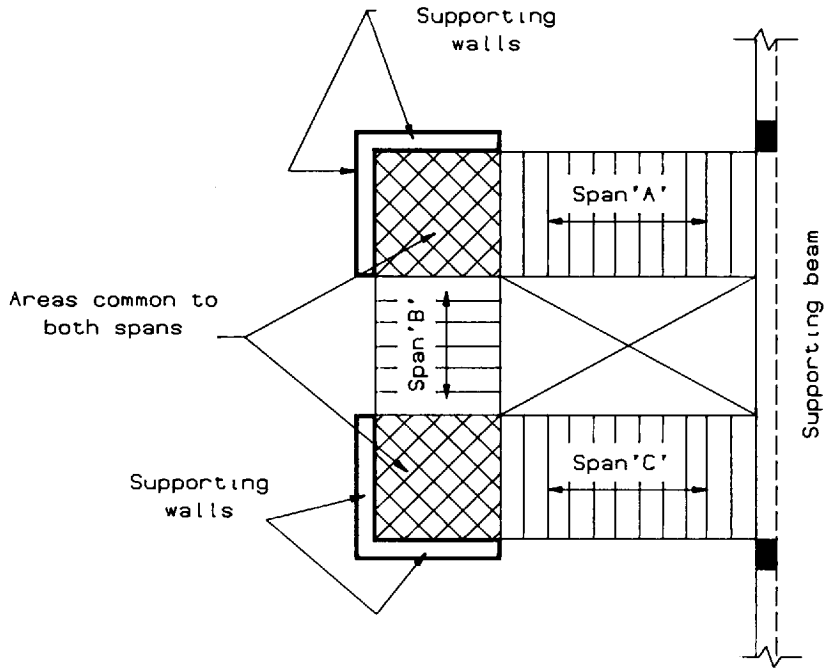
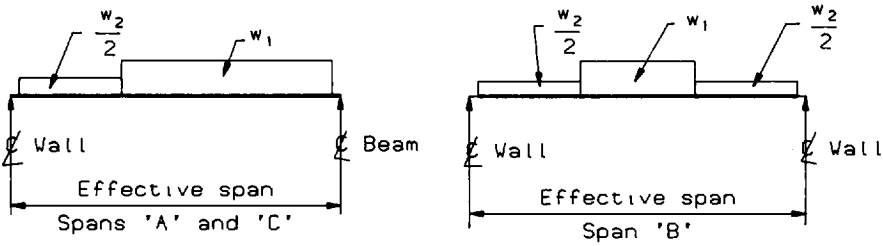
4.7 Staircases

4.7.1 Introduction

The reinforced concrete slab supporting the stair flights and landings should be designed generally in accordance with the design information in subsection 4.2, except as indicated otherwise in this subsection.



16 Stairs with open wells



w_1 = load/unit area for flights
w_2 = load/unit area for landings

17 Loading diagram

When considering the dead loads for the flights, care should be taken to ensure that a sufficient allowance is made to cater for the weight of the treads and finishes as well as the increased loading on plan occasioned by the inclination of the waist.

4.7.2 Fire resistance, durability and concrete grades

The member sizes, reinforcement covers and concrete grades to provide fire resistance and durability should be obtained from Tables 7 and 8.

4.7.3 Bending moments and shear forces

Staircase slabs and landings should be designed to support the most unfavourable arrangements of design loads. Normally this requirement will be satisfied if staircase slabs and landings are designed to resist the moments and shear forces arising from the single-load case of maximum design ultimate load on all spans.

Where a span is adjacent to a cantilever of length exceeding one-third of the span of the slab, the case should be considered of maximum load on the cantilever and minimum load on the adjacent span.

Where staircases with open wells have two intersecting slabs at right-angles to each other, the loads on the areas common to both spans may be divided equally between the spans.

4.7.4 Effective spans

4.7.4.1 Stairs spanning between beams or walls

The effective span is the distance between centre-lines of supporting beams or walls.

4.7.4.2 Stairs spanning between landing slabs

The effective span is the distance between centre-lines of supporting landing slabs, or the distance between the edges of the supporting slabs plus 1.8m, whichever is the smaller.

4.7.4.3 Stairs with open wells

The effective span and loads on each span are as indicated in Figs. 16 and 17. The arrangement of flight supports shown in Figs. 16 and 17 is a special case where vertical support is provided at the ends of *all* flights. Where this condition does not occur, the stair flights should be designed for the full landing loads and the effective spans should be in accordance with clauses 4.7.4.1 and 4.7.4.2.

4.7.5 Span/effective depth ratios

The span/effective depth should not exceed the appropriate value from Table 36 multiplied by the modification factor in Table 37.

Table 36 Span/effective depth ratios for stairs

cantilever	7
simply supported	20
continuous	26