains all object elements with operation team required information; can we extract from BIM and interface directly with Facilities Management (FM) system the required information?

The utilization of BIM database requires the involvement of AEC and IT industries. Over the last few months with the devoted support from FM and BIM software specialists, I am glad to share with you that the seamless interfacing prototype (the Proof-Of-Concept middleware) was successfully completed for one of my handled Projects. It sets a major milestone in aiding FM operations with BIM database.

To achieve data exchange across different system platforms, we require a common standard / protocol and make use of Application Programming Interface. It is a basic technique in the world of software programming. Depending on the type of application, we may adopt COBie or ODBC for data exchange.

The basic elements in building lifecycle comprise Plan/Improve, Design, Build and Operate. While CAD provides drawing production aid in building design, BIM can be extended its reach in Facilities Management (FM) to complete the entire building life cycle. The intrusion of IT applications in AEC industry has making innovation and technological advancement in building development. It creates opportunities across different vertical industries to keep amazing happening.

Dr. Stewart Wan

EngD, CEng, MIET, MHKIE, RPE, MCIBSE, SrMIEEE, CAP, BEAMPro, MHKIBIM

Dr Stewart Wan is an Executive Project Manager of Hong Kong Science and Technology Parks Corporation. He is responsible for capital building projects and IT projects for the Hong Kong Science Park development since 2001, which include the project and design management of sustainability, building services, information technology and telecommunications infrastructure and intelligent systems.

Apart from promoting intelligent buildings and intensifying the application of information and communications technologies in construction / engineering industries, he also drives the concept of green building and the application of Building Information Modelling (BIM) for the building life cycle. Stewart holds the memberships in various international and local professional institutions. He is a board member of Hong Kong Institute of Building Information Modelling (HKIBIM) (2011-2013).

IVE Graduates are ready!

To cope with changes in the construction industry, the Hong Kong Institute of Vocational Education (IVE) has been offering the Building Information Modelling (BIM) learning in the curriculum of the construction already. The related programmes are (a) Higher Diploma in Architectural Design & Technology and (b) Higher Diploma in Building Technology & Interior Design at the current stage.

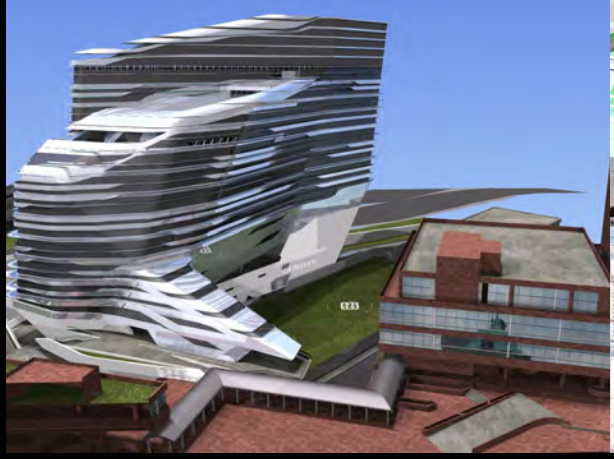
As the local leading vocational education provider in Hong Kong, IVE is strongly facilitating our students to learn efficiently with updated knowledge, helping them to understand the skills and practice that required in the construction industry. Three IVE Campus including Morrison Hill, Tsing Yi and Tuen Mun Campuses have dedicated computer studios in BIM technology teaching. In 2010, the BIM Training Centre at Morrison Hill Campus was set up and equipped with the latest BIM software and pared with high-end workstations. Combined with the "Student-Centered Learning" strategy, our students can learn more updated and practical knowledge in the required workplace environment.

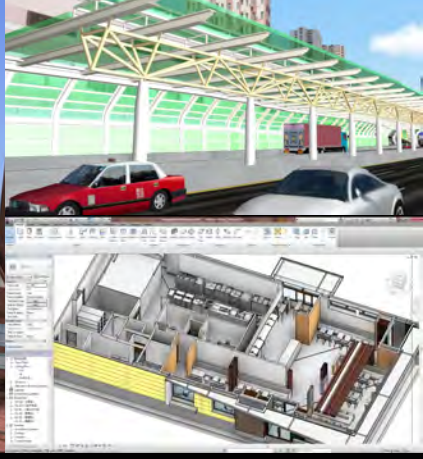
Concerning the graduate employment, we offer over 100 IVE graduates who are well equipped with BIM knowledge. Majority of them are employed by the major consultants and construction companies working on various public housing and private projects. Last year, we jointly organized a "Better By Design" Building Information Modelling (BIM) Competition with Autodesk Far East Ltd. and Nutech Ltd. Students used Revit as the tool to implement BIM in the project works with environmental and sustainable considerations. The competition successfully demonstrated students' outstanding works to the industry.

