illustrated in Fig. 10.10(d) for BS 5628 and Fig. 10.14 (line 2) for ENV 1996–1–1.) Additionally, the method of obtaining the stress, for these cases, will differ because of the different representations of the stressstrain relationship.

For other distributions the design approach for BS 5628 would satisfy the requirements of ENV 1996–1–1 and it is suggested that the methods described in section 10.5 could be used for all cases. No guidance is given in the Eurocode with regard to biaxial bending or slender columns and for these cases the methods described in sections 10.5.3 (b) and 10.5.4 could be used.

11

Prestressed masonry

11.1 INTRODUCTION

Masonry is very strong in compression, but relatively very weak in tension. This restricts its use in elements which are subjected to significant tensile stress. This limitation can be overcome by reinforcing or prestressing. Prestressing of masonry is achieved by applying precompression to counteract, to a desired degree, the tension that would develop under service loading. As a result, prestressing offers several advantages over reinforced masonry, such as the following.

1. *Effective utilization of materials.* In a reinforced masonry element, only the area above the neutral axis in compression will be effective in resisting the applied moment, whereas in a prestressed masonry element the whole section will be effective (Fig. 11.1). Further, in reinforced masonry, the steel strain has to be kept low to keep the cracks within an acceptable limit; hence high tensile steel cannot be used to its optimum.
2. *Increased shear strength.* Figure 11.2 shows the shear strength of reinforced and prestressed brickwork beams with respect to shear arm/effective depth. It is clear that the shear strength of a fully prestressed brickwork beam with bonded tendons is much higher

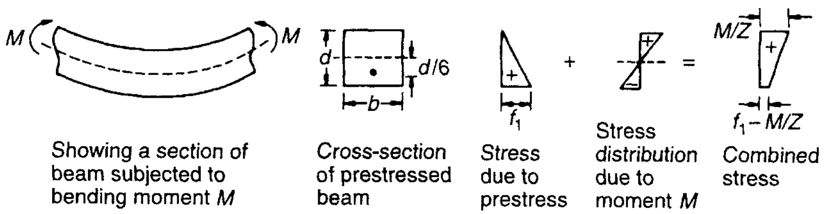

Fig. 11.1 In a prestressed element the whole cross-sectional area is effective in resisting an applied moment.