Autodesk

Better by Design

Autodesk Hong Kong BIM Awards 2010

Preface

In 2002, Autodesk introduced the Building Information Modeling (BIM) concept to Hong Kong. BIM is an integrated process that allows architects, engineers, builders, owners and other design professionals to represent the building process digitally. It has gained widespread support ever since.

Autodesk has been enabling BIM to stay ahead of the trend by constantly updating and improving our innovative design interface over the years. Autodesk has developed the broadest portfolio of state-of-the-art software to help customers experience their ideas visually. In turn, BIM models representations of the actual parts and pieces being used to build a building and therefore bridges the gap between planning and production seamlessly.

More precisely, BIM helps you "get more of what you want and less of what you don't". It aids the prediction of building performance by visualizing the impact of design changes before building. This can minimize costly errors during construction and preview the materials required off site. As a result of that, the cost estimates for construction and operation can be calculated more accurately.

Besides, BIM helps create a more sustainable environment. How do we do that? With more accurate figures, waste can be minimized. Graphic plans are done electronically so a variety of models can be created. On the other hand, the changes made due to environmental concerns can be amended easily. Different factors can now be taken into considerations before the construction takes place. Newly added features in our software also promote energy-efficient building practices.

The Autodesk Hong Kong BIM Awards celebrate building industry professionals and educators in Hong Kong with extraordinary designs and concepts. Together with Autodesk, they are definitely one of the most important participants to kick start the transformation of the building and construction industry through the innovative BIM technology.

On behalf of the Autodesk team, I would like to congratulate all the award winning organizations and thank you all for supporting today's event. I am sure that all of you are excited to find out how the software can capture and fine tune our winners' design. Read on to find out more about how these companies make the most out of our BIM technology and start to explore what our products can do for you.

Patrick Williams
Senior Vice President, APAC, Autodesk

Preface

Renowned for its magnificent skyline, Hong Kong has always been crowned as one of the busiest cities in the world filled with magnificent skyscrapers. In recent years, Macau has also been catching up as new casinos, hotels and other tourist attractions are being built. I am excited to see the growing popularity of Building Information Modeling (BIM) in Hong Kong and Macau in many of the major building projects. In over 185 countries in the world, more than 10 million professionals are already using Autodesk products to save time and money, gain competitive advantage, and change the way ideas are brought to life.

BIM is the process of generating and managing building data by using three dimensional and dynamic computer models to better showcase their ideas and deliver these ideas faster while minimizing environmental impact in the building design and construction process. As one of the leading companies in the world with BIM technology, Autodesk enables users to visualize their projects before they are even built. This greatly increases the efficiency of communication and consistency between architects, engineers, construction professionals and facility owners.

In 2010, winners of the Autodesk HK BIM Awards have demonstrated how BIM can channel brilliant ideas into these world-class designs. BIM is one of the important contributing factors in raising productivity and lowering production costs to assist our clients to stay ahead of the business. Autodesk will continue to help architects, designers, engineers, manufacturers, and artists to enhance their designs by enabling them to experience their ideas virtually — as stated in this year's theme — Better By Design.

I wish to congratulate, once again, to all the winners of the awards: Aedas Limited, Gammon Construction Limited, Hong Kong Housing Authority, The Luk Hoi Tong Co., Limited, MTR Corporation Limited and Scott Wilson Limited. I am also grateful to contribution of all the supporting organizations: The American Institute of Architects Hong Kong Chapter, Chartered Institute of Architectural Technologists (Hong Kong Centre), The Chartered Institute of Building (Hong Kong), The Hong Kong Institute of Architects, The Hong Kong Institute of Building Information Modelling, Hong Kong Information Technology Joint Council. The success in implementing the Autodesk BIM software is not limited to the six winners of the awards. Experience by yourself and discover what BIM could possibly bring into your business!

Wendy Lee
Branch Manager, Hong Kong and Macau
Autodesk

The Luk Hoi Tong Co., Limited

Office:
Proposed Office Redevelopment of 31 Queen's Road Central

Location:
Central, Hong Kong

Type:
Commercial

Scheduled Time of Completion:
2011

A Design Dress Rehearsal Before Building

The exquisite exterior of the new building created in BIM.

