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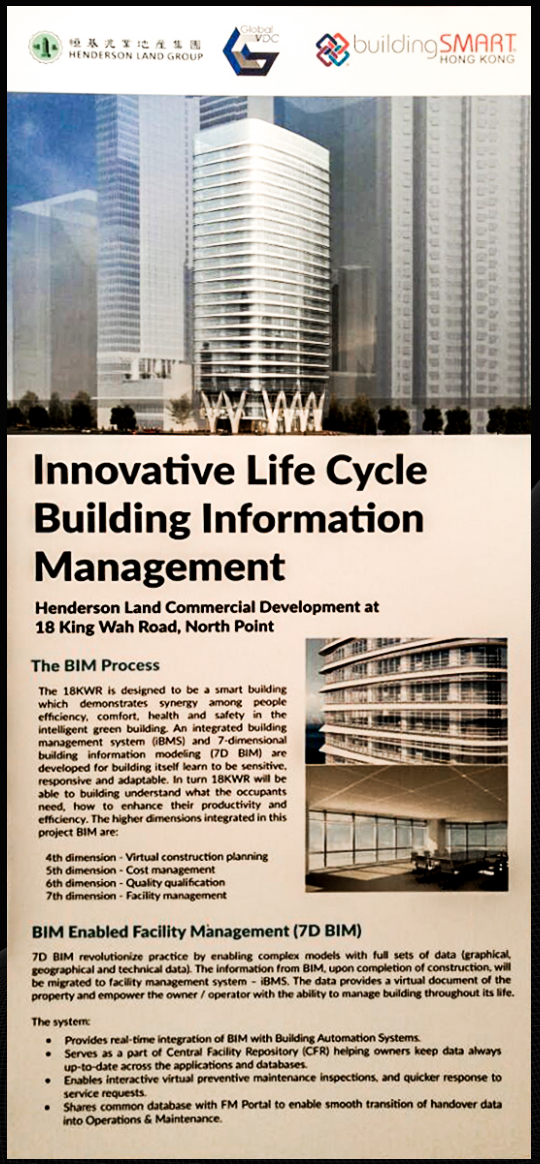

Innovative Life Cycle Building Information Management

Henderson Land Commercial Development at 18 King Wah Road, North Point

The BIM Process

The 18KWR is designed to be a smart building which demonstrates synergy among people efficiency, comfort, health and safety in the intelligent green building. An integrated building management system (iBMS) and 7-dimensional building information modeling (7D BIM) are developed for building itself learn to be sensitive, responsive and adaptable. In turn 18KWR will be able to building understand what the occupants need, how to enhance their productivity and efficiency. The higher dimensions integrated in this project BIM are:

4th dimension - Virtual construction planning
5th dimension - Cost management
6th dimension - Quality qualification
7th dimension - Facility management

BIM Enabled Facility Management (7D BIM)

7D BIM revolutionize practice by enabling complex models with full sets of data (graphical, geographical and technical data). The information from BIM, upon completion of construction, will be migrated to facility management system – iBMS. The data provides a virtual document of the property and empower the owner / operator with the ability to manage building throughout its life.

The system:

- Provides real-time integration of BIM with Building Automation Systems.
- Serves as a part of Central Facility Repository (CFR) helping owners keep data always up-to-date across the applications and databases.
- Enables interactive virtual preventive maintenance inspections, and quicker response to service requests.
- Shares common database with FM Portal to enable smooth transition of handover data into Operations & Maintenance.