Ms. Christy Wong

MPhil. MHKIBIM, Lecturer, Department of Construction, IVE

Christy, as a member of the IVE professional teaching team, has effectively developed her career and professional training on construction education, particularly in BIM, CAD and computer 3D modelling, computer visualization, and project management. In 2009, she was successfully elected to be the Committee of Autodesk Industry Advisory Board (AIAB), aiming to enhance the communication platform, experience sharing on architectural design and construction planning between students and different segments in the industry. She performed the guest speaker and presented "BIM Education in VTC" in the event of "Present & Future of BIM Implementation for DCD" organised by HKHA in 2010. Through the cohesive working relationship with the industry, she has organized different BIM events with industrial experts for IVE students.





BIM – When You Need It

Randy Pausch once mentioned that engineering is not about providing the perfect solution but is to provide the solution with limited resources. So what can we do while we want to utilize resources fully? The answer is the increase productivity.

In general, productivity throughout different sectors of the AEC industry can be improved by either reducing costs or improving efficiency of output via using BIM. BIM could help visualize the model of the building in a 3D perspective, hence reducing possible errors of reading a 2D drawing. By comprehensively considering all relevant information from AEC and fitting into a BIM model, suitable analysis or improvements could be made and hence higher efficiency could be reached.

From simulation technology of BIM, clash analysis and reports could be provided after utilizing data and information. This could reduce potential errors and wastage, and hence improve the time and cost for some steps in AEC.

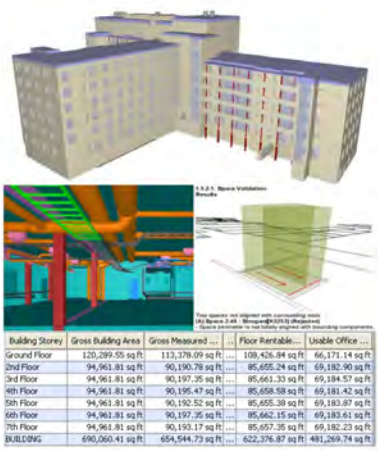
BIM information could be further used in your operation, such as facilities planning and management. All relevant information could be extracted from your computer within a short time instead of finding through piles of paper. Needless to say, this improves efficiency. Overall, BIM would be your solution to improve productivity.

To implement BIM, a comprehensive execution plan which offer step by step clear guideline of how to implement your creative ideas is a MUST. If not, your investment in BIM may be hindered.

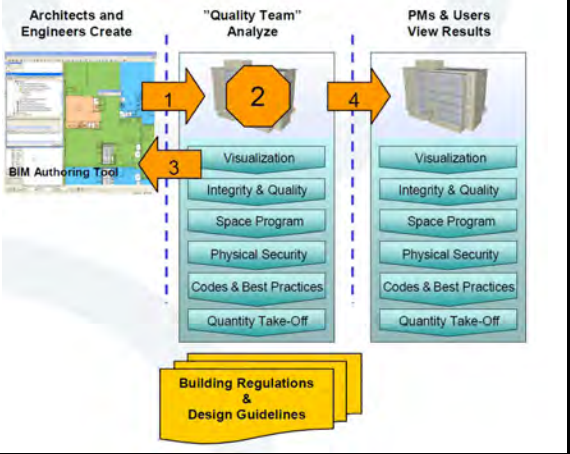
Mr. Elvis Li

CEO, isBIM limited, MHKIBIM,PFM

Elvis is an experienced project director in BIM projects and the CEO of isBIM limited, a leading Building Information Modelling (BIM) consultant in Hong Kong and China. He is willing to share his BIM inspirations of how BIM can be applied in the AEC industry at numerous talks and seminars such as cost saving for property developers and detecting clash for engineering purposes. With his more than 8 years BIM project experience, Elvis was dedicated in numerous BIM consulting efforts by doing over 100 BIM projects, having the goal to create value-addedness for those who are involved in stages of the AEC sector. Elvis is the founding member of the Hong Kong Institute of Building Information Modelling, the member of BIM Expert Committee of China Commercial Real Estate Association and the council member of China Engineering Graphic Society.



