Autodesk®

Winning by Design

Autodesk Hong Kong BIM Awards 2009

Winning by Design

Autodesk Hong Kong BIM Awards 2009

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

Acknowledgement

Sincere thanks to the five awarded organizations, HOK, Hong Kong Housing Authority, InteliBuild Limited, Kerry Properties Limited, The Hong Kong Polytechnic University, in providing such valuable information and pictures of their projects. Besides, we are extremely grateful of the contribution of the AIAB committee and members, Mr. David Fung, Mr. Elvis Li, Mr. Kenneth Lau, Ir Ronan Collins, and Ir Dr Stewart Wan, who are profiled in this booklet.

Content

Preface

Building Information Modeling (BIM) was introduced by Autodesk in year 2000. BIM is an integrated process that allows architects, engineers, builders, and owners to explore a project's key physical and functional characteristics digitally – before it's built. Today, BIM is breaking down barriers and bridging communication between extended design and construction teams, providing them with consistent, reliable information across the scope of a project.

Adoption of Building Information Modeling is no longer a question of how but when. This visibility enables all members of the project team to contribute to its success through better coordination, improved accuracy, less waste, and the ability to make more informed decisions earlier in the process. It not only benefits to property architects, but also engineers, builders and developers. BIM gives mechanical, electrical, and plumbing (MEP) engineering professionals the ability to better predict the outcome of their system before it's built.

With BIM, structural design and documentation can be integrated earlier in the process and design interferences can be addressed before construction begins. Bidirectional linking to analysis applications from leading industry and regional partners helps reduce coordination errors and improve accuracy. By creating coordinated, reliable design information, civil engineers are able to respond to changes faster; optimize designs with analysis, simulation, and visualization; and deliver higher-quality designs and construction documentation.

Finally, construction professionals can use BIM solutions to perform quantity takeoffs, visualize construction processes through 4D simulation and clash detection, improve communication and collaboration among project stakeholders, and optimize execution in the field, thus minimizing material waste on-site, increasing productivity, and potentially lowering costs.

With the current energy mandates being announced by most governments as part of stimulus requirements, Autodesk BIM solutions help make sustainable design practices easier, more efficient, and less costly by enabling architects, engineers, builders, and owners to:

- More easily create coordinated, digital design information and documentation
- Use that information to more accurately visualize and simulate performance, appearance, and cost
- Deliver the project faster, more economically, and with the potential for reduced environmental impact

Hong Kong is an international city famous for its tall and high-rise buildings, such as International Finance Centre (IFC), International Commerce Centre (ICC), the Hong Kong Bank of China Building, the Hong Kong and Shanghai Banking Corporation Headquarter, and so on. BIM definitely helps better manage retrofitting projects, space planning as well as maintenance of the building's assets. BIM definitely plays an important role in increasing efficiency and effectiveness of these iconic buildings in Hong Kong and Macau.

This year, the BIM Award is organized the 3rd year in a roll. Thank you very much for the contributions of all stake-holders of Building and Construction industry in recent years, made the implementation of BIM a success.

On behalf of Autodesk management team, I would like to congratulate the five winning organizations, HOK, Hong Kong Housing Authority, InteliBuild Limited, Kerry Properties Limited and The Hong Kong Polytechnic University for their outstanding performance on application of BIM in their projects. The theme this year is "Winning by Design", and I am absolutely delighted to see out that these organizations re-engineer their project workflow to "win" the benefits BIM brings to their "designs".

This booklet will showcase how these five winning organizations to build world-class building, and facilitating the construction process. After reading this booklet, the best practices gained will surely make you a better user of this innovative technology and hopefully help you to win next year's BIM awards.

Pat Williams
Senior Vice President, APAC,
Autodesk

Preface

"Green" and "Sustainability" has been an extremely hot topic all over the world recently. Greater China has paid great effort in environment protection, especially in the Building and Construction industry. This leads to the evolvement of Building and Information Modeling (BIM).

BIM changes the way what building and construction professional did in the past. It is a new, creative and innovative approach which streamlines the whole building and construction process, including improvements in designs, documentation and facility management. All stake-holders of the industries can be benefited by this new approach, which can reduce the time and money for project completion.

Furthermore, BIM re-engineers the traditional approach, by a means to support the continuous and immediate availability of design scopes, schedules, cost and build of materials, of high-quality and accurate.

BIM, of its 3-dimensional visualization capability, can also detect clashes in early design phase, whereas in traditional workflow, clashes are only solved in construction site. The detection of clash in design stage will be fixed and thus it reduces the wastage in later stage. This will absolutely make a great impact in environment protection.

Linking a 4th dimension – time – to BIM 3D model can allow Project Managers to manage projects efficiently and doing project process computer simulations. This approach is widely used in the Building and Construction industry in the last few years!

Hong Kong is one of the world's most advanced cities in BIM technology. I am greatly impressed by the leadership Hong Kong has set up on BIM adoption over the Greater China region. The Hong Kong Government, Property Developers, Architects, Engineers, Consultants, and Contractors all play critical role in the adoption of this new advanced technology.

The theme of this year's BIM award is "Winning by Design" and I would like to congratulate the five winning organizations, HOK, Hong Kong Housing Authority, InteliBuild Limited, Kerry Properties Limited and The Hong Kong Polytechnic University for their outstanding designs and performance on application of BIM in their projects. I am delighted that these "winners" build a new milestone in Hong Kong Building and Construction industry.

I strongly believe that these five organizations have set up a new standard, not only to Hong Kong and Macau projects, but also international and China projects.

On reading this booklet, you will be shared with experiences by award winners and you will be able to adopt this new advanced technology to your next building and construction projects.

Please join me to congratulate them again as all of us are hand-in-hand facing the challenges ahead.

Aldous Wong
Vice President, Greater China Region
Autodesk

Preface

Hong Kong is an international city full of high-rise buildings, and building and construction projects play a major role in Hong Kong infrastructure development. Building Information Modeling (BIM) is one of the success factors of building and construction projects in recent days. It is an innovative approach for building and construction design, documentation and facility management. It breaks the barriers between non-graphical data in computer and graphical ones.

We can see that BIM adoption has been growing rapidly in Hong Kong since the first introduction more than 7 years ago. Many stake-holders in the building and construction industry successfully rise up their level in the adoption of BIM in their projects in just a few years' time and I am greatly impressed by the wide adoption of this advanced technology.

Hong Kong is without doubt one of the leaders worldwide in BIM technology adoption. I strongly believe that the growth in BIM adoption will even faster with the enthusiasm of the whole industry players. Therefore, I am also strongly convinced that Hong Kong will continue to play a leading role in BIM internationally.

On behalf of Autodesk Hong Kong, I would like to congratulate the five winning organizations, HOK, Hong Kong Housing Authority, InteliBuild Limited, Kerry Properties Limited and The Hong Kong Polytechnic University for their outstanding performance on application of BIM in their projects. I believe, with the theme "Winning by Design", this is not just an award for them, but also another start point to implementing BIM in their further designs.

Wendy Lee
Branch Manager, Hong Kong & Macau
Autodesk

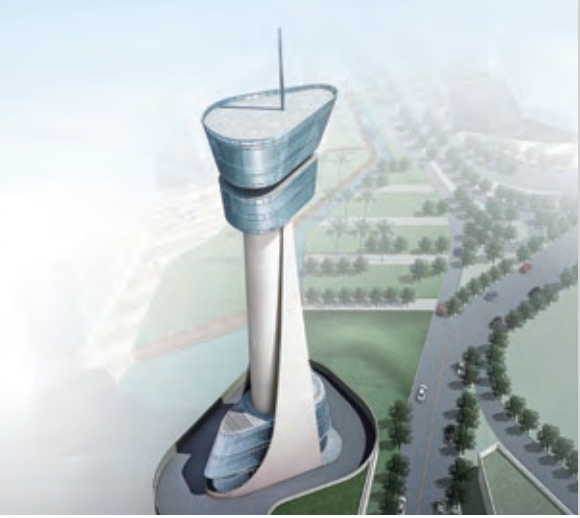
Faster, better design process with BIM

Project: Chhatrapati Shivaji International Airport Air Traffic Control Tower & Technical Block

Location: Mumbai, India

Type: Aviation

Scheduled for completion: 2012



"An unusual design calls for an unusual work flow, and REVIT is our software of choice."

Mr. Dickson Mak,
Associate / Design Architect, HOK

When HOK won the tender for designing the Chhatrapati Shivaji International Airport Air Traffic Control Tower & Technical Block – for the new airport in Mumbai, India – they did so with a design that was more sculptural than the competition. Featuring a curvy organic stalk, the tower was designed to fit within the site's landscape plan.

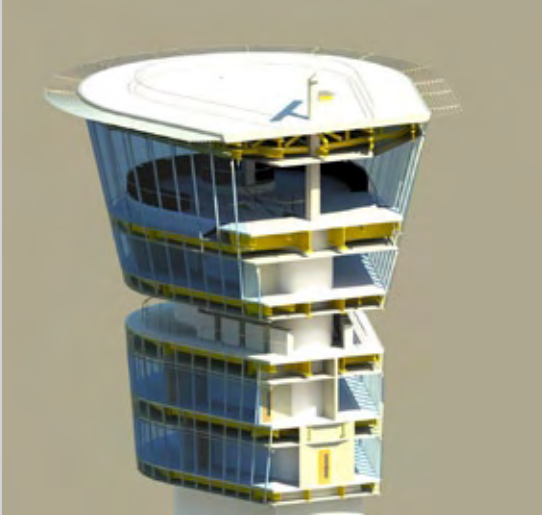
For all the design's artsy appearance, the tower would have to be built to strict parameters, including a height limit, a specified area for the top floor, and a wide cone of view across the airport. From day one, says Mr. Owen Cockle, an associate with HOK, the design team knew they would use Autodesk Revit BIM software: "Without Autodesk Revit, we may have thought twice about changing the design, which would have been much more labour intensive."

A strong working relationship

HOK is among the largest international architecture firms to have fully embraced BIM. Mr. Dickson Mak, HOK associate/ design architect, recalls the firm's early experiences with BIM, when he worked in the Los Angeles and San Francisco offices around five years ago. "I did some fairly simple pilot projects, and BIM was making quite a lot of noise – it was covered in a lot of seminars, and publications," he says. HOK looked at

“With BIM, you can experiment more; you can change things more readily. You don’t settle for options that are not so good.”

Mr. Owen Cockle,
Associate, HOK



available software, and in 2005 the board of directors decided to adopt Autodesk Revit.

