

## SECTION 8. DESIGN OF *mortarless* WALLS FOR BENDING

All *mortarless* walls are fully grouted and they are readily reinforced with certainty of the reinforcement positioning within. As such they can readily be designed for flexure as members spanning vertically, horizontally or both.

### 8.1 Reinforced *mortarless* walls subject to out-of-plane bending:

The provisions of AS 3600 Section 9 (Design of Slabs for Strength and Serviceability) are used for the design of *mortarless* walls for out-of-plane bending.

Clause 9.1.1 refers back to Clauses 8.1.1 through 8.1.8 for determining the strength of a one-way slab in bending. Clause 8.1.2 outlines the assumptions used when calculating the strength in bending which incorporates equilibrium and strain-compatibility considerations, and Clause 8.1.3 provides the deemed to satisfy provisions using a rectangular compression stress block. These can be summarized as follows:

- a) Plane sections normal to the axis remain plane after bending;
- b) The concrete has no tensile strength;
- c) Compressive stress distribution is represented by an equivalent rectangle where the stress is  $\alpha_2 f_c$  and the depth of the compression block is  $\gamma k_u d$  where
 
$$\alpha_2 = 1.0 - 0.003 f_c \text{ (within the limits } 0.67 \leq \alpha_2 \leq 0.85 \text{ )}$$

$$\gamma = 1.05 - 0.007 f_c \text{ (within the limits } 0.67 \leq \gamma \leq 0.85 \text{ )}$$
- d) The maximum strain in the outermost compression fibre is taken as 0.003;

AS 3600 Clause 11.1(b) permits the design of walls simply as slabs in accordance with the appropriate provisions of Section 9 provided the stress at the mid-height section of the wall due to factored in-plane bending and axial forces does not exceed the lesser of  $0.03f_c$  and 2MPa, provided the second-order deflections due to in-plane loads and long-term effects are considered in the calculation of bending moments, and provided the slenderness ratio (using effective height) does not exceed 50.

### 8.2 Reinforced *mortarless* beams, i.e. *mortarless* walls subject to in-plane bending:

The recommended limiting span to effective depth ratios for beams are as follows:

- 20 for simply supported beams,
- 26 for continuous beams, and
- 7 for cantilever beams.

The cross section should be designed in accordance with the provisions of AS 3600 Section 8. Special consideration needs to be given to the detailing of any required shear reinforcement.