

# BIM

Building Information Modeling

A New Chapter of Building Industry

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Hong  
Kong

Autodesk

# C O N T E N T

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### **Acknowledgement**

Sincere thanks to the four winning companies, Aedas Ltd, Henderson Land Development Co Ltd, New World Development Co Ltd and The Hong Kong Polytechnic University, in providing such valuable information and pictures of their projects. We are extremely grateful of the contribution of the AIAB committee and members, Mr YY Yip, Ir Francis Leung, Mr Elvis Li, Dr Andy Wong, Mr David Fung, Mr Philip Leung, Mr Kenny Tse, Mr Hermann Fong and Mr Wong Chi Wai, who are profiled in this booklet.

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# P R E F A C E



**Karsten Popp**  
*Senior Vice President  
Autodesk EMEA and Apac Emerging*

Building and construction is a complex business. The moment the speed factor is added, it becomes more complex. Customers are demanding completion in shorter time frames and the builders are committing time frames of nine months or less from concept to completion in order to deliver on time, reduce inefficiencies and streamline dependencies.

The building and construction industry in Asia Pacific is rapidly automating and streamlining its processes to stay abreast with the international business ecosystem.

Building Information Modeling (BIM) is an innovative new approach to building design, construction and management. It has changed the way industry professionals worldwide think about how technology can be applied to building design, construction, and management.

Building information modeling supports the continuous and immediate availability of project design scope, schedule, and cost information that is high quality, reliable, integrated, and fully coordinated.

Hong Kong is one of the most advanced countries in adopting building technologies among the world and it has played a crucial role in setting up standards in the industry among the world. With deploying cutting-edge technologies in its projects, Hong Kong is well-known for its effectiveness and efficiency in completing the world class building projects.

I here would like to congratulate the four companies, Aedas Ltd, Henderson Land Development Co Ltd, New World Development Ltd and The Hong Kong Polytechnic University, in receiving our first ever “BIM – A New Chapter of Building Industry” award. I am sure they have played a crucial role in setting up new standards in the building industry in Hong Kong and have built a very important milestone for Hong Kong.

Please congratulate the winners as we strive to provide best solutions for Hong Kong industry professionals to stay ahead of the competition.

Karsten Popp

# P R E F A C E

BIM is an innovative approach of architectural design and documentation to support the application of design phases, drawing and schedule production, procurement, construction engineering and facility management required for the development and life cycle of a construction project. The construction and real estate industry is interdisciplinary by nature. The whole process of real estate development, from site identification, through land acquisition, investment evaluation, capital funding, design development, construction processing, property and facility management is carried out by an interdisciplinary project team. In this context, a key factor in the successful delivery of built facilities is the achievement of cohesion in the project team.

BIM aims to provide an effective tool for facilitating the integrative and cohesive operations of the development process in built environment. The potential development of BIM applicative solutions is able to provide great opportunities in construction research and development (R&D). The academic institutes in cooperation with the industry should undertake the leading role in R&D. The research outcome shall also contribute to the relevant value-added training for the construction professions from vocational diplomas, up to undergraduate, post-graduate degrees and continuous professional development (CPD) of the related professionals. The Government as the biggest client in construction and infrastructure development should pay a significant role to promote and facilitate the application of BIM.



Andy Wong



**Dr. Andy Wong**

*Associate Professor  
Department of Building @ Real Estate,  
The HK Polytechnic University*



# Building Information Modeling (BIM) Development

## Information technology in the AEC Industry

In the old days, architect's offices were equipped with drawing boards and parallel bars. All the drawings were done with pencil and ink on paper. As only simple low-rise buildings were built, and people were living in buildings that had no lift and sometimes no water supply, there was no urgent need for sophisticated tools for architects to design buildings.

As construction technology was improving; many high-rise buildings appeared in the city areas like the Bank of China building in the 80s and Central Plaza in the 90s. The industry required a tool that could help them to manage large scale projects.

At the same time, computer technology was getting mature. In design offices, AutoCAD® software was replacing pencil and ink. Now, most if not all architects and engineers are making their drawings on a computer screen. It fundamentally changed the way drawings were made and saved a lot of drafting time so that professionals can focus more on important tasks.

Apart from CAD, information technology is being used in different stages of construction projects such as architects using computer rendering and animated presentations, and building contractors using project management software to manage construction process.

However, there are areas which the industry could harness more benefits from using more powerful yet easy to use IT software.



## How BIM evolves

In many places, one of the latest hot topics is the usage of 3D, 4D and the Building Information Modeling (BIM).

3D geometric models contain almost no intelligence whereas BIM models are objects containing the most intelligence. A 3D model includes a three-dimensional geometric representation of the building, whereas a BIM is organized as a prototype of the building including building floors, spaces, walls, doors, windows and a wide array of information associated with each of these elements.

The “I” of BIM stands for information; it is a data rich digital representation cataloging the physical and functional characteristics of design and construction. It can serve as a shared knowledge base that can be directly manipulated (computable). Its importance stems from having an open interchange of information across platforms and a transferable record of building information throughout a building lifecycle. BIM serves as a reliable foundation for decision making and provides a platform for automated analyses that can assist in planning, design, construction, operation, and maintenance activities.

BIM can greatly reduce errors made by the design and the construction team. One of the uses of BIM is conflict detection; the computer actually informs team members about parts of the building which clash. This error reduction process is a great part of cost savings and easily realized by all members of a project. Reduction of the number of RFIs also reduces the construction time and directly contributes to the cost savings numbers as well.

*Reference: Dennis Hall, BIM is Here. Now What? AEC Tech News, 2006. Kimon G. Onuma, AIA. BIM Ball – Evolve or Dissolve. Stephen Lau Siu Yu. The Role of Architects in the 21st Century. Professional Practice for Architects in Hong Kong. Lachmi Khemlani, Ph.D, Autodesk Revit: Implementation in Practice, Arcwiz, 2004. GSA Building Information Modeling Guide, U.S. General Services Administration, 2006.*



## AUTODESK INDUSTRY ADVISORY BOARD (AIAB) — THE 1ST BIM USER GROUP

On April 2005, a group of Revit users found that there was a need to form a user group to promote the development, usage and awareness of BIM design technology in HK. Therefore, The Autodesk Industry Advisory Board (AIAB) was founded. Through seminars and technology exchange conferences organized by AIAB, the use of the BIM technology in Hong Kong is getting more and more popular.

