Table 2.8 Chloride content of mixes

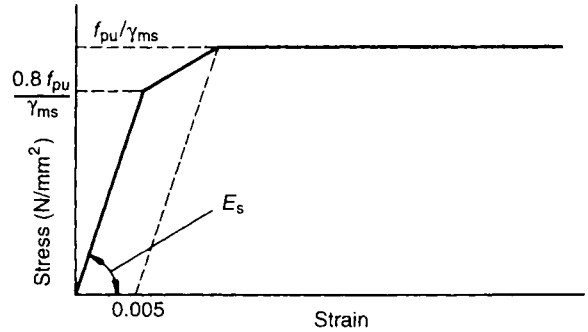
Type or use of concrete or mortar	*Maximum total chloride content by mass of cement* (mass %)
Prestressed concrete, heat-cured concrete containing embedded metal	0.1
Concrete or mortar made with cement complying with BS 4027	0.2
Concrete or mortar containing embedded metal and made with cement complying with BS 12 or BS 146	0.4

Table 2.9 Characteristic tensile strength of reinforcing steel

Designation	*Nominal size*	*Characteristic tensile strength,* f_y (N/mm^2)
Hot-rolled plain steel bars complying with BS 4449	all	250
Hot-rolled deformed high-yield steel bars complying with BS 4449	all	460
Cold-worked steel bars complying with BS 4461	all	460
Hard-drawn steel wire complying with BS 4482 and steel fabric complying with BS 4483	up to and including 12	485
Stainless steel complying with BS 970: Part 1 grades 316 S31 or 316 S33	all	460

The maximum size of the aggregate can be increased depending on the size and configuration of the void to be filled with concrete. In some cases it would be possible to use concrete design mix as specified in BS 5328 for reinforced and prestressed masonry. In reinforced and prestressed masonry, the bricks or blocks coming in contact with concrete will absorb water from the mix depending on its water retentivity property, and hence maximum free water/cement ratio used in BS 8110 may not be applicable. In order to compensate for this and for free flowing of the mix to fill the space and the void, a slump of 75 mm and 175mm for concrete mix has been recommended in BS 5628: Part 2.

In prestressed sections where tendons are placed in narrow ducts, a neat cement or sand:cement grout having minimum compressive strength of 17 N/mm^2 at 7 days may be used.



E_s 205 kN/mm^2 for cold drawn wire complying with BS 5896
195 kN/mm^2 for strand complying with BS 5896
165 kN/mm^2 for rolled and stretched bars complying with BS 4486
206 kN/mm^2 for rolled and as rolled stretched and tempered bars complying with BS 4486

f_{pu} is the characteristic tensile strength of prestressing tendons
γ_{ms} is the partial safety factor for strength of steel
E_s is the modulus of elasticity of steel

Fig. 2.7 Typical short-term design stress-strain curve for normal and low-relaxation tendons.

The mix must conform to the limit prescribed by BS 5628: Part 2 for maximum total chloride content as in Table 2.8.

2.14 REINFORCING AND PRESTRESSING STEEL

2.14.1 Reinforcing steel

Hot-rolled or cold-worked steel bars and fabric conforming to the relevant British Standard can be used as reinforcement. The characteristic strengths of reinforcement are given in Table 2.9.

In situations where there is risk of contamination by chloride, solid stainless steel or low-carbon steel coated with at least 1 mm of austenitic stainless steel may be used.

2.14.2 Prestressing steel

Wire, strands and bars complying to BS 4486 or BS 5896 can be used for prestressing. Seventy per cent of the characteristic breaking load is allowed as jacking force for prestressed masonry which is less than the 75% normally allowed in prestressed concrete. If proper precautions are taken, there is no reason why the initial jacking force cannot be taken to 75–80% of the breaking load. This has been successfully demonstrated in a series of prestressed brick test beams at Edinburgh University.

The short-term design stress-strain curve for prestressing steel is shown in Fig. 2.7.