

COMPANY

Urban Renewal Authority

PROJECT

Central Market Revitalisation Project

LOCATION

80 Des Voeux Road Central and 93 Queen's Road Central, Hong Kong

TYPE

Revitalisation Project

SCHEDULED TIME OF COMPLETION

2021

Full Building Life Cycle Approach with Open BIM and Open Data Concept

“Central Market was the icon of building innovation more than eighty years ago when it was amongst the first to adopt reinforced concrete and other passive environmental design features for public enjoyment of a hygienic and airy market environment. Through the application of BIM initiatives for survey, documentation, design & construction coordination and management, it was resurrected from its past life when building records were irretrievable, to sustained future use by the public.”

—Lawrence Mak

General Manager (Planning & Design), Urban Renewal Authority

BIM PARTNERS

AGC Design Limited

AECOM Asia Company Limited

Ove Arup & Partners Hong Kong Limited

Rider Levett Bucknall Limited

Global Virtual Design and Construction Limited

Yau Lee Construction Company Limited

Shui On Construction Company Limited

Vircon Limited

AUTODESK PRODUCTS USED

BIM 360 Doc

CFD

Dynamo

Navisworks

Recap

Revit



BIM model of Central Market Revitalisation Project
Image Courtesy of Urban Renewal Authority

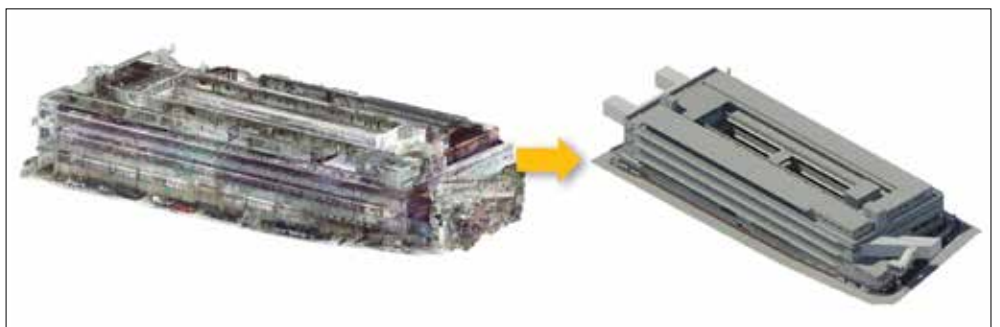
As part of the “Conserving Central” initiative proposed in the 2009-10 Policy Address, the Urban Renewal Authority was commissioned by the HKSAR Government to revitalize the Central Market, a grade 3 historic building.

The Project involves the alteration and addition works for conservation and adaptive reuse of the existing reinforced concrete market building which is more than 80 years old. A minimum intervention approach is adopted to conserve the Central Market without affecting the existing foundation, structure and façade as well as architectural and historical significant building elements.

The Main Challenges for Revitalisation of Central Market

Central Market is a “Streamline Moderne” architectural style building built in 1930s, and has been used as a wet market building until the 1990s when the government constructed the Mid-levels Escalator System in Central and the market was decommissioned.

As the building was built in the 1930s, no existing building record or structural plans were available for design reference. BIM technology was adopted to first assist proper documentation of the existing historical building and to improve the effectiveness in “change management” with respect to time, cost and quality.



3D laser scanning of historical building to establish point cloud model and BIM model verification.
Image Courtesy of Urban Renewal Authority

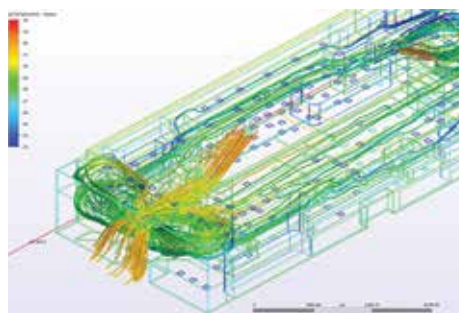
BIM in Full Life Cycle Management

The “Full Life Cycle Management” approach enables application of complex models with full sets of data (graphical, geographical and technical data) and provides a virtual document of the project which empowers the owner / operator with the ability to manage building throughout the building’s life cycle.

