BIM & FM in Hong Kong Public Rental Housing Projects
BIO
BIM Application in USA, UK and other countries
BIM Application in Hong Kong
Interview
Case Study
A new process for BIM-combined construction
Frameworks for preparing as-built BIM model
Maintenance of BIM model in whole lifecycle
Suggestions
BIM Application in USA, UK and other countries

- The U.S. is the first country to apply BIM. The U.S. General Services Administration (GSA) has published series of BIM guide and National 3D-4D-BIM Program and applied them in more than 35 projects.

- The U.S. Army Corps of Engineers (USACE) planned to achieve full operational of BIM no later than 2012.

- Pennsylvania State University (PSU) developed a BIM Project Execution Plan on July 2010, which was a product of the buildingSMART alliance Project. The facility data like level of development (LOD) and data standard structure COBie were suggested to be defined for facility management.

- In UK, Cabinet Office published the Government Construction Strategy in May 2011 and announced that it will coordinate government to enable all members of the supply chain to work collaboratively through BIM.
Since 2006, in Hong Kong, more than 19 public rental housing projects have adopted BIM in their design and construction stages.

Hong Kong Housing Authority (HA) also developed their in-house BIM standards and user guide for guiding the architect and engineers to use BIM properly during design stage.

Hong Kong establish Institute of BIM and held BIM conference every year.
The following additional will be incorporated into the as-built BIM model prior to handover for facility management.

- Room number and building name, staircase number, washroom number, lift lobby number;
- Door Schedules;
- Window Schedules;
- Roofing System;
- Fresh & flush water supply system, drainage system for building blocks and underground;
- Other textual information subject to agreement of facility management at later stage; eg. Planter number, green roof number;
- Retrieval of building services system installation information by hyperlink to related folder of data bank.
How to combine BIM&FM?

- **Step 1**
  Build the BIM models and make sure it consistent with as-built drawings

- **Step 2**
  Sorting the BIM models and add necessary parameters to components and equipments in BIM model.

- **Step 3**
  Export NWC format from BIM model.

- **Step 4**
  Build up a Naviswork FM platform for facility management.
What do main contractors and sub-contractors do in handover stage?

- **Main Contractors:**
  - Make sure all the as-built drawings consistent with reality
  - Gather all the FM information from sub contractors in time

- **Sub-contractors:**
  - Provide all the equipments/Materials’ catalogues and Warrant Information
  - Provide equipments layout with Ref. number mark up
  - Provide contract required equipments TC reports
  - Provide contract required equipments Operation Manual
Procedure for Preparing As-built Model

BIM Team raise up the Input Data Set

Discuss Input Data Set with Owner/FM Managers

During Construction Period, BIM Team collect information from Contractor and sub-contractor

During As-built Period, BIM team take photos on site and make sure the as-built model consistent with reality.

BIM team finish the as-built model and submit to Housing Authority for checking.

Facility Management Period

Lifecycle management

Input Data Set includes information being input in the BIM model such as geometry information of models, catalogue and quantity schedules.

Contractor should prepare information such as catalogues, drawings and supplier contact.

Contractor must leads BIM team to finish this inspection.

Contractors and BIM team has the same responsibility on as-built model.

In BIM model, clicking on an object will bring up its catalog, supplier and the mobile number of the servicing staff.
Using Navisworks to Set Up FM platform

- **BIM can help facility professionals:**
- **Space Management**
  - Facility managers can build a detailed and accurate space inventory based on BIM models, helping clients make more efficient use of their real estate and significantly reducing costs.
- **Maintenance Management**
  - Facilities professionals can access BIM model to obtain accurate FM information for each equipments efficiently, having accurate as-built information to reduce the cost and time required for renovations.
- **View floor plans and 3D views from BIM models**
  - Helping clients understand how they use space and quickly locate building equipments. Fast then traditional method of searching CAD drawing.
Components

Components like pipes, ducts, cable trays, trunkings only need to provide geometry information and routing layout.

Equipments

Each of equipment should have serial number.

Both of the components and equipments can be seen in the 3D visual environment.
1. Save all the Equipments in Library
2. Naming the Equipments (Each of equipment should have its own equipment number)
3. Input the Equipments Value (in BIM software)
   - Equipment No.
   - Location (Floor, Room)
   - Manufacturer
   - Startup Date
   - Warranty Expiration Date
   - Status
   - Repair History
   - Link Documents
FM Manager can access the geometry information and other material information in Navisworks interface. Navisworks provides CSD view for each floor.
Navisworks also provides 3D views for each floor. Facility manager can easily access the pipe or duct information by clicking the component in 3D views.
- Add FM demo Pictures
Add FM demo Pictures
File Submission

**FM Submission: .nwd format**

- Whole Building (ARCHI + SE Model)
- Whole Building Drainage System + Plumbing System
- Each Floor Model (Combined Service Model + ARCHI+SE Model)
- Critical Place Model (optional)

*Each model link with equipments catalogue, TC report or operation manual, detail information please refers to contract requirements.*
Challenges Forward

- **Challenge I:** processes to maintain the building information
- Updating FM model is not allowed in Navisworks Platform

- **Solution 1:**
  - Outsourcing BIM model Updating Work to BIM consultant

- **Solution 2:**
  - Housing Department trains its own operation staffs to update BIM models and Navisworks FM platform
Challenges

- **Challenge II:**
  - Existing CAFM Software can’t import BIM information

- **Solution 1:**
  - Follow U.S. BIM guideline and install new CAFM software which can import COBie format.

- **Solution 2:**
  - BIM consultant write plug-in to export data rich IFC format which can be imported by existing CAFM software.