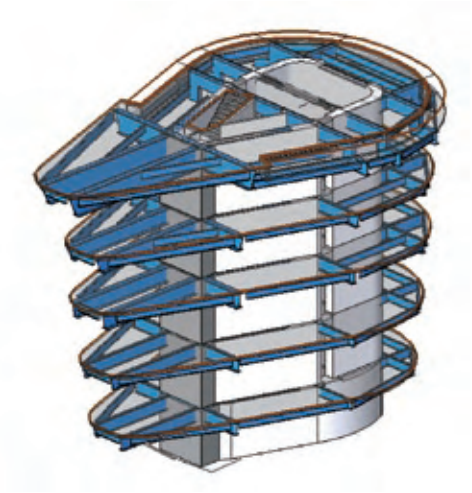
HOK and Autodesk have since forged a strong working relationship. HOK provided significant feedback to Autodesk on how to improve Autodesk Revit products, and is now close to using Autodesk Revit for all new projects worldwide. Two Autodesk customer success engineers have spent a week with HOK’s Hong Kong team, to help make them more productive with using Autodesk Revit.

Finding the best design options

For HOK, says Mak, Autodesk Revit is especially a tool that enables architects to visualise their designs. With it, they can quickly make detailed design changes, and there are particular advantages in detailed design stages, such as when an architect might change a building’s floor height – compared to traditional methods, Autodesk Revit makes it easy to see how such changes impact designs.

“With BIM, you can experiment more, you can change things more readily,” says Mr. Cockle. “You don’t settle for options that are not so good.”

Even people who aren’t architects or engineers can be impressed by BIM models. Using the models, it’s possible



"Without Autodesk Revit, we may have thought twice about the design, which would have been much more labour intensive."

Mr. Owen Cockle,
Associate, HOK

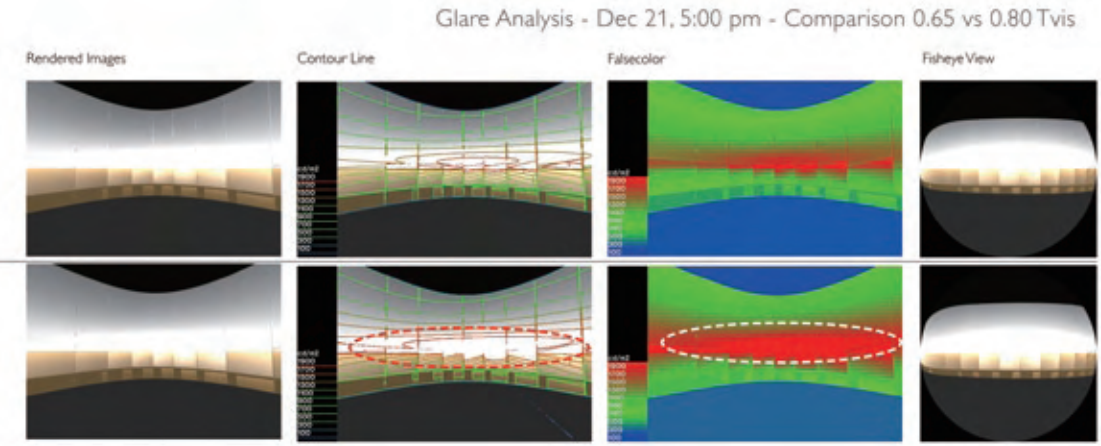
to show a building interior, and to then step back to show exterior views, spinning around the building. Clients can be excited seeing a virtual building this way. "It is an intelligent model - a real building," says Mr. Cockle. "It's meaningful."

Collaborating to find clashes

BIM models can show far more in architecture, but more comprehensive models require collaboration with other teams who are involved in creating buildings. In the case of the airport tower, HOK worked closely with Arup, which was responsible for the structure.

"This worked fantastically," says Mr. Cockle. "We worked on the skin and interior; they did the floors and columns. We gave Arup our model, they worked on the structure, which we brought into our model." By combining the information in one BIM model, the HOK and Arup teams were able to find and solve clashes involving architectural and structural elements of the tower – before construction even commenced.

The BIM model played a key role in helping show the client where suggested design options would work or not work in practice. An example arose early on – when the HOK team showed the planned generator would not fit in the large plant room intended for the bottom of the tower. The walls were sloping – as is typical for rooms throughout the tower – and the problem might have been hard to spot with 2D drawings, but was easily seen and demonstrated with the 3D model.



Quickly assessing design changes

Adding to pressure on the architects, the client often requested design changes – and typically wanted to know the next morning whether a change would work. Here, the BIM model proved crucial – allowing the HOK team to quickly verify whether changes would prove viable, including the ways the impacts ramified throughout the tower. “We had very specific standards for each room, and set the model to blink red if a required area became too low,” says Mr. Cockle.

As changes were made to room types, the BIM model instantly revised the table of room areas throughout the tower. Even small changes could be tested in the BIM model – for instance, when the client suggested adding five washbasins to a ground floor toilet, the model showed there wasn’t room.

After assessing the results of changes, the HOK team used the BIM model to create images they could show the client during video conferences.

The team also used Autodesk Revit for generating 2D drawings – far more quickly than they could have done with traditional design methods. “What takes a day now would have taken five days before,” says Mr. Cockle.

Reflecting on the use of BIM, Mr. Cockle says, “Traditional ways of building design are very compartmentalised. With Autodesk Revit, the process is more holistic. I think BIM will change the industry.”

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 our expertise available across the globe in the last 50+ years. HOK is currently operating from 24 established office locations with more than 2,000 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 recent recognitions include:

- #1 Engineering News-Record "Top Green Design Firms", June 2009
- #1 Engineering News-Record "Top Green Design Firms", June 2008
- #1 Engineering News-Record "Top 500 Design Firms" (A/E Firms), April 2009
- #1 Building Design & Construction "Giants", July 2009
- #2 Interior Design "Top 100 Giants", January 2009
- #4 Architectural Firm, Building Design (UK), January 2009
- Urban Design Firm of the Year, AsiaCRE, April 2008

Their ability to collaborate across markets and disciplines in every part of the world allow us 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

Far More Than Just Pretty Pictures

Project:	Towards Customization with Standard Modular Flats in Mass Housing Design
Location:	Hong Kong
Type:	Public Rental Housing
Scheduled for completion:	2009

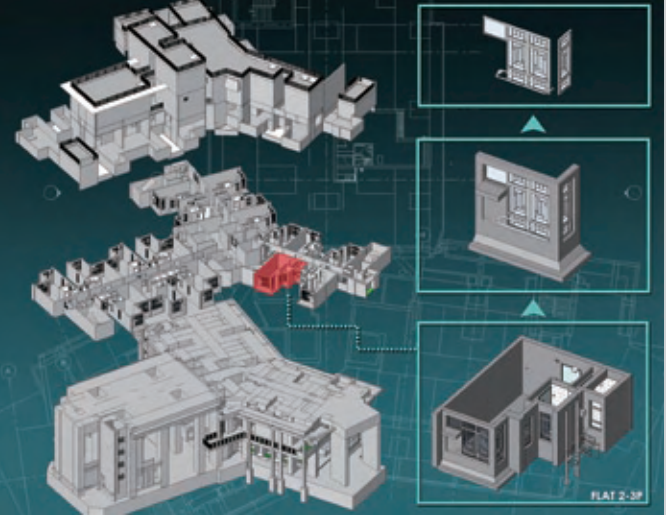
There are increasing numbers of housing projects being built with demanded quality from the public. There are new projects being designed by using BIM models which have helped optimising the living environment in Hong Kong.

More user friendly

The Housing Department is by no means a newcomer to using 3D software in building design. As early as 1993 the Department began using 3D graphical solutions. The feedback was good, especially from architects, who could visualise designs on computer screens. The software was quite versatile at that time but lack of the intelligent modeling features of BIM nowadays; required strong technical and typing ability, and was not Y2K compliance. Hence, the Department has sought a different solution in recent years.

BIM has started to boom three to four years ago, and the Department tried various software available in the market, including Autodesk Revit, to see if it could be applied in the office. The technology is more affordable now, making it readily available to build models. The hardware, software and ease of use have been improved since then.

Autodesk Revit is considered more user friendly for architects, who can use it on their own. They usually start by producing models used for visualizations – it is possible to walk through a building, assess perception views, and



BIM models can quickly be built and evaluated in accordance with site specific requirements.

conduct design studies. The software is intuitive and capable of showing changes almost instantly.

Standardization

The Department designs and constructs domestic blocks using standard modular flats to safeguard building quality and standard. BIM models help to assemble modular flats of different sizes, mixing and matching them to suit site conditions and requirements.

To allow more flexibility and achieve efficiency and effectiveness in building design, standard modular flats had been developed for project teams to customize flat types, layout and storey height to meet their configuration requirements and project needs.

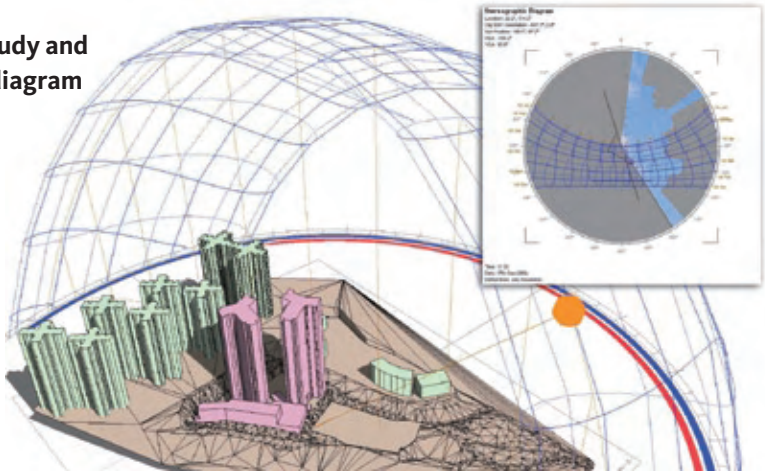
Apart from developing modular flats, the Department developed BIM standard component library and compiled the "BIM Design Guide" and "BIM User Guide" as standards and reference manuals to be followed by project teams. BIM models can be easily and quickly built, and evaluated in accordance with specific site requirements.

Project teams followed in-house developed BIM manuals to assemble "site specific" domestic blocks using standard modular flats as well as components, such as stairs, lifts from the BIM component library.

Sustainable Design

The Department used to design buildings using 2D software which made it difficult to visualise the context relationship, such as topography and surrounding buildings. With the help of BIM, it is easy to conduct environmental studies such as lighting, ventilation, energy

Shadow Study and Sun-path diagram



consumption, carbon emission, green design, etc.