香港房屋委員會
Hong Kong Housing Authority
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Produced
Arrived
Erected
Produced
Delivering
Arrived
Erected
Logistic and Supply Chain Management - Integrated Use of BIM and RFID
The BIM Process
This project introduces a scheme for converting typical construction objects into Smart Construction Objects (SCOs) using RFID devices and cloud technology, and proposes an innovative "RFID-enabled Gateway", which is designed and developed for managing the SCOs.
To establish a system that is capable of interacting and sharing the information with BIM and among different project stakeholders for enhancing collaboration and decision-making, HKU-PolyU has developed a RFID-enabled BIM Platform (RBIMP) which employs cloud technologies for designing the architecture and a suite of services and tools.
Through the RBIMP, this project expands the 3D design and modeling tools in BIM to a multi-dimensional application by making full use of the collected real-time data so that decisions based on the solution can be more reasonable, precise, and scientific. The visibility and traceability service extends the construction business solution into the one that is multi-dimensional by including additional dimensions such as time (progress) and cost.
HKHA-HKU-PolyU team have integrated BIM and RFID to achieve successful results in their Tuen Mun Area 54 project:
Real-time progress monitoring
Capture of real-time data during fabrication
Capture of real-time data during transportation
Capture of real-time data during on-site assembly
Progress tracking
Error alert system on location tracking
Optimized planning for order and delivery of precast components to achieve "Just-in-time" management
Benefits of BIM-RFID Integration
RFID-enabled BIM Platform (RBIMP) substantially improved visibility and traceability of the process.
Realtime information regarding the fabrication, delivery and installation of precast elements is easily available for timely and effective decision making. All project stakeholders can therefore be benefited from this RBIMP through which better coordination, planning and monitoring at different phases of the construction processes can be achieved.
The successful experience of using RBIMP in the project may be extended to any prefabricated construction projects in both public and private sector to enhance the efficiency of logistic and supply chain management.

Balfour Beatty

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Westgate Santa Monica

The BIM Process

By collective agreement, the Architectural and Structural design had to be completed first and Mechanical, Electrical, Plumbing & Fire Protection systems would be created thru Design-Build approach. Balfour Beatty (GC) has taken the lead in the BIM coordination process resulting in a much cohesive and swift course where the role of ALL participants is more proactive and efficient.

Taking in consideration the diversity in available platforms to initiate and sustain the BIM procedures, our team at Balfour Beatty Construction (BBC) had developed a series of flexible pathways to integrate an effective collaborative framework. Starting by creating a Federated Model (namely at first Design Model) where the Design Team, Architects, Structural, MEP and FP Engineers can visualize and detect potential problems prior to finalize Construction Documents. Once this step has reached an acceptable level of completion, the Construction team is brought in to assist in the review of the Project incorporating their correspondent level of expertise which will eventually form the basis to generate their Construction models.

BBC team have integrated the use of Photogrammetry and UAVs (Unmanned Aerial Vehicles/drones) to keep a better track of construction progress, these auxiliary means are substantially cost effective and practical with a significant degree of success.

Benefits of BIM-aided methods

At conceptual phase, the owner and Architect decided to utilize BIM from Design thru Construction. Since its inception the BIM process has been proven to be to most effective pathway to execute the different and pressing tasks faced during all phases of this project.

The owner has manifested his approval and praised the tangible Benefits of the BIM process in repeated occasions. By the same token, the Design and Construction Teams had equally shown appreciation for CIM Group's outstanding team player role, a key factor in every Project's successful outcome.

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Improve Rapid Design Changes with Open BIM

L ● Harbour 18, To Kwa Wan, Hong Kong

The BIM Process

From concept to documentation, design to construction, huge amount of time were spent in time consuming workflows to share and update information. The following BIM process have been adopted to resolve the above challenges:

- Optimized workflow between the Design Team, Consultants, Client and Contractor.
- Internal Collaboration - Teamwork
- Open BIM Collaboration in the design and construction
- Integrated Model based Documentation
- BIMx on the construction site
- Modeling to Achieve Lifecycle Value

Open BIM with no Data Loss

Information in this project was transversal to all platforms used, with the most important, no data loss. The information in the BIM tool was checked, passed and received via IFC to consultants, and taken to construction site in the published BIMx file. This accelerated the process of all documentation checking on site, with no need of paper handling.

The right combination of design efficiency while creating the framework to improve communication on the jobsite and drive construction schedules and workflows. The model ultimately becomes an integral part of building management and operations. With this enhanced BIM workflow, the project team realized productivity improvements, time savings, improved communication and coordination with contractors and, most importantly, the delivery of a better quality product.

