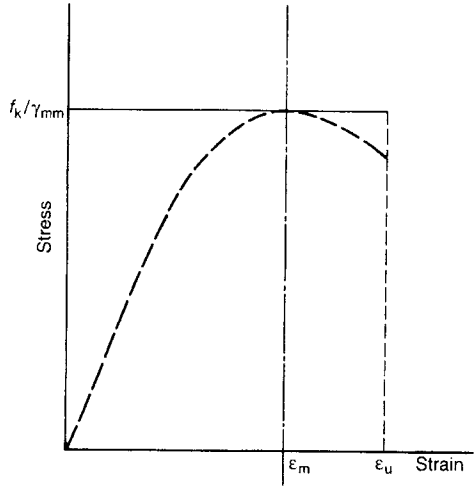

Fig. 10.2 Idealized stress-strain relationship for brickwork.

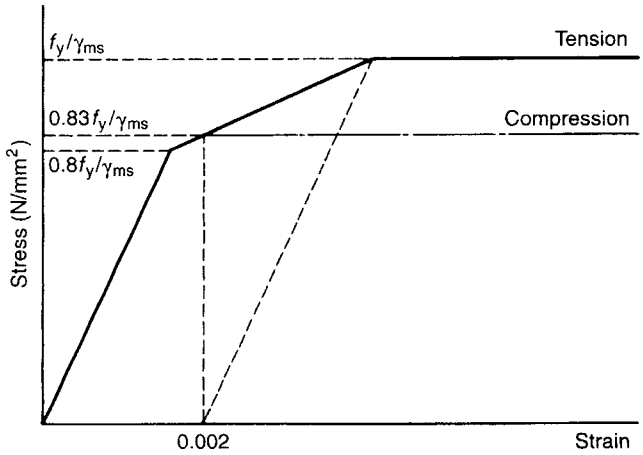

Fig. 10.3 Idealized stress-strain relationship for reinforcement (BS 5628).

10.2.2 Additional assumptions and limitations

In addition to the idealization of the stress-strain relationships further assumptions are introduced as follows:

1. Plane sections remain plane after bending.
2. The tensile strength of the masonry is ignored.
3. The effective span of simply supported or continuous members is taken as the smaller of (i) the distance between support centres and (ii) the clear distance between supports plus the effective depth.
4. The effective span of cantilevers is taken as the smaller of (i) the distance between the end of the cantilever and the centre of its support and (ii) the distance between the end of the cantilever and the face of the support plus half its effective depth.
5. The ratio of span to effective depth is not less than 1.5 otherwise the beam would have to be designed as a deep beam and the basic equations would not be applicable.
6. The strains in both materials are directly proportional to the distances from the neutral axis.
7. The section is under-reinforced so that the strain in the reinforcement reaches the yield value ε_y whilst the maximum strain in the masonry is still below the ultimate value ε_u. (A limiting strain distribution can be defined in which the reinforcement is at ε_y and the masonry at ε_u (Fig. 10.4).)
8. Although design is based on the ultimate limit state, recommendations are included in the codes of practice to ensure that the serviceability states of deflection and cracking are not reached. These recommendations are given as limiting ratios of span to effective depth. (See Tables 8 and 9 of BS 5628: Part 2, and similar recommendations in EC6 Part 1–1.)
9. To ensure lateral stability beams should be proportioned so that (i) for simply supported or continuous beams the distance between lateral restraints does not exceed the lesser of $60b_c$ and $250b_c^2/d$, and (ii) for

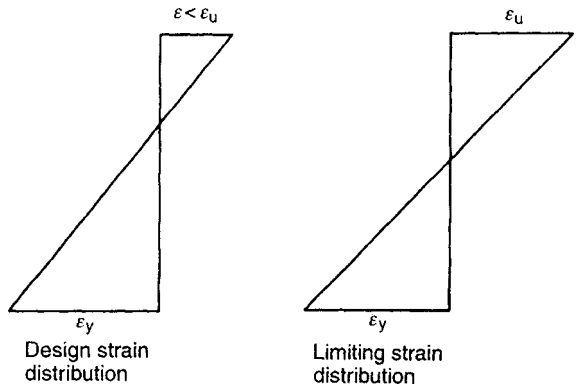

Fig. 10.4 Strain distributions.