Rules are given for the assessment of the effective height of a wall. In general, walls restrained top and bottom by reinforced concrete slabs are assumed to have an effective height of 0.75×actual height. If similarly restrained by timber floors the effective height is equal to the actual height. Formulae are given for making allowance for restraint on vertical edges where this is known to be effective. Allowance may have to be made for the presence of openings, chases and recesses in walls.

The effective thickness of a wall of 'solid' construction is equal to the actual thickness whilst that of a cavity wall is

$$t_{ef} = (t_1^3 + t_2^3)^{1/3} \tag{4.18}$$

where t_1 and t_2 are the thicknesses of the leaves. Some qualifications of this rule are applicable if only one leaf is loaded.

The out-of-plane eccentricity of the loading on a wall is to be assessed having regard to the material properties and the principles of mechanics. A possible, simplified method for doing this is given in an Annex, but presumably any other valid method would be permissible.

An increase in the design load resistance of an unreinforced wall subjected to concentrated loading may be allowed. For walls built with units having a limited degree of perforation, the maximum design compressive stress in the locality of a beam bearing should not exceed

$$(f_k/\gamma_m)\,[(1+0.15\,x)\,(1.5-1.1\,A_b/A_{ef})] \tag{4.19}$$

where $x = 2a_1/H \not> 1$, H, A_b and A_{ef} are as shown in Fig. 4.7.

This value should be greater than the design strength f_k/γ_m but not greater than 1.25 times the design strength when x=0 or 1.5 times this value when x=1.5. No increase is permitted in the case of masonry built with perforated units or in shell-bedded masonry.

(d) Design of shear walls

Rather lengthy provisions are set out regarding the conditions which may be assumed in the calculation of the resistance of shear walls but the essential requirement is that the design value of the applied shear load, V_{sd}, must not exceed the design shear resistance, V_{Rd}, i.e.

$$V_{Sd} \leqslant V_{Rd} = f_{vk}\,t\,l_c/\gamma_m \tag{4.20}$$

where f_{vk} is the characteristic shear strength of the masonry, t is the thickness of the masonry and l_c is the compressed length of the wall (ignoring any part in tension).

Distribution of shear forces amongst interconnected walls may be by elastic analysis and it would appear that the effect of contiguous floor

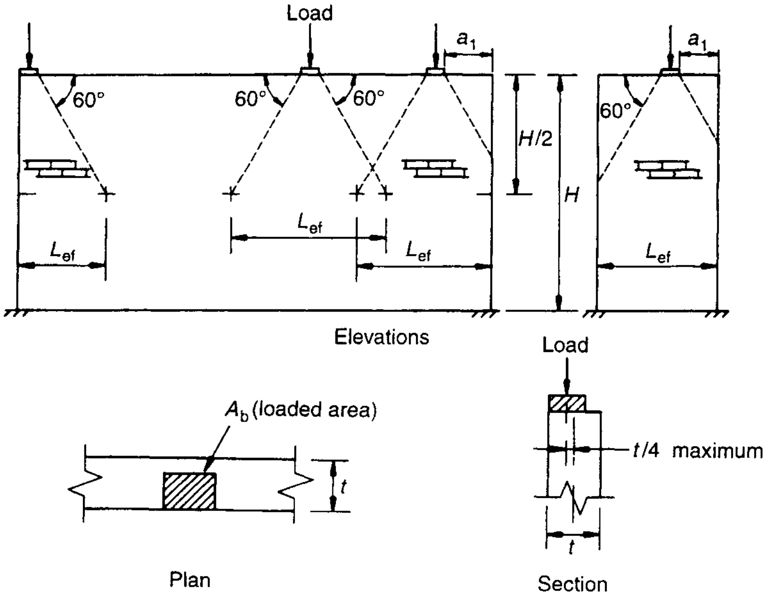

Fig. 4.7 Walls subjected to concentrated load.

slabs and intersecting walls can be included provided that the connection between these elements and the shear wall can be assured.

(e) Walls subject to lateral loading

In accordance with general principles, a wall subjected to lateral load under the ultimate limit state must have a design strength not less than the design lateral load effect. Approximate methods for ensuring this are said to be available although where thick walls are used it may not be necessary to verify the design. The provisions in ENV 1996 for lateral load design for resistance to wind loads are the same as those in BS 5628: Part 1 (1994) and need not be repeated here.

(f) Reinforced masonry

In general, the principles set out for the design of reinforced masonry follow those used for reinforced concrete and for reinforced masonry in BS 5628: Part 2, although differing slightly in detail from the latter.

The formulae for the design moment of resistance of a singly reinforced section are the same as in BS 5628 although the limit in the British code to exclude compression failures has been omitted. The