Located in a highly visible and centrally located spot in Hong Kong, the LHT project team wished to create a more iconic building by remodelling the older office building. As a property developer, LHT has a strong interest in how BIM can improve and speed up the development process. BIM represents a revolutionary new way of working in the building industry that has the potential to improve the design and construction processes very significantly. To be able to use BIM effectively on the 31 Queen's Road Central project signifies the company is a participant in the forefront of this innovative process.

The Combination of the Ancient and the Advanced

Inspiration for the new building design is drawn from the site and its unique cinematic history and physical characteristics. Situated at a prominent corner next to the pedestrian Theatre Lane, the sculptural form of the building façade is derived from the metaphor of a theatre curtain opening to reveal the office and retail programs within. The openness and transparency of the building façade frames a new dynamic and engaging street environment for Theatre Lane. Main concerns included the complexity of the exterior curtain wall and complex roof system and the numerous site constraints imposed on their construction process in the constantly busy part of Central. To achieve this complex design, BIM technology comes in handy.

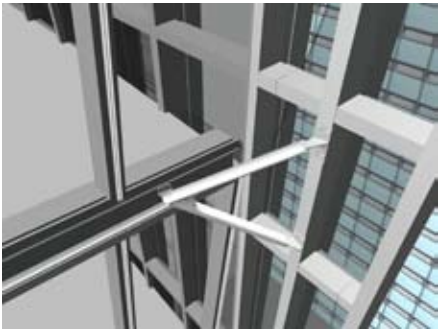
The team favoured Autodesk's software versatility and compatibility with different software platforms, in that most consultants that they worked with are familiar with the software. The design team from Rocco Design Architects Limited successfully executed the challenging design with the aid of BIM as a powerful visualization and design tool.

Visualization at an Early Stage

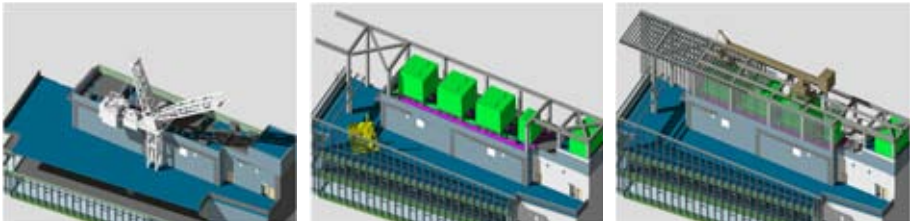
The project team was able to meet their very challenging timeline with the aid of AutoCAD, Autodesk Revit, Autodesk Navisworks. Because they were able to model and then visualize design proposals in a very realistic way quickly, the team in turn was able to modify and confirm their design decisions in a very fast manner. BIM allowed them to visualize, the design very realistically at an early stage so that they were able to evaluate and resolve problems and make design revisions early on.

Throughout the design and construction process, the team had used BIM as an intense in-depth visualization tool. The key to its effectiveness was that it allowed them evaluate and analyze their product from multiple perspectives. They traditionally use a third person perspective to analyze building systems and details, but BIM also allowed them to easily use a first person perspective to

The curtain wall views from the inside.



Bracing details of the new building.



The construction sequence of the roof feature.

evaluate the experiential qualitative aspects of the building spaces. Overall BIM was able to improve and enhance their building design in the following areas:

i. Exterior Design of the Building

The team was able to visualize the exterior design in a very realistic surrounding context from multiple perspectives, allowing them to fine tune the aesthetics of the design based on their clear understanding of how the design would look and feel from different vantage points. The LHT team used BIM to study the sculptural nature of their curtain wall facing Theatre Lane and how it impacts the street environment. This is very different from the 3D images in the old days where they are just mere representations of the artists. With BIM, the project team recognized the images generated were accurate representation of the design and the same set of information is going to be used in the construction.

