

Hong Kong Housing Authority

Project:

Construction of Public Rental
Housing at Sha Tin Area 52
Phase 1 (known as Shui Chuen
O Ph 1)

Location:

Sha Tin, Hong Kong

Type:

Public Housing

Scheduled Time of**Completion:**

February 2014

Pioneering BIM for Quantity Surveying



The Housing Authority is implementing probably the Greater China Region's first project for obtaining detailed quantities data from a BIM model. The "5D" model – with three physical dimensions plus time and cost data – generates data far more quickly than traditional QS methods. The standardised approach and guidelines developed in the project may extend the use of BIM in the construction industry.

Pioneering research and design project

In 2006 the Hong Kong Housing Authority first adopted BIM, and has made remarkable achievements in sustainable construction and strengthening site safety through applying BIM technology in design and site planning. Now, the Housing Authority aims for all new projects from 2014/15 onwards to use BIM.

The success and future plans prompted the Housing Authority's Quantity Surveying Section to investigate how to tap BIM's potential for helping to generate data such as quantities and costs of construction projects. This could lead to several advantages over current practices. Traditionally, design intent and cost data are often separated and isolated in different digital environments – making it extremely difficult and time consuming to extract data for planning and controlling construction project finance and risk issues.

The Housing Authority decided to undertake a research in a housing project under construction, in partnership with the contractor China State Construction Engineering (Hong Kong) Ltd. and the BIM consultant isBIM Limited. As there is no previous example of BIM being applied to generate detailed quantities based on isBIM's



approach in the Greater China Region, this project could be said the first in the Region.

BIM in parallel with traditional QS methods

The project covers a new public rental housing development in Shui Chuen O Phase 1 in Shatin of Hong Kong. This HK\$1.3 billion development involves construction of five blocks with 3,039 domestic flats. The research spans four work trades which are Piling, Excavation, Concrete Works and Underground Drainage, which together account for around HK\$301 million of the project cost.

Quantity surveyors are still applying



isBIM Limited. The model currently has over 85,000 objects.

Using this model, team members developed a systematic approach for quantity takeoff process, costs management and cash flow simulation linking the BIM database with a Cost database. This approach was dubbed Quantity Surveying Building Information Modelling (QSBIM). QSBIM aims to provide quantity surveyors an effective way to transfer, extract and verify the cost related information from BIM modelling elements to a BQ database.

conventional practices, taking manual measurement from drawings and transferring dimensions to sheets or spreadsheets to carry out cost estimates or interim payment assessments. The research runs in parallel with this work, seeking a new way to use BIM information to boost efficiency and productivity by automated quantification, increase accuracy by reducing data variability, and facilitate sharing of data among stakeholders.

Standardised approach and guidelines

“At first, there was no BIM model – we created one from 2D drawings,” says Elvis Li, CEO of

“One of the challenges in extracting quantities is the requirement to follow the measurement rules in the Hong Kong Standard Method of Measurement of Building Works (HKSM),” says Sunny Choi, Senior Quantity Surveyor of the Housing Authority. “Another challenge is different methods of building up BIM models will give out different quantities.”

isBIM drafted a standard approach of modelling for the four work trades, coupled with standardised guidelines based on the HKSM, to assist quantity surveyors to extract quantities data from BIM models.

Over 200,000 measurement records generated directly from BIM model

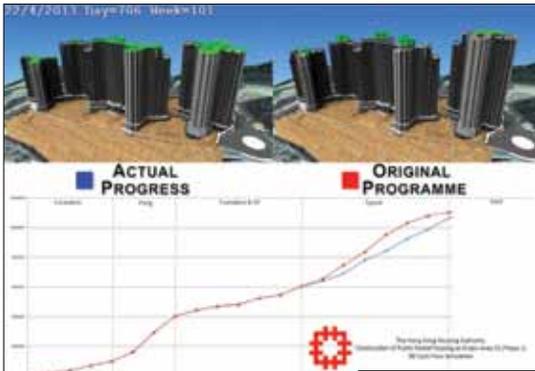
Through integrating extracted quantities from BIM model, construction programme and cost information, the research team has created 5D [i.e. 3D models plus time (the 4th dimension) and cost (the 5th dimension)] cash flow simulations, which help revealing actual and predicted cash flow of the project. “So far, we have generated over 200,000 measurement records directly from the BIM model,” says Mr Li. “There will be many more in future.”

The research spans April to November this year, and the results will help to have a better understanding on project cash flow. Mr Li

demonstrates one way of showing the results, in which it is possible to select a time and date, and instantly show a 3D image of the partly built housing blocks together with a graph and figures indicating project costs.

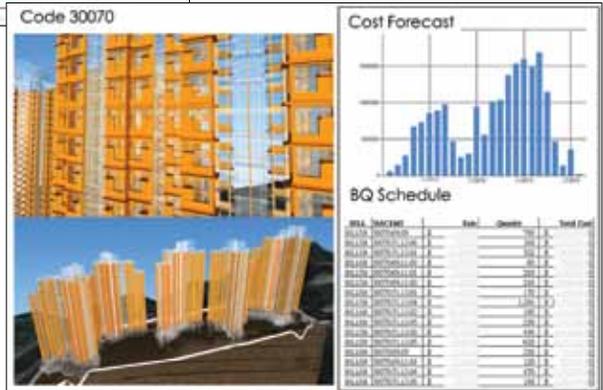
“Extracting quantities from BIM models is very fast compared to manual measurements and calculation for interim payment assessments,” says Mr Choi. “For the traditional practice, we need to head back to the office after visiting the site, and assess the amount of works completed, which may take one to two weeks.” Comparing the quantities obtained through the QSBIM and from traditional quantity surveying practice, the difference is within 10%; the discrepancies will decrease as the new method is fine-tuned.





May extend the use of BIM in construction industry

“If this method indeed works as expected, we can introduce it to contractors,” says Mr Choi. “If we find a constant difference between QSBIM and traditional methods or the gap be minimised we may try to use QSBIM to speed up interim payment assessment, which will be a win-win situation for both the Housing Authority and contractors.”



Though the research primarily focuses on cash flow forecast and payment assessment, the gradual development of standard approach of modelling and measurement guidelines allow QSBIM be extended to other quantity surveying functions, such as preparing Bills of Quantities for BIM models. And it may be employed far more widely within Hong Kong.

** All images in this article are provided by Hong Kong Housing Authority*



ABOUT HONG KONG HOUSING AUTHORITY

The Hong Kong Housing Authority (HA) develops and implements a public housing programme which seeks to achieve the Government's policy objective of meeting the housing needs of people who cannot afford private rental housing. Approximately 30% of the Hong Kong population is now living in public rental housing units.

The HA plans, builds, manages and maintains different types of public housing, including rental housing estates, interim housing estates, and transit centres. In addition, the HA owns and operates some flatted factories and ancillary commercial and other non-domestic facilities. The HA also supports the Government's policy in providing subsidised home ownership flats to qualified persons.

The Housing Department (HD) acts as the executive arm of the HA to help the Government achieve its policy objective on public housing.