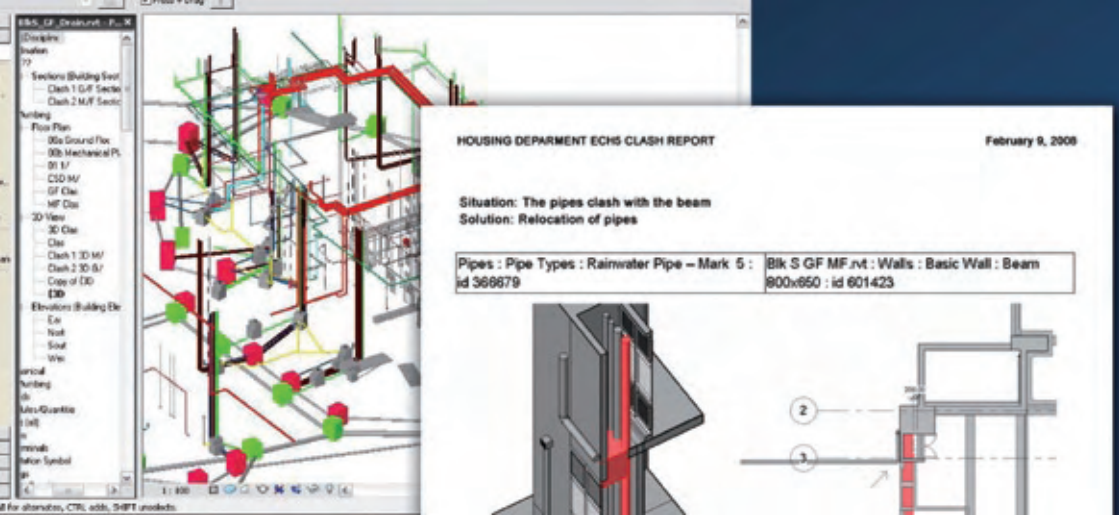
Using Autodesk Revit building information models, the Department can assess micro-climates for planned buildings in a more scientific manner, like design options with enhanced ventilation can reduce the need for air conditioning. It is also possible to design landscaping – such as providing sunny sitting out areas for residents during winter, whilst seeking to ensure these areas are mostly naturally ventilated and under shade during summer.

Environmental Friendly Construction

The BIM models also help the Department to detect clash in design. This is important in fitting together the modular flats. The design team can check that building services such as fire protection, plumbing and drainage are put together without conflict. By using Autodesk Revit in the design stage, it is possible to minimise contractual claims, save time and effort, and eliminate the need for reworking and hence reducing construction waste and be more environmental friendly.

There is also potential for using BIM models after construction, such as for estate and facility management. Though people are not yet used to using the models for such purposes.

The Department has not just used virtual 3D models developed with Autodesk Revit, but also used the models for 3D printouts, such as typical flats, cross sections of domestic blocks, and even for comprehensive housing development in its setting.



A terrain model from the Lands Department was imported to the BIM model to show an accurate 3D model of the proposed redevelopment using 3D printing for presentations of improved landscaping and living environment.

Partnering & Teamwork

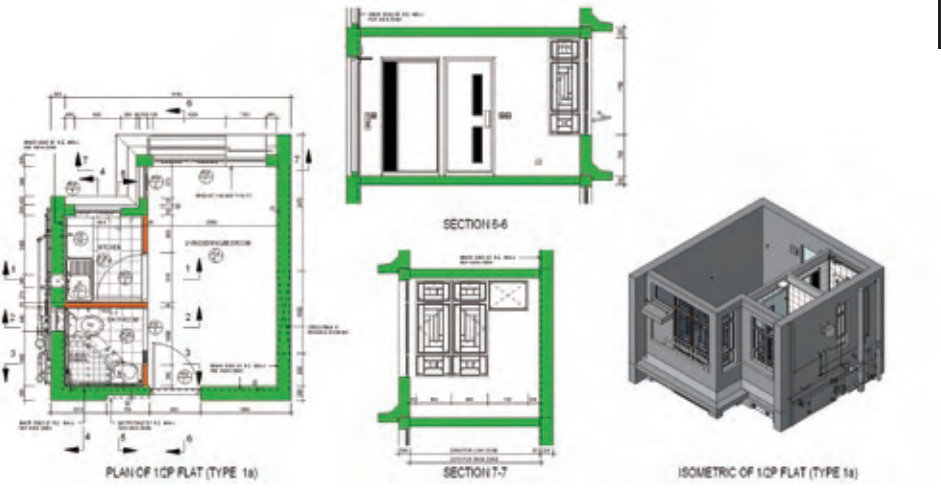
Partnering & teamwork is important for project using BIM. Ideally, architects, structural engineers and building services engineers should work together closely. This is possible within the Department, project members of various disciplines can work on the same set of BIM models. Contractors are sometimes hesitant to use BIM since the technology is relatively new to most of them.

As part of the Department's change management programme, the introduction of BIM has led to formation of a BIM Centre and BIM Service Team.

The project team can sit and work together, discuss and resolve any design issue in front of computer screens which saves a lot of effort and time in writing e-mails.

The Centre includes a training room as well as a lab equipped with a smart board and BIM workstations. The BIM Service Team will work here for about two-years during which they can focus on BIM. This will facilitate regaining skills, and they can then move onto projects, and hence transferring skills. In the long run, staff in the Department can use and handle BIM.

Apart from training in-house staff, the Department has also brought in external BIM consultants to meet the housing development programme as well as enhancing the BIM skills.



Bright future for BIM

There are increasing numbers of housing projects using BIM, including a project to be constructed on a multi-level site. Civil and geotechnical engineers found this difficult to visualize the site conditions in 2D drawings. There is a need to cut sections on different slopes, and to assess whether design of permanent and temporary works, the cut and fill of the site are optimised. BIM can greatly assist in the optimisaton, hence better the design, lowering cutting costs and reducing waste.

It is foreseeable that BIM will continue to contribute to the construction industry, and more people will realise its benefits. Changes in the industry are needed for successful implementation of BIM. The clients are playing an important role to take the lead by specifying the use of BIM. For an effective change management programme, training is one of the critical success factors for BIM implementation. The Department is promoting BIM development in Hong Kong through a joint working group with the Hong Kong Contractors Association, and has developed its own BIM standards and guidelines to be followed by the staff and business partners.

Hong Kong Housing Authority

About Hong Kong Housing Authority

The Housing Department (HD) supports the Transport and Housing Bureau (THB) in dealing with all housing-related policies and matters.

The HD also acts as the executive arm of the Hong Kong Housing Authority (HA), which is a statutory organization tasked to develop and implement a public housing programme to help the Government achieve its policy objective on public housing.

The HD provides affordable and sustainable public rental housing for those in genuine need, provides subsidized quality housing to about 30% of the HK population. To meet the Government's pledge of maintaining an average waiting time of about three years for eligible applicants, The HD has a steady construction programme of producing about 15,000 new flats per year, plus recovering about 16,000 refurbished flats from the existing stock of about 680,000 flats.

InteliBuild

BIM + 3D Consultants

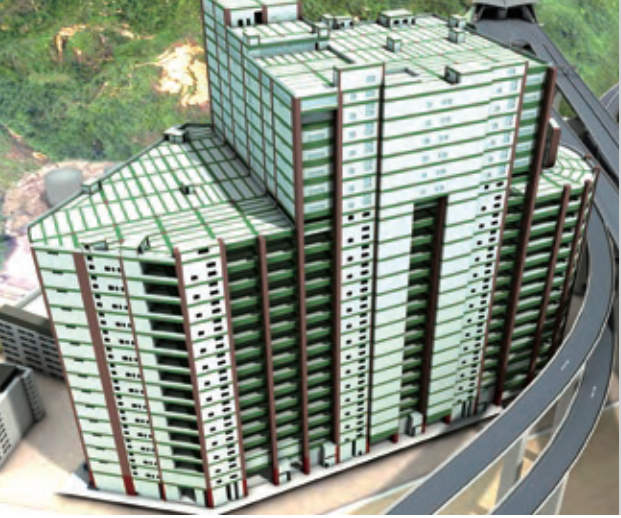
One BIM to Rule Them All

Project: Goodman Interlink Logistics Centre

Location: Tsing Yi

Type: Industrial Construction

Scheduled for completion: March 2011



“Goodman’s revenue will be tied in to the delivery time of the building, and there will be better assurance it can be delivered on time. We can mitigate delays and costs during the project planning stage.”

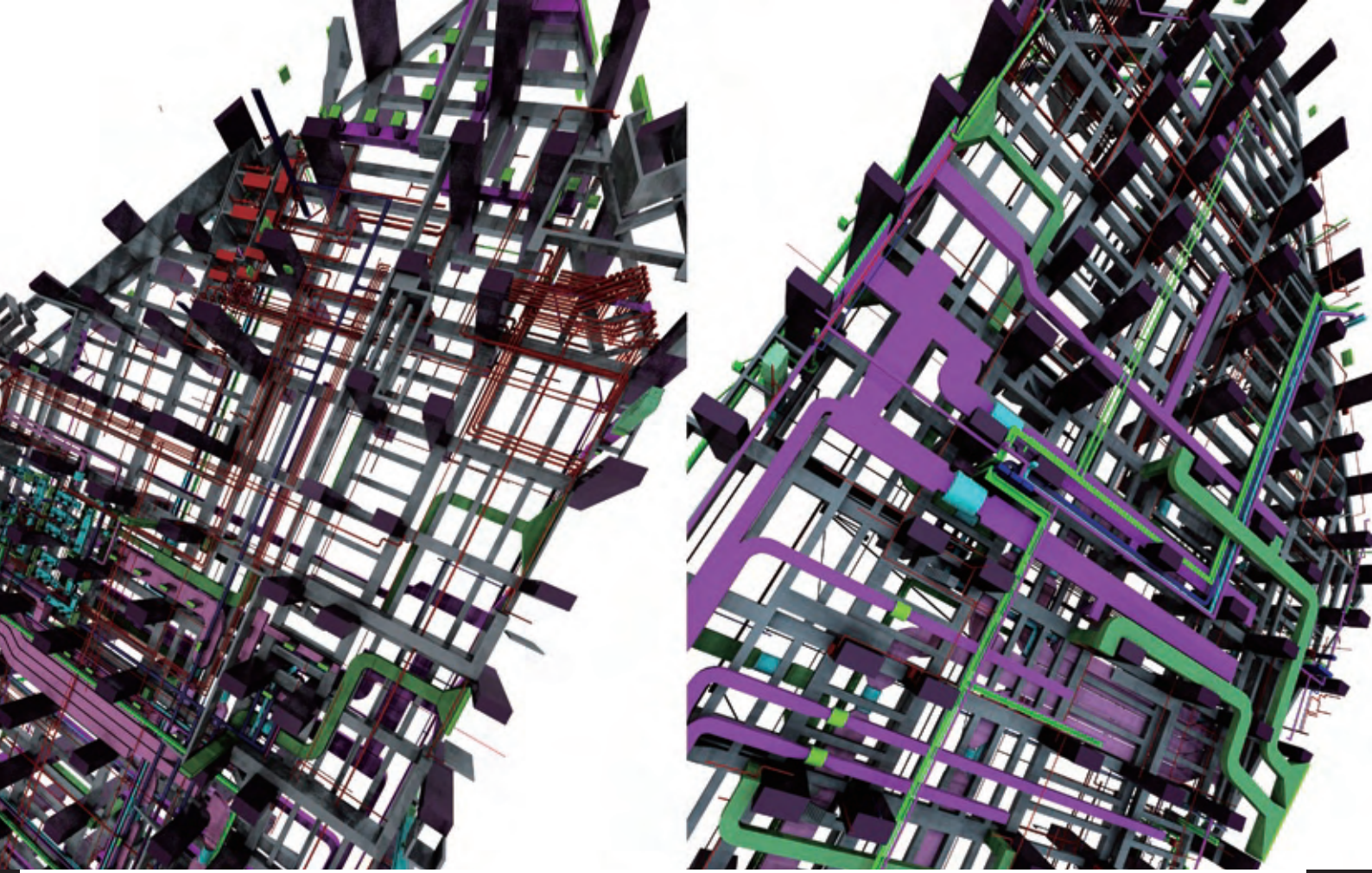
Ir. Ronan Collins,
founder and managing director, InteliBuild

The plot of land where Goodman Hong Kong will build a logistics centre on Tsing Yi is little more than empty space at present. But on a screen in the office of InteliBuild, a 4D Virtual Construction simulation shows the area transformed, as tower cranes help assemble the insitu-concrete floors, complete with spiral ramp.