Building Storey	Gross Building Area	Gross Measured ...	...	Floor Rentable...	Usable Office ...
Ground Floor	120,299.55 sq ft	113,378.09 sq ft	...	108,426.84 sq ft	66,171.14 sq ft
2nd Floor	94,961.81 sq ft	90,190.78 sq ft	...	85,655.24 sq ft	69,182.90 sq ft
3rd Floor	94,961.81 sq ft	90,197.35 sq ft	...	85,661.33 sq ft	69,184.57 sq ft
4th Floor	94,961.81 sq ft	90,195.47 sq ft	...	85,658.58 sq ft	69,181.42 sq ft
5th Floor	94,961.81 sq ft	90,192.52 sq ft	...	85,655.38 sq ft	69,183.87 sq ft
6th Floor	94,961.81 sq ft	90,197.35 sq ft	...	85,662.15 sq ft	69,183.61 sq ft
7th Floor	94,961.81 sq ft	90,193.17 sq ft	...	85,657.35 sq ft	69,182.23 sq ft
BUILDING	690,060.41 sq ft	654,544.73 sq ft	...	622,376.87 sq ft	481,269.74 sq ft



Quality Assurance in BIM

Quality assurance is a very important step in building BIM, without a proper process the benefits of BIM will not fully materialize.

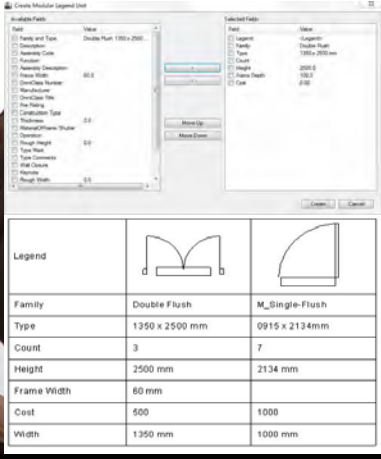
In a typical project there is lots of 2D information transforming into the 3D model, the quality of design varies and increases the difficulty in modeling process. It is a tedious job in walking through each room of a building and trying to find design problem, which could be a clash, building code noncompliance, or environmental concern.

One of our company goals is to evaluate and develop a solid quality assurance process which saves time, independent of human judgment, high accuracy and reliable. The system is going to X-rays the building model and reveals potential flaws and weaknesses in the design, highlights the clashing components and checks that the model complies with the building codes and organization's own best practices. Furthermore, it helps to extract information from BIM files to downstream applications such as energy analysis, quantity and cost estimation.

The technology combines professional knowledge and turned into a great quality assurance tool, which improves BIM quality significantly.

Mr. Kenneth Lau

Mr. Kenneth Lau is the General Manager of Forida Limited, BIM Consultant and AFM Limited, FM Consultant. With over 15 years' CAD, FM and project management experience including key roles in managing BIM projects in public housing and private development, Mr. Lau is involved in multi-disciplinary BIM projects.



Legend		
Family	Double Flush	M_Single-Flush
Type	1350 x 2500 mm	0915 x 2134mm
Count	3	7
Height	2500 mm	2134 mm
Frame Width	60 mm	
Cost	500	1000
Width	1350 mm	1000 mm

Customization of BIM to Suit for Your Work Flow

BIM has become an essential tool for architects, project managers and engineers to visualize design, check clash detection, and generate section views.

Professionals in the construction industry usually expect that a BIM software can be directly used to perfectly suit their work flow. For example, users want to generate a design schedule in their required format directly from a BIM system; users need to export section data from one software system to an analysis software. In fact, most of prevailing BIM software systems such as Revit, Civil 3D provided API for advanced users to achieve these expectations. Through developing some simple scripts, information can be extracted from BIM and organized into any requested formats.

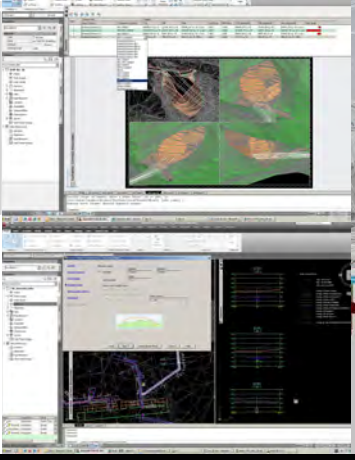
Akin to the way many MS Office Users develop VBA add-ons to customize EXCEL, to customize BIM is not very difficult but the customization can yield impressive results. From the API documents, one can better understand the information structure of BIM. By modifying the sample code provided in the software, you can easily export data such as a design schedule. Of course, you can employ a Programmer or a BIM consultant to do this.

