

Advantages of Reinforced Concrete as a Structural Material

Reinforced concrete is the most important material available for construction.

1. It has considerable compressive strength per unit cost compared with most other materials.
2. Reinforced concrete has great resistance to the actions of fire and water.
3. Reinforced concrete structures are very rigid.
4. Reinforced concrete is a low-maintenance material.
5. As compared with other materials, it has a very long service life.
6. It is usually the only economical material available for footings, floor slabs, basement walls, piers, and similar applications.
7. A special feature of concrete is its ability to be cast into any shape from simple slabs, beams, and columns to great arches and shells.
8. Concrete takes advantage of inexpensive local materials such as sand, gravel, water and requires relatively small amounts of cement and reinforcing steel.
9. A lower grade of skilled labor is required for concrete construction as compared with other materials such as structural steel.

Disadvantages of Reinforced Concrete

1. Concrete has a very low tensile strength, requiring the use of tensile reinforcing.
2. Forms are required to hold the concrete in place until it hardens sufficiently. In addition, falsework or shoring may be necessary to keep the forms in place for roofs, walls, floors, and similar structures until the concrete members gain sufficient strength to support themselves. Formwork is usually very expensive.
3. The low strength per unit of weight of concrete leads to heavy members. This becomes an increasingly important matter for long-span structures, where concrete's large dead weight has a great effect on bending moments.
4. Similarly, the low strength per unit of volume of concrete means members will be relatively large. Therefore, aircraft hangars, industrial shades are made of structural steel.
5. The properties of concrete vary widely because of variations in its proportioning and mixing. Furthermore, the placing and curing of concrete is not as carefully controlled as is the production of other materials, such as structural steel and laminated wood.
6. Two other characteristics that can cause problems are concrete's shrinkage and creep.