# Investigation on Non Destructive Testing For Residential Building

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***Abstract-*** *The NDT methods relevant for the inspection and monitoring of concrete materials characterization of material properties and damage as a function of time and environmental influences is more and more becoming a serious concern. Non-destructive testing (NDT) methods have a large potential to be part of such a system. Nondestructive testing in the broad sense refers to methods whereby internal characteristics of solid structures can be examined without permanently affecting the structure. Thus, parts that prove to be satisfactory under specified test conditions are not degraded by the test procedures*

***Keywords***- NDT, Rebound Hammer.

## I. INTRODUCTION

Non-destructive testing (NDT) is a wide group of analysis techniques used in science and industry to evaluate the properties of a material, component or system without causing damage. The terms Nondestructive examination (NDE), Nondestructive inspection (NDI), and Nondestructive evaluation (NDE) are also commonly used to describe this technology. Because NDT does not permanently alter the article being inspected, it is a highly-valuable technique that can save both money and time in product evaluation, troubleshooting, and research. Non-destructive Testing is one part of the function of Quality Control and is Complementary to other long-established methods. By definition non-destructive testing is the testing of materials, for surface or internal flaws or metallurgical condition, without interfering in any way with the integrity of the material or its suitability for service. testing of materials, for surface or internal flaws or metallurgical condition, without interfering in any way with the integrity of the material or its suitability for service..

## II. RESEARCH REVIEW

**D.K. Kulkarni et al (2013),** studied that to test concrete structure to determine its suitability for which it is designed. Ideally such testing should be done without damaging the concrete. The test available for testing concrete range from the completely non-destructive, where there is no damage to the concrete, through those where the concrete surface is slightly damaged, to partially destructive tests, such as core tests and pullout and pull off tests, where the surface has to be repaired after the test. The range of properties that can be assessed using non-destructive tests and partially destructive tests is quite large and includes such fundamental parameters as density, elastic modulus and strength as well as surface hardness and surface absorption, and reinforcement location, size and distance from the surface.

**Rajan L Wankhede** et al (2009) investigated that assessment of concrete for structural evaluation purposes has been performed in last two decades mostly by visual examination, surface sounding and coring to examine internal concrete conditions. Condition assessments can be made with NDT methods to provide information for the structural performance of the concrete, such as: Member dimensions; Location of cracking, delamination and deboning; presence of voids and honeycomb; Steel reinforcement location and size; Corrosion activity of reinforcement; and Extent of damage from freezing and thawing, fire, or chemical exposure. When the actual compressive strength of the concrete in the structure is to be determined core testing as per IS 516:1959‘Method of test of strength of concrete

**Limbachiya et al 2007**, with the introduction of waste legislation in the form of regulations and directives in many parts of world, a significant movement towards the sustainable management of construction and demolition (C&D) waste is becoming a legal requirement. In response, different sectors of the construction industry are undertaking various initiatives to minimize waste generation and improve the management of C&D waste to maximize economic and environmental benefits, generally by placing emphasis on increasing recycling for reuse.

**Padmini et al. 2009**, the building industry in particular is a major consumer of materials and at the same time a major producer of waste. According to study, concrete accounts for up to 67% by weight of construction and demolition waste.

**Tam et al. 2007**, the amount of demolition waste dumped at landfill sites in the United Kingdom is said to be in excess of 20 million tons per annum. The bulk of this material is concrete (50%–55%) and masonry (30%–40%) with only small percentages of other materials such as metals, glass and timber. In the Netherlands, about 14 million tons of building and demolition waste per annum are produced, in which about 8 million tons are recycled, mainly for unbound road base courses.

**Xiao et al. 2012**, it is also estimated that approximately 200 million tons of waste concrete are currently produced annually in the mainland of China. Due to the increasing rate of demolition, it is essential to effectively reuse demolition waste in order to conserve the nonrenewable natural resources. As a result of the mentioned problems, the idea of producing Recycled or Green Recycled coarse aggregate concrete (RCA), which is by definition a concrete in which recycled aggregate is used, has emerged.

**Nagataki et al. 2000**, States that, Recycled coarse aggregate concrete will satisfy the three prerequisites of Recycled or Green materials (i) it can recycle and reduce natural resources and energy consumption; (ii) it will not affect the environment; and (iii) it can maintain sustainable development.

## III. METHODOLOGY

Structural Audit is an important tool for knowing the real status of the old bldgs. The Audit should highlight & investigate all the risk areas, critical areas and whether the bldg. needs immediate attention. It should also cover the structural analysis of the existing frame and pinpoint the weak structural areas for static, wind & earthquake loads. If the bldg. has changed the user, from residential to commercial or industrial, this should bring out the impact of such a change. The Operations are very simple. It consists of releasing the plunger from locked position by pressing gently against the hard surface and check for zero setting of rebound number indicator on the graduated scale. The hammer is then strongly pressed against the prepared spot on the surface under investigation which releases the spring-loaded weight which strikes the plunger and causes the impact.