ii. Curtain Wall

The team created virtual mockups of the architectural details of their complex curtain wall design, which observed from the vantage point of both inside and outside the building, allowed them to analyze and refine the details' aesthetics and structural capacities. Ultimately, they made revisions to create more elegant and more structurally efficient curtain wall details. An example is a bracing detail supporting a cantilevered portion of the curtain wall.

iii. Roof Design

BIM helped the team coordinated and combined the mechanical area of the design and construction sequencing of their complex roof design feature which is important to the aesthetics of the building, but at the same time had to incorporate the building's mechanical and building maintenance unit equipments. This was a very challenging task as they had many functional requirements that must be incorporated within various structural, spatial, and constructability limitations. BIM allowed their contractors to successfully coordinate the construction sequence of these structural and mechanical elements.

Resolving Design Conflict

Virtual overlay of their building's structural and M&E systems allowed them to detect conflicts and clashes at an early stage, so that the team was able to resolve these problems without delay, while as part of the same analytical process they were able to improve the overall mechanical layouts at each floor. As well, necessary adjustments were made early to avoid construction errors.

Our contractor used BIM as an analytical tool at the very beginning of the process to understand the design better, allowing

for more efficient construction sequencing, resulting in construction cost savings in time and materials. This helped to make sure the project can be completed on time according to the project schedule.

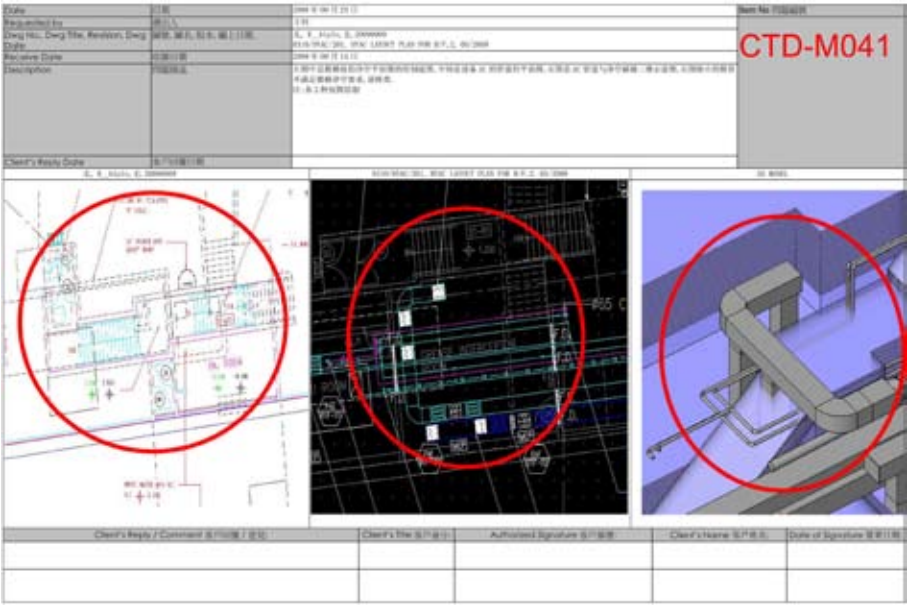
Refining Construction Details

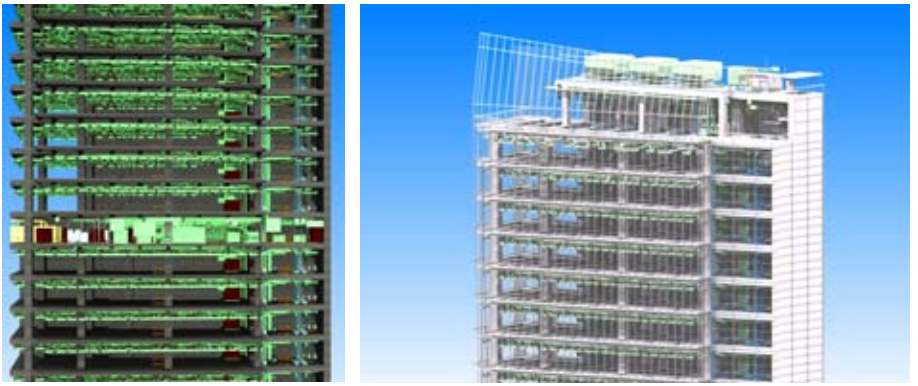
This was the first time the LHT company has used BIM comprehensively. Our design teams have traditionally used AutoCAD for past projects. BIM software is a much more efficient and powerful design and documentation tool as compared to traditional 2D-based design and documentation tools such as AutoCAD. With BIM, the team can design, visualize, perform analyses, and generate documentation all in the same virtual environment. Conflict or clash detection can be performed quite automatically. Moreover, with its capability for accuracy and precision, BIM is a valuable design tool for the refinement of construction details.

