

Case 7/2022

Issue: In-principle Acceptance of Modular Integrated Construction (MiC)

Recommendation: (1) To accept the design of lightweight foamed concrete adopted in slabs and external non-load bearing walls of MiC modules based on ‘ACI 318-14 Building Code Requirements for Structural Concrete’ and ‘ACI 523.3 R-14 Guide for Cellular Concrete above 800 kg/m³ with modified parameters /coefficients to fulfill the requirements of the Building (Construction) Regulation.

(2) To accept the use of lightweight foamed concrete for construction of precast slabs and precast external non-load bearing walls in MiC modules with the following composition and proportion:

Components	kg for 1m ³ foamed concrete
Ordinary Portland Cement (OPC)	1155
Water	289
Superplasticizer	6 to 10
Viscosity Modification Agent	1 to 1.3
PP fiber (3mm length)	9.24
Pre-formed Foam	320 (L)

Notes:

- (i) The formation method of pre-formed foam refer to the proposed production method.
 - (ii) Amount tolerance for OPC, water and pre-formed foam is ±2% while the amount tolerance for superplasticizer, viscosity modification agent and PP fiber is ±5%.
- (3) To accept the use of the lightweight foamed concrete with the abovementioned composition with the following design parameters:

Air-dry density	1400 - 1500kg/m ³
Characteristic compressive strength	25 MPa
Short-term static modulus of elasticity	10 GPa
Tensile Splitting strength (for derivation of shear strength)	1.2 MPa

Decision:

Having noted the background of the design approach, construction sequence, quality control, site supervision and the testing proposals, members endorsed the recommendations on a case-by-case basis subject to the following conditions:

- (1) The results of the proposed tests to verify the properties of completed lightweight foamed concrete product are found satisfactory;
- (2) The proposed quality control measures of the production of lightweight foamed concrete are properly implemented; and
- (3) The quality supervision for the production of precast lightweight foamed concrete complies with PNAP APP-143 and the proposed enhance supervision frequency.