

3.6 REQUIREMENTS OF CONCRETE MIX DESIGN AS PER BIS

- **Grade designation:** It gives characteristic compressive strength of concrete. The target mean strength of concrete is fixed by adding a suitable margin to the characteristic strength depending upon the quality control to be envisaged.
- **Type of cement:** The type and grade of cement mainly influences the rate of development of compressive strength of concrete.
- **Maximum nominal size of aggregate:** The maximum nominal size of the aggregate to be used in concrete is governed by the size of the section to be concreted and spacing of the reinforcement.
- **Maximum water-cement ratio:** The maximum water cement ratio to be used for a particular work is governed by the desired strength and limited by the durability requirements.
- **Minimum cement content:** The minimum cement content to be used is governed by the respective environmental exposure conditions.
- **Workability:** The desired workability for a particular job depends upon the shape and size of section to be concreted, denseness of reinforcement, and method of transportation, placing and compaction of concrete.
- **Exposure conditions:** The anticipated environmental exposure conditions in which the structure is intended to serve during its service span defines the durability requirements.
- **Type and properties of aggregate:** It influences the workability and strength of concrete. The relative proportions of coarse and fine aggregate are determined from the characteristics of the aggregates such as grading, shape, size and surface texture.
- **Method of transporting and placing:** It influences workability of the mix.
- **Use of admixtures:** Admixtures are used to enhance and modify one or more properties of concrete in fresh as well as hardened state.

The minimum compressive strength required from structural consideration

- The adequate workability necessary for full compaction with the compacting equipment available.
- Maximum water-cement ratio and / or maximum cement content to give adequate durability for the particular site conditions
- Maximum cement content to avoid shrinkage cracking due to temperature cycle in mass concrete