BIM is one of the keys to the future success of the Hong Kong AEC industry. The benefits are huge and some of the key players in the industry are already successfully applying BIM in different projects.

The adoption of the technology is progressing rapidly. In this section, several of the well known industry leaders are displaying how BIM helped to resolve different problems in their projects.



<http://www.aiab.org>



When you heard about the term “BIM, Building Information Modeling”, you may think it is just a 3D software or application. In fact, BIM represents a new Chapter of Building Industry. It is a new approach/subject on the design and works management of the real estate development from inception stage to post-handover stage. Unlike the traditional CAD software, the BIM software is an intelligent database that can give a lot of innovative applications. BIM can help the clients, consultants, engineers and contractors to visualize and integrate the design model and to co-ordinate the works model under a single source. It makes the design more tangible and meaningful in front of each team players and stakeholders. BIM application is a global trend and the knowledge of the BIM application is definitely required to manage a high quality building project in future.

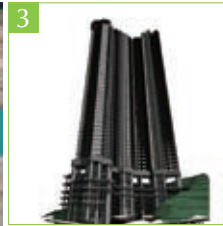
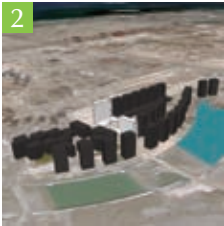
- 1 WORLD FINANCIAL CENTRE, BEIJING
- 2 BIM MODEL AT B3 LEVEL
- 3 ACTUAL SITE INSTALLATION AT B3 LEVEL
- 4 COMBINED SERVICES MODEL AT TYPICAL FLOOR



**Y Y Yip** *MHKIS, RPS (BS) Authorized Person*

Mr Y Y Yip is a Project Manager of Henderson Land Development Co. Ltd. He is a Chartered Building Surveyor and Authorized Person. With his 13 years experience in Government, developer, consultant and contractor, he is familiar with the process of the building project development. Recently, he plays a key role to promote BIM application in order that the industry and himself can have continuous improvement and excellent performance.





BIM is the new system for the design and documentation of building. Instead of presenting our design in drawings, the designed elements in a computer 3D model will all the design information stored. This information can be used in the design and output format without losing during the whole life of the building.

BIM has revolutionarily changed the design process. The drawing production efficiency, accuracy and consistency are dramatically improved. Designer can put most of his effort in the design, analysis, review and decision making which are the core values of his services.

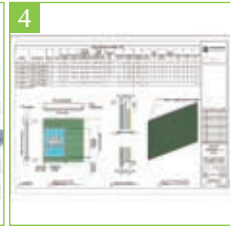
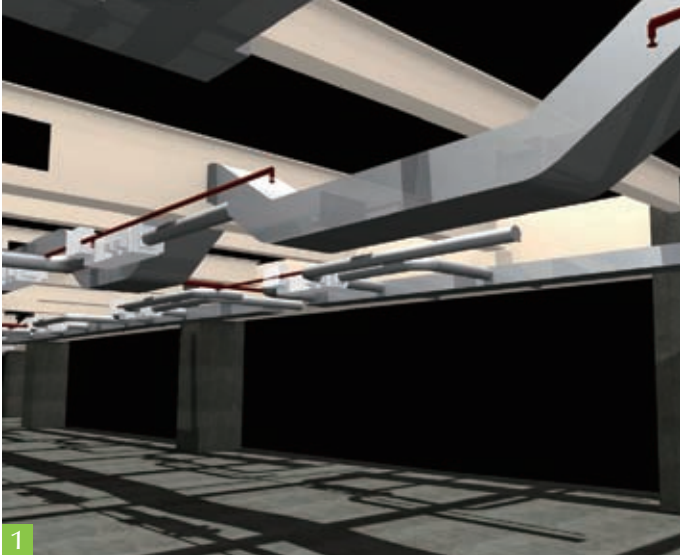
- 1 TOKYO INTERNATIONAL FORUM, TOKYO
- 2 BUSINESS BAY DEVELOPMENT, DUBAI
- 3 RESIDENTIAL DEVELOPMENT IN 152-160 KWOK SHUI ROAD, TSUEN WAN
- 4 RESIDENTIAL DEVELOPMENT AT KCR TAI WAI MAINTENANCE CENTRE, TAI WAI



### **Francis Leung** *CEng, MHKIE, MStructE, MHKIoD, RPE, RSE(HK), IRSE-PRC*

Ir Francis Leung is the Director of WSP Hong Kong Limited and Head of BIM for the offices in Asia region including Hong Kong, Shenzhen, Shanghai, Beijing and Manila. Francis has hands-on knowledge and experience in REVIT Structure. He starts using REVIT Structure in his projects since 2005. In WSP, the REVIT application is now extending to MEP to enhance the E&M design, coordination, drawing production and documentation.

Francis was the speaker in Autodesk University 2006. He will be the speaker again in Autodesk University 2007 in the intermediate and advanced classes for Revit Architecture and Revit Structure.



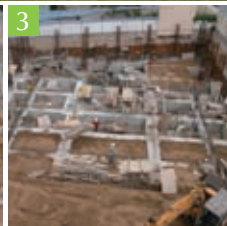
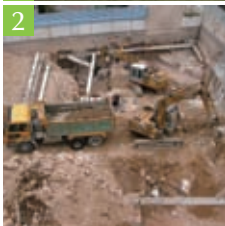
Elvis believes the building and current construction industry is at the turning point of history. In other industries sector such as aviation, automobile, manufacturing and medicine, fruitful results has achieved by reforming of information technology. Those resources of technologies, numerous and with high potential like BIM, are being embraced and used everyday besides us, and are providing the building and construction industry precious historic opportunities to make good use of them. The building and construction industry is at the high time to brush up its technologies that have remained similar in almost the last half-century to enable historic automatic production and consequently industrialization and digitalization in the construction industry.

