where $h$ is the clear storey height and $\rho_n$ is a reduction factor where $n$=2, 3 or 4 depending on the edge restraint or stiffening of the wall. Suggested values of $\rho_n$ given in the code are:

- For walls restrained at the top and bottom then

$$\rho_2 = 0.75 \text{ or } 1.0 \text{ depending on the degree of restraint}$$

- For walls restrained top and bottom and stiffened on one vertical edge with the other vertical edge free

$$\rho_3 = \rho_2 / [1 + (\rho_2 h/3L)^2] > 0.3 \quad \text{when } h \leqslant 3.5L$$

$$\rho_3 = 1.5\,L\,/h \quad \text{when } h > 3.5L$$

  where $L$ is the distance of the free edge from the centre of the stiffening wall. If $L \geqslant 15t$, where $t$ is the thickness of the stiffened wall, take $\rho_3 = \rho_2$.

- For walls restrained top and bottom and stiffened on two vertical edges

$$\rho_4 = \rho_2 / [1 + (\rho_2 h/L)^2] \quad \text{when } h \leqslant L$$

$$\rho_4 = 0.5L/h \quad \text{when } h > L$$

  where $L$ is the distance between the centres of the stiffening walls. If $L \geqslant 30t$, where $t$ is the thickness of the stiffened wall, take $\rho_4 = \rho_2$.

Note that walls may be considered as stiffened if cracking between the wall and the stiffening is not expected or if the connection is designed to resist developed tension and compression forces by the provision of anchors or ties. These conditions are important and designers should ensure that they are satisfied before assuming that any stiffening exists. Stiffening walls should have a length of at least one-fifth of the storey height and a thickness of 0.3×(wall thickness) with a minimum value of 85mm.

### 5.4.2 Effective thickness

The effective thickness of single leaf walls or columns is usually taken as the actual thickness, but for cavity walls or walls with piers other assumptions are made.

*(a) BS 5628*

Considering the single leaf wall with piers shown in Fig. 5.5(a) it is necessary to decide on the value of the factor $K$ shown in Fig. 5.5(b), which will give a wall of equivalent thickness. Here, the meaning of

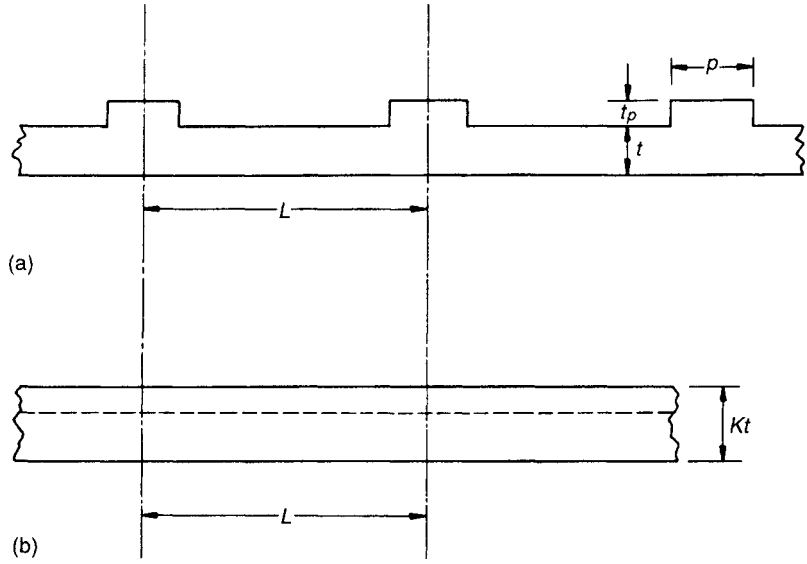


**Fig. 5.5** (a) Single leaf wall with piers; (b) equivalent wall without piers.

'equivalent' is vague since it implies some unknown relationship between the areas and section moduli for the two cases.

Suggested values for *K* are given in BS 5628, and these are reproduced below in Table 5.1.

The effective thickness for cavity walls is taken as the greater value of two-thirds the sum of the actual thicknesses of the two leaves or the actual thickness of the thicker leaf. For the case of a cavity wall with piers a similar calculation, but introducing the factor *K* from Table 5.1, is used (Fig. 5.6).

**Table 5.1** *K* values for effective thickness of walls stiffened by piers

| | $t_p/t$ | | |
|---|---|---|---|
| $L/p$ | 1 | 2 | 3 |
| 6 | 1.0 | 1.4 | 2.0 |
| 10 | 1.0 | 1.2 | 1.4 |
| 20 | 1.0 | 1.0 | 1.0 |