

5(a). Explain the procedure of conducting a rebound hammer test for measuring the surface hardness with reference to the following points: (i) Rebound number and its significance (ii) Principle of equipment (iii) Sketch of equipment (iv) Limitation of test

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Ans= (i) Rebound number and its significance:

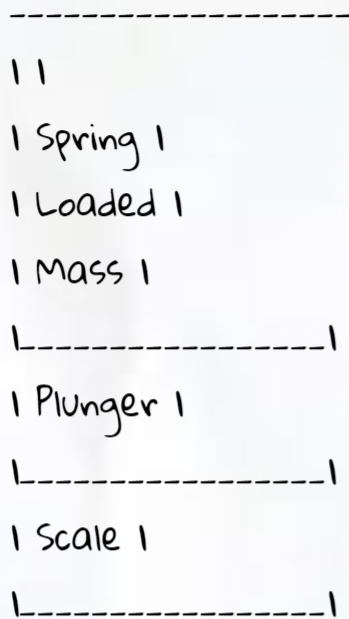
The rebound hammer test is a non-destructive testing method used to assess the surface hardness and strength of concrete. The test measures the rebound number, which represents the amount of rebound of a spring-loaded hammer mass when it impacts the concrete surface. The rebound number is an indicator of the concrete's compressive strength and can be correlated to the concrete's quality, uniformity, and durability. It provides a quick and convenient assessment of the concrete's surface hardness and can be used for quality control and condition assessment of structures.

(ii) Principle of equipment:

The rebound hammer operates on the principle of the rebound of a mass impacting the concrete surface. The equipment consists of a cylindrical body with a spring-loaded mass inside. At the end of the cylinder, there is a plunger or impact pad that strikes the concrete surface. When the plunger impacts the surface, it compresses the spring, and the mass rebounds. The rebound distance is measured using a scale on the equipment, and this rebound distance is converted into a rebound number.

(iii) Sketch of equipment:

Here is a simple sketch of a rebound hammer:



The spring-loaded mass is housed inside the cylindrical body, and the plunger is located at the end of the cylinder. The scale is used to measure the rebound distance and determine the rebound number.

(iv) Limitation of test:

The rebound hammer test has some limitations that should be considered:

- The test provides an indication of the surface hardness and strength of concrete but does not directly measure the compressive strength of the entire concrete mass.
- It is sensitive to surface conditions, such as smoothness, moisture content, and presence of coatings or surface treatments. These factors can affect the rebound results.
- The test is influenced by the impact angle and the consistency of the test operator. Different operators may obtain slightly different rebound

numbers.

- The rebound hammer test is suitable for assessing relatively homogeneous and uniform concrete surfaces. It may not be suitable for highly heterogeneous or textured surfaces.
- It is not suitable for testing very young concrete, as the rebound number may not accurately reflect the compressive strength at early ages.
- The test does not provide information about other important properties of concrete, such as permeability, modulus of elasticity, or long-term durability.

Despite these limitations, the rebound hammer test is a widely used and valuable tool for quick assessment of concrete surface hardness and strength, especially in field conditions where destructive testing is not feasible or desired. It should be used in conjunction with other tests and evaluation methods to obtain a comprehensive understanding of the concrete's properties.