- 1 COMBINED BUILDING SERVICES MODELING FOR CLASHES IDENTIFICATION
- 2 RFID BASED PROJECT MONITORING SOLUTION
- 3 MASS CUSTOMIZATION FOR RAPID DESIGN SOLUTION
- 4 PRECAST FAÇADE DRAWINGS FROM BIM MODELS



## Elvis Li

Mr Elvis Li is the Vice President and Director of Tecton Limited, the leading building information modeling and management (BIM) solution provider in Hong Kong & China. He has over 5 years of BIM & BLM experience from virtual prototyping, computer simulation, design and drawing conflicts identification, cost estimation, construction planning, RFID based construction monitoring to facility management. He is responsible for all stages and facets of more than 25 BIM projects in Hong Kong and China.



The construction IT known as IT applications in construction has always been a burning topic of research and development in the construction industry. BIM application is the core of construction IT for long where BIM solutions are commonly recognized to have great potential for enhancing the efficiency of the works in various stages of a construction development project including construction design, procurement, production, property and facility management. In normal applications, BIM solutions have three characteristics. The application creates and operates on digital databases for collaboration. It enables the management of changes throughout those databases so that a change to any part of the database is coordinated in all other parts. The application should also capture and preserve information for reuse by additional industry specific applications.

- 1 CONCEPTUAL MODEL OF AN INDOOR SWIMMING POOL
- 2 EXCAVATION OF THE SWIMMING POOL
- 3 SUBSTRUCTURE OF THE SWIMMING POOL
- 4 PRESENTATION OF BIM RESEARCH AT THE HK POLYTECHNIC UNIVERSITY



### **Andy Wong** *BBS, AP(HK), PhD, MCIQB, MHKIE*

Dr Andy Wong is the Associate Professor of the Department of Building and Real Estate, The Hong Kong Polytechnic University. He obtained his PhD from the Civil Engineering Department, Loughborough University of Technology, UK, on "An Integrated Information System for Hong Kong Contractors". He joined the University in 1987 after 10 years working with contractors and consultant firms in a wide range of aspects: quantity surveying, contract administration, project management, quality assurance and computer applications for construction management. He has been involved in various consultancy jobs for the Department, and has also been appointed to various government committees: such as the District Council, Town Planning Appeal Board, the Hospital Governing Committee and ICAC Corruption Prevention Committee etc. Dr Andy Wong is also the appointed district councillor.



Architects have been designing buildings for thousands of years by means of 2D drawings. Whilst 2D drawings maintain the traditional methodology of designing and communication, it nevertheless imposes limitations to the design process. BIM, completely revamps the design process and redefines the roles of all the different building professionals. The technology has proven itself to be a far better and efficient way of building co-ordination and designing, which will definitely create great impacts to the building industry as a whole.

City University Community College is one of the BIM Projects that Aedas adopted this technology. The university project involves the construction of a 40,000 sq.m teaching facilities at the existing campus. While the whole project was initiated by means of BIM, we greatly improve the methodology in the following aspects:

1. Design visualization
2. Drawing productions
3. Services co-ordination and clash detection with other disciplines
4. Quantity taking and preparation of Tender Document
5. Automated Statutory Submission
6. Scientific analysis of different environmental aspects
7. Supply Chain Integration with the manufacturing and production

**1** COMPLICATED GEOMETRY: DUBAI OCEAN HEIGHT ONE (COURTESY: AEDAS AND MR ANDREW BROOMBERG)

**2** INTEGRATION WITH SITE: CITY UNIVERSITY

**3** BUILDING SERVICES CO-ORDINATIONS: UNIVERSITY PROJECT IN SHENZHEN

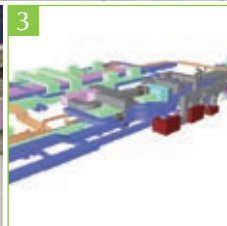
**4** DESIGN IN 3D SPACE: CITY UNIVERSITY OF HONG KONG



### **David Fung** *HKIA, RAIA, Registered Architect*

Mr David Fung is a Senior Associate of Aedas Ltd, the 4th largest architectural firm in the world. Apart from his usual working as a practicing architect, he is also currently the Division Head of BIM of Aedas, using the BIM technology in his works.

David has been using BIM technology since 1998 on all kinds of projects ranging from office towers, hotels, institutional buildings, theatres etc. He teaches this technology in Hong Kong universities and professional institutes, and was the speaker for public forums in Beijing's Tsing Hua University, Korea and Japan.



BIM (Building Information Modeling) is a very powerful tool for the transportation and railway industry. It can enhance the value of its existing facilities and also the constructability of its new stations and buildings.

Below are the areas that BIM could help:

- Fully consider different design options before actually building a station
- Perform spatial analysis, evacuation route analysis, safety analysis (e.g. smoke dispersion) based on the BIM model
- Perform structural analysis and give feedback to architects and other disciplines
- Minimize the cost resulted from the delay of construction (e.g. clashes of Electrical and Mechanical (E&M) facilities)
- Perform Facility Management based on the information from the BIM model

1 TSEUNG KWAN O SOUTH STATION (CONCOURSE)

2 TSEUNG KWAN O SOUTH STATION (CONCOURSE)

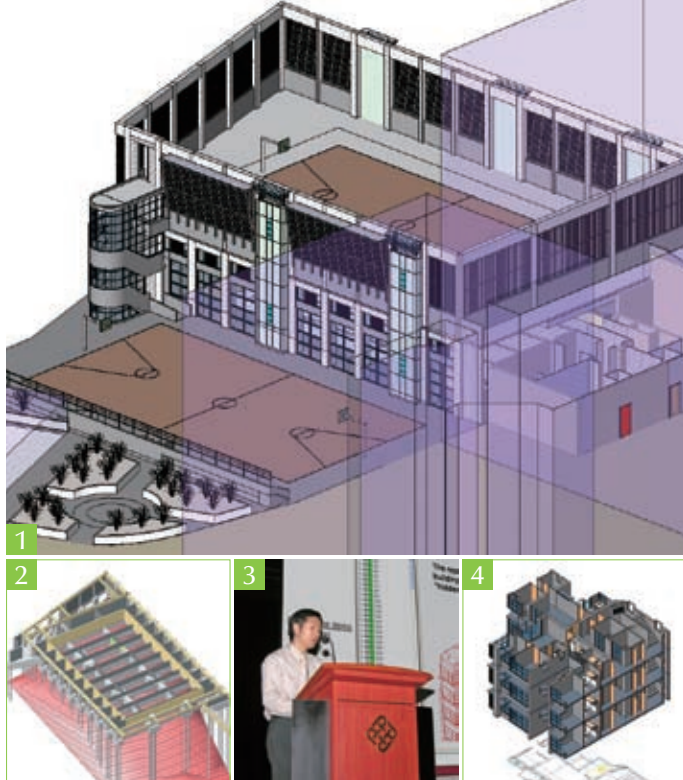
3 TSEUNG KWAN O SOUTH STATION (E&M)