By using BIM as an analytical tool, the team was able to study the architectural and M&E layouts of the building quite easily in 3D, allowing them to quickly evaluate and make design revisions that ultimately improved our building efficiency, thus yielding them higher building productivity. For example, one result was that they were able to improve the mechanical layout inside the ceiling spaces and generate higher headroom clearances for our building's commercial lettable spaces.

Creating a More Sustainable Building at a Lower Construction Cost

BIM had helped the LHT contractors built in a more sustainable manner. They were able to estimate material quantities much more accurately. Thus, building materials could be saved. With better preparation for construction sequencing, contractors could plan to work more efficiently and save time, thus reducing the embodied energy associated





M&E and structural systems analysis.

with a typically longer construction timeline. This translates to savings in construction costs. Also, because the team could visualize the product at the early design stage, they could evaluate and make design changes early, to avoid costs involved with making design changes during or after construction.

In the future, LHT hopes that all parties can use BIM effectively. For example, for design consultants, the LHT thinks that it would be in the client's best interest if the design consultants can spend more time working on design issues and improving the quality of a design product rather than on dealing with documentation coordination, drawing management, and conflict detection. BIM takes care of all these things to allow the designers to focus on design. Cities like Hong Kong are perfect settings for the application of BIM, because of its density and limited space which creates a lot of complexity and restrictions for the development process. BIM is a comprehensive tool that can help developers and designers visualize and understand the nature of this complexity in a quick and clear manner. Darrell Chan, an Executive Director of LHT further commented that, "Overall the design process was truly enhanced by our ability to experience numerous realistic virtual mockups. In this sense, much like a director of a theatrical production, the design team had the benefit of a true Design Dress Rehearsal for our project at Theatre Lane."

陸海通有限公司
THE LUK HOI TONG CO., LTD.

ABOUT THE LUK HOI TONG CO., LIMITED

The Luk Hoi Tong Co., Ltd. (LHT) is a privately owned development company in Hong Kong founded in 1926. LHT has over the years developed various residential and commercial properties throughout the Hong Kong Region. The company currently holds a property portfolio that includes retail and commercial office properties such as the one being developed at 31 Queen's Road Central.

At 31 Queen's Road Central, the company had operated the historic Queen's Theatre for over 80 years prior to the site's redevelopment in 2008. The new development will be a premium mixed-use commercial building. LHT is strongly committed to high-quality sustainable development and the continual betterment of urban settings that surround its building projects.

In addition, the company also currently operates the Luk Kwok Hotel in Wanchai, the Nathan Hotel on Nathan Road in Kowloon, and the Dragon Inn Seafood Restaurant in the New Territories.

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 were consolidated and recorded. In addition to the comments of the selected projects, the overseas advisors also shared with us about the BIM development in other parts of the world.

