MASONRY WALL PANEL DESIGN TO BS5628:2005

In accordance with BS5628-1:2005

TEDDS calculation version 1.2.06

Masonry panel details

Dunollie - Unreinforced masonry wall without openings

Panel length — L = **10800** mm

Panel height — h = **1500** mm

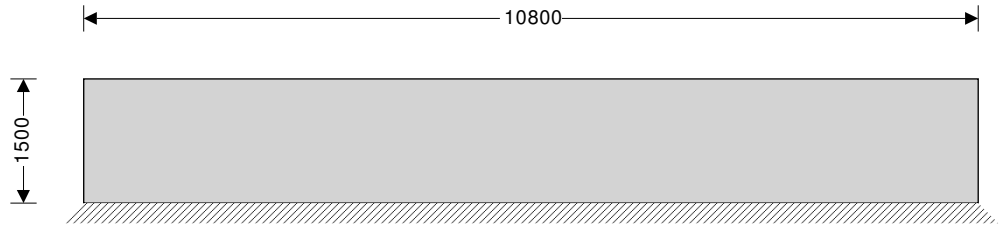
Panel support conditions

Bottom only supported continuously

- Horizontal supports provide enhanced resistance to lateral movement

Effective panel length — $L_{ef} = 1.0 \times L =$ **10800** mm

Effective panel height — $h_{ef} = 0.75 \times h =$ **1125** mm



Single-leaf wall construction details

Wall thickness — t = **215** mm

Effective wall thickness — $t_{ef} = t =$ **215** mm

Masonry details

Masonry type — **Clay bricks having a water absorption between 7% and 12%**

Compressive strength of unit — $p_{unit} =$ **10.0** N/mm^2

Mortar strength Class/Designation — **M6** / **(ii)**

Height of masonry units — $h_b =$ **65** mm

Density of masonry — $\gamma =$ **18.0** kN/m^3

From BS5628-1 Table 2a - Characteristic compressive strength of masonry

Characteristic compressive strength f_k = **3.80** N/mm^2

From BS5628-1 Table 3 - Characteristic flexural strength of masonry

Plane of failure parallel to bed joints f_{kx_para} = **0.40** N/mm^2

Plane of failure perpendicular to bed joints f_{kx_perp} = **1.10** N/mm^2

Lateral loading details

Characteristic wind load on panel W_k = **0.700** kN/m^2

Partial safety factors for material strength

Category of manufacturing control **Category II**

Category of construction control **Normal**

Partial safety factor for masonry in compression γ_{mc} = **3.50**

Partial safety factor for masonry in flexure γ_{mf} = **3.00**

Partial safety factor for masonry in shear γ_{mv} = **2.50**

Horizontal loading (cl 32)

Limiting dimensions (cl 32.3)

Limiting wall height $h_{max} = 12 \times t_{ef}$ = **2580** mm

PASS - Limiting wall height is not exceeded

Partial safety factors for design loads

Partial safety factor for design wind load γ_{fW} = **1.40**

Partial safety factor for design dead load γ_{fG} = **0.90**

Design moments of resistance in panels (cl 32.4.2)

Self weight of wall at base $S_{wt} = h \times t \times \gamma$ = **5.81** kN/m

Design vertical compressive stress $g_d = \gamma_{fG} \times (G_k + S_{wt}) / t$ = **0.02** N/mm^2

Enhanced flexural strength of masonry $f_{ka\_para} = f_{kx\_para} + \gamma_{mf} \times g_d$ = **0.47** N/mm^2

Section modulus of wall $Z = t^2 / 6$ = **7704167** mm^3/m

Elastic design moment of resistance $M_d = f_{ka\_para} \times Z / \gamma_{mf}$ = **1.214** kNm/m

Design moment in panels (cl 32.4.2)

Using elastic analysis to determine bending moment coefficients for a freestanding panel

Bending moment coefficient α = **0.500**

Design moment in wall $M = \alpha \times W_k \times \gamma_{fW} \times h^2$ = **1.102** kNm/m

PASS - Resistance moment exceeds design moment