4 YAU TONG PLAYGROUND RE-PROVISION



## Philip Leung *MBA, RIBA, HKIA*

Graduated from London University and gained his Master in Cambridge University, Mr Philip Leung has been working in the Mass Transit Railway Corporation (MTRC) Hong Kong Limited for over 10 years of professional practice. He is an Architect of Operating Engineering Services Department which handles more than HK\$1 billion (US\$128 mil) of construction works in Hong Kong every year. He has joined AIAB for more than 2 years and is an active member of the committee. His team works extensively on applying BIM for MTR stations design and implementation. Philip only has around 2 years experience in Revit but he had led his BIM team to study using BIM in different projects, such as new station design, renovating existing stations and plant-room's spatial study. During his station design project, he already got experience in implementing Revit to different disciplines including architectural and structural design, MEP combined services layout and recently is further testing the possibility of moving forward to Facility Management.



BIM is currently an emerging and revolutionizing technology in the architecture /engineering /construction industry and in academia around the world. In essence, it is a multi-dimensional virtual space for modelling real-world buildings while generating a set of coordinated two-dimensional drawings. Unlike traditional 2D computer aided drawings, BIM fosters an environment where the rich 3D model information can be reused throughout the lifecycle of a project. This breakthrough would bridge a number of technological gaps and enhance the existing practice of different professions such as architecture, structural engineering, building services engineering, quantity surveying, construction management and facility management. Stakeholders should keep abreast with BIM technology and achieve a better built environment in the future.

- 1 AN IN-DOOR SWIMMING POOL MODEL
- 2 FOUNDATION OF THE SWIMMING POOL
- 3 PRESENTATION OF BIM RESEARCH AT THE HK POLYTECHNIC UNIVERSITY
- 4 TEACHING BIM USING A TYPICAL RESIDENTIAL BUILDING



### **Kenny T.C. Tse** *MHKICM, MAIB, MIEEE, MPhil, BSc(Hons)*

Mr Kenny Tse is a Demonstrator of the Department of Building and Real Estate, The Hong Kong Polytechnic University. He obtained his BSc (1st Class Hons) Degree in Construction Economics and Management and Master of Philosophy from the same University. His current PhD study focuses on the integration of BIM and construction documents. Kenny is keen on transforming the traditional 2D CAD practice to BIM. He has published a number of BIM related papers and was recently awarded the Outstanding Professional Services and Innovation Awards 2006 - Most Active New Consultant (Merit) by the PolyU Technology and Consultancy Limited.

## Building Information Modeling (BIM)

Implementation of BIM could share the past experience from hand drafting to CAD drawing. It can do more than what we expected but not everything can do. BIM user should be profession within their discipline. A single BIM model forms common platform for electronic communication linking different professionals and project team members. It was expected to develop a BIM standard & best practice similar to drawing practice manual & CAD standard in the industry.



### Hermann Fong

Mr Hermann Fong was the Chairman of Chartered Institute of Architectural Technologists – Hong Kong Centre (CIAT – Hong Kong Centre) from 1998 to 2004. He is the Chairman of The Institute of Hong Kong Architectural Technologists (HKAT) since July 2004 and currently holding the same post. Having more than 30-year experience, he familiarizes with Architectural Design and Project Management of the Construction Works under different stages from Project Inception to Maintenance Management. He is the Founding Secretary of Autodesk Industry Advisory Board (AIAB) in 2005 and currently holding the same post.

## BIM – easy to use and improve communication

As we play plastic house-kid in child, Building Information Modeling (BIM) is a design approach for any digital building design, with the Lego-like components such as walls, doors and windows to create an intelligent 3D building model inside computer.

With Revit, the bi-directional editing (parametric change engine) technology, any changes to any views and information on the building model (e.g. plan), do affect the building and reflect on other views thought the project (e.g. elevation, door schedule). It gives Architects and Engineers more time for design, better model and ensures drawing integrity.



### Wong Chi Wai

Mr Wong Chi Wai is the Regional IT Manager of an international firm and he is also a member of Autodesk Industry Advisory Board (AIAB) since 2005. Having more than 15-years experience in IT field, he familiarizes with both hardware and software.



Courtesy from Aedas and Andrew Bromberg

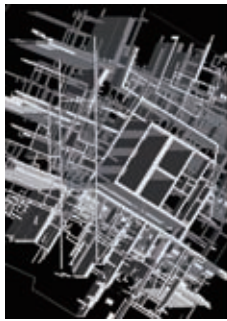
Founded in 1982, **Aedas** is a global force in the built environment in a variety of Architectural, Design, Property and Surveying services. It employs over 1,600 professionals working in 20 offices spanning across Europe, Central Europe, Asia and the UAE. Aedas is the fourth largest\* architectural design company in the world and it is truly a global player in architectural practices.

Aedas has involved in a number of International projects including Tate Gallery at London, the Government headquarter at Bahrain, Legend Palace Hotel at Beijing, The Peninsula at Shanghai, Dancing Tower at Abu Dhabi, Emaar Tower and Ocean Height Towers at Dubai, Avia Park at Moscow, Venetian Hotel in Macau, Hong Kong International Airport Terminal 2 in Hong Kong etc.

