Two-way slabs

Unlike BS 8110 there is no specific guidance given in Eurocode 2 on how to determine the bending moments for a two-way slab. The assessment of the bending moment can be carried out using any suitable method from Section 5 of the Code. However, co-efficients may be obtained from Table 8 (taken from the *Manual for the design of building structures to Eurocode 2*[9]) to determine bending moments per unit width (M_{sx} and M_{sy}) where:

$$M_{sx} = \beta_{sx} w l_x^2$$

$$M_{sy} = \beta_{sy} w l_x^2$$

Where β_{sx} and β_{sy} are coefficients, l_x is the shorter span and w (load per unit area) is the STR ultimate limit state combination. For more information on combinations refer toChapter 1, originally published as *Introduction to Eurocodes*[3].

Table 8
Bending moment coefficients for two-way spanning rectangular slabs supported by beams

Type or panel and moments considered	Short span coefficients for values of l_y / l_x					Long-span coefficients for all values of l_y / l_x
	1.0	1.25	1.5	1.75	2.0	
Interior panels						
Negative moment at continuous edge	0.031	0.044	0.053	0.059	0.063	0.032
Positive moment at midspan	0.024	0.034	0.040	0.044	0.048	0.024
One short edge discontinuous						
Negative moment at continuous edge	0.039	0.050	0.058	0.063	0.067	0.037
Positive moment at midspan	0.029	0.038	0.043	0.047	0.050	0.028
One long edge discontinuous						
Negative moment at continuous edge	0.039	0.059	0.073	0.083	0.089	0.037
Positive moment at midspan	0.030	0.045	0.055	0.062	0.067	0.028
Two adjacent edges discontinuous						
Negative moment at continuous edge	0.047	0.066	0.078	0.087	0.093	0.045
Positive moment at midspan	0.036	0.049	0.059	0.065	0.070	0.034

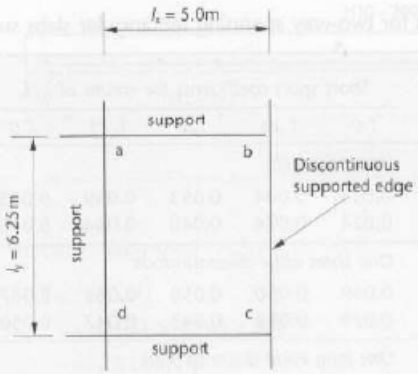

Figure 8.9
Continuous panel spanning in two directions

EXAMPLE 8.6

Moments in a continuous two-way slab

The panel considered is an edge panel, as shown in figure 8.9 and the uniformly distributed load, $n = (1.35g_k + 1.5q_k) = 10\,\text{kN/m}^2$.

The moment coefficients are taken from table 8.5.

$$\frac{l_y}{l_x} = \frac{6.25}{5.0} = 1.25$$

Positive moments at mid-span

$$M_{sx} = \beta_{sx} n l_x^2 = 0.045 \times 10 \times 5^2$$
$$= 11.25\,\text{kN m in direction } l_x$$
$$M_{sy} = \beta_{sy} n l_x^2 = 0.028 \times 10 \times 5^2$$
$$= 7.0\,\text{kN m in direction } l_y$$

Negative moments

Support ad, $M_x = 0.059 \times 10 \times 5^2 = 14.75\,\text{kN m}$

Supports ab and dc, $M_y = 0.037 \times 10 \times 5^2 = 9.25\,\text{kN m}$

The moments calculated are for a metre width of slab.

The design of reinforcement to resist these moments would follow the usual procedure. Torsion reinforcement, according to rule 4 is required at corners b and c. A check would also be required on the span–effective depth ratio of the slab.