

COMPANY

Independent Checking Unit, Office of the Permanent Secretary for Transport and Housing (Housing), HKSAR Government

PROJECT

Development of the Technology to Use Building Information Modelling for Statutory and Building Control Submission

LOCATION

Hong Kong

TYPE

BIM Standard, Guideline, Templates, Objects Library and Plug-in Software

SCHEDULED TIME OF COMPLETION

30 September 2020

About Independent Checking Unit, Office of the Permanent Secretary for Transport and Housing (Housing), HKSAR Government

The Independent Checking Unit (ICU) works directly under the Office of the Permanent Secretary for Transport and Housing (Housing). Under the delegated authority from the Building Authority (i.e. the Director of Buildings), the ICU exercises statutory building control to properties developed by the Hong Kong Housing Authority (HA) that have been sold or divested, in accordance with the Buildings Ordinance (BO) and the policies and guidelines of the Building Authority (BA). The ICU also exercises administrative building control to the HA's new development works and existing buildings in line with the BO and the BA's policies and guidelines.

ICU exercises building control to properties developed by the HA including new development works, alterations and additions works, minor works and site monitoring. All the submissions of plans under administrative building control can be made through the Housing Electronic Plan Submission System (HePlan).

BIM PARTNER

Building Information Technology Limited

AUTODESK PRODUCT USED

Autodesk Revit

Development of the Technology to Use Building Information Modelling for Statutory and Building Control Submission

Project Description

ICU initiated this Project with funding support by TechConnect (Block Vote) of Innovation and Technology Bureau (ITB) which aimed to develop BIM standard and guideline, model templates, BIM objects and families so as to minimize manual-editing works during generation of 2D plans and schedules from BIM 3D model, and a plug-in software for automatic detection of manual-editing works on 2D plans to check the linkage and consistency between BIM 3D model and 2D plans generated. It serves to provide tools for the construction industry to facilitate production of 2D plans with minimum manual editing works using BIM technology for statutory and building control submission, including General Building Plan, Superstructure Plan and Foundation Plan. It echoed the government policy on promoting the use of BIM in construction industry.

Project Challenges

In traditional construction industry, the site works rely on the 2D construction drawings including plans, elevations and sections which are produced separately without linkage to each other. When design changes, all drawings have to be updated manually which is time consuming and vulnerable to unnecessary human errors. Moreover, as the concept

of direct drawing generation for statutory and building control submission is relatively new to Hong Kong and most of the building professionals do not know how to prepare 2D drawings for statutory and building control submission by using BIM. Besides, as there are always software constraints, 100% direct 2D drawing generation is normally infeasible. To mitigate the constraints, most of the BIM softwares provide 2D manual-editing tools including 2D line and annotation editing tools etc., so that users can produce 2D drawings within BIM softwares when such drawings cannot be generated directly from 3D models. For building professionals who are not familiar with BIM, it is very likely that 2D manual-editing tools will be abused. In such case, it loses the spirit of using BIM as 2D drawings produced by BIM are not directly linked from 3D model. In order to further promote the use of BIM in the construction industry of Hong Kong, this gap of linkage between 2D drawings and 3D models and minimizing the use of manual-editing works for statutory and building control submission need to be bridged over.

Solutions for challenges

The above challenge is resolved by development of:

- 1) BIM Standard and Guideline

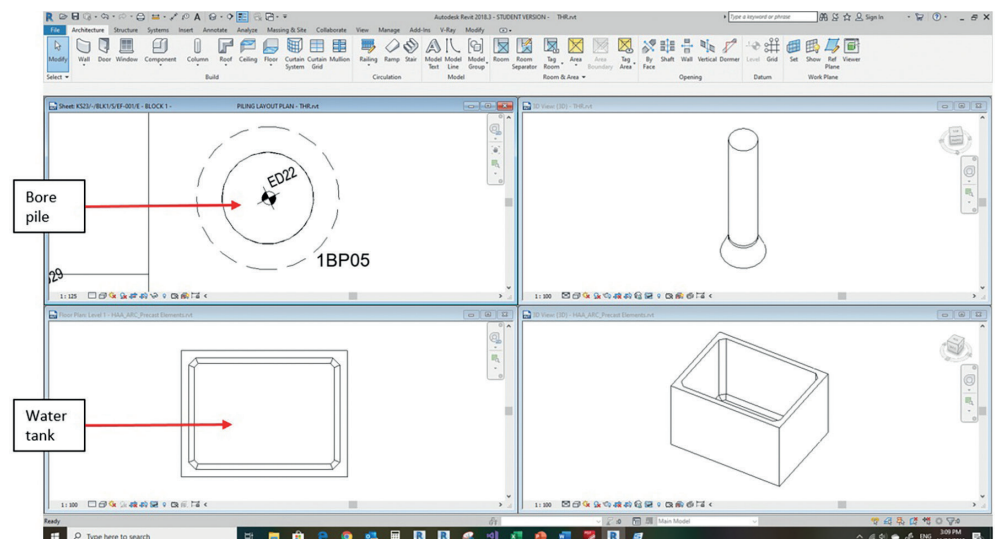
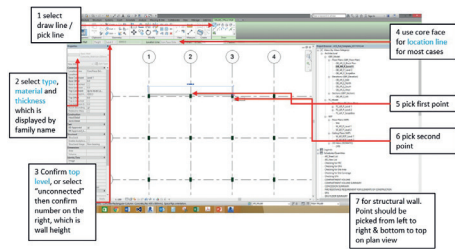
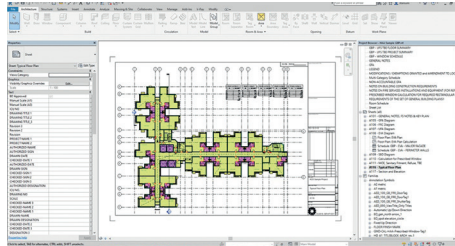