The building is relatively simple, with logistics facilities on the first 16 levels, warehousing at upper levels, and offices at the top. BIM is chiefly being employed to ensure that construction proceeds smoothly, and the BIM model was used to develop the 4D simulation showing the construction process.

Independently checking building design

InteliBuild specialises in design validation using BIM, and Goodman approached the firm regarding using a BIM model to analyse the design of the logistics centre project, like an independent checking engineer. “There will be fewer clashes through using BIM,” says InteliBuild founder and managing director Ir. Ronan Collins. “Goodman’ s revenue will be tied in to the delivery time of the building, and there will be



better assurance it can be delivered on time. We can mitigate delays and costs during the project planning stage."

Autodesk Revit software is being used for the BIM model – or rather models, as the information for the entire building would be overwhelming. The InteliBuild team transferred data from Autodesk Revit to Autodesk Navisworks for creating complete digital building models, performing clash analyses and working on coordination, and used Autodesk Maya for the construction simulation, complete with texture, lighting and shading.

The Goodman team had expected there would be benefits including reductions of clashes during construction, but were surprised by some of the benefits of the 3D models and simulations produced from the BIM model.

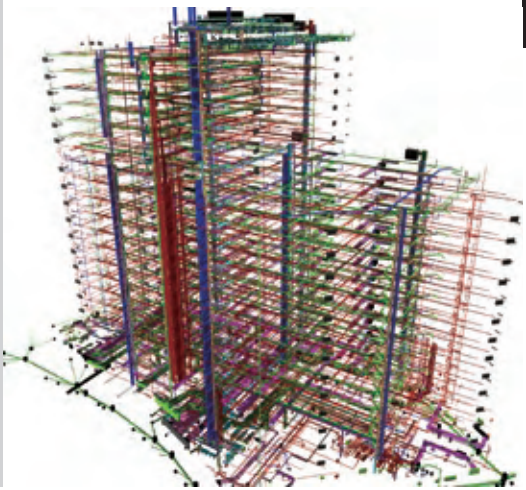
An overall BIM strategy

The InteliBuild BIM Project Manager devised an overall BIM strategy for the project at the outset. "You need a full BIM methodology – someone has to drive all the geometry, so the model fits into the overall project," says Ir. Collins. "We wrote BIM specifications, with origin points, levels of detail, file names, names for materials, and geometry for clash analyses."

The building had been designed using 2D drawings, and that 2D information was used for building the 3D model in Autodesk Revit. Rather than creating the entire building in Autodesk Revit as a single file, they created three architectural and structural models, which met at "natural" break points along movement joints, such as between the ramp and the main building.

"We build the models in a very similar way to how the contractors will construct the real building."

Ir. Ronan Collins,
founder and managing director,
InteliBuild



Then, they assembled 15 MEP models, with building services such as mechanical ventilation, air conditioning, fire services, drainage, and major electrical components. Four teams worked on these services – one building the model for ducts, another focusing on sprinklers, another on drainage, and one on electrical distribution. The InteliBuild BIM Project Manager coordinated all of the work. "We build the models in a very similar way to how the contractors will construct the real building," says Ir. Collins.

Rather than work to a level of detail that would be impractical, the team used a 50mm threshold for the systems that they would model. There was no point in adding, say, electrical sockets – contractors would not position these according to detailed plans and the smaller components typically do not cause issues on site.

Once the initial modelling work was completed, the team could then assess the building design co-ordination – would the designs work in practice?

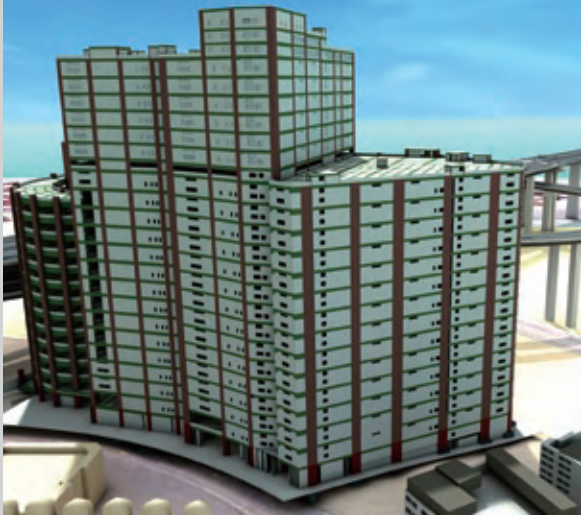
Finding and resolving design problems

In their first report to Goodman, InteliBuild noted 38 technical design issues, chiefly involving cases where they had detected that engineers' drawings didn't match the details on the architects' drawings. They used Autodesk Navisworks to identify and present the technical queries, helping make discrepancies and errors obvious to all concerned.

One error that passed undetected on 2D drawings, yet was obvious in the 3D model, was that a planned staircase within the spiral ramp was two levels higher than necessary. In addition,

“There will be fewer clashes through using BIM.”

Ir. Ronan Collins,
founder and managing director, InteliBuild



the BIM structural team identified a superfluous column.

An issue that would prove more costly to Goodman over time arose with a heavy goods lift in the east side of the building. If built according to the engineers’ drawings, it would mean that each floor would be 5.25 sq m less than planned – and with this reduction in area repeated on all of the floors, the building rental space potentially would have been less than originally planned.

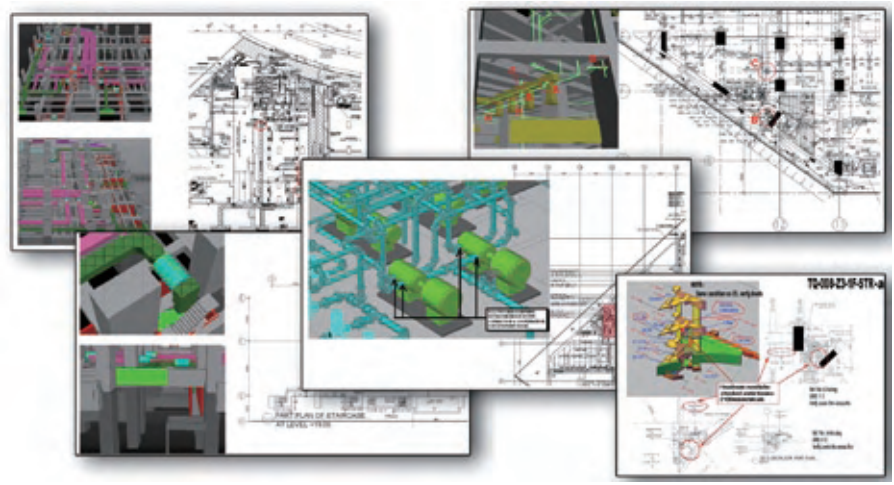
Drawing on engineering expertise, the InteliBuild team proposed a suitable design change, which would allow the lift to be built whilst regaining the lettable floor area, whilst not compromising structural integrity.

The team also flagged other design problems, such as clashes involving sprinkler pipe routes. The clashes they identified were passed to the consultants, who revised their 2D drawings, and the information was in turn entered into the BIM model, to check the issues were resolved without creating new problems.

As the design co-ordination review and clash analysis is nearing completion, the InteliBuild team is now working on a new 4D clash analysis for the building construction. They will use Autodesk Navisworks timeline to check for issues involving objects such as cranes that move in time.

Design is coordination

Awareness of BIM is spreading quickly in Hong Kong, says Ir. Collins – yet there are misconceptions regarding BIM, and the term is sometimes misused: “We educate clients about what BIM is – it is not just pretty pictures.” To him,



the chief value of BIM is in design and construction coordination and clash analyses.

Ir. Collins is critical of traditional design methods in the construction industry, believing some industry practitioners may produce un-cordinated and poorly considered design drawings and the contractors accept that they will receive error-ridden plans leading to them facing many co-ordination issues and clashes on site. “There is a lack of design co-ordination management,” he says. “Yet I believe design is coordination – you can’ t design a watch without figuring where the cogs go.”

BIM can eliminate many of these problems, though for it to be successful the client must be involved, ensuring clashes that are identified are corrected, so their investment is well placed and money can be saved during construction.

Summarising the BIM work by InteliBuild – and emphasising where the teams add value, Ir. Collins says,

“Around 15% of our time is spent on modelling, and 85% on design co-ordination – focusing on what’s in the model and the analyses, identifying issues and communicating those issues to the designers and contractors.”

InteliBuild

BIM + 3D Consultants

About InteliBuild

InteliBuild are BIM + 3D Specialists. Experienced professional engineers and knowledgable 3D CAD technicians collaborate to produce precise digital models for construction projects. The multi-disciplinary BIM models are used to identify design clashes and co-ordination issues. When combined with building programmes to create 4D models they can demonstrate site logistics and assist with construction planning.

InteliBuild are responsible for planning and implementing BIM processes on fastrak projects in collaboration with the client, consultants and contractors. Their BIM Managers are experienced in training Architects, Structural and Building Services Engineers on how to use the BIM process to improve design integration and drawing production.