Supporting Organizations

- The American Institute of Architects, Hong Kong Chapter (AIA HK)
- Chartered Institute of Architectural Techologists, Hong Kong Centre (CIAT HK)
- The Chartered Institute of Building, Hong Kong (CIOB HK)
- The Hong Kong Institute of Architects (HKIA)
- The Hong Kong Institute of Building Information Modelling (HKIBIM)
- Hong Kong Information Technology Joint Council (HKITJC)

Advisory Panel -Representatives of Supporting Organizations

Mr. Bernard Chang, *Senior Associate Principal*
The American Institute of Architects, Hong Kong Chapter

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

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

Mr. KS Wong, *Vice President*
The Hong Kong Institute of Architects

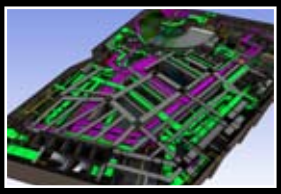
Mr. William Poon, *Member*
Hong Kong Information Technology Joint Council

Mr. Y. Y. Yip, *Board Member*
The Hong Kong Institute of Building Information Modelling

Advisors' Comments from Supporting Organizations

Aedas Limited

The project team has managed to use BIM technology from form creation, design information coordination to accurate modelling in a systematic and creative way. The Application Programming Interface (API) usage can help integrate data in different BIM software efficiently. Procedures are simplified and the design workflow is well organized. We look forward to seeing the usage of the information in the next stage of project development and in the construction process where the BIM data may be reused to speed up the process.



Gammon Construction Limited

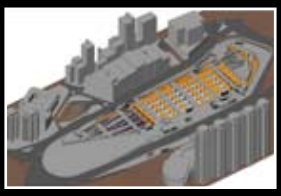
The project team has done a good job in combining the information in the construction programme with BIM. This has advanced the usage of information and facilitated the construction sequence decision which improves in the pre-fabrication practice. Also, the enhanced RFI process helps to clarify the construction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

Hong Kong Housing Authority

The effort and resources input into the usage of BIM to enhance the existing workflow as well as the existing business practice are appreciated. BIM usage can also be seen in the design checking process. Moreover, by integrating with environmental performance analysis, the sustainability of building design can be improved. More sharing in this kind of sustainable design integration is highly encouraged.

The Luk Hoi Tong Co., Limited

The BIM technology is implemented at an early stage to assist in decision making. The BIM model created in the design stage can be extremely useful in the construction phase. The comprehensive usage of BIM can present a real environment to the stakeholders. This improves the communication between different parties. We also appreciate the effort put in to develop real-time walkthrough where details are provided precisely.



MTR Corpration Limited

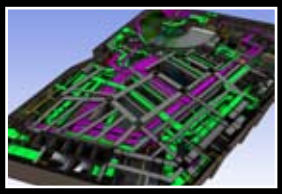
The adoption of the object library and project standard transfer technology makes it possible to deliver consistent BIM data between different stations, it also enables the data sharing amount different software. Consistent drawing standard and station design can assure the quality.

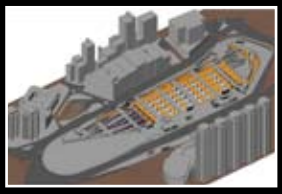
Scott Wilson Limited

The project team cleverly integrates the existing environment with the new design in the same BIM, so that the team can make advance and accurate decisions. Design information can be visualized in 3D at an early stage to reduce the possible delay and construction nuisance to public. The initiative to creatively use BIM to fulfill their clients' requirements is also appreciated.

Advisors' Comments

Dr. Calvin Kam


Congratulations to Hong Kong for holding the 4th Annual BIM Award! This year, I am excited to see a well-balanced representation of BIM showcases from visionary owners, innovative designers, and thoughtful contractors. The spectrum of project and program types is promising. As the National Chairman of AIA Technology in Architectural Practice Community, I can attest to the value of BIM Award Programs in catalyzing the advances of building industry.

BIM has empowered Aedas with design freedom. Aedas has embraced the power of parametric modelling to aid in their rationalization of organic forms for the West Kowloon Terminus Entrance Building. While BIM has enhanced project documentation, communications and review, there is a good opportunity for the project team to explore direct fabrication from computational numerically-controlled models and continue to leverage the power of BIM during the fabrication, assembly and installation processes.

