

Precast Facades with Cast-in Window

1. Background

For cast-in window method, the outer window frame is placed on a mould horizontally and cast with concrete. The window frame and precast façade are integrated and sent to site for installation. By casting horizontally, the concrete could flow and encase the window frame profile fully. The consistency and quality is better controlled in precast plant. Hence, the water-tightness at interface joints between window frame and façade concrete is greatly enhanced.

From the research collaboration with BCA, HDB had carried out further R&D castings with full-height façade designs using different window configurations, namely full-height window frames with and without intermediate mullions.

2. Scope of R&D

Precast facades with two different width of framing concrete, namely 150mm and 200mm were cast. The thickness of facade remained at the current standard of 120mm. The objectives were to:

- determine whether the thin framing concrete can withstand production, demoulding and handling stresses;
- find out the suitability of the current bracing and stopper system of the mould for precast production; and
- determine whether mullions contribute to the overall rigidity.

3. Learning points

Detailing of steel reinforcement at the narrow strip of framing concrete shall be carefully done to prevent congestion of reinforcement. Smaller hand-held trowel is recommended for proper leveling of concrete at framing area. Position of lifting points for demoulding shall take into consideration the Centre of Gravity (CG) of façade. Proper lifting gear such as lifting beam may be necessary for a more even distribution of lifting forces and minimize cracks on hardened façade concrete.

4. Sharing with industry

Framing concrete shall be in the range of 250mm to 300mm for full-height window facades to cater for precast connections at both ends and to ease the congestion of steel reinforcement. The thickness of façade shall be 150mm to provide the rigidity during handling and transportation and prevent crack at the interface of attached beam and facade. The contribution of mullions is insignificant in the overall rigidity. These findings were disseminated to the consultants for better design and detailing of facades before full-scale implementation as well as to the precasters.

Photographs of Precast Facades with full-height cast-in window



Elevation of R&D panels



Side view of R&D panels

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