\* P. 12, January 2007, BD World Architecture

<http://www.aedas.com>





Courtesy from Aedas and Andrew Bromberg

## PROJECT USING BIM:

**Project:** Ocean Heights One

**Location:** Dubai, UAE

**Type:** Residential

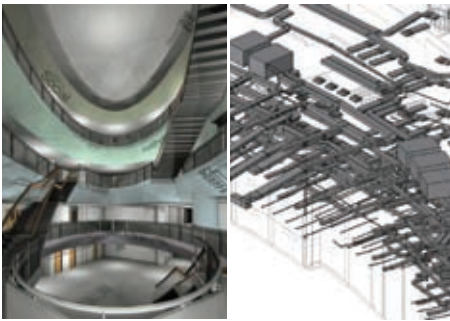
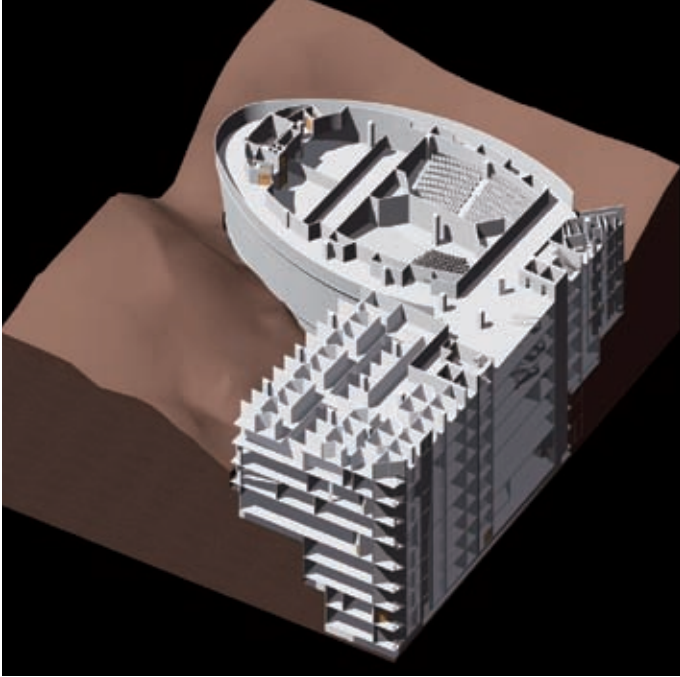
## DESCRIPTION OF THE PROJECT:

### Ocean Heights 1, Dubai, UAE

Ocean Heights, located in Dubai Marina, in United Arab Emirates, is a 310-meter residential tower. The design evolved to maximize views toward the ocean with a deliberate twist on three of its faces. This allows the units, even in the back, a view toward the water beyond. The 82 storey tower is planned for completion in 2008. The building immediately starts its twist of its three faces at the base. As it rises, the tower's floor plates reduce in size, allowing the rotation to become even more pronounced. At fifty stories, the building rises over its neighbors. This movement allows two faces of the building, unobstructed views to the ocean. The tower breaks away from the orthogonal grid and re-oriens the project toward one of Dubai's Palm Islands to the north.

## CHALLENGES:

- A challenging aspect of the design was accommodating the client's strict requirement of unit layouts within a changing envelope. What resulted was a rational 4-meter module, which tracks its way down through the entire building and only changes at the façade. This also considerably simplified the structural system of the project.
- The shear walls were placed perpendicular to the mean of the two most extreme angles of the façade. This was done to soften the relationship between façade and partitions, minimizing how "off-perpendicular" the relationship becomes.
- The shifts in geometry were taken as soft gradual moves over the 310 meters of height resulting in a sculpted and dynamic object. It is essential to design with a rationalized structural system and modularized façade to facilitate the viability of common sized residential units for Dubai's market. Aedas is Lead Consultant and Architect for this project.



Courtesy, City University and Aedas

## PROJECT USING BIM:

**Project:** Community College City University Building (CCCUB)

**Location:** Hong Kong

**Type:** Institutional

## DESCRIPTION OF THE PROJECT:

### City University Community College

Community College City University Building is a BIM Project that Aedas adopted BIM technology to its full extent. The project involves the design of a 7 storeys, 40,000 sq.m teaching facilities at the existing hilly campus site.

## CHALLENGES:

- In the project, BIM was used during all phases include Preliminary Design, Client Presentation, Government Submission and Coordination with consultant and contractors. As the project requires different involvement with different third parties, the data involved is just in huge amount. The target is to ensure the data's consistency and accuracy throughout all parties and at all stages. Since all the information is stored in the single database, wherever making changes, the whole model will get updated. This can ensure the best coordination among different parties and also to minimize the errors.

## HOW BIM HELP

### For Ocean Heights 1:

"The geometry of this project is extremely complicated; the external façade is twisting at different angles. Whether the external wall panels are curved or straight? Given that most building materials are either flat or straight, how many panel modules is needed to make the building envelope look smooth? If we use traditional CAD package, we need to alter each one of the 10,000 curtain wall panels manually – this procedure is very tedious and time-consuming, and worst of all, inaccurate. But now with BIM's powerful parametric change capability, the outlook of the building can be completed in a few minutes. In addition, we can make changes at different stages without worrying about the consistency. It certainly greatly improves the efficiency and accuracy." David Fung, Senior Associate and Head of BIM Division, Aedas said.

### For City University of Hong Kong:

#### 1. Design Visualization

BIM model is 3D (in fact more than 3D), which facilitate communication and visualization. The project was design in perspectives rather than traditional 2D.

#### 2. Co-ordinated drawing Production

Automatic production necessary 2D plans, elevations, sections, perspectives, call outs, schedules. Change in once place, changes everywhere in the documentation.

#### 3. Services Co-ordination and Clash detection with other disciplines

Identify design clashes and fix before construction. This will reduce time avoid wastage on site.

#### 4. Quantity taking and Preparation of Tender Document

Assist in cost estimation and reflect changes as model changes. Automatic extraction of quantities and specifications assist in preparation of Bills of Quantity.

#### 5. Automated Statutory Submission

Statutory submissions are automatically calculated and reported according to the Hong Kong regulations, including areas, means of escapes, staircases, toilet provisions etc.

#### 6. Scientific Analysis of different Environment aspects

Sightline analysis, Shadow analysis etc helps to design the building in the most effective way.

#### 7. Supply Chain Integration with manufacturing and production

Information was passed on from the consultants to contractors and manufactures in which data can be recycled and reused.

