**Non Destructive Testing Lab (CE-606)**

**Civil Engineering**

**EXPERIMENT NO.1**

**REBOUND HAMMER TEST**

**Date of conduction:-**

**Date of submission:-**

**Submitted by other members:-**

**1.**

**2.**

**3.**

**4.**

**5.**

**Group no:-**

**Signature**

**Name of faculty in charge: Ms. Vishakha Yadav**

**Name of Technical Assistant: Mr. Sonu Prajapati**

**Aim:** To determine the compressive strength of concrete by using the rebound hammer.

**Apparatus**: Rebound Hammer instrument, Abrasive Stone

**Procedure**: To take reading the following step should be considered.

1: Make sure the hammer is calibrated.

2: The surface must be smooth, clean and dry, and should be preferably formed, but if trowelled surfaces are unavoidable, use a grinding stone to smoothen the test surface.

3: The plunger is released before use; then it should be pressed strongly and vertically to the concrete surface and locked in its position.

4: Take the scale reading on the side window of the hammer, this reading is known as the rebound number.

5: Repeat the test at all points and record the rebound numbers, find the mean and check that each reading didn’t exceed 6 units difference from the mean reading.

6: Each rebound number will produce a compressive strength from the relationship between the rebound number and compressive strength on the side of the hammer.

7: Compressive strength can then be found using a calibration graph of Compressive strength v/s Rebound (Rebound Hammer conversion chart)

**Observation:**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Rebound Number** | **Compressive Strength (N/mm2 )** |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |
| 9 |  |  |
| 10 |  |  |

**Result**: Make at least ten readings from a concrete surface and discard the highest and lowest rebound numbers. Average the remaining eight numbers. If desired, take a few test readings before you complete your series of ten regular tests. Use the average rebound number to estimate the strength of the concrete. Compare your average rebound number to the chart shown on your Concrete Rebound Hammer.

|  |  |
| --- | --- |
| **Average Rebound Number** | **Quality of Concrete** |
| ˃40 | Very good hard layer |
| 30 to 40 | Good layer |
| 20 to 30 | Fair |
| ˂20 | Poor concrete |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

**Precaution:**

* The surface should be smooth, clean and dry.
* The loose surface should be rubbed off with a grinding wheel or stone, before testing.
* The point of impact should be at least 20mm away from the edge or sharp discontinuity.
* The test should not be conducted on the rough surface resulting from incomplete [compaction of concrete](https://gharpedia.com/compaction-of-concrete/), loss of grout, spoiled or tooled surface.

**Non Destructive Testing Lab (CE-606)**

**Civil Engineering**

**EXPERIMENT NO.2**

**ULTRASONIC PULSE VELOCITY TEST**

**Date of conduction:-**

**Date of submission:-**

**Submitted by other members:-**

**1.**

**2.**

**3.**

**4.**

**5.**

**Group no:-**

**Signature**

**Name of faculty in charge: Ms. Vishakha Yadav**

**Name of Technical Assistant: Mr. Sonu Prajapati**

**Aim:** The aim of this experiment is to determine the quality of concrete by ultrasonic pulse velocity method

**Apparatus Required**: Electrical pulse generator, transducer, amplifier, electronic-timing device and concrete specimen.

**Procedure**:

1. Take the specimen and mark the suitable number of locations on the specimen to be tested.

2. First take the distance between the two points on the surface for testing.

3. Before testing make sure that the surface of the concrete specimen is smooth. If the surface of the specimen is rough apply grease to it before testing.

4. Take the UPV tester and fix the wires to it which transducers are fixed at the end.

5. Calibrate the instrument by the reference bar. The pulse time for calibration is engraved on the reference bar.

6. After calibration place the transducers on the surface and press it hard onto the surface. A value of pulse time in microsecond is displayed on the screen and it is noted.

7. According to the placing of transducers the respective length is also measured.

8. This is followed for number of marked points to be tested. After obtaining the pulse time value and the distance, velocity is calculated.

9. Based on the value of velocity the quality of concrete is determined as per IS code 13311(part-1)-1992, table-2.

**Observations and Calculations**:

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Pulse velocity time(T)-µs** | **Distance (L)-mm** | **Velocity km/s** |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |

**Formula**: Pulse velocity time (V) = length (L) / Pulse time (T)

|  |  |  |
| --- | --- | --- |
| **S. No** | **Pulse velocity by cross probing (km/sec)** | **Concrete quality grading** |
| 1 | Above 4.5 | Excellent |
| 2 | 3.5 to 4.5 | Good |
| 3 | 3.0 to 3.5 | Medium |
| 4 | Below 3.0 | Doubtful |

As per IS code 13311 part-1Table-2: velocity criterion for concrete quality grading.

**Result**: The average pulse velocity of the specimen is \_\_\_\_\_\_\_ (km/s).

Quality of the specimen is \_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

**Precaution**: Poor sampling or selection of test locations may lead to incorrect findings.