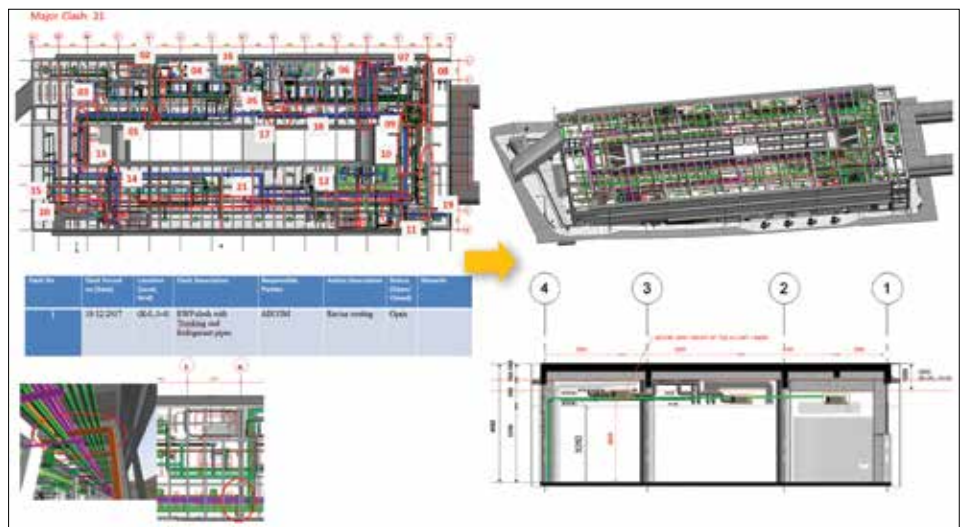
To extend the use of 3D geometry applications, 3 higher dimension applications were also adopted to enhance the project’s full life cycle management:



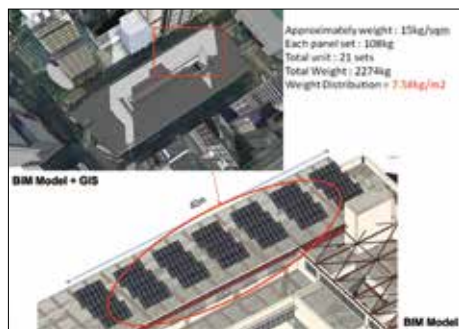
Full building life cycle approach with open BIM, open data concept from design to management. Image Courtesy of Urban Renewal Authority



CFD analysis for optimal MVAC design effectiveness and open space simulation. Image Courtesy of Urban Renewal Authority



Zero Clash Model incorporating various architectural, structural and MEP elements for production of tender drawings. Image Courtesy of Urban Renewal Authority



BIM + GIS simulates solar path for optimal location of PV solar panels. Image Courtesy of Urban Renewal Authority



Design and Build BIM Model: The Main Contractor took over the tender model for further updating, enhancement and 3D design coordination. Image Courtesy of Urban Renewal Authority



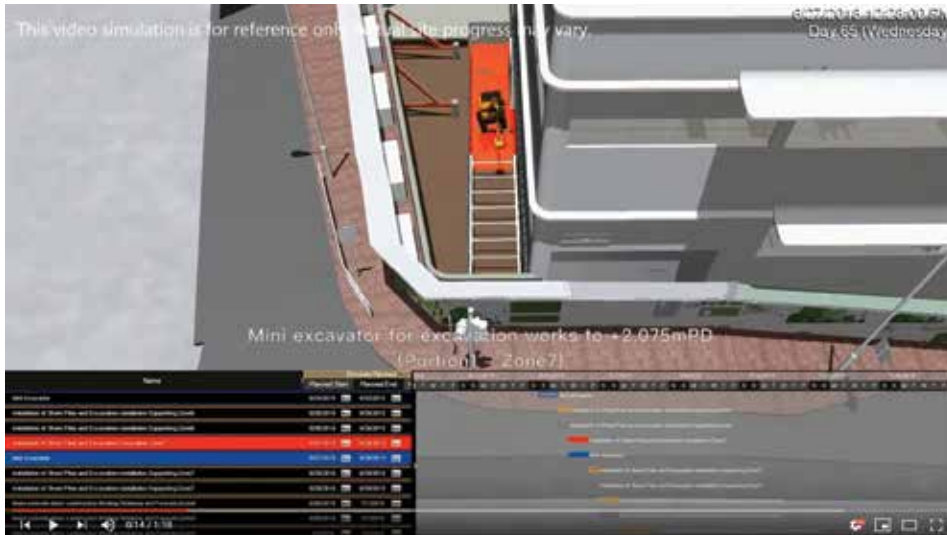
As-built BIM Model updated based on as-built laser scan data for proper documentation. Image Courtesy of Urban Renewal Authority

- 4D BIM - Virtual construction simulation and planning;
- 5D BIM - Cost management; and
- 6D BIM - BIM enabled facility management.

