

5(b). Explain two properties of concrete in hardened stage.

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Two important properties of concrete in the hardened stage are compressive strength and durability.

1. **Compressive Strength:** Compressive strength is one of the most crucial properties of hardened concrete. It refers to the ability of concrete to resist compressive forces and is measured in terms of the maximum load a concrete sample can bear before failure occurs. Compressive strength is determined through standardized testing methods, typically using cylindrical or cubical specimens.

The compressive strength of concrete is influenced by factors such as the water-to-cement ratio, cement content, aggregate properties, curing conditions, and the presence of additives or admixtures. It is an essential parameter for structural design and plays a significant role in determining the load-carrying capacity and structural integrity of concrete elements, such as columns, beams, and foundations.

2. **Durability:** Durability is another critical property of hardened concrete, indicating its ability to withstand various environmental and service conditions over time. Durability encompasses resistance to factors such as weathering, chemical attack, abrasion, freeze-thaw cycles, and alkali-aggregate reactions.

Concrete durability is influenced by factors such as the quality of

materials, mix design, water-cement ratio, curing methods, and construction practices. Proper design and construction practices can enhance the concrete's durability, ensuring its long-term performance and minimizing potential damage.

To enhance the durability of concrete, various measures can be taken, such as using appropriate cement types (such as those with low alkali content), incorporating pozzolanic materials (such as fly ash or silica fume), providing adequate cover to reinforcement, using proper surface coatings or sealers, and implementing effective waterproofing and corrosion protection systems.

Ensuring a high compressive strength and good durability are crucial for the long-term performance and service life of concrete structures. These properties contribute to the structural integrity, resistance to external factors, and overall sustainability of the built environment.