Table 8 Durability requirements for slabs

Conditions of exposure (For definitions see Appendix C)	Cover to *all* reinforcement mm	mm	mm
Mild	25	20	20
Moderate	—	35	30
Severe	—	—	40
Very severe	—	—	50
Maximum free water/cement ratio	0.65	0.60	0.55
Minimum cement content, kg/m^3	275	300	325
Characteristic concrete strength in the UK, N/mm^2	30	35	40

Notes to Table 8
1. The cover to *all* reinforcement should not be less than the nominal maximum size of the aggregate.
2. The cover in mm to the *main* reinforcement should not be less the the bar size.

The characteristic strengths quoted in Table 8 will often require cement contents that are higher than those given in the Table. The potential problems of increased shrinkage arising from high cement and water contents should be considered in the design.

4.2.3 Bending moments and shear forces

4.2.3.1 General

Slabs should be designed to withstand the most unfavourable arrangements of design loads.

Design for a single load case of maximum design ultimate load on all spans or panels will be sufficient provided that the following conditions are met:

(a) In a one-way spanning slab the area of each bay exceeds $30m^2$
In this context, a bay means a strip across the full width of a structure bounded on the other two sides by lines of supports (see Fig. 2)

(b) The variation in the spans does not exceed 15% of the longest span

(c) The ratio of the characteristic imposed load to the characteristic dead load does not exceed 1.25

(d) The characteristic imposed load does not exceed $5kN/m^2$, excluding partitions

(e) In the analysis the elastic support moments other than at a cantilever support should be reduced by 20%, with a consequential increase in the span moments. The resulting bending moment envelope should satisfy the following provisions:

(i) **Equilibrium must be maintained**

(ii) The redistributed moment at any section should not be less than 70% of the elastic moment.

Where a cantilever of a length exceeding one-third of the adjacent span occurs, the condition of maximum load on the cantilever and minimum load on the adjacent span must be checked.

Concentrated loads

The effective width of solid slabs assumed to resist the bending moment arising from a concentrated load may be taken to be:

$$\text{width} = l_w + 2.4\left(1 - \frac{x}{l}\right)x$$

where l_w = load width
x = the distance to the nearer support from the section under consideration
l = the span

For loads near an unsupported edge see BS 8110.[1]

4.2.3.2 One-way spanning slabs of approximately equal span

Where the conditions in clause 4.2.3.1 are met, the moments and shear forces in continuous one-way spanning slabs may be calculated using the coefficients given in Table 9. Allowance has been made in these coefficients for the 20% reduction mentioned above.

Table 9 Bending moments and shear forces for one-way slabs

	end support	end span	penultimate support	interior spans	interior supports
moment	0	$0.086Fl$	$-0.086Fl$	$0.063Fl$	$-0.063Fl$
shear	$0.4F$	—	$0.6F$	—	$0.5F$

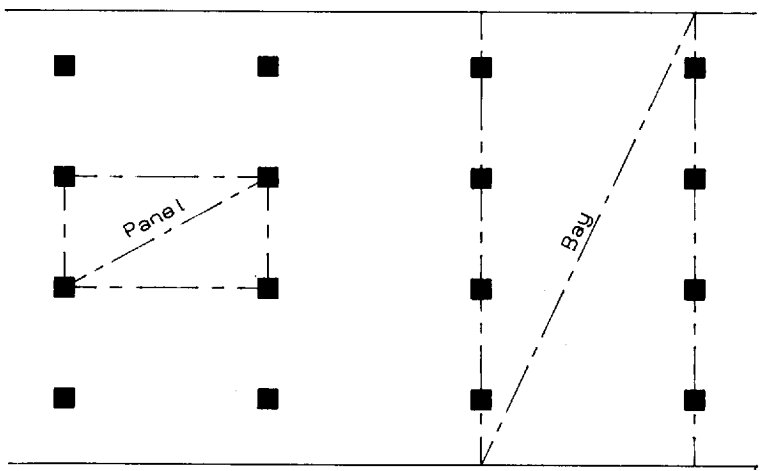
where F is the total design ultimate load ($1.4G_k + 1.6Q_k$) for each span and l is the span.

4.2.3.3 Two-way spanning slabs on linear supports

Bending moments in two-way slabs may be calculated by yield-line analysis. Alternatively, the following coefficients may be used to obtain bending moments in the two directions for slabs whose ratio of the long span to the short span is 1.5 or less and with edge conditions described in Table 10:

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

where β_{sx} and β_{sy} are the coefficients given in Table 10 and l_x is the shorter span.



2 Definition of panels and bays