REBOUND HAMMER TEST

INTRODUCTION

- The rebound hammer test is one of the non-destructive tests used to check the compressive strength of concrete.
- the rebound hammer is designed to carryout instant nondestructive test on concrete structure without damage and gives an immediate indication of the compressive strength of the concrete using the calibration curve applied each instrument.
- Principle of the rebound hammer test is: The rebound of an elastic mass depends on the hardness of the surface against which its mass strikes.

PROCEDURE

- Should be tested against the test anvil.
- Apply light pressure on the plunger and allow it to extend to the ready position for the test.
- Apply a gradual increase in pressure until the hammer impacts.
- Take the average of about 15 readings.

ADVANTAGES

- Simple to use. No special experience is needed to conduct the test. Establishes uniformity of properties.
- Equipment is inexpensive and is readily available.
- A wide variety of concrete test hammers is available with an operational range of M10 to M70.
- For rehabilitation of old Monuments..

DISADVANTAGES

- Evaluates only the local point and layer of masonry to which it is applied.
- No direct relationship to strength or deformation properties.
- Unreliable for the detection of flaws.
- Cleaning maintenance of probe and spring mechanism

ULTRASONIC PULSE VELOCITY

INTRODUCTION

- Ultrasonic Pulse Velocity (UPV) testing of concrete is based on the pulse velocity method to provide information on the uniformity of concrete, cavities, cracks and defects. Presence of voids, honeycombing or other discontinuities.
- The pulse velocity in a material depends on its density and its elastic properties which in turn are related to the quality and the compressive strength of the concrete.
- This test method is applicable to assess the uniformity and relative quality of concrete, to indicate the presence of voids and cracks, and to evaluate the effectiveness of crack repairs.
- It is also applicable to indicate changes in the properties of concrete, and in the survey of structures, to estimate the severity of deterioration or cracking

USED IN

- Measurement of concrete uniformity.
- Detection of cracking and honeycombing.
- Strength estimation.
- Measurement of layer thickness
- Measurement of elastic modulus.
- Strength development monitoring.

METHODS

- There are two methods used for this test

1. Direct method
2. Indirect method

- Direct transmission is the most sensitive, and indirect transmission the least sensitive.
- Indirect transmission should be used when only one face of the concrete is accessible, when the depth of a surface defect or crack is to be determined or when the quality of the surface concrete relative to the overall quality is of interest.

WORKING

- The equipment consists of two transducers, usually in the form of metal cylindrical heads, one of which is used to transmit an ultrasonic pulse and the other is a receiver.
- They are brought into contact with the concrete surface (‘coupled’) using a gel or grease.
- They are connected by cable to a control box which contains a pulse generator, timing circuit and digital display.
- The digital display indicates the time for the ultrasonic pulse to travel between the transmitting and receiving transducers.
- It is possible to develop an empirical relationship between pulse velocity and strength but this relationship is influenced by type of cement, type and size of aggregate, presence of reinforcement, moisture condition, compaction and age of concrete.

LIMITATIONS

- Ultrasonic pulse velocity measurement has been found to be a valuable and reliable method of examining the interior of a body of concrete in a truly nondestructive manner.
- Modern equipment is robust, reasonably cheap and easy to operate, and reliable even under site conditions; however, it cannot be over emphasized that operators must be well trained and aware of the factors affecting the readings.