Image Courtesy of Independent Checking Unit, Office of the Permanent Secretary for Transport and Housing (Housing), HKSAR Government

BIM Objects



BIM Standard & Guideline
 Image Courtesy of Independent Checking Unit, Office of the Permanent Secretary for Transport and Housing (Housing), HKSAR Government



BIM Template – GBP
 Image Courtesy of Independent Checking Unit, Office of the Permanent Secretary for Transport and Housing (Housing), HKSAR Government

- 2) BIM Template and Object Library
- 3) Plugin for automatic detection of manual-editing works

The standard quantifies the definition of “proper 3D modelling”. The guideline illustrates the methodology on how to achieve the standard. The Template and Library provide the commonly used BIM setting for statutory and building control submission. And as manual-editing works can be minimized but not fully eliminated, a plugin is developed for automatic detection of manual-editing works.

Testing is carried out. Number of manual editing works of a project using traditional approach is recorded. Same project is reproduced using the method proposed in this project. Significant reduction in the nos. of manual editing works items (which could be reduced from 200 to 20 approximately) has been recorded in testing stage for different

types of plans including General Building Plan, Superstructural Plan and Foundation Plan for a test project.

The deliverables developed in this Project could be used by HA and other works departments such as Buildings Department, Architectural Services Department and over 2700 registered consultant firms and professionals (Authorized Persons, Registered Structural Engineers, Registered Geotechnical Engineers) in Hong Kong. This would facilitate the applications of BIM technology in these departments and the whole construction industry in Hong Kong.

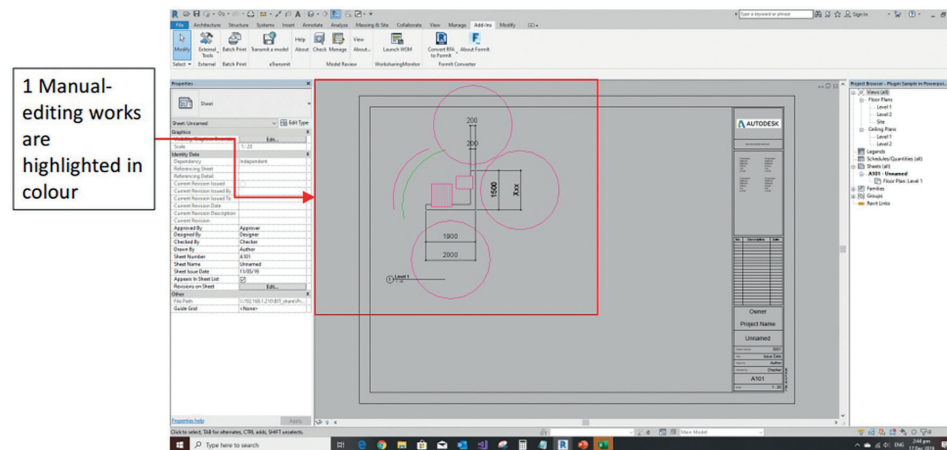
submission. The costs and time for 2D drawings production could be significantly reduced while the saving on resources could be redeployed to further develop the applications of BIM.

How does BIM benefit the project?

With the recent adoption of BIM technology, all design data are stored in a consolidated manner and all relevant presentation by means of 3D model and 2D drawings could be generated from a single source of data. When design changes with the source data amended, all related 3D model and 2D drawings will be updated automatically. This enhances efficiency and prevent unnecessary human errors.

Better with BIM

If Professionals in Hong Kong can adopt the BIM standard, guideline and template of this Project, they would be able to produce 2D drawings directly from BIM with minimum manual editing works for statutory and building control



Plug-in for Automatic Detection of Manual-Editing Works
 Image Courtesy of Independent Checking Unit, Office of the Permanent Secretary for Transport and Housing (Housing), HKSAR Government