## SIGNIFICANT IMPROVEMENTS

- Increase productivity with shorten design cycle over 50%
- Ensure data accuracy: change once, change everything
- Increase company's competence
- Facilitate design options



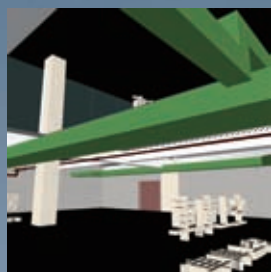
恒基兆業地產有限公司  
HENDERSON LAND DEVELOPMENT COMPANY LIMITED



**Henderson Land Development Company Limited** is one of the largest enterprises in Hong Kong with core business comprising investment holding, property development, property investment and related businesses including project management, construction, property management, and financial services. The Company focuses primarily on the Hong Kong market, but is also active in Mainland China where it has been steadily expanding its investments and scale of operations in recent years. The Company was incorporated in Hong Kong in 1976 and obtained its local public listing in 1981.

<http://www.hld.com>





### PROJECT USING BIM:

**Project:** World Financial Centre, Beijing

**Location:** No. 2 Guan Dong Dian, Chao Yang District, Beijing

**Project Information:** The buildings are designed as twin "crystal jewel boxes" with special effect of façade lighting on the exterior. It is a new landmark in the heart of Beijing.





**When started to use BIM** 2006

### THE OBJECTIVES OF USING BIM

- To enhance the effective of design co-ordination and integration
- To improve the accuracy of co-ordinated services drawings
- To reduce the construction waste
- To maintain continuous improvement and enable performance excellence
- To enhance the efficiency of building handover to Facilities Manager/Tenants

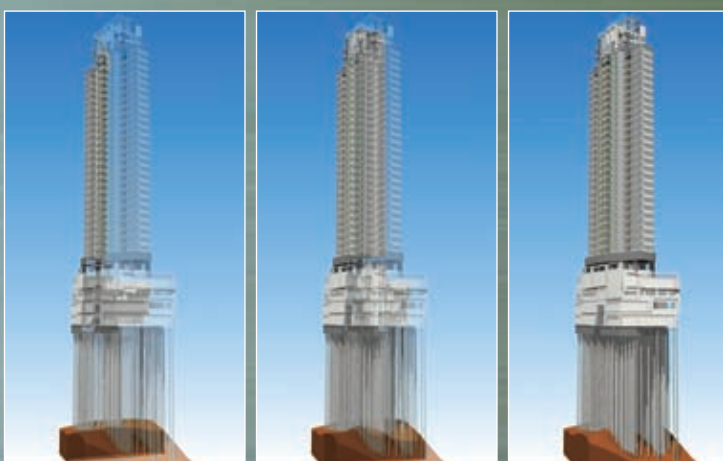
### SIGNIFICANT IMPROVEMENTS

- Improved the communication among the project design team in Hong Kong and China on design co-ordination and integration issues
- Enhanced the efficiency on checking the building constructability and functionality
- Shortened the time on design alternative study and confirmation
- Performed the high quality design auditing



新世界發展有限公司

New World Development Company Limited



**New World Development Company Limited** ("NWD" or "the Group", Hong Kong stock code: 0017) is a Hong Kong-based leading conglomerate. Established in 1970, the Company was listed in Hong Kong since 1972, and is now a constituent stock of the benchmark Hang Seng Index with a total asset value exceeding HK\$117 billion.

After more than 30 years of operations, the Group has expanded from its original property business to include four core businesses, including property & hotel; infrastructure; service; department store in Hong Kong, Macau and Mainland China. The Group is also involved in a number of strategic investments.

<http://www.nwd.com.hk>







### PROJECT USING BIM:

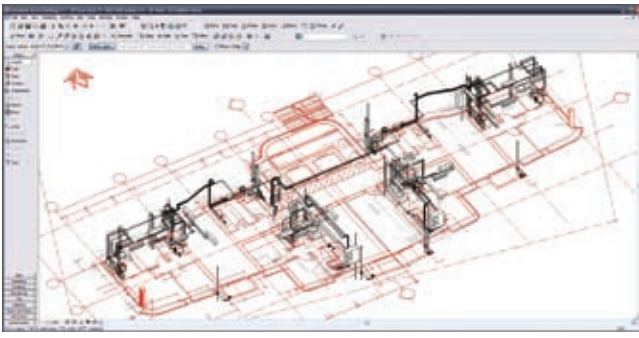
**Project:** Prince Ritz

**Location:** 448 Prince Edward Road West, Hong Kong

**Type:** Residential / Commercial

**Description:** Site Area of Approx. 1070m<sup>2</sup>  
Domestic Area of Approx: 8040m<sup>2</sup>  
Non-Domestic Area of Approx: 1600m<sup>2</sup>  
Building Height 119m





**When started to use BIM** 2003

### HOW BIM HELP

- Providing an interactive communication media from photomontage, animation to virtual reality to support top management decisions making process
- Providing a virtual environment that helps project manager, designer and contractors to experience the building spatial arrangement virtually before physically built
- Providing a smart platform that allows computer to simulate the built environments like sunlight, wind, temperature, lifetime energy consumption and etc
- Providing an intelligent building information model that supports connecting with other construction application like RFID project management system and facility management system
- Providing a design review workflow that automatically detects the design coordination errors and spatial conflicts
- Providing consistent construction drawings directly from the building information models
- Enabling the verification construction drawings consistency which reduces drawing discrepancies and coordination problems

### SIGNIFICANT IMPROVEMENTS

- Rapid design visualization
- Better communication
- Consistence, better coordination of documents
- Reduced errors/mistakes on misunderstanding; less rework; less construction waste; more environmental friendly, more sustainable
- Minimized the unexpected risks on time and design quality issues
- Enhanced build ability and serviceability



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.

<http://www.polyu.edu.hk>

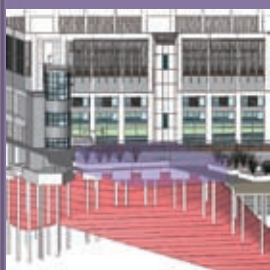


### **ABOUT THE DEPARTMENT OF BUILDING AND REAL ESTATE:**

The department is one of the oldest departments in the Hong Kong Polytechnic University and has been producing graduates for the construction, real estate, and related industries for over 60 years. During this time they have helped develop the infrastructure and services of the region. Many of our graduates now occupy important positions in industry. They represent an important group of people contributing to the growth and development of Hong Kong.

Today we are educating and training young people for the future of Hong Kong and China. We provide educational programmes in the construction and the real estate sectors which will enable students to develop their full potential for personal and academic development and will enable them to practice and lead within their chosen professional discipline. Our aim is to provide programmes that are application orientated, and produce graduates who can apply theories in practice. To ensure this our research is of an applied nature relevant to industrial commercial and community needs. We have established and will continue to develop dedicated partnerships with business, industry and the professions.

