

Summary of Decisions of the Structural Engineering Committee
SEC Meeting 1/2025 held on 11.3.2025

Case 1/2025

Issue: In-principle acceptance of structural use of lightweight aggregate concrete for precast and cast in-situ structural elements

Recommendation: (1) To accept the design of the lightweight aggregate concrete (LWAC) applied in precast structural slabs, beams, columns, walls and cast in-situ structural slabs, columns and walls based on ‘BS EN 1992-1-1:2004 Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings’ (Eurocode 2) with modified parameters/coefficients to fulfill the requirements of the Building (Construction) Regulation.

(2) To accept the following design composition and mix proportion of the LWAC in structural use:

Components	kg/m ³	Remarks
Ordinary Portland Cement (OPC)	540	N/A
Fine lightweight aggregate (LWA) (Grading “M”)	334	Grading conforming to clause 3.2 of Construction Standard CS3:2013 (CS3:2013)
10 mm LWA nominal size of single-sized aggregate	258	
20 mm LWA nominal size of single-sized aggregate	210	
Water	218	N/A
Admixture	6.5*	N/A

Note:

* This value is the maximum dosage of admixture.

(3) To accept the following design parameters of the LWAC based on the aforementioned composition and mix proportion:

Density of fresh concrete – for self-weight calculation	1 600 kg/m ³
Oven-dry density of hardened concrete	1 480 kg/m ³
Characteristic compressive strength	Cube: 30 MPa Cylinder: 27 MPa
Short-term static modulus of elasticity	14.0 GPa
Bond strength for all reinforcing bars with bar diameters $\varnothing \leq 25$ mm (500B)	2.17 MPa (‘good’ bond condition)

	1.52 MPa ('poor' bond condition)
Coefficient of thermal expansion	$8 \times 10^{-6}/^{\circ}\text{C}$
Poisson's ratio	0.2

Decision:

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

- (1) Fire resistance tests on horizontal and vertical elements should be carried out prior to commencement of the LWAC works. Fire test reports should be submitted and found satisfactory prior to the commencement of the LWAC works.
- (2) The results of the proposed tests to verify the properties of finished LWAC product are found to be satisfactory;
- (3) The proposed quality control measures for the production of LWAC are properly implemented; and
- (4) The quality supervision for the production of precast and cast in-situ LWAC is in accordance with PNAP APP-143 and the proposed increased supervision frequency.