KERRY PROPERTIES

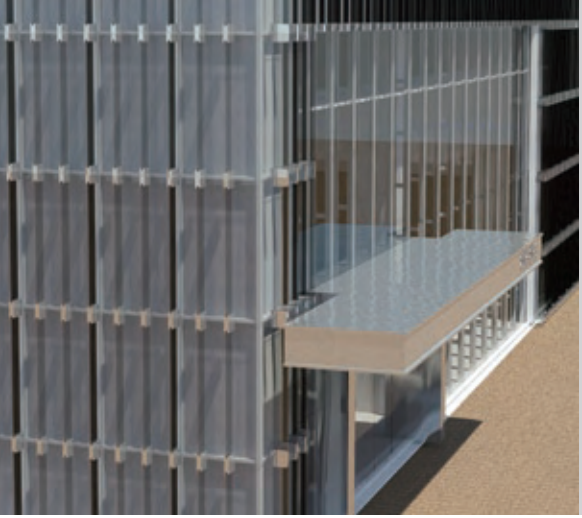
Building in a Better Way

Project: 863-865 King's Road, Quarry Bay Project

Location: Quarry Bay

Type: Office

Scheduled for completion: 4th quarter 2010



"This is beyond what we could imagine with using traditional 2D drawings. BIM helps us to visualise projects, as we see things in 3D."

Mr. Albert Yeung,
Project Director of Kerry Properties Limited

Kerry Properties Limited decided to use BIM as a project management tool right from the outset of its commercial office development in Quarry Bay. Several reasons led to the decision, including the desire to develop an environmentally sound building, hoping to improve coordination and design quality, and ensuring timely construction and delivery. With an integrated and shared information base used by all project team members and consultants, BIM has been an invaluable tool in helping with the collaboration of design and planning.

Building in a better way

BIM assisted the project team with coordination by precisely illustrating various building elements - both the internal arrangements and the external envelope - in three dimensions. This enabled the project team to resolve potential clashes in the design stage rather than during actual construction, saving the project both time and money.

Using BIM as a tool contrasts with traditional ways of managing a complex building project. Typically, architects will create one set of drawings, structural engineers produce another set, and building services engineers work from

yet another set of drawings, and all parties must make manual cross-checks and comparisons resulting in a time-consuming process that is often fraught with mistakes. Utilizing an integrated and accurate BIM model allowed all teams to share the same database and to work in parallel in a multidisciplinary manner.

As an example, the project team opted to combine the structural, engineering and mechanical elements into common zones – rather than position them separately, as is typical. By making use of the BIM model, the team was able to neatly arrange elements such as electrical and mechanical routing, creating layouts that would be difficult or impossible to achieve with traditional 2D drawings.

Reflecting true ratios and perspectives

The BIM model was built using a set of specifications for tolerances and spacing, with tolerances sometimes as low as 1mm. This is in stark contrast with the typically more lenient tolerances of traditional building designs.

Both the designers working on the project and the Kerry Properties management team have found the 3D BIM model extremely useful for assessing and reviewing the different design options. As one example, a view in the BIM model not only shows what a typical floor will look like from a static angle, but also allows the team to review the building floor from all angles.

"Our ultimate goal of using BIM is to deliver a good product to our customers, and bring value to them."

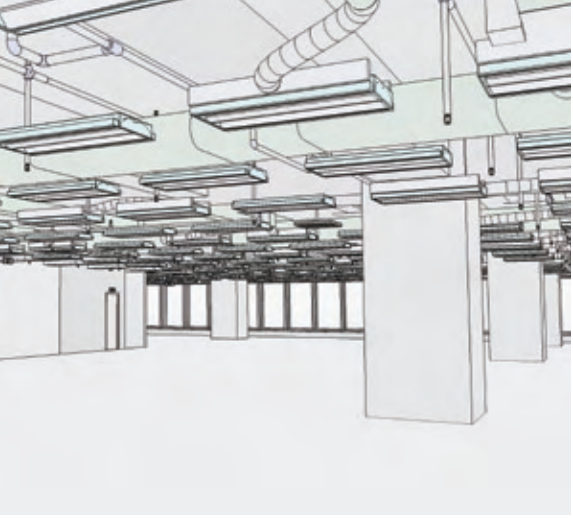
Mr. Albert Yeung,
Project Director of Kerry Properties Limited

Optimizing lighting and roof feature design

The project team decided to use exterior lights on the building fins, but also wanted to minimise light pollution. This required a lot of experimentation to determine the optimal brightness and colour which should be used. Rendering in the BIM model allowed the team to view how the lights will appear on the whole building, despite the low intensity of the specified glow.

The BIM model has also helped with optimising the design of the roof features. Here, there was a need to strike a balance between the structural needs of the design engineers and the aesthetic requirements of the architects. Using the BIM model, the design team tested how tie wires would appear to someone on the roof. The initial design specified crossed wires, but the BIM model made it clear this not only blocked the line of sight, but was also unattractive when viewing the building from different angles; ultimately, using the model to review various options, a more aesthetically pleasing horizontal wire was selected for the design.

The BIM model also helped to show perspectives of features and highlighted the different feel created by selecting 250mm or 210mm wide members. Such small differences would not be apparent in physical models, but they have an important and noticeable effect on one's impressions of the actual building.



Delivering a good project

Going forward, the project team expects to continue to reap the benefits of using BIM: the team will use the BIM model to help with construction scheduling and the base BIM model will also allow the marketing team to present and showcase the project to potential tenants.

KERRY PROPERTIES

About Kerry Properties Limited

Kerry Properties Limited (KPL) is a property development company with significant investments throughout Asia. The company is known for its premium developments in China and Hong Kong.

KPL began investing in and developing properties in the 1970s, and quickly established itself as a major player in residential developments during the 1980s. The Company was listed on the Main Board of The Stock Exchange of Hong Kong Limited in August 1996.

Today, KPL has earned an outstanding reputation in Hong Kong and China, where it has a portfolio of commercial, hospitality, residential and retail properties, as well as investments in go-downs and logistic centres. In China, the Company also has a number of mixed-use developments underway in Shanghai, Tianjin, Hangzhou and Shenyang. Its portfolio of premier residences includes developments such as Aigburth, Branksome Crest, Tavistock, Belgravia, 15 Homantin Hill, SOHO 38, Primrose Hill, Beijing Kerry Residence, Shanghai Kerry Residences, Shenzhen Kerry Plaza and Arcadia Court.

Apart from property development, KPL has a range of investments in infrastructure projects in Hong Kong and Mainland China as well as China-focused, Asia-based, global logistics subsidiary, Kerry Logistics, which focuses on delivery a seamless and integrated range of value-added logistics services.

THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

BIM Helps Building to Exacting User Requirements

Project: The PolyU Campus in the Shenzhen Virtual University Science Park

Location: Shenzhen

Type: Institutional

Scheduled for completion: end of 2009

“The building users could easily look at a 3D model, and found it impressive”

Ms Margaret Lam,
Project Manager,
Campus Development Office,
The Hong Kong Polytechnic University

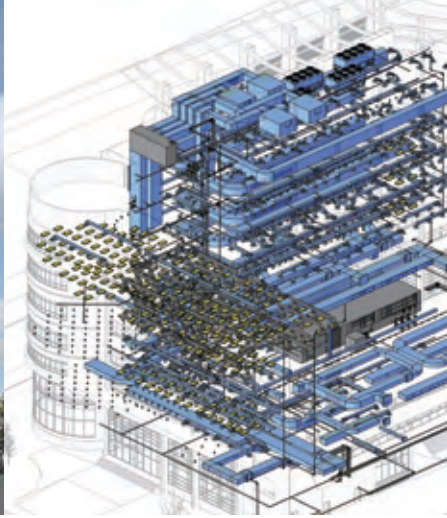
The building of the Hong Kong Polytechnic University campus in the new Shenzhen Virtual University Park has been built to exacting user requirements. With a total floor area of 16,500 square meter, including the basements, it comprises three blocks, which are three, six and seven storeys high.

With classrooms, offices and laboratories, the building had to meet the needs of a variety of users. With challenges including a host of design changes made through to construction stages, a 40-metre height constraint, and need for coordination between project teams in Hong Kong and Shenzhen, BIM was adopted for the design process.

Easy transfer of information from Autodesk Revit

This is the first full project by the Campus Development Office of the Hong Kong Polytechnic University in which BIM has been used. Margaret Lam, Project Manager of the office, knew of BIM – including as a contractor for a previous project used BIM to simulate the precast construction, but relied on the project architects – from Aedas – for actual implementation, including through use of Autodesk Revit. It helped that project consultants were also familiar with BIM.


香港理工大学产学研大楼
THE HONG KONG POLYTECHNIC UNIVERSITY



Importantly for the Campus Development Office, Aedas advised Ms. Lam that it would be easy to change some of the BIM information into AutoCAD, and to pdf, which is the main software the office uses.

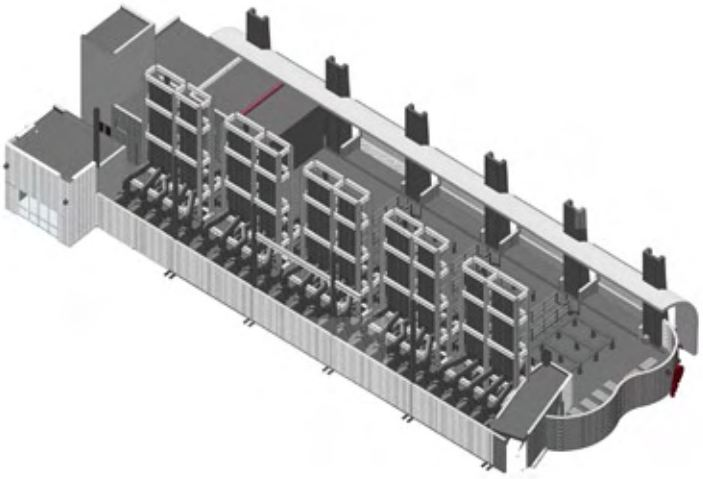
Also, the Hong Kong team worked with a China counterpart – a design institute, which in turn dealt with the government, ensuring the building design met regulations. This made communications relatively complex, and the Autodesk Revit model helped with explaining the design details, as well as producing 2D drawings for submission to the government.

3D images helped presentations

Partly as there was a vetting process regarding the best allocation of space within the building, it was not possible to decide on exact room requirements when the design process began. Here, the BIM model helped with showing end users what the designs would look like in reality, so they could optimise their requirements.

“They could easily look at 3D model, and found it impressive,” says Ms. Lam. Indeed, the whole project team liked seeing actual 3D images rather than just looking at plans.

In some presentations, the designers could show the whole building – albeit without some of the interior details. They could show views walking into the building, as well as the building exterior, relationships to neighbouring buildings,



and even how a car could arrive, and park outside.