Gammon utilized BIM in construction planning and coordination. The visualization power of BIM played an important role in the communications of the Hennessy Centre Redevelopment Project. 4D model and 3D-based simulations added value to the high-rise construction in a tight urban jobsite. I would encourage the team to explore the incorporation of BIM-based cost estimation and scheduling as the logical next steps.

Scott Wilson illustrated that BIM was about virtual design and construction, not necessarily referring to "building" as a fixed subject, but could also refer to BIM in civil and infrastructure projects. I would encourage the project team to document and quantify the impacts of BIM-enabled design as opposed to conventional practice.

Luk Hoi Tong Company integrated BIM into their design iterations and construction planning. Design rehearsal, construction documentation and quantity survey were the benefits reported by the project team. Similarly, I advise the team to further advance their BIMs in areas such as fabrication and cost estimation.

We shall credit the Hong Kong Housing Authority and the HK Mass Transit Railway Corporation for two significant levels of contributions to the industry. First, they demonstrated the value of BIM on their respective projects in Tung Tau and in Shatin-Central Link. More importantly, HKHA and MTRC are demanding BIM across their project portfolios and thus, they are setting an irrevocable course for the building industry to follow. As a founder and senior expert of GSA's National BIM Program, I can appreciate the organizational culture, training program, procurement changes and industry engagement that are necessary to establish and sustain a sound BIM adoption.

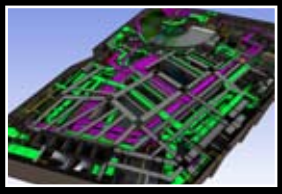
At Stanford University, we advocate the development of metrics and comparison between BIM practice and conventional performance. I would encourage Hong Kong industry leaders to quantify the added value of BIM. While with the 2010 AIA BIM Awards in the United States, we have seen project organizations with significant business transformation and process change that were empowered by BIM, while we have also seen a good spectrum of BIM applications from documentation, fabrication, energy simulation and more. I hope that Hong Kong professionals and leaders will be active citizens of the global BIM movement, commit to sharing, to learning and to collaborating with the global community in advancing the vision of excellence in design, construction and operation.

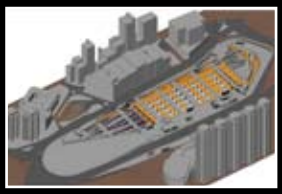
Dr. Calvin Kam *PhD, AIA, PE, LEED AP*

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. 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. Philip G. Bernstein


The 2010 Hong Kong BIM Awards is a strong indication that Hong Kong is rapidly becoming a major centre of world-wide innovation in the use of digital design and construction technology. The breadth, complexity and technical sophistication shown by all six of this year's winners suggest that advanced design and construction methodologies, supported by BIM technology, will soon become typical of projects in Hong Kong. The portfolio can only lead one to conclude that Hong Kong is now setting an example for the entire industry in the implementation of BIM for advanced urban projects of all scales.

Of particular interest is the breadth of BIM implementers represented by this year's awards, and the correlation of those firms' core business interests with the capabilities of the tools they have mastered so well. The range of projects—from office buildings to rail terminals to roadways—and the critical process improvements achieved—complex geometric design, establishment of new building standards, construction sequencing, sustainable outcomes—supports the idea that technology can truly transform not just the process of building but its results. From the beautiful sweeping curves of AEDAS's Kowloon Terminal Design—an idea that would not have been possible without their great skill with both design and design technology—to the pilot projects of the Hong Kong Housing Authority—where business practice of this critical

public owner and operator are being literally transformed by BIM—Hong Kong's owners, designers and builders have each embraced the fundamental value proposition of BIM itself. The value of the "I" in BIM ("Information") makes innovation in the service of great results not just possible, but likely.

I salute the designers, builders and owners represented by this year's BIM winners—AEDAS, Gammon, HKHA, Luk Hoi Tong, MTRC and Scott Wilson—as representatives of the newest, most innovative practitioners in our industry, and look forward to seeing even more exciting results from their work in the future.

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.

