

COMPANY

Hong Kong Housing Authority, HKSAR Government

PROJECT

Modular Flat Design in Public Housing Developments
- Adopting BIM for Collaboration and Integration

LOCATION

Hong Kong

TYPE

Public Housing Development

SCHEDULED TIME OF COMPLETION

End of 2019

Modular Flat Design (MFD) in Public Housing Developments - Adopting BIM for Collaboration and Integration



About Hong Kong Housing Authority, HKSAR Government

The Hong Kong Housing Authority (HA) was established in 1973 under the Housing Ordinance with the Housing Department (HD) as her executive arm to help the Government achieving its policy objective on public housing. The HA provides subsidized public rental housing to low-income families, and to help low to middle-income families gain access to subsidised home ownership. Approximately 30% of the Hong Kong population is now living in public rental housing units.

To meet the increasing demand for public housing flats, the HA adopts site specific design approach to fully utilize the potential of each public housing site and designs standard Modular Flat Design (MFD) units to maintain high quality in standardization and buildability to meet varying configuration requirements of different building blocks.

BIM PARTNER

isBIM Limited

AUTODESK PRODUCT USED

Revit

Project Description

The MFD units are the major components of each public housing block. With the collaboration between the HA's Development and Standards (D&S) Section and the Quantity Surveying (QS) Sections and the assistance of a BIM consultant (isBIM), BIM models of different standard MFD units are developed for the integrated purposes of design, drawing production, cost estimating and quantity take-off (QTO). The MFD BIM models form a library of standard flat units, allowing easy updating upon design enhancement and estimating the corresponding cost implications. The parametric MFD BIM models are readily adopted by project teams in different public housing projects which can speed up both the design and tendering processes.

Project Challenges

The major challenge is to have all stakeholders collaboratively establishing the standard approach of modelling (SAM) to determine what and how the geometric and non-geometric information to be provided in the MFD BIM models. The level of information has to suit design and drawing production by design professionals and cost estimating and QTO by quantity surveyor at different project stages while keeping the file sizes at a workable level and user friendly.

Another great challenge is the necessity to change mindset and practice of project teams in adoption of the MFD BIM models including the new collaboration workflow, the ownership of models, the rights and liabilities of model authors and users, the coordination of disciplinary models and the ways to apply the MFD BIM models in assembling domestic blocks in projects.

Solutions for challenges

Different disciplines comprising architect, structural engineer and building services engineer in the HA worked in full collaboration with the assistance of a BIM consultant to develop their own disciplinary models and then regularly integrate the models to form the federated models of MFD units. The design professionals also worked closely with quantity surveyor to agree on the modelling approaches and the incorporation of non-geometric design information to facilitate extraction of information from models for BIM-based cost estimating and QTO. SAM was established and the BIM workflow of applying the MFD BIM models in projects was also developed through mutual undertaking and close coordination.

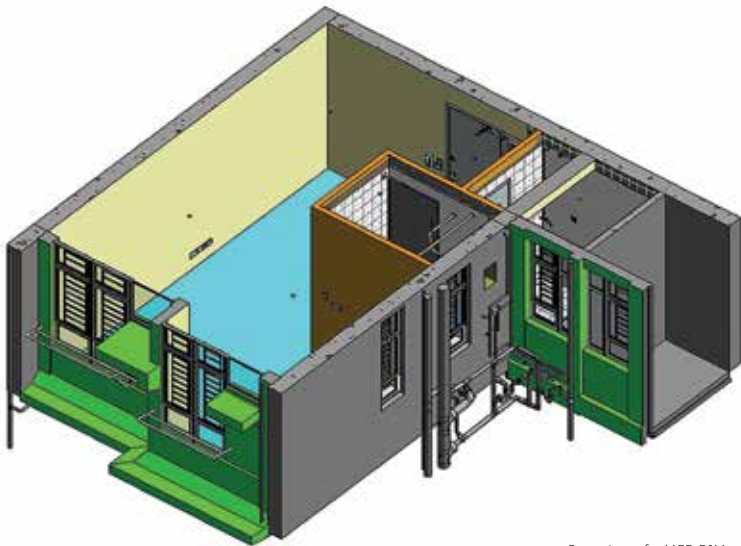
With the repetitive features of MFD and the established SAM, the adoption of the MFD BIM models enhances the efficiency of assembling site specific design domestic blocks in projects and extracting well-defined dimensional information for budget control and cost management.

How does BIM benefit the project?

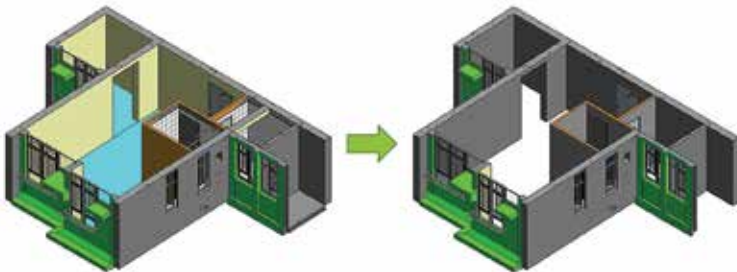
BIM is a good platform for information exchange and management. The MFD BIM models facilitate the sharing of MFD information among project team members throughout the whole workflow. Regular integration of disciplinary models into a federated model enables clashes, omissions and errors to be identified effectively in early stage. The Design Options function enables achieving creation of 36 MFD BIM models to represent 86 flat types for better file management and maintaining consistency across models when updating. The adoption of Workset allows smooth navigation of the federated models and also effectively addresses the concern of discipline liability, category, file sizes and visualization of models at different stages in the project life cycle. Parametric families allow flexibility to modify the MFD BIM models to suit different site specific designs. The design information and well-defined dimensional information can be readily extracted in Revit schedules in a systematic manner for quantity surveyor to carry out budget control, cost management and tender documents preparation.