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Dramatic Journey: From Abandoned Factories to Mordern Racecourse

中建八局第一建设有限公司

针对项目的BIM解决方案

（1）高大切坡受力分析
（2）BIM土方平衡—RTK数据采集
（3）无人机航拍+点云+BIM
（4）BIM+无人机平面管理
（5）BIM施工图预算
（6）深化设计—马厩装修方案选定
（7）地下受限空间综合管线深化
（8）施工方案、技术交底
（9）质量虚拟样板间
（10）市政路道节点、施工模拟
（11）项目进度、资金管控
（12）项目质量、安全管理
（13）BIM+VR技术应用

亮点：BIM无人机测量应用

项目团队根据项目成果的分辨率要求和航摄区域的地理情况，设计无人机航摄的航高、航向重叠度、旁向重叠度等参数，并进行航线敷设，经过预处理、空三处理、点云加密，DSM/DOM生成等过程，制作高分辨率正射影像和彩色点云成果。

建模团队利用点云成果创建地形信息模型，依据场地平整图纸，施工计划编制土方量清单，充分使用各专业数据处理软件，深入加工点云数据，创建地形三维模型，设计地形与航拍地形对比，生成土方量数据。

施工管理团队利用全自动pix4d空中无人机航拍技术，形成施工现场的精确包含高程的坐标信息，经过专业软件处理，对选定点进行测试，选定点包含的高程、坐标信息与模型信息一致，检查现场施工质量是否符合要求。

P&T GROUP 巴馬丹拿集團

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BIM for Statutory Submission

Based on Malvern College Hong Kong Project

HK statutory submissionis particularly difficult to generate from a BIM model due to its requirements for graphics, calculations and layering system of the .dwg files exported for electronic submission. Due to the highly technical nature of the problem, P&T Architects have developed a practically useful, software specific standard workflow for generating statutory submission from a BIM model.

BIM Implementation Scope

- Developing BIM workflow for the entire design process integrating architecture, structure and building services.
- Preliminary environmental studies and analysis.
- Generate HK statutory submission documentation directly from the model, multidisciplinary coordination.
- Production of tender submissions.

Benefits of Standard BIM Workflow

Establishing a tested and well defined standard workflow for statutory submission can achieve the following goals:

- Remove an important obstacle for adopting BIM process for project design and delivery in Hong Kong and contribute to the future Hong Kong BIM(Revit)Standard.
- Speed up the preparation of statutory submissions from Revit models by eliminating the need of using CAD postproduction.
- Maintain the integrity of the model and documentation as the entire statutory submission package will be kept within the Revit file and can be easily updated in case of design changes.
- Encourage more companies to adopt BIM approach throughout the entire design process when they realize that one of the most important project milestones can be successfully served with the BIM process.

新鴻基地產
Sun Hung Kai Properties

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Building Homes with Heart using BIM

Achieve Core Values

In Sun Hung Kai (SHK), BIM is not only a technology but also a platform to achieve their core values.

Property development is the core element of the Group's business. BIM platform is used to vertically integrate the whole development process from land acquisition, project planning, material sourcing, construction and project management. This ensures high standards in every aspect and enables the Group to better meet the long standing commitment to build ideal home that is "Building Homes with heart".

The BIM Process

SHK team have utilized BIM to achieve successful results in their King Sau Lane project:

- Visual Impact Assessment to Study the Property Value
- Optimize Construction Schedule and Cost
- BIM supports the General Building Plan submission
- Foresee and Optimize Design Impact before Construction
- 4D BIM for Construction Methodology Simulation
- BIM-VR Immersive Experience

Benefits of BIM-IPD Approach

Over 5 years' deployment of BIM technology, SHK has gained experiences to maximize the value of BIM.

Incorporating BIM into SHK IPD process enables Project Team members to use information in an integrated environment, increasing efficiency and enabling new ways of working that inspire more creative and sustainable designs.

The planning and design stage is considered the most important to maximize the value and minimize the cost of project. The BIM-IPD approach enables the Project Team to join and work together at the earliest stage, improving accuracy of decisions. The rest of the process will then become more predictable, thus avoiding costly redesign abortive work.

Collaboration between the architect, contractor, and engineers allows for better decision making, helping to improve quality and mitigate risk. Because of thorough early planning, Project Team members are able to use materials efficiently, creating less waste. Change orders are minimized, and no operational revenue is lost. Construction can be completed on schedule and within budget.