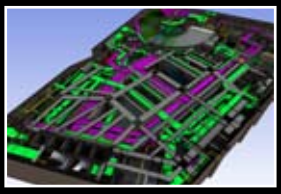
Advisors' Comments

Mr. Emmanuel Samuel

BIM is going through a lifecycle in Asia Pacific. The acronym got head turns only about 5 years ago. Productivity, ease of use and the ever increasing awareness around "Green" and "Sustainable Designs" has pushed the use of BIM within the built environment. Companies are looking for ways to fast forward the adoption of BIM tools. In the US, companies are constantly moving the capabilities of BIM towards Lean Construction, Integrated Project Delivery and so on. In Asia, the move comes from commercial companies wanting to create competitive advantage as well as government's renewed interest to drive productivity. In Japan, the effects of BIM being felt by pressure coming from abroad as well as recent Japanese Sustainable Building Council's collaboration with Autodesk to connect Revit with CASBEE green assessment tool. In Singapore, the construction authority has seen the benefits of using BIM and thus has gone live with the BIM implementation funding to entice local firms. In China, the owner of Shanghai Tower has openly embraced the use of BIM and is evangelizing BIM to the entire built environment.

Some of the best commercial and governmental visionaries in Hong Kong are constantly stretching the capabilities of BIM. The winners of this year's BIM awards are the true pioneers. It is a celebration and pleasure to honour this year's winners.

Aedas Limited
An interesting and complex project, the West Kowloon Terminus (WKT) is the underground terminus of the Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL) is constantly on the lime-light. What can't be done using vanilla Revit was materialized using API, keeping all the rest of the components coordinated. The benefit gained is a best practice and is extremely commendable.



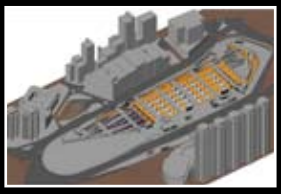
Gammon Construction Limited
Hennessy Centre, Causeway Bay is already a heavily built up area. Thus not to our surprise, congestions and sustainable targets, are clearly mentioned as key challenges. Gammon has used BIM technology to drive 4D simulation with the help of parametric Revit families to handle design changes while complying to the constrain. This could only be possible with Revit and BIM approach.

Hong Kong Housing Authority

HKHA not only uses BIM for design but is poised to transform business practices, motivates external parties as well as educated the build community to adopt BIM. The building teams collaborate and interrogate designs using technology enables best practices which can further be leverages in future projects. It is what we call "reusable knowledge" which will build a BIM culture within HKHA design teams.

The Luk Hoi Tong Co., Limited

Looking at the project details, Luk Hoi Tong has applied BIM approach well. One thing I like to highlight here is how they are meeting timelines. Luk Hoi Tong has used the BIM model as a collaborative platform by which all stakeholders are involved from the beginning of the design process. This is allowing them to spend less time fixing things and more time on design and delivery for construction.



MTR Corpration Limited

The designing of both underground and above ground structures and to keep it all constant is not an easy task. MTRC again has used the power of BIM in design options, scheduling, preliminary design drawings and the collaboration with civil engineering which is paramount in this type of work. By applying the power of BIM, MTRC is able to maintain high standards, consistent design information and save precious time.

Scott Wilson Limited

The nullah was constructed in the early 1960's to alleviate flooding. Many studies have gone on regarding drainage capacity, food protection, etc. Local residents have increasingly requested the rehabilitation. We are glad to see that one of our prominent customers is part of this special and important project. Scott Wilson has used BIM exactly the way it should be to help design this 600m section.

Mr. 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 Autodesk HK

Autodesk, Inc., is a world leader in 2D and 3D design, engineering and entertainment software for the manufacturing, building and construction, and media and entertainment markets. Since its introduction of AutoCAD software in 1982, Autodesk continues to develop the broadest portfolio of state-of-the-art software to help customers experience their ideas digitally before they are built. Fortune 100 companies as well as the last 15 Academy Award winners for Best Visual Effects use Autodesk software tools to design, visualize and simulate their ideas to save time and money, enhance quality and foster innovation for competitive advantage.

Autodesk Hong Kong office has been established since 1992.
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