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Developing a BIM-Based Programme Based on Preliminary FM Guidelines for Care and Attention Homes

Background

Hong Kong has one of the world's highest life expectancies and lowest fertility rates, which have contributed to its growing elderly population. The number of elderly in Hong Kong has been estimated to rise from 1.12 million (15.4% of the total population) in 2015 to 2.32 million (28.6% of the projected total population) in 2035 (Census and Statistics Department 2015). This phenomenon is expected to bring with it various problems such as a greater proneness to diverse diseases and disabilities, an increasing level of dependence and care, etc. To tackle Hong Kong's ageing problem, over 755 care and attention (C&A) homes have been constructed to provide accommodation for its elderly (Subcommittee on Retirement Protection 2012).

C&A homes in Hong Kong are gradually adopting the concept of continuity of care. Elderly people with different psychological or physical health conditions tend to live in the same areas. However, C&A home operators should consider that their patients' health will, on average, deteriorate as they age. A good facilities management (FM) programme in C&A homes is necessary to ensure that they live their golden years in safe environments and enjoy healthy social lives.

A preliminary FM guideline for C&A homes has been established via a systematic study supported by a grant from the Innovation and Technology Fund of the Hong Kong Special Administrative Region, China (Project No.ITF13-ITS/319/13). It consists of: (1) extensive literature; (2) onsite measurements; (3) radio frequency identification devices (RFID) to monitor space utilisation and traffic patterns; (4) questionnaire surveys; and (5) focus groups. In addition, to ensure that the FM guideline satisfies the needs of Hong Kong's elderly, a BIM-based programme has been developed based on a preliminary FM guideline for C&A homes. The detailed data analysis has been reported to the government and is not shown here. This article shares parts of the preliminary FM guidelines and our BIM-based programme for C&A homes.

Preliminary FM Guidelines for C&A Homes

Based on the findings of the study, a drafted FM guideline, namely, the FM(C&A) Guideline, includes three main sections (space management, building services, and support facilities), was prepared for the C&A homes. Space management covers the home layouts, functional spaces, floor levels, doors, and windows, while building services include ventilation, water supply, and vertical transportation. Support facilities consist of finishes and 18 fixture and furniture types. Some recommendations related to the layout of C&A homes were abstracted from the FM(C&A) Guideline as follows:

- a) **The administrative area** should be located next to the main entrance and have a good view of the entrance. This area enables live-in wardens to manage everything from residential care to building maintenance. In addition, the administrative office should connect to the reception counter.
- b) **Function rooms**, such as physical therapy, computer, exercise, and staff rooms (e.g., nursing, office, and changing rooms), should be located at the centre of the C&A home. Such a layout plan would not only facilitate the working processes of caregivers, but also ensure a certain amount of physical exercise (i.e., walking) for the elderly.
- c) **The living and dining rooms** shall be in proximity to the elderly living quarters, which ensure a reasonable distance for elders travel between living/dining room and bedrooms, so that long distances and travel times can be avoided. The mobility of the elderly is affected by the weather and conditions of their health. Hence, they may not be able to travel long distances from their bedrooms. A communal area for social activity should be arranged somewhere next to the corridor, as such an area can enhance the social relationships among the elderly.
- d) **The isolation and hope rooms** should be located close to the medical treatment room for easy access, while a family room should accommodate the patient's family members who want to stay for a while at the home.
- e) **Zoning by colours** is a possible way to separate C&A homes into different sections or areas, such as for storage, sitting, bedrooms, and so on, according to their uses and functions. This will help the elderly identify where they are. The colour of a particular section, such as the sitting area, should match that of other sitting areas.
- f) To create a feeling of home for the elderly, **bedrooms or dormitories** should be grouped together in each wing or location, while a group of dormitories could be considered a community. Bedrooms should have easy access to corridors and be near bathrooms and toilets.

- g) It is best that all main bedrooms be ensuite. At least one **toilet** with a wash basin for the elderly should be provided in each bedroom. The distance between the bedrooms and the toilets or bathrooms significantly affects the hygienic and satisfaction levels of the elderly. The placement of toilets requires further consideration when determining the locations of the bedrooms.
- h) **A walking area** should be provided in every C&A home. Elderly people with dementia are still physically active and tend to wander. If there is enough space, a walking area should be provided. If not, an indoor corridor can also act as a walking path. It is necessary to ensure that the movement of the elderly along corridors or other places will not hinder the normal traffic patterns of their fellow patients and staff.

BIM-based Programme for C&A Homes

Based on the preliminary FM(C&A) guidelines, a number of family FM members have also been established including different types of doors, windows, lighting, air-conditioners, cabinets, mobility aids, chairs, shower beds, tables, curtains, etc. All FM(C&A) guidelines and the BIM-based family members have been integrated into a BIM programme, which comprises two browsers (a project browser for building components such as architectural floor plans, ceiling plans, structural plans, etc., and a property browser for detailed information on building components and family members; see Figure 1). End-users, either construction professionals (architects,

building service engineers, interior designers, facilities managers, etc.) or operators (superintendents, social workers, occupation therapists, etc.), can then change each home's design by simply inserting, omitting, or moving family members according to the drawings in the BIM programme.

Summary

The elderly in C&A homes suffer from diverse diseases and disabilities in their daily lives, which should dictate the basic FM needs required to support their activities. In order to meet their needs, this study briefly summarises their behavioural patterns and daily activities so that appropriate spaces for them could be incorporated into C&A homes. Based on the outcome of the study, a preliminary FM(C&A) guideline has been suggested for improving the general health of the elderly in Hong Kong's C&A homes. It establishes the minimum standards for the design of elderly homes, so as to ensure that the quality of life for the elderly meets a certain level. The results of this study should provide a platform for a more comprehensive guideline of the elderly's living environment in C&A homes throughout Hong Kong and the world.

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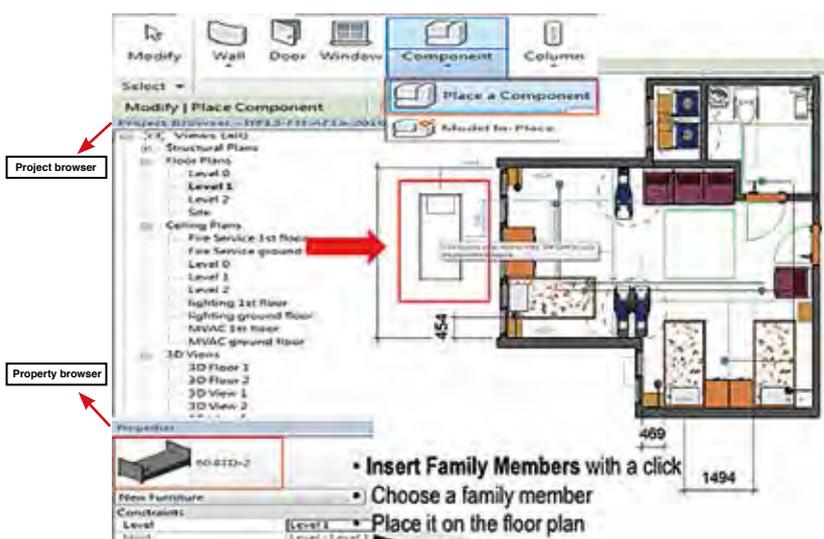


Figure 1 BIM-based programme for FM(C&A) homes