<http://www.bre.polyu.edu.hk>



## PROJECT USING BIM

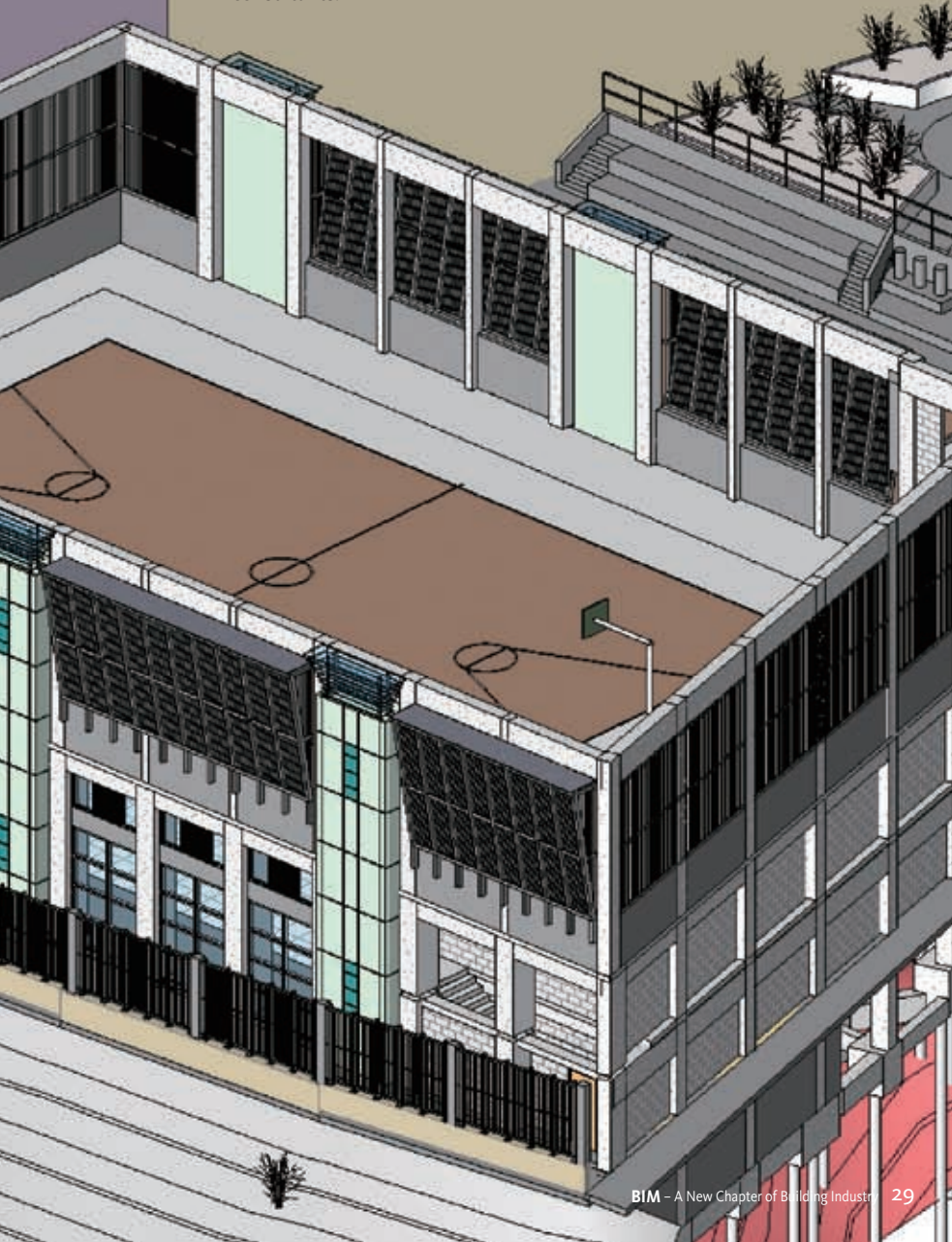
**Project:** Proposed Swimming Pool at  
Fukien Secondary School, Hong Kong

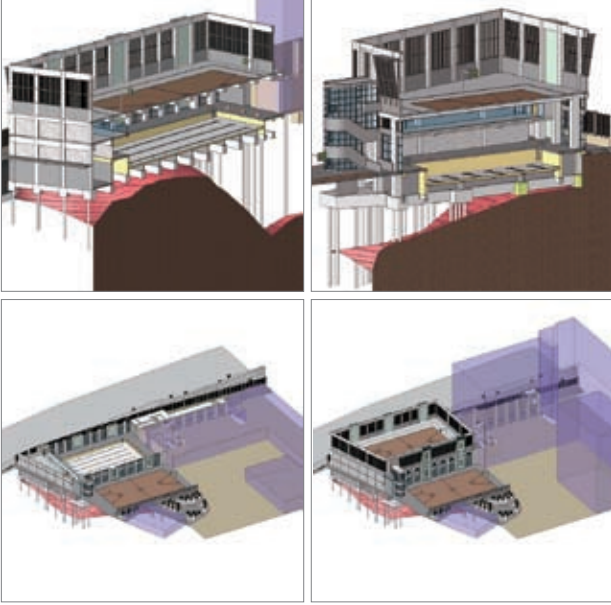
**Location:** Kwun Tong, Kowloon, Hong Kong

**Type:** Sport facilities

## DESCRIPTION OF THE PROJECT

The project is a 2-storey in-door swimming pool which is an extension to an existing secondary school in Hong Kong. It is situated on top of a cut slope where the bed rock profile varies from 3.9m to 26.8m below the existing ground level. The foundation comprises 76 mini-piles with each pile penetrating 3.3 meters below the rock surface. The filtration plant, a 6-lane pool measured 15m x 50m, a male and a female changing room, an external basketball court and associated performance stage and planters. Another basketball court on the roof is accessible through an external staircase and a walkway connecting the existing school. The pool is equipped with some “green” features including solar chimneys, reflector panels and photovoltaic panels. The design was awarded a “Merit in Environmental Design” in the research and planning category by the Professional Green Building Council (PGBC, 2006). The construction commenced in November 2006 and is expected to be completed by September 2007. The implementation of BIM in this project is lead by the Project Manager (PM) and a BIM Manager rather than the design consultants.





