

7.2 Steel used in bridges

Steel used for bridges may be grouped into the following three categories:

- (i) **Carbon steel:** This is the cheapest steel available for structural users where stiffness is more important than the strength. Indian steels have yield stress values up to 250 N/mm² and can be easily welded. The steel conforming to IS: 2062 - 1969, the American ASTM A36, the British grades 40 and Euronorm 25 grades 235 and 275 steels belong to this category.
- (ii) **High strength steels:** They derive their higher strength and other required properties from the addition of alloying elements. The steel conforming to IS: 961 - 1975, British grade 50, American ASTM A572 and Euronorm 155 grade 360 steels belong to this category. Another variety of steel in this category is produced with enhanced resistance to atmospheric corrosion. These are called 'weathering' steels in Europe, in America they conform to ASTM A588 and have various trade names like 'cor-ten'.
- (iii) **Heat-treated carbon steels:** These are steels with the highest strength. They derive their enhanced strength from some form of heat-treatment after rolling namely normalisation or quenching and tempering.

The physical properties of structural steel such as strength, ductility, brittle fracture, weldability, weather resistance etc., are important factors for its use in bridge construction. These properties depend on the alloying elements, the amount of carbon, cooling rate of the steel and the mechanical deformation of the steel. The detailed discussion of physical properties of structural steel is presented in earlier chapter.