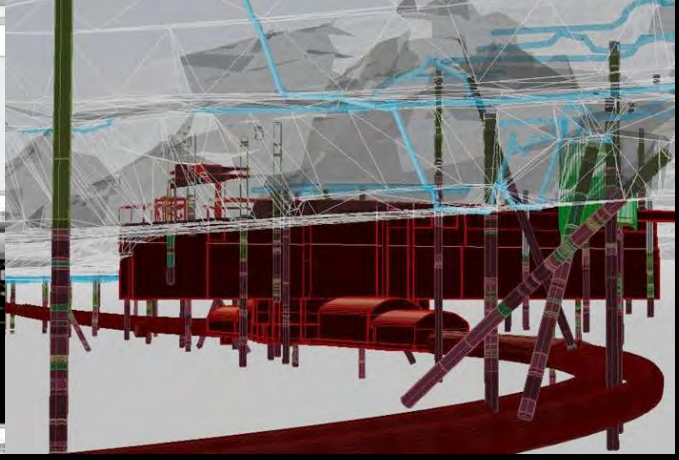
BIM is just a tool. We should sharpen this tool to better facilitate our work.

Dr. Huang Ting, Tim

PhD (PolyU), Msc (Tsingshua), MHKIBM

Dr. Tim HUANG has over 7 years experience in implementing BIM and Virtual Construction. Now he is the Director of the Construction Virtual Prototyping Center, in the Hong Kong Polytechnic University. He plays the role as a facilitator to apply the BIM in real design process and construction process. He has the passion to develop BIM to fully use in the whole building life cycle.





AutoCAD Civil 3D – Cost and Time Saving

Recently we applied Civil 3D for two of our geotechnical projects in Hong Kong and would like to share some of our experiences.

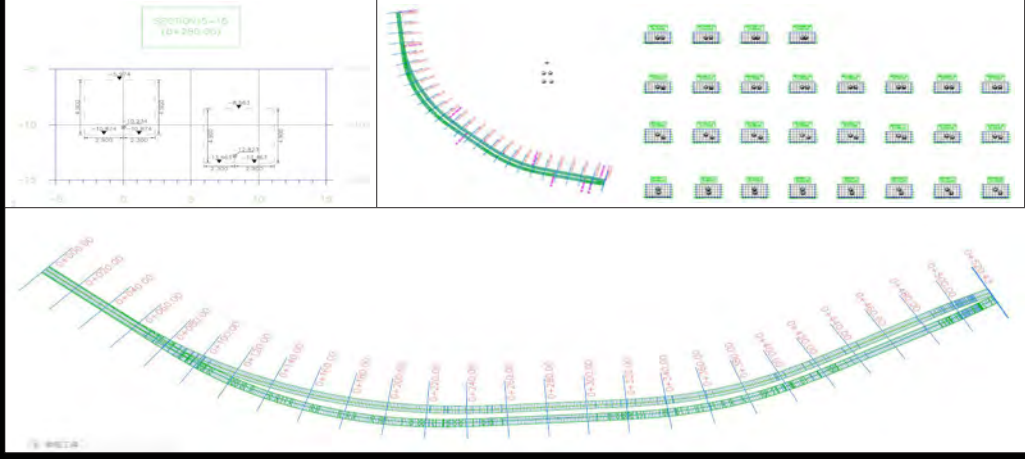
In a site formation project (total area 23 hectares) in rural area of Fanling in Northern New Territories, which has natural terrain and slopes, some of the slopes have to be cut, to provide the platforms. A novel approach was adopted usage using Civil 3D cut slope function to design the slopes. Also I applied "real-time navigation" was append to aid the vertical and horizontal profiles design of the road alignment. These applications have helped the engineers to design the roads easily.

In a railway tunnel project on the Hong Kong Island, where many cross sections with geological data shall be cut across natural terrain and man made slopes for the tunnel design, the cut section function in Civil 3D creating geological cross-sections across the site easily.

The Project Director noted that "Applying Civil 3D in our projects has saved engineers' calculation time and project cost".

Mr. YK Li

YK Li is the principal draughtsman in Mott MacDonald Hong Kong. He has over 15 years experience in drafting engineering drawings. He worked on various high profile projects such as Kowloon Southern Link KDB200, Tsuen Wan Drainage Tunnels and Lok Ma Chau Terminus.



AutoCAD Civil 3D 2012 has done a great job!

Using Civil 3D has totally improved the efficiency of our civil engineering works at URS/Scott Wilson. The great functionality of this program allows my team to create cross sections accurately at any point along a road or tunnel design. Now with Version 2012, I am glad that the program can handle multiple section views at ONE section cut and has the ability to create sections off skewed or angled sample lines. This useful and very powerful feature results in better and more efficient solutions for our road and tunnel designs.