## CHALLENGES OF THE PROJECT

This is the first project in which BIM is applied by the Project Management team. The objectives are two folds: (i) to equip the PM team with the BIM techniques, and (ii) to study the use of BIM in material take-off in the field of quantity surveying. The main challenges came from learning BIM and building the model within a tight timeframe.

## HOW BIM HELP

The integrated architecture and structure model was built using Revit Building 9.0. The software package has a built-in materials takeoff function. Once the function is chosen, a new materials takeoff dialogue box appears. The whole model is composed of different categories of building elements such as columns, windows and furniture. A single category or multi-category can be selected from given lists. The taking off can be targeted at either existing or new phases of construction. After making the selection, the materials takeoff properties dialogue box pops up. The fields of the materials schedule can then be chosen from a list of available fields. The schedule content can be filtered, sorted, and grouped according to need. Once all the selections are made, the materials schedule is automatically tabulated.

The key findings are the differences between Model Quantities and Bills of Quantities. An understanding of how the model quantities are derived by the built-in material takeoff function is essential in the first place. In summary, BIM is a new tool to facilitate material takeoff in quantity surveying. The domain knowledge of quantity surveyors is of vital importance for generating bills of quantities from building information models. However, it may not be the case in some countries where the quantity surveying profession does not exist and the method of measurement is more flexible.

## SIGNIFICANT IMPROVEMENTS

The advent of BIM has lead to new thoughts and practices in the construction industry. Yet, computerization does give rise to concerns on the future value of some labour intensive tasks. Material takeoff is one of those which can be preformed automatically and accurately using BIM.

*Reference: Tse, T.C., Wong, K.D. and Wong, K.W. (2007) "Design Visualisation and Documentation with Building Information Modelling – A Case Study". Proceedings of Computer Aided Architecture Design Research in Asia (CAADRIA) Conference 2007. Southeast University, Nanjing, 25-27 April 2007.*



## BIM FUTURE

BIM is one of the keys to the future success of the Hong Kong building industry. The benefits are huge and some of the key players in the construction industry are now ready for the change and successfully applying BIM in different projects.

The adoption of the technology is progressing rapidly. From the four outstanding projects highlighted, we can see that how BIM helps to resolve different problems in their projects.



## Building Information Modeling (BIM) Revit Architecture

this course is designed to equip architects / architectural assistants/graduates/students, or other interested parties related to the building profession, with a range of skills in Autodesk Revit Architecture, from work stages of schematic design, contract documents to building construction

<b>tutor</b>	Mr David Fung, Registered Architect
<b>day/time</b>	starting from 6 sep 2007 (thur) 7 - 10pm (12 workshops)
<b>venue</b>	494 king's road   north point   hong kong
<b>medium of instruction</b>	cantonese supplemented by english
<b>fee</b>	\$4,020 *
<b>course code</b>	AH 45-078-26-01(71)
<b>queries</b>	2809-9877
<b>details</b>	<a href="http://hkuspace.hku.hk/ah/architectural_studies">http://hkuspace.hku.hk/ah/architectural_studies</a>

\* the school is applying for listing this programme as a CEF reimbursable course. eligible applicants may be reimbursed 80% of their tuition fees on successful completion of the approved course.



## Computer Aided Design using **Autodesk Revit**

To equip candidates with digital design skills in architectural and interior design using Autodesk Revit.

### Course contents include:

- Introduction to 3D computer aided design and introduction to Autodesk Revit
- Concepts 3D solid modeling and its application in architectural and interior design
- Application of Autodesk Revit in architectural and interior digital design
- Digital design case study
- Digital design project

<b>Organising Unit</b>	: IC
<b>No of Session</b>	: 10, 3 hours each
<b>Medium of instruction</b>	: Cantonese & English
<b>Venue</b>	: PolyU Campus
<b>Course Fee</b>	: \$2,800

<b>CEF Code</b>	22Z055332
<b>Certification</b>	A Certificate of Attainment will be issued to students who have attended 80% or above of the classes and passed the assessment.

Course Code	Dates	Day	Time
NN73	2 Aug – 4 Sep 2007	Tuesdays & Thursdays	6:30 pm – 9:30 pm



"The course has been included in the list of reimbursable courses for CEF purposes."

The School reserves the right to cancel a course due to insufficient enrolment or other unforeseen circumstances.

### Enquiries:

Room QR802, 8/F, Core R, The Hong Kong Polytechnic University, Hung Hom, Kowloon  
Telephone : 3400 2828  
Fax : 2363 0540  
Email : [speed@polyu.edu.hk](mailto:speed@polyu.edu.hk)  
Website : [www.speed.polyu.edu.hk](http://www.speed.polyu.edu.hk)

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# BIM Resources

Get and share tips, news, and connect with other Revit experts on the Internet:

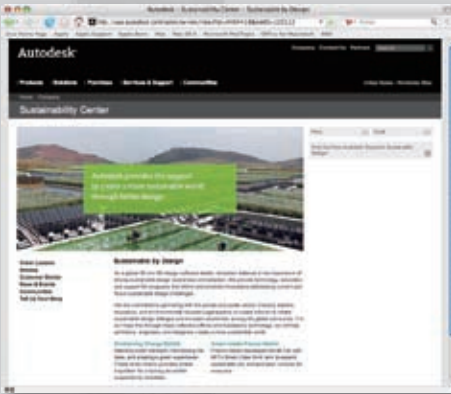
## Building Information Modeling



Whether you're an architect, structural engineer, or MEP engineer, it's essential that you communicate seamlessly with builders, contractors, owners – and with each other. To know more about BIM, please visit:

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## Sustainable by Design



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## Education



Autodesk supports academic achievement by providing access to the industry-leading design software that helps students push conceptual thinking in the classroom and prepare for future careers in design and engineering. To know more about Autodesk supports educators, please visit:

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www.revit.com.hk



This web site is tailored for Hong Kong Revit users. From this site, you can share and download local content; look for the latest Revit information such as the most updated case studies, white papers, etc. It also provides a platform for Hong Kong Revit users to share their design and experience.

IMAGE COURTESY OF BING ( MCVS COMPETITION WINNER )



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