Better with BIM

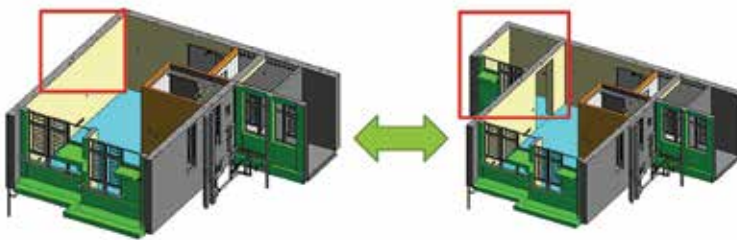
The development of MFD BIM models can be readily adopted by the project team of each public housing project, which can save time in design, modelling, cost budgeting and cost management, and tender preparation. The sharing of MFD BIM models to project teams not only can drive BIM adoption of in-house professional teams but also of our external professional service providers. It is a further step forward of transformation of our work process to digitized workflow.



Overview of a MFD BIM model
Image Courtesy of Hong Kong Housing Authority, HKSAR Government



Dynamic management of BIM models by Workset
Image Courtesy of Hong Kong Housing Authority, HKSAR Government



Dynamic management of BIM models by Design Options
Image Courtesy of Hong Kong Housing Authority, HKSAR Government

Site Specific Design

2000s

Site Specific Block

1-Person/2-Person Flats

Modular Flat Design

2-Bedroom Flats

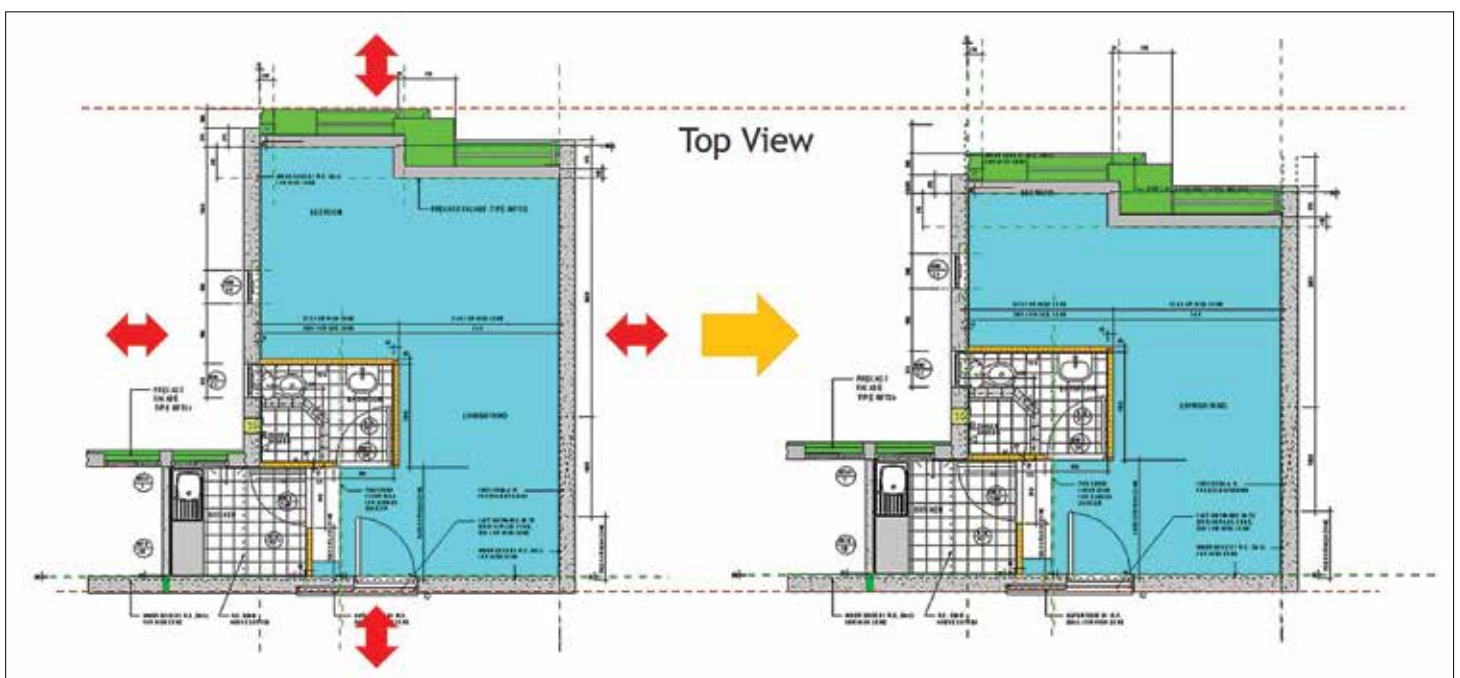
1-Bedroom Flats

2-Person/3-Person Flats

Typical MFD flat types as basic units of a public housing block
Image Courtesy of Hong Kong Housing Authority, HKSAR Government

<p>A Finishes and Fixings</p>	<p>S Fabric Mesh</p>	<p>B MEP</p>
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Components of a federated MFD BIM model
Image Courtesy of Hong Kong Housing Authority, HKSAR Government



Readily adjustment of flat layout through Alignment Constraints
Image Courtesy of Hong Kong Housing Authority, HKSAR Government