TIONGSENG GROUP 长成控股

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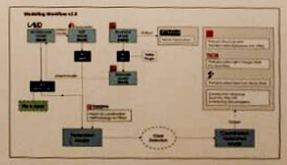
Open BIM for Construction Management and Cost Control

The BIM Process

TiongSeng employed a series of smart design and construction approaches to achieve the 33% reduction in construction time while maintaining the S$24.5 million project budget and meeting or exceeding high construction quality expectations. The team selected open standards including Industry Foundation Classes (IFC) and Open BIM Collaboration Format (BCF) to empower cross-disciplinary collaboration in optimizing design and construction solutions through Design for Manufacture and Assembly (DfMA) methodologies to fully leverage seamless design to prefabrication.



Quantified Business Benefits

Open BIM and variousDesign for Manufacture and Assembly solutions empowered the team to achieve exemplary performance gains:

Eliminate 100% of mullions for façade installation

- 25% less time required to install façade
- S$360,000 overall cost saving for façades

Open technology saved effort of structural engineers, general contractor, and rebar fabricator

- 2000 man-hours less, S$56,000 savings for coordination and detail bar bending schedules

Open technology increased productivity for DfMA

- 33% reduction in overall construction time

AECOM

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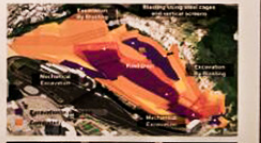
Tunnel Design and Construction with BIM

Tseung Kwan O – Lam Tin Tunnel

Alignment, Site Formation and Tunnel Design using BIM

Conventionally, BIM is used to assist in the design coordination of building works, especially the building services disciplines. AECOM, as the leaders of the design industry, have found that BIM can bring significant benefits to civil and geotechnical disciplines. Site formation design is an example where geotechnical engineers can use the BIM technology as a technical tool for design, project management and construction management. The Tseung Kwan O – Lam Tin Tunnel, which is currently undertaken for the Civil Engineering and Development Department of the HKSAR Government, is being able to benefit from BIM by enhancing efficiency in providing accurate 3D BIM models and data in different stages of the study process.



Level 2 BIM Effective Collaboration

AECOM has established a Project Hub as the Common Data Environment (CDE) for collaborative engineering information management. This promotes a consistent approach to information management and supports our ability to deliver high quality projects and share work on a global scale. To address different requirements the from Quarry Development Study, AECOM used the most appropriate software for the tunnel and portal formation for BIM authoring. There are no difficulties for information exchange as IFC acts as a universal, neutral and open BIM data interchange format and allows the model to be integrated with different software platforms

南豐集團
NAN FUNG GROUP

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Beyond Coordination, BIM for Future

Challenging Environment

Construction costs in Hong Kong have risen 21% significantly in the past three years, with a 34% increase in Labor Cost and a 7% increase in Material Cost. At the same time Hong Kong has been facing huge shortage of construction workers.

To enhance productivity and cost-effectiveness of projects, Nan Fung team implemented BIM to resolve potential conflicts in advance and simulate different scenarios for analyses, make sure the project can be completed on time. Nan Fung team have also integrated BIM with VR and "3D No Nail Zone" demonstration to broaden their use of BIM, hence maximizing property value.

The BIM Process

Nan Fung team achieve their core values "to serve the needs of our customers, our stakeholders and our community" with BIM.

As BIM is a powerful tool for Project management from planning stage to handover, improving project management, reducing wastages to benefits customers and community.

Nan Fung team adopt BIM in the following processes:

- Visualization
- Design and construction validation
- Clashes identification and coordination
- Construction Cost Estimating
- Construction methods simulation
- Facility management
- VR Showflats application

Benefits of BIM-VR Integration

Nan Fung team discovered that it was fairly convenient and cost-effective to build up VR virtual mockup using BIM's accurate 3D spatial data. The immersive VR environment greatly improves the efficiency of management and interior designing teams to perform concept testing on new designs. The team could refine the details in a faster, more environmental friendly way thanks to the innovative technology.

Thank you !