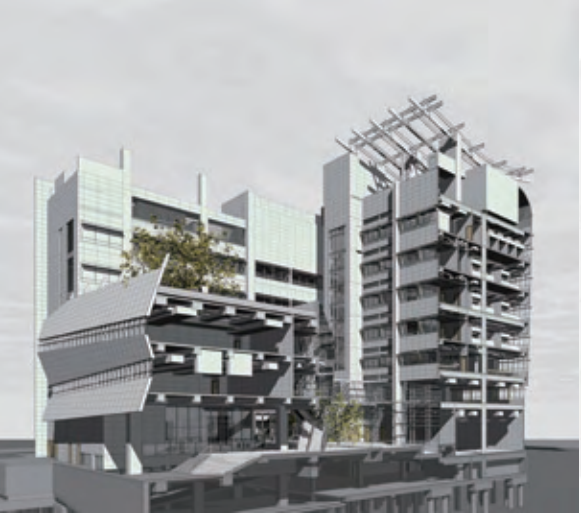
Academics including professors liked seeing animations and 3D images, without which they would have struggled to understand the designers' intentions. For instance, they could see how the lift lobby would look, and appreciate whether ideas they suggested would work in practice.

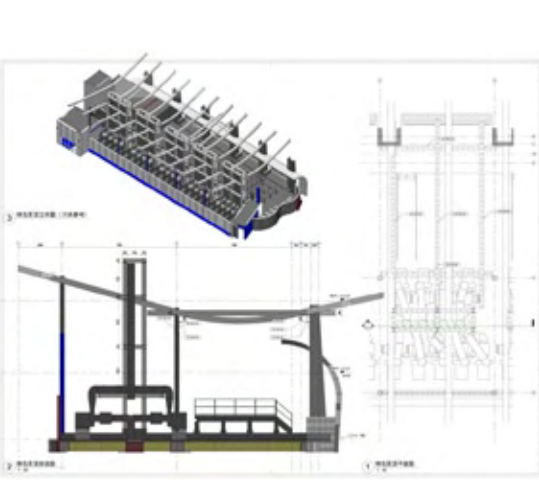
Using the BIM model for presentations contrasts with traditional presentation methods, in which perhaps three to four weeks is required to use plans to create a 3D representation. As designs are typically polished during this period, the representations cannot fully show the plans at the time a presentation is made. However, using the BIM model means the audience sees how the latest design will appear.

Colour codes help systems coordination

Ms. Lam and colleagues made use of a datasheet with information on room sizes, as well as numbers of different rooms such as classrooms and laboratories. "It was quite easy to ask for this information," she says. "But in other projects, using AutoCAD, we would have to calculate the figures. Indeed, BIM impressed me most with the ease of generating room data sheets quickly and accurately, by consultants who might be just junior staff."

David Fung, the project architect, worked closely with the structural engineer; using the BIM model, they could see inconsistencies, and make changes to prevent clashes during construction. "We shared the files, and could see changes immediately," says Mr. Fung. "This is





unlike using paper, where we have to imagine based on what we have in our hands. You can't see everything on 2D drawings."

The project team modelled laboratory equipment, including nearly 100 fume cupboards for expelling poison gases, which would be carried through vent and discharged to the air. The team used a colour code for the flues, and used the BIM model to arrange them correctly. They used other colour codes for ducts and pipes for fire services, electrical, plumbing and drainage, and air conditioning. Once these were input, each set of pipes and ducts could be shown individually, using just Autodesk Revit. Many potential clashes were solved in computers, rather than on site.

Visualising design intention

Using the BIM model, the project team produced 250 A1 size tender drawings; none of these had to be drawn by CAD. Most of the spaces documented come with perspectives – probably making this the first project in Hong Kong to include perspectives in full set of tender drawings. The perspectives showed the intended space quality, so help the construction team to visualise design intention, and to ensure the building would look exactly as the designers planned.

Ms. Lam says that the project has proven to be beneficial to the Hong Kong Polytechnic University's Campus Development Office using BIM, and will support contractors that wish to use BIM in further department projects.

LIFT LOBBY
DESIGN CONCEPT

THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

About the Hong Kong Polytechnic University

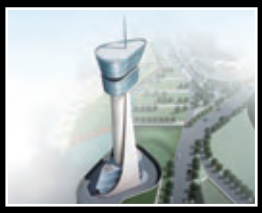
The Hong Kong Polytechnic University is a university with a proud and illustrious history. Formerly known as the Hong Kong Polytechnic, the Institution assumed full university status in 1994.

PolyU is strategically located in Hung Hom, Kowloon, on a site of approximately 93,500 square metres adjacent to the Cross Harbour Tunnel. There has been extensive development and rapid expansion since the last 10 years. The University is the largest UGC-funded tertiary institution in terms of number of students. A wide range of courses which directly meets industrial, commercial and community needs is offered. In addition to meeting Hong Kong's manpower requirements, PolyU also makes significant contributions towards the territory's success by providing the public and private sectors with its expanding range of consultancy, professional training and applied research services. Through these activities, the University maintains a strong partnership with the business and industrial sectors.

The Campus Development Office, established on 1 October, 2002, is responsible for the acquisition of accommodation, space and land; overseeing the planning and development of the University and managing all capital and alteration & additions works.

Advisors' Comments

Chuck Eastman



HOK

HOK has been a leader in BIM, worldwide. For the airport tower, HOK and Arup developed 3D models of their designs for coordination. Both developed Revit models and integrated them to address clashes and other coordination conflicts.

The construction manager was leading to very fast-paced design development. The agility of design development, allowing quick assessment of changes, would not be possible in the same timeframe without BIM.

The glare analysis undertaken for visual capabilities from the tower are impressive. More documentation on how they were used to enhance the design would be very helpful. The project showed effective coordination, addressing a complex programmatic design.

Hong Kong Housing Authority

This is a good example of the use of BIM, taking advantage of the 3D information in multiple ways such as design options and presentations, 3D coordination and clash detection.

The environmental analyses facilitates higher quality comfort, based on best practice environmental criteria, which is not easily realized without exploring many alternatives. Also the teams developed standards, as a BIM Guide for their work, an important aspect of using BIM successfully. Also develop many component libraries of furniture and small component of buildings.

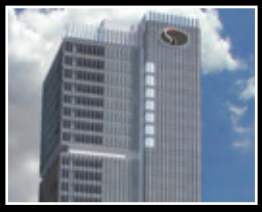
They also describe a training program, and BIM work center that will have all the housing staff learn to utilize BIM. This was one of the most sophisticated and well applied uses of BIM. The Housing Authority has made a commitment to BIM and an investment for their staff to use its, and the benefits shown in this project are an indication of the pay-off.

InteliBuild Limited

Exercise in developing a building model from drawings for use in construction, by outside consultant. Applied clash detection and uses the development of the 3D model as a way to assess (and find errors) in drawings. Used a 50mm size filter to determine what should be modeled.

Shows benefits of BIM even if not used by architects, and picked up and applied during construction. Also used Maya for animating aspects of construction. InteliBuild was able to assign large teams to address the building, esp. the MEP parts.

This project parallels what has happened in the US, where the cost and time benefits of BIM have led contractors to create virtual models for benefits during construction planning and execution.



Kerry Properties Limited

This project describes how the project teams shared a common model, instead of sharing drawings, leading to a better coordinated, more closely coupled final design result. The examples of tight layouts in the plenum spaces above the ceiling show the efficiency of 3D layout.

The Hong Kong Polytechnic University

HK Polytechnic new campus — new multi-purpose building. Good use of BIM modeling as a collaborative tool with university client, offering good collaboration with professors and other prestigious users. Makes a good case for the efficiency of producing models and walk-through in 3D from the same BIM model, instead of building separate rendering models and 2D drawings.

Detailed mechanical model was required to deal with laboratory issues, developing complex layouts to show how mechanical equipment could be accommodated.

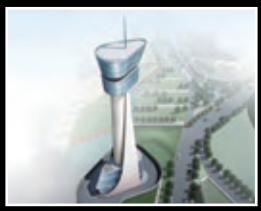
This project shows how BIM can shine in addressing complex requirements, such as those required for the mechanical required in laboratories.

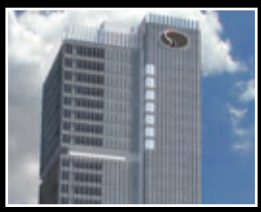
Chuck Eastman

Chuck Eastman is a Professor in the Colleges of Architecture and Computing at Georgia Institute of Technology, Atlanta. He is Director of the AEC Integration laboratory in the College of Architecture PhD Program, where he leads research in IT in building design and construction. He has been active in building modeling research since the 1970s and has worked with a variety of industry groups developing BIM technology, including steel, precast and reinforced concrete modeling at the fabrication and production level. He is also very much involved in interoperability standards, particularly the National BIM Standard for specifying exchange workflow standard. He is also co-author with Paul Teicholz, Rafael sacks and Kathleen Liston, of the BIM Handbook, A Guide to Building Information Modeling, published by Wiley in 2008.

Advisors' Comments

Dr. Calvin Kam




A sound foundation for BIM is in place.

In 2009, winners of the HK BIM Award have exemplified two key elements in driving transformational changes in the building industry — owner's leadership and advances in design and coordination.

Owner's Leadership

Two years ago, I had the pleasure to give a keynote at the BIM Conference in Hong Kong and interacted with many local owners, who were curious but uncertain about BIM at the time. Today, public agency (HK Housing Authority), private developers (Kerry Properties Limited, Goodman) and institutional owner (HK Polytechnic University) are no longer standing along the sideline as spectators. They are actively leading the BIM movement in Hong Kong with award-winning projects and initiatives.

From my first-hand experiences implementing BIM programs for the government in Finland, the federal government's landlord in the U.S. (GSA), and an integrated private developer (Optima), I can attest to the power of owner's leadership in the BIM movement. With such a sound foundation in place, Hong Kong is poised to harvest the many benefits from virtual modeling in the years and decades to come.

Building upon a 15-year tradition of 3D modeling, the **HK Housing Authority** is investing in a knowledge base (modular components, configurations, sustainability) and cultivating a

collaborative culture (training, teamwork, partnering) with a committed vision to leverage BIM in optimizing the living environment in Hong Kong. **Kerry Properties Limited** has started to integrate BIM in its development process and benefited from the visualization and coordination values of a model-based design process. Professors and other building end-users at **HK Polytechnic University** are more engaged because they can experience their facilities virtually before their university commits major capital investment in campus construction. With an impartial design coordination through an independent BIM consultant, **Goodman** expedites the quality assurance of its logistics center.

