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Codes of practice for structural masonry

4.1 CODES OF PRACTICE: GENERAL

A structural code of practice or standard for masonry brings together essential data on which to base the design of structures in this medium. It contains recommendations for dealing with various aspects of design based on what is generally considered to be good practice at the time of preparing the code. Such a document is not, however, a textbook and does not relieve the designer from the responsibility of acquiring a full understanding of the materials used and of the problems of structural action which are implicit in his or her design. It follows therefore that, in order to use a code of practice satisfactorily, and perhaps even safely, the engineer must make a careful study of its provisions and, as far as possible, their underlying intention. It is not always easy to do this, as codes are written in terms which often conceal the uncertainties of the drafters, and they are seldom accompanied by commentaries which define the basis and limitations of the various clauses.

This chapter is devoted to a general discussion of the British Code of Practice, BS 5628: Parts 1 and 2, which deal respectively with unreinforced and reinforced masonry, and also with ENV 1996-1-1. The latter document covers both unreinforced and reinforced masonry and after a trial period will become Eurocode 6 (EC6). The application of these codes will be discussed in detail in subsequent chapters of this book.

4.2 THE BASIS AND STRUCTURE OF BS 5628: PART 1

The British code is based on limit state principles, superseding an earlier code in permissible stress terms. The code is arranged in the following five sections:

- *Section 1.* General: scope, references, symbols, etc.
- *Section 2.* Materials, components and workmanship
- *Section 3.* Design: objectives and general recommendations
- *Section 4.* Design: detailed considerations
- *Section 5.* Design: accidental damage

There are also four appendices which are not technically part of the code but give additional information on various matters.

4.2.1 Section 1: general

The code covers all forms of masonry including brickwork, blockwork and stone. It is to be noted that the code is based on the assumption that the structural design is to be carried out by a chartered civil or structural engineer or other appropriately qualified person and that the supervision is by suitably qualified persons, although the latter may not always be chartered engineers.

If materials and methods are used that are not referred to by the code, such materials and methods are not ruled out, provided that they achieve the standard of strength and durability required by the code and that they are justified by test.

4.2.2 Section 2: materials, components, symbols, etc.

This section deals with materials, components and workmanship. In general, these should be in accordance with the relevant British Standard (e.g. BS 5628: Part 3; Materials and components, design and workmanship and BS 5390; Stone masonry). Structural units and other masonry materials and components are covered by British Standards, but if used in an unusual way, e.g. bricks laid on stretcher side or on end, appropriate strength tests have to be carried out.

A table in this section of the code (see [Table 2.6](#), section 2.3) sets out requirements for mortar in terms of proportion by volume together with indicative compressive strengths at 28 days for preliminary and site tests. The wording of the paragraph referring to this table seems to suggest that both the mix and the strength requirements have to be satisfied simultaneously—this may give rise to some difficulty as variations in sand grading may require adjustment of the mix to obtain the specified strength. Four mortar mixes are suggested, as previously noted, in terms of volumetric proportion. Grades (i), (ii) and (iii) are the most usual for engineered brickwork. Lower-strength mortars may be more appropriate for concrete blockwork where the unit strength is generally lower and shrinkage and moisture movements greater. Mortar additives, other than calcium chloride, are not ruled out but have to be used with care.