For the URS/Scott Wilson tunnel project illustrated above, Version 2012 allowed us to handle multiple cross sections easily. In addition, the ability to create sections off skewed and angled sample lines offers excellent opportunities for modelling. These two new features are a great help to us in resolving design challenges. Civil 3D 2012 is much more user-friendly and is more closely aligned to real-life design elements and our workflow. This is the reason why URS/Scott Wilson is adding Civil 3D 2012 to its toolkit.

Ms. Can Leung

Can is the BIM Manager of URS/Scott Wilson, a leading design, engineering and technical services company in Hong Kong and China and with 47,000 staff worldwide in 40 countries. Can has over 23 years of hands-on experience in information systems development, computer network services, security management and BIM services. Since 2003, she has led the company's 2D and 3D services including the use of BIM to provide high quality design visualization, virtual reality modelling, virtual construction sequencing and traffic simulations for buildings, highways, bridges and underground works projects in Hong Kong, China and the UK. Recent BIM projects include the Hong Kong Pavilion at the Shanghai World Expo, Asian Games facilities in Guangzhou and complex urban infrastructure works in Hong Kong. Her BIM team won the 2010 Autodesk Hong Kong BIM Award for the Reconstruction & Improvement of Kai Tak Nullah – a major urban drainage project in Hong Kong.

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Course For : Autodesk® Revit® Architecture

Level : Basic

Day 1 Conceptual Design in Revit

- Building Information Modeling
- Working with Building® Elements
- Using Building Maker for Conceptual Design
- Working with Levels
- Working with Family

Day 2 BIM in Architectural Components

- Working with Column Grids
- Getting and Working with Walls
- Working with Doors and Windows
- Working with Dimensions and Constraints
- Creating Curtain Walls
- Creating and Modifying Floors, Ceilings and Roofs
- Working with Stairs and Railings
- Loading and Modifying Component Families

Day 3 Documentation and Data Management

- Working with Materials and Schedules
- Creating Details and Views
- Working with Section Views
- Working with Drawing Sheets
- Working with Title Blocks
- Controlling Object Visibility
- Importing Content
- Exporting Content
- Working with Project Templates

	Day Time Training	Night Time Training
Duration:	3 Days	6 Evenings
Time:	09:30 – 12:30 & 14:00 – 17:00	19:00 – 22:00
Date:	Every Tuesday or Thursday	Every Thursday Evening
Fee:	HK$3000 per participant	
Venue:	**Forida Limited - Autodesk Authorized Training Centre**	

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- ✱BIM Project-based training
- ✱BIM 4D Simulation training

IMPLEMENTATION
- ✱Corporate IT strategy consulting
- ✱Corporate BIM standard consulting
- ✱Corporate BIM project execution planning (PEP) consulting

PROJECT CONSULTING
- ✱BIM assisted planning
- ✱BIM assisted coordination
- ✱BIM assisted technical illustration
- ✱BIM assisted construction planning
- ✱BIM assisted facility management

INFORMATION INTEGRATION
- ✱BIM-FM database integration
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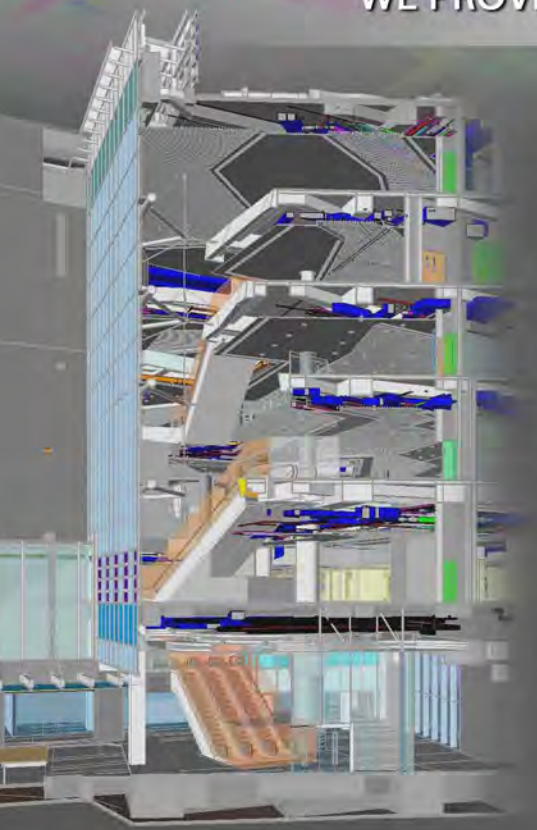

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