Advances in Design and Coordination

All 5 award winners this year showcase the values of design modeling and multi-disciplinary coordination. In particular, **HOK** explores sculptural forms with rational programming and follow through with design production under geographical and schedule constraints. **Aedas Limited** orchestrates end-user communications, resolves technical requirements and coordinates design details utilizing a BIM-centric approach. Architects and engineers on **HK Housing Authority** projects subject design options through environmental evaluations with BIM. **InteliBuild Limited** demonstrates the power of 3D spatial coordination to owner and contractors. It is universal for project teams to find architectural design production, client communications, and spatial coordination with multi-disciplinary design as some immediate returns on BIM investment.

2020 — The Decade Ahead

As we approach the second decade in this millennium, let's assess our industry and envision what the future holds for all of us. My vision is that successes in award-winning projects will be repeatable and scalable through knowledge sharing. We shall expand the power of BIM from visualization and coordination to simulation, automation and optimization of the built environment. Design-driven innovation will be seamless in engineering, construction, fabrication and operation. Let's pursue for an intelligent and sustainable built environment. Let's congratulate the 2009 award winners as we BIM-up for the next decade!

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

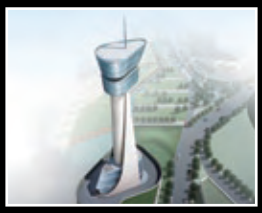
Vice President, Optima

Consulting Assistant Professor, Stanford University

Grew up in Hong Kong, Dr. Calvin Kam is the Vice President for Strategic Innovation with Optima—an award-winning real estate developer based in Chicago and Phoenix. Dr. Kam is a Consulting Assistant Professor at Stanford University, while serving on the national advisory group for technology in architectural practice community, national convention continuing education committee, and BIM award jury for the American Institute of Architects. Between 2003 and 2008, Dr. Kam had cofounded an internationally-acclaimed BIM program at the U.S. General Services Administration (GSA) and served as GSA's first ever National 3D-4D-BIM Program Manager with the Office of the Chief Architect.

Advisors' Comments

Phillip G. Bernstein



HOK

The design team used parametric modeling to its best possible advantage, managing the technical complexities of a difficult building type — a control tower — with skill while simultaneously creating a sophisticated and memorable design solutions. The control tower must be designed quickly but dynamically with consideration of not just internal systems like HVAC and structure but the external geometries of site lines to the airfield. As the problem evolves so must the design. HOK used Revit to its maximum advantage to optimize all aspects of their approach efficiently and with great technical precision yielding a terrific result that will be a symbol for this airport for years to come.

Hong Kong Housing Authority

The Housing Authority operates at enormous scale and similarly challenging capital investment. Design and construction decisions must be made in tandem with great speed, and the implications of those decisions multiply across the thousands of units of housing this agency puts online each year. Rapid insight matched with fast execution are the watchwords of their process, and they have deployed BIM in service of both in a most sophisticated manner. For a design to be standardized for the Agency, it must be thoroughly studied, evaluated and analyzed and BIM is perfectly suited to such a process when properly implemented. But what is truly remarkable about this implementation is the use of BIM not just to create repeatable solutions, but leveraging the parametric nature of the designs in BIM themselves allowing them to be rapidly adapted to changing site, environmental and construction constraints. This allowed the Housing Authority to see sustainable design not as a constraint but an opportunity. Using the collaborative model of the BIM Centre, they have developed a truly modern way of building that should be an example to the Hong Kong market for years to come.

InteliBuild Limited

Perhaps the greatest single inhibitor to accomplishing aggressive construction schedules is the integration of design, engineering and construction strategies smoothly. The BIM strategy for the Logistics Center took maximum advantage of Revit's ability to comprehensively describe and interconnect the elements of a design to discover problems virtually before they appear in the field during construction. The Logistics Center is to be built as quickly as possible, and eliminating as many

coordination problems before beginning that work was critical to making the tight schedule. The contractor was able to begin the project with the confidence that these problems had been worked out early, and they could deliver a quality project with speed and precision. This team demonstrated the value of BIM to construct virtually before building actually.

Kerry Properties Limited

Accomplishing tall buildings with appropriate "compactness" — that is, the efficient integration of enclosure, mechanical and structural systems in the smallest possible solution — is particularly difficult to accomplish with paper drawings produced by traditional multi-disciplinary tall building design teams. The Quarry Bay team working for Kerry Properties saw the possibility of examining each of these questions in concert by creating their design and BIM and allowing their solutions to work together, rather than against each other, towards these aims. Designs which aggressively squeeze multiple systems together in tall buildings rely heavily on the proper three-dimensional coordination of elements, particularly in the cores and ceiling plenums, and 2D drawings rarely provide enough information for the team to be confident that the "Swiss Watch" is fitting together well. The Quarry Bay team's building information model gave the architects, engineers and constructors the chance to orchestrate this dance carefully in digital form before trying to do so on the construction site, and set a new standard for how tall buildings can be designed quickly and effectively in Hong Kong.

The Hong Kong Polytechnic University

The HKPU team used BIM for one of its most important purposes: allowing the entire project team of clients, architects, engineers and constructors to understand the design as it develops. Traditional drawing techniques can be particularly problematic when trying to define and explain a complex building project like a teaching laboratory, especially when the decision-makers are trained as scientists, educators and researchers and not architects. Exploiting the richness of the 3D model to develop and refine the design means using BIM as not just a documentation tool but a platform for collaboration. A laboratory project has many components at different scales, from research space layouts to specifics of equipments. Small decisions of location have huge implications for use, and this team used BIM to make sure that everyone understood those implications before they were built and it was too late to change them.

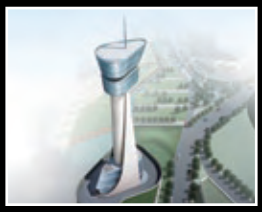
Phillip G. Bernstein ***FAIA, RIBA, LEED AP***

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.

Advisors' Comments

Emmanuel Samuel



HOK

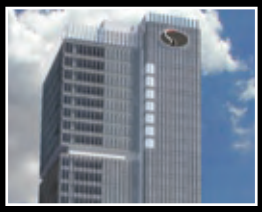
Managing change was key to use of BIM for this project and BIM helped a quick turnaround of design changes, coordination with consultants for the complex Air Traffic Control Tower in Mumbai. Complex geometrical design of tower meant that client understood the design intent and visualization helped a healthy dialogue with the design team.

Hong Kong Housing Authority

HKHA project proves that Revit is very good tool for modular pre-cast designs. The idea of using this as a prototype and ability to create a new design and document from scratch is an efficient and cost effective process. All other elements of design such visualisation, thermal and solar studies, clash detection has lead to establishing a comprehensive process for project delivery for HKHA. BIM cell, dedicated BIM support team and creation of BIM User Guide and BIM Design Guide definitely give them a thought leadership position.

InteliBuild Limited

BIM is changing the way AEC industry works. Fragmented nature of AEC industry is driving construction firms like Goodman to engage firms like InteliBuild to create 3D models for use in construction. By having a digital virtual model to understand how the building has to be put together. Understand and eliminate clashes before construction begins and help to keep RFI to minimum. This has helped Goodman to deliver quality project on time and on budget.



Kerry Properties Limited

With many consultants on board to design and deliver this high rise building BIM has played a key role to help make right design decisions. Design implication are more visible with BIM model and clash detection tools helped to make changes to design and coordinate with other disciplines easy.

The Hong Kong Polytechnic University

A complex project where coordination was the key challenge. BIM played an important role to ensure coordination of design and documents for all disciplines. Used BIM to deal complex design layouts and equipment requirements for labs and ensure clashes were fixed before construction started. The team also came up with new standards for documents with 3D perspective images to ensure contractor and sub contractors understood the drawings more clearly.

Emmanuel Samuel

Sales Development Director, Architecture, Engineering and Construction (AEC)
Autodesk Asia Pacific

Emmanuel Samuel is Sales Development Director for Building Solutions Division, Autodesk Asia-Pacific. He is responsible for driving the Architecture Engineering and Construction Business in Asia Pacific.

With more than 18 years experience in the information technology industry, Emmanuel has worked with a range of multinational IT companies such as IBM, and enterprise asset management companies such as Datastream Systems.

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 Modeling) 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:

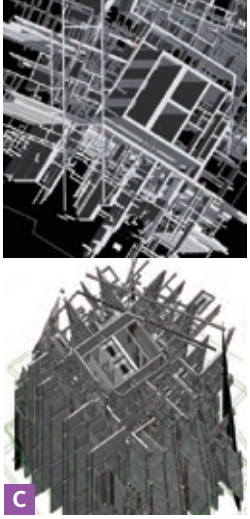
- Enhance communication and partnership between different segments in the industry;
- Promote the development, usage and awareness of CAD/CAM/BIM design technology in HK, China and Macau;
- Advance the professional standards on Autodesk products;
- Provide latest technology update (e.g. Building Information Management);
- Provide cross-border technology exchange/visit;
- Express and share opinions and views on CAD/CAE/BIM technology development;
- Act as a platform for technology exchange and experience sharing.

Want to know more about AIAB? Contact us now!

Joshua So, AIAB Supervisor

Email: joshua_so@synnex.com.hk

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



BIM ripples — from now to the next 10 years

20 years ago, no building professionals used Computer Aided Design (CAD). Now, we can hardly find any hand drafter in the industry. 10 years ago, no building professionals heard about Building Information Modelling (BIM); today, we are celebrating the BIM Awards to outstanding building professionals utilising BIM in their practice. What is going to happen in the next 10 years?

BIM ripples far greater impacts than CAD. It affects not only the technical drafting part of the building process, but also the planning, architectural design, structural/ building services co-ordination, authority submission, quantity and cost estimation, construction and even facility management. While clients, architects, engineers, contractors and operators are enjoying the benefits from the technology, they are facing new challenges in the traditional practices and professionalism. New generation of architects and designers that process the techniques are becoming popular; contractors are building better coordinated and less wastage buildings; and new profession known as BIM Consultants or BIMers is emerging. Professional bodies and educational institutions are supporting the industry with BIM standards and trainings.

Following the maturity of the computer software techniques and recent completion of BIM projects both local and overseas, building practitioners begin to realise the cutting edge technology can offer them competitive advantages over traditional practices, and, facilitating sustainable design.

BIM Awards 2009 organized by Autodesk recognizes and appreciates the contributions of different BIMers to the industry; advancing the BIM technology and demonstrating to the not-yet-BIMers the effective way of making better buildings, and it is not hard to imagine more and more BIM projects emerged in the coming future.