Information during design and construction stages were recorded in the BIM model, upon completion of construction, comprehensive BIM

information will be migrated to facility management system.

In addition, BIM enables energy performance evaluation for design optimization of the overall building environmental performance and waste minimization, hence reducing the building’s carbon footprint throughout it’s life cycle.



4D animation showing important construction sequences for construction planning and public presentation. Image Courtesy of Urban Renewal Authority

4D & 5D BIM

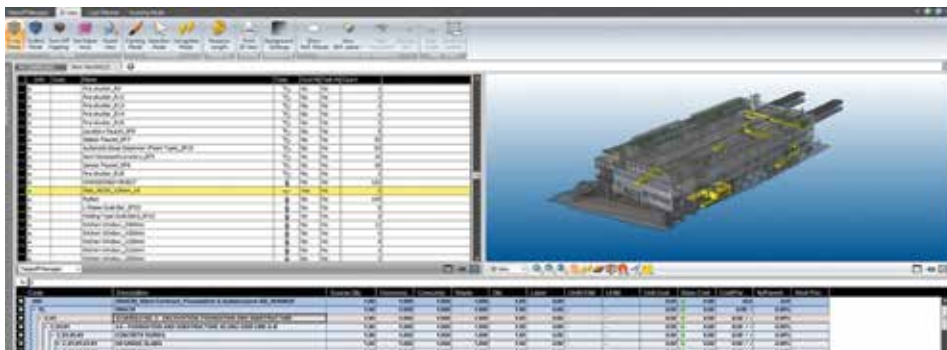
Adopting 4D and 5D BIM initiatives can also assist in quantity take off, cost estimation and work sequence planning during tendering and construction stages.

6D BIM

Early adoption of Cobie system during modeling will also speed up the process for 6D BIM-FM (Facility Management) implementation during the operation stage. To ensure a seamless transition between project parties from design to construction and even future operation stages, the project team recognized the importance to adopt OPEN BIM as a universal approach for design and construction workflows, which provides a common platform for effective communication.



Phase planning 4D model adopted in the project for planning and construction programme monitoring. Image Courtesy of Urban Renewal Authority



Tender model imported for cost estimation; Model based Quantity Take Offs were adopted for tender. Image Courtesy of Urban Renewal Authority

Common Data Environment

The whole project is conducted under a Common Data Environment (CDE) by utilizing Network Attached Storage (NAS) and BIM 360 Autodesk Cloud Solution as project management tools to share, view, markup, manage drawings, documents and models in order to facilitate daily project administration and coordination.

Workflow for Implementation of BIM in Full Life Cycle Management

Prior to the commencement of design stage, CAD drawings from the project team were incorporated for model build

up and they were used for comparison with 3D point cloud model obtained via laser scanning for verification and fine tuning in order to ensure the contents are correct to facilitate the detailed design development for each discipline. Through 'Big Room' concept for meetings, the 3D model was used to facilitate the team for better presentation, visualization and understanding of various issues throughout meetings. Clash analyses were also performed during design stage to assist the project team for early design review to minimize on-site abortive works.



Central Market Revitalisation Project
Image Courtesy of Urban Renewal Authority

About Urban Renewal Authority

The Urban Renewal Authority was established in May 2001 under the Urban Renewal Authority Ordinance enacted in July 2000, having the responsibility of improving the standard of housing and the built environment of Hong Kong by undertaking, encouraging, promoting and facilitating urban renewal. A comprehensive and holistic approach is adopted to rejuvenate older urban areas by way of Redevelopment, Rehabilitation, heritage pReservation, Revitalisation and Retrofit (the 5R business strategy).