## IV. RESULT AND DISCUSSION

There are different non-destructive testing methods which can be broadly classified as those which measure the overall quality of the concrete, dynamic or vibration methods like resonance frequency and ultrasonic pulse velocity tests and those which involve measurement of parameters like surface hardness, rebound, penetration, pull-out strength etc. are believed to be indirectly related to the compressive strength of concrete. In addition, radiographic, radiometric, nuclear, magnetic and electrical methods are also available. Since such non-destructive tests are at best indirect methods of monitoring the particulars, characteristics of concrete.

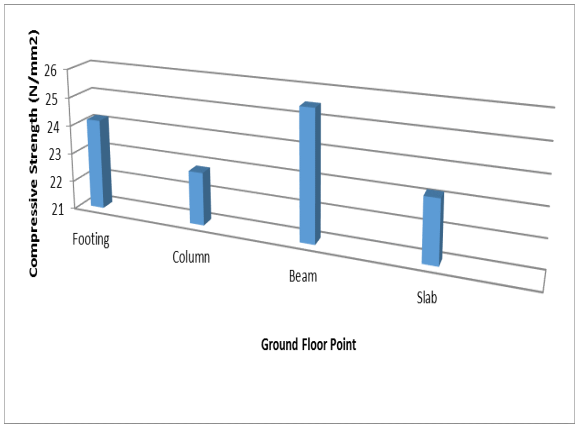


Fig 1 Rebound Hammer Test Result for Ground Floor Point.

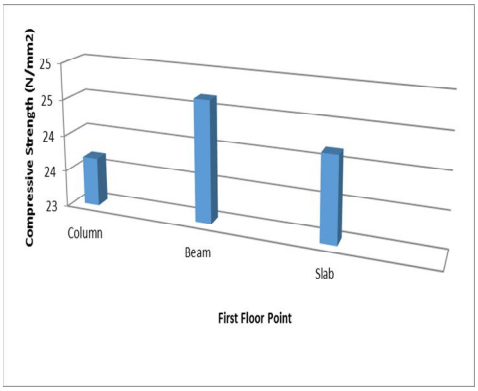


Fig 2 Rebound Hammer Test Result for First Floor Point

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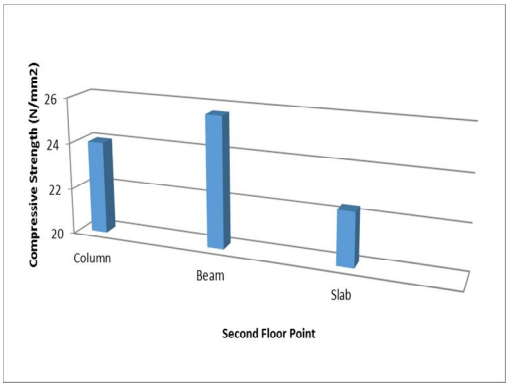


Fig 3 Rebound Hammer Test Result for Second Floor Point

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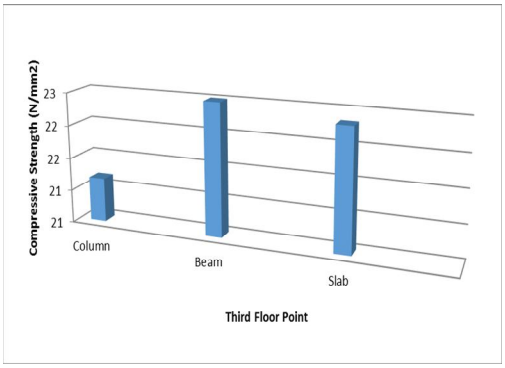


Fig 4 Rebound Hammer Test Result for Third Floor Point.

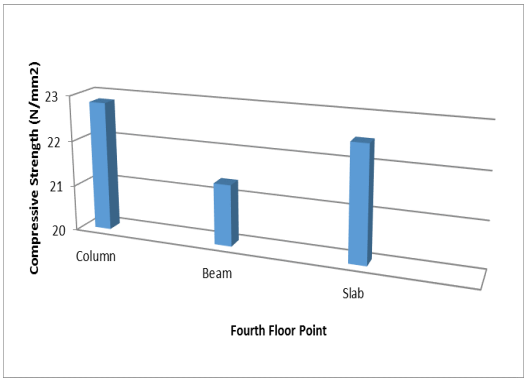


Fig 5 Rebound Hammer Test Result for Fourth Floor Point.

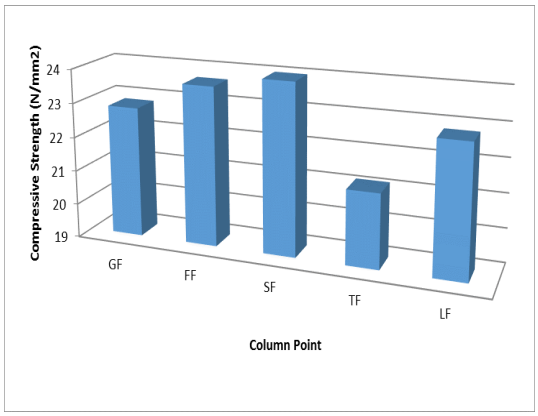


Fig 6 Rebound Hammer Test Result for All Floor Column Point