A. BIM produces complex geometry for curtain walling design

B. 3D internal space quality as produced during design phase

C. Exposed skin showing structural elements for complicated geometry tower

David Fung

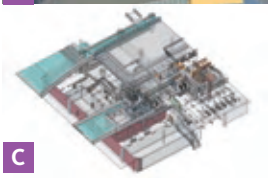
HKIA, Registered Architect, HKIBIM

David is a Hong Kong Registered Architect and the Head of BIM Division of an architectural practice. BIM has been the main design and documentation tools for his works for over 10 years. BIM projects include residential towers, houses, offices, shopping centres, churches, universities, logistic centre, MTR and train stations. His BIM team won the Hong Kong BIM and International Revit Experience Award in 2007.He teaches BIM technology in different universities in Hong Kong and overseas such as HKU, PolyU, HKUSPACE, TsingHua University. He leads internal BIM training to architects. He was also speakers for various BIM forums and conferences to different professional institutions in Hong Kong, Shanghai, Beijing, Tokyo and Seoul. David is also the current Chairman of Autodesk Industry Advisory Board and the Vice Chairman of HK Institute of BIM aiming also at promoting the BIM technology.


Artist impression

A


B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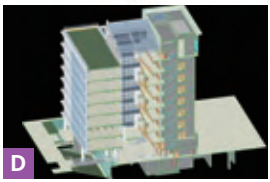

D

BIM for HK Science Park Building 20

The Science Park Building 20 is the first building development of the Corporation marching into the Building Information Modeling (BIM) application. We successfully managed the adoption of BIM in design activities by consultants. It is now progressing into construction phase and the application of BIM will continue providing a platform to facilitate team members to witness various construction phases in 3D cyber space.

BIM covers geometry, spatial relationships, geographic information, quantities and properties of building components. It is a process which goes far beyond switching to a new software, but a substantial shift from the traditional computer aided drafting method of drawing with vector file based lines that combine to represent objects.

It is good to hear that the adoption of BIM in Hong Kong's AEC industry is rising rapidly over the past few years. It enables designer to focus more on design rather than drafting. The interfacing development with other simulation tools further enhances BIM to be a total solution for building designs.

Innovation never ends. BIM is not merely a drafting tool for AEC industry, with adequate middleware deployment, the extent of its reach can further be extended to cover the building operation life cycle. I look forward to seeing this from happening and welcome the BIM industry players participating and scattering it around the industry.

A. Hong Kong Science Park Building 20
B. Interior study
C. Basement study
D. Sectional study

Ir Dr Stewart Wan

CEng, MIET, RPE, MHKIE, MCIBSE, SrMIEEE, CAP

Ir Dr Stewart Wan is a Project Manager of Hong Kong Science and Technology Parks Corporation. He looks after the building development and IT projects for the Hong Kong Science Park and its IT operations. Stewart is a Chartered Engineer. In these years, he has driven the adoption of BIM applications and green concepts in new building development of Science Park. He is author of international journal articles and book chapter in respect of IT management. He is also a certified carbon auditor professional accredited by the Association of Energy Engineers.

BIM – Building Information On Demand

When people lack good information, they will invent some information themselves. When they don't know how well their project is doing, they will try to guess. When they don't know how other teams are performing, they will make assumptions. When they don't understand what their colleagues contribute to the organization, they will invent their own reasons. And when they don't know about their manager's personal life, they will gossip about it. Jurgen Appelo.

BIM is replacing conventional AEC graphical jargon by a simple and easily understanding way. The BIM seems can greatly improve our information quality and quantity. But for communication purpose, the real BIM must be ubiquitous, like email, google or mobile phone. We can get the good information on demand.

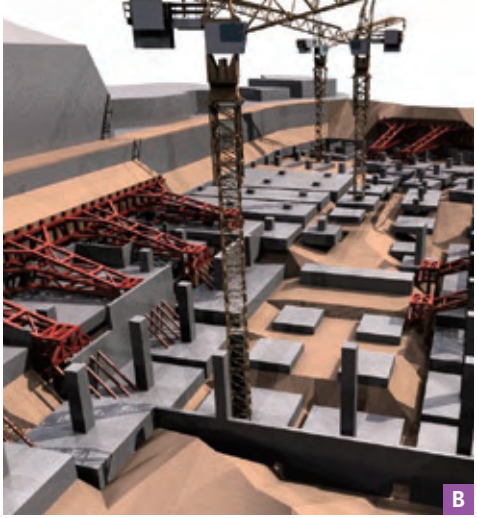
A. BIM model of a new shopping mall in Shanghai
B. conventional AEC graphical jargon
C. communication with BIM
D. BIM information via ubiquitous web technology

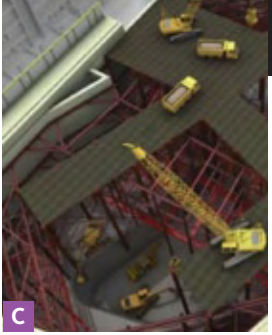
Elvis Li

VP, Tecton Limited

Mr. Elvis Li is the VP and Director of Tecton Limited, the leading building information modeling consultant in Hong Kong and China.

With his 8 years experience in Government, developer, designer and contractor and over 7 years experience of planning and implementing BIM and BLM project, he has successfully created a series of value adding services for building industry from feasibility study to facility maintenance phase. He has managed over 50 BIM projects in Hong Kong, Shanghai, Beijing, Tokyo and Mumbai.





Virtual Construction — InteliBuild Engineering Solutions

Demolition, excavation, piling, strutting, rock breaking, historic buildings, slopes, culverts, bridges, MTR stations, construction equipment and new buildings ...

4D Virtual Construction simulations are used to analyse and plan all of these works using InteliBuild Building Information models and construction assessments.

Hip Hing Construction used InteliBuild 4D analysis for their recent bid for the Hong Kong University Centennial campus to examine slope stabilisation, excavation sequences and to mitigate the risks of movement and disruption to the existing historic buildings and campus facilities.

Leighton Contractors and InteliBuild engineers are collaborating on the planning for the excavation, tunnelling works and station construction activities for the MTR West Island Line contracts.

For the new West Kowloon Terminus of the high speed Express Rail project, InteliBuild are assisting the AECOM project planners with excavation analysis, construction sequencing, temporary traffic management plans and engineering solutions for culvert diversions, bridge alignments and other major structural works.

Innovative engineering analysis, constructability assessments and detailed building information models enable engineers, contractors and clients to plan fast track complex civil engineering and building projects to mitigate risks and save money.

A. Hysan Hennessy Centre Redevelopment, Construction Simulation

B. Hong Kong University Centennial Campus, Excavation Sequence

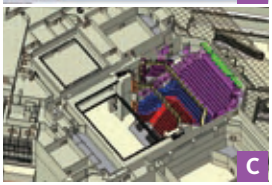
C. Hysan Hennessy Centre Redevelopment, Basement ELS

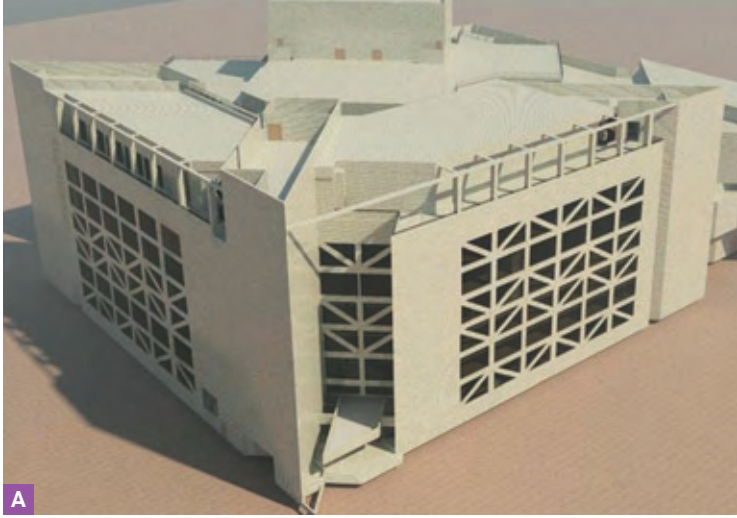
D. 5D Quantative Excavation Analysis

Ir Ronan Collins

MIStructE, MHKIE, RPE CEng, BIM Manager

Ir Collins is an experienced BIM Manager and specialises in the management and production of detailed and accurate BIM models for the purpose of design and construction co-ordination. He is responsible for planning and implementing the BIM projects in direct collaboration with clients, consultants and contractors. By combining his structural engineering knowledge and skills, leadership and management talents and the latest BIM processes, Ir. Collins has developed a specialised and focused consultancy business based in Hong Kong.



Adopting BIM for Facilities Management

Introduction

The Hong Kong Academy for Performing Arts (HKAPA) has a range of flexible and high international quality performance venues. To maintain and enhance the quality and standard of the facility, the facility manager faces a lot of challenges, like renovations, upgrades, and maintenance. Equally important to managing the physical changes to the facility, project data needed to be captured and maintained. This information is reused when the complex goes through its natural changes. Though FM practices are diverse in their requirements, there is a need for a central repository for all geometrical and textual data. BIM is the best way to capture all the information.

Difference of using BIM from Traditional Methods

The conventional CAFM approach uses 2D CAD file as an underlay, to create "polylines" that define an area and identify room numbers to name that area. Whenever changes happen, "polylines" need to be updated, and subsequent changes to the FM database need to be re-entered. This make the process error prone.

But BIM reads the room boundaries, room areas, room numbers and descriptions from the central information portal, and compares it to the existing database to find new and removed rooms, and then updates automatically. This shifts from 2D-based documentation and staged delivery processes to a digital prototype and collaborative workflow.

An accurately digitised BIM model created the baseline to accommodate equipment, assets and systems with spatial referenced data. BIM-based process improved design and FM process, which increases the value of project information in each phase and decreases the effort required to produce that information.

A. Bird eye view of HKAPA
B. Staircase and Escape Route
C. Main Theatre
D. Drama Theatre

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.

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Date: 5-Jan-10 (Tue) Course Code: 093-159390-01
Time: 6:45-9:45 PM (10 sessions) Venue: Tsimshatsui Centre

Introduction to 3D Animation using Maya

Date: 20-Nov-09 (Fri) Course Code: 093-159100-01
Time: 6:45-9:45 PM (10 sessions) Venue: Mongkok Centre

Fundamental of 3D Modeling using 3ds Max

Date: 21-Oct-09 (Wed) Course Code: 093-159315-01
Time: 6:45-9:45 PM (10 sessions) Venue: Mongkok Centre

Fundamental Computer-Aided Design using AutoCAD

Date: 4-Nov-09 (Wed) Course Code: 093-159360-01
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Autodesk, Inc., is a world leader in 2D and 3D design software for the manufacturing, building and construction, and media and entertainment markets. Since its introduction of AutoCAD software in 1982, Autodesk has developed the broadest portfolio of state-of-the-art Digital Prototyping solutions to help customers experience their ideas before they are real. Fortune 1000 companies rely on Autodesk for the tools to visualize, simulate and analyze real-world performance early in the design process to save time and money, enhance quality and foster innovation.

Autodesk Hong Kong office has been established since 1992.
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