FURTHER MASONRY DESIGN INCORPORATING TENSILE & SHEAR STRESSES

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STRUCTURAL DESIGN FOR THE SMALL PRACTICE

Table 1 gives the flexural f_{xk} values in the relative directions in N/mm^2. (BS5628 pt)

Concrete blocks of compressive strength N/mm^2	***Plane of failure parallel to bed joint***		***Plane of failure perpendicular to bed joint***	
Mortar Designation	I, ii & iii	iv	I, ii & iii	iv
2.8	0.25	0.20	0.40	0.40
3.5	0.25	0.20	0.45	0.40
7.0	0.25	0.20	0.60	0.50
10.5	0.25	0.20	0.75	0.60
14.0 and over	0.25	0.20	0.90*	0.70*

When used with flexural strength assume an orthogonal ratio of 0.30

Values of α_x

$\frac{h}{L}$	1	2	3	4	5	6	7	8	9	10	11
0·30	0·045	0·035	0·029	0·022	0·018	0·016	0·014	0·009	0·024	0·021	0·016
0·50	0·064	0·049	0·039	0·032	0·035	0·029	0·025	0·017	0·055	0·045	0·035
0·75	0·080	0·059	0·045	0·040	0·052	0·041	0·033	0·026	0·098	0·075	0·060
1·00	0·089	0·065	0·049	0·044	0·064	0·050	0·039	0·032	0·144	0·104	0·084
1·25	0·095	0·068	0·052	0·048	0·074	0·055	0·043	0·037	0·194	0·129	0·108
1·50	0·100	0·071	0·053	0·050	0·081	0·060	0·046	0·040	0·244	0·152	0·129
1·75	0·103	0·073	0·054	0·051	0·086	0·063	0·048	0·043	0·296	0·173	0·148

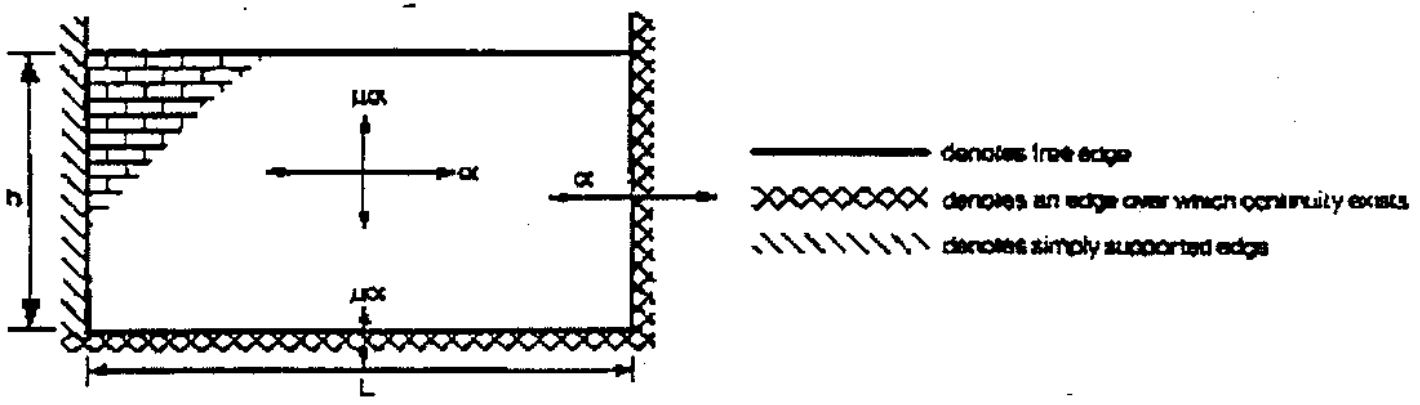

Table 2 – Bending moment coefficient for two way spanning panels subjected to Lateral loads (μ= 0.35)

BS 5628 pt1 table 9 gives coefficients for the calculation of bending moments M_{xx} in the plain vertical to the bed joint due to lateral loading given by : $M_{xx} = \alpha W_k \gamma_f . L^2$.

this is to be compared to $MR = f_{kx} Z / \gamma_m$

These are worked for panels of various sizes supported on 3 or 4 sides with varying conditions of fixity, according to the yield line theory, which has been found as a reasonable method for predicting the capacity of walls. The support conditions have to be assessed first. Table 2 is an abridged version of the coefficients found in BS 5628 pt1.

Tests carried out on franka (Saliba 1990) gives an unconfined shear strength varying from 2.2 to 3.85 N/mm^2.

The characteristic shear strength of masonry in the horizontal direction is given by BS5628 pt1 at

$0.35 + 0.6g_a$ N/mm^2 with a max of $1.75N/mm^2$ for walls in mortar designation i, ii &iii

$0.15 + 0.6g_a$ N/mm^2 with a max of 1.4 N/mm^2 for walls in mortar designation iv

where g_a is the design vertical load per unit area.

Horizontal shear may occur along bedding surfaces, particularly at the level of damp-proof membranes. Further guidance may be obtained from (Saliba 1992).

In the vertical direction shear failure may occur particularly at the level of intersecting walls and is given by

For masonry $0.7N/mm^2$ for mortar designations i,ii & iii.

$0.5N/mm^2$ for mortar designation iv.

For blockwork $0.35N/mm^2$ with a minimum strength of $7N/mm^2$.

Alternatively for reinforced sections, as per BS 5628 pt 2 the characteristic shear strength of masonry is given by $0.7N/mm^2$, provided that the ratio of height to length of the wall does not exceed 1.5.