The types of block generally available are as follows:

Facing blocks Blocks with a finish suitable to provide an attractive appearance.

Ordinary or common blocks Blocks suitable for internal use or, if rendered, for external use.

Solid blocks These are primarily voidless, having no formal holes or cavities other than those inherent in the block material.

Hollow blocks These are blocks which have cavities passing right through the unit, but the volume of such cavities must not exceed 50 per cent of the total unit volume.

Cellular blocks These are similar to hollow blocks, but the cavities are effectively closed at one end. They are laid with the closed end uppermost in the wall to provide a good bed for the next layer of mortar.

Insulating blocks These are usually cellular blocks faced with polystyrene or having the cavities filled with UF foam or polystyrene to improve their thermal qualities.

4.4.3 Mortar

Whilst masonry walls may be constructed from bricks, blocks or stone, in each of these the mortar is the common factor. The mortar serves several purposes in the construction, and must satisfy a number of requirements in both the newly mixed and the hardened state.

During construction, mortar should have good workability to enable efficient use by the bricklayer. It must spread easily so as to provide a level bed on which to align the masonry units of brick, block or stone. This in turn will ensure that the applied loads will be spread evenly over the bearing area of such units. When used with absorbent bricks it should retain moisture to avoid drying out and stiffening too quickly. Finally, it should harden in a reasonable time to prevent squeezing out under the pressure of the units laid above.

In the hardened state, mortar must be capable of transferring the stresses developed in the masonry units. Ideally, however, it should not be stronger than the masonry units themselves, so that any movement that occurs will be accommodated in the joints. This should ensure that any cracking that does develop will be in the mortar and not the masonry units.

Traditionally lime-sand mortars, relying on the loss of water and the action of carbonation to slowly gain strength, were employed for masonry construction. Whilst these offered excellent workability, their slow construction rate led to the adoption of cement mortars.

The addition of cement promotes a faster gain of strength, resulting in more rapid construction. Lime may still be included in the mix for workability, giving cement-lime-sand mortar. Ready mixed lime with sand may be obtained in specified proportions to which the cement is then added on site prior to use. Plasticized mortar is produced by replacing the lime

with a proprietary plasticizer additive to provide the workability, giving a mix of cement and sand with plasticizer.

Mortar to which the cement has been added should generally be used within two hours of mixing. Ready mixed retarded mortars are available which contain a retarding agent to delay the set and prolong the working life of the mortar. These should not be used without the prior approval of the designer.

BS 5628 Part 1 Table 1 gives requirements for mortar designations in relation to their constituent proportions and compressive strength; this is reproduced here as Table 4.3. In general the lowest grade of mortar practicable should be used. Thus for general purpose masonry construction a 1 : 1 : 6 cement : lime : sand mortar will be sufficient. For high strength load bearing masonry a $1 : \frac{1}{4} : 3$ cement : lime : sand mortar is more appropriate. For reinforced masonry a mix not weaker than $1 : \frac{1}{2} : 4\frac{1}{2}$ cement : lime : sand should normally be specified.

The bond of the mortar with the masonry units is equally as important as its compressive strength. Adequate bond depends on a number of factors such as sand quality, the type and absorption rate of the masonry units at the time of laying, and attention to curing.

Ready mixed lime with sand for mortar should comply with the requirements of BS 4721 'Specification for ready mixed building mortars'. The mixing and use of mortars should be in accordance with the recommendations given in BS 5628 Part 3.

4.4.4 Wall ties

The two leaves of a cavity wall should be tied together by metal wall ties embedded at least 50 mm into the horizontal mortar joints. Their overall length should be chosen to suit the cavity width.

The ties should comply with the requirements of BS 1243 'Metal ties for cavity wall construction'. This code gives recommendations for three types of tie: the wire butterfly, the double triangle and the vertical twist. Ties can be manufactured from either galvanized or stainless steel.

The traditional butterfly tie has limited structural strength and is usually confined to domestic construction. Vertical twist wall ties are structurally the most substantial and are suitable for the most highly stressed load bearing cavity walls. Double triangle wall ties are less substantial than the vertical twist but better than the butterfly tie.

The minimum spacing and the selection of wall ties is dealt with in BS 5628 Part 3 Table 9, reproduced here as Table 4.4. Additional ties should be provided adjacent to wall openings in accordance with the recommendations given in the standard.

4.4.5 Damp proof courses

Whilst the main purpose of a damp proof course (DPC) is to provide a moisture barrier, in structural terms it must not squeeze out under vertical load or induce sliding under horizontal loading.