

**Memorandum for the Building Committee of  
the Hong Kong Housing Authority**

**QUALITY FOR HOUSING: PARTNERING FOR CHANGE**

**Off-site Manufacturing and Modular Integrated Construction**

**PURPOSE**

This paper updates Members about the viability study of Modular Integrated Construction (MiC) in public housing developments.

**BACKGROUND**

2. Previously, we had briefed the Building Committee of the mechanised construction including the use of precast concrete components (PCCs)<sup>Note 1</sup> in public housing construction and the extended use of PCCs in structural wall and corridor slab to further enhance the buildability and productivity (Paper No. **BC 41/2018, QH 1/2018** refers). We also reported the interim review on the study of MiC in public housing developments at the Building Committee meeting in September 2018 (Paper No. **BC 49/2018, QH 2/2018** refers).

3. As reported, we were perusing –

- (a) the viability study<sup>Note 2</sup> of MiC application in public housing construction; and
- (b) continuous extending on the use of prefabrication technology.

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Note 1 Including staircase, façade, semi-precast slab, volumetric precast bathroom and kitchen, partition wall, beam, balcony, refuse chute, water tank and roof parapet.

Note 2 We have engaged Dr. Wei Pan of the University of Hong Kong as our consultant in early 2018 to conduct a viability study on the application of MiC in public housing developments projects from technical points of view.

## MiC

4. After reporting on Singapore visit and the factory visit in Mainland China <sup>Note 3</sup> (Paper No. **BC 49/2018**), the findings now from the viability study mainly include –

- (a) MiC might be technically viable for public housing development in principle subject to variable conditions and gains <sup>Note 4</sup>; and
- (b) a pilot project should be conducted to see any further conditions that is worth noting.

5. We will learn more from the pilot run to see whether MiC will be beneficial in actual terms.

6. Meanwhile, we will take this recommendation and look for a pilot project of MiC.

## PREFABRICATION AND OTHERS

7. As reported previously, HA has adopted PCCs including precast staircase façade, semi-precast slab, volumetric precast bathroom, and kitchen, partition wall, beam, balcony and refuse chute, at a typical floor for about 35% of concrete volume and 70% precast rate on plan (**Annex A** refers). HA's prefabrication is consistent with MiC and both methods are using off-site construction with benefits in –

- (a) better quality control;
- (b) site safety enhancement;
- (c) environmental protection ;
- (d) expediting construction programme; and
- (e) increasing productivity

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Note 3 HA delegation has visited various parties and completed “Prefabricated Prefinished Volumetric Construction (PPVC)” projects in Singapore and some potential MiC suppliers in Mainland China in July and August 2018.

Note 4 The conditions include the contractor's experience, availability of storage area and plants, well planned logistic arrangement and the market trend of MiC demand etc.

8. We have adopted mesh reinforcement for wall & slab construction and off-site “cut & bent” steel reinforcement. Where conditions permit, the bathroom and the kitchen are made off-site as volumetric units and we aim to use such volumetric bathroom and kitchen in all projects.

9. To further enhance the productivity on site, we are exploring to adopt semi-precast slab with pre-installed service conduits in common area (Annex B refers) at typical floor. Some trials have been successfully conducted in precast component factories. We have confidence to apply it in coming HA’s projects.

10. Another attempt is precast structural wall (annotated as the red lines in Annex B) which will be adopted at internal wall and lift shaft where we can install concealed conduits and bracket for lift guide rail. A pilot project will be tendered out in 2019.

11. The applications mentioned above will bring the precast rate from 70% to about 90% on plan.

## WAY FORWARD

12. As recommended by the consultant, we will identify a pilot MiC project and the details will be reported in due course under separate paper. In parallel, we will adopt more off-site construction as mentioned above.

## INFORMATION

13. This paper is issued for Members’ information.

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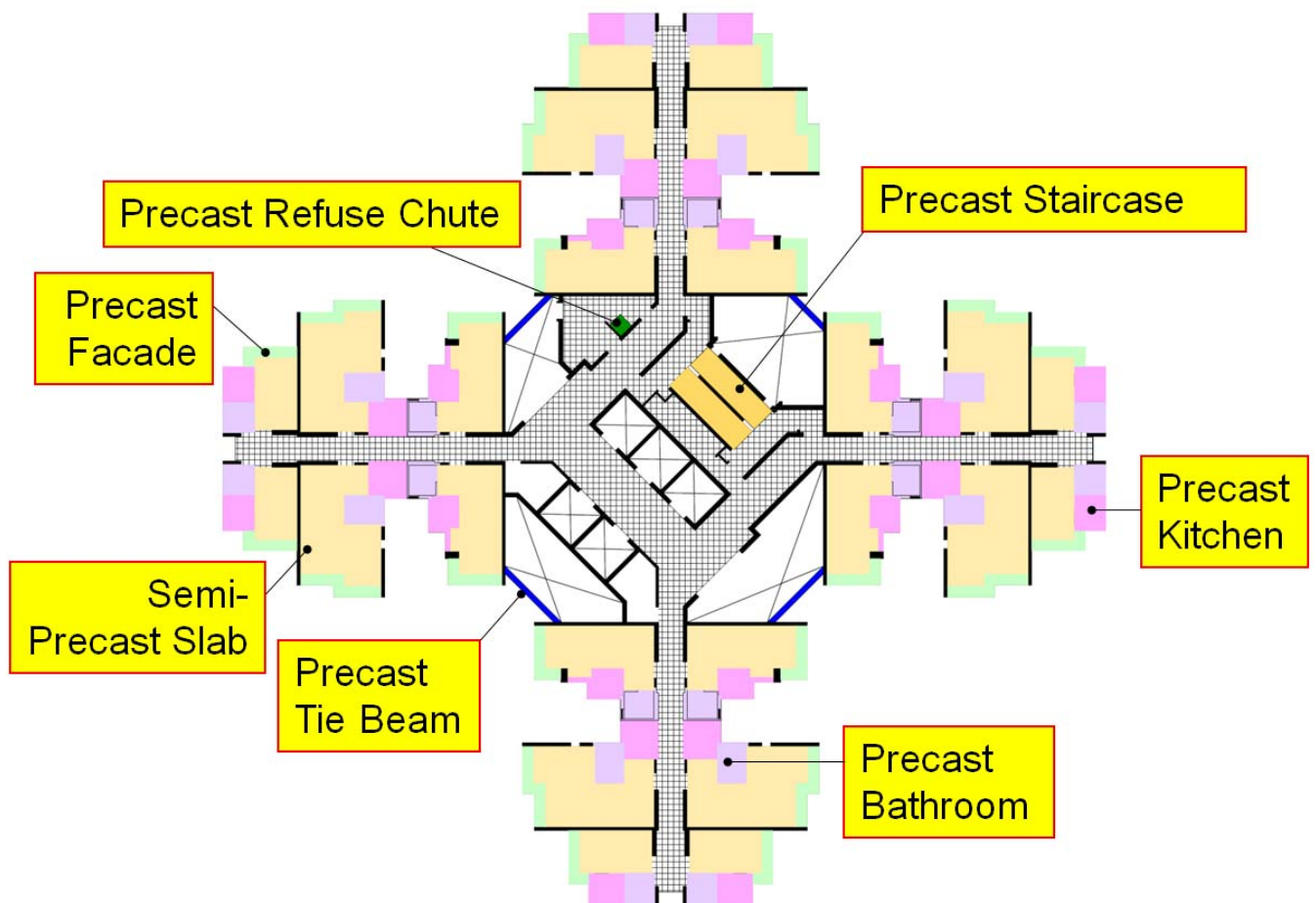
## LIST OF ANNEXES

**Annex A** – Precast concrete components in HA domestic blocks

**Annex B** – Enhanced precast concrete components in HA domestic blocks

## Precast Concrete Components in HA Domestic Blocks

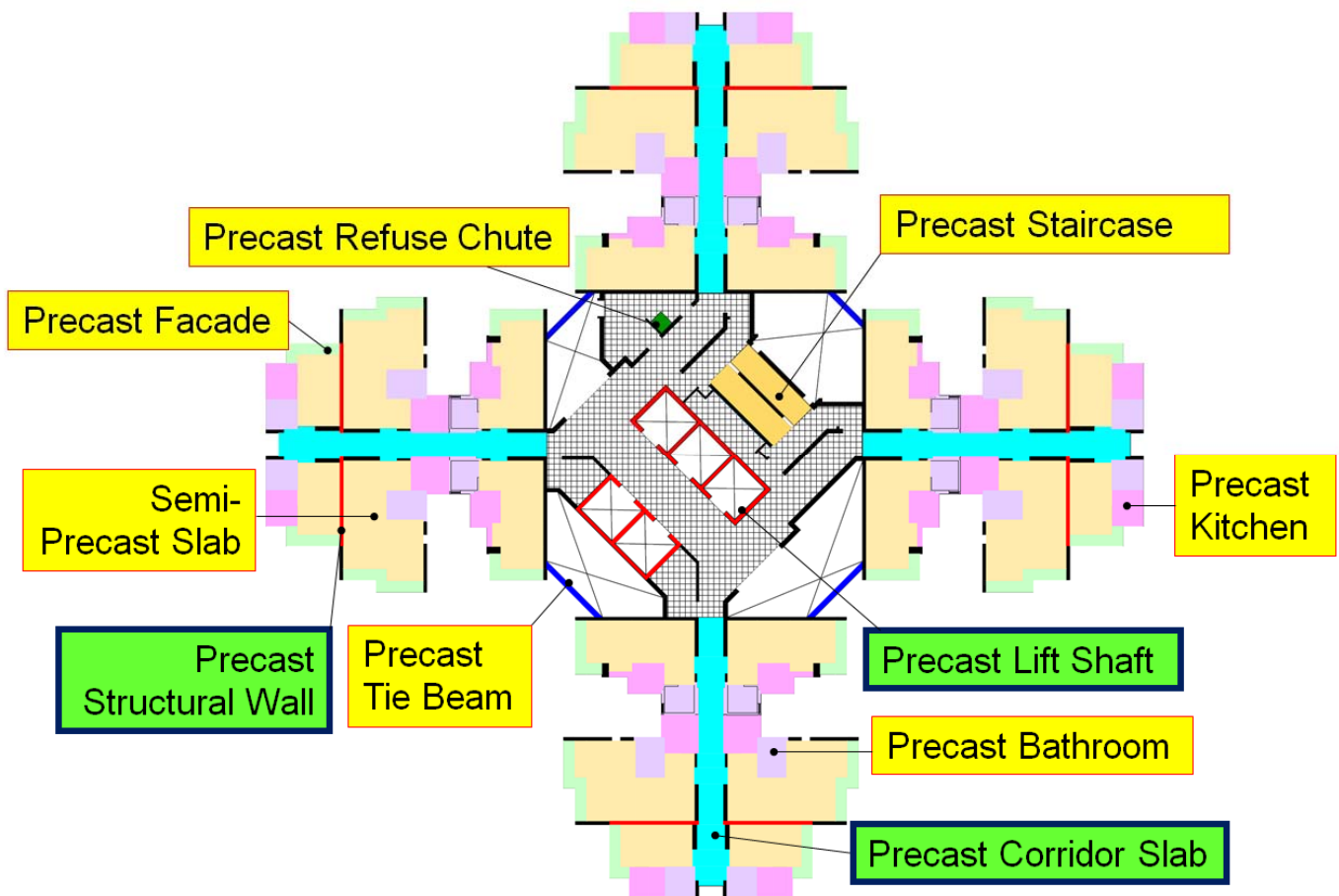
Precast Rate: **70% (approx.) on plan**



**Note: Structural Walls and Slabs in common area (corridor and lift lobby) are insitu.**

# Enhanced Precast Concrete Components in HA Domestic Blocks

Precast Rate: **90% (approx.) on plan**



## Legend

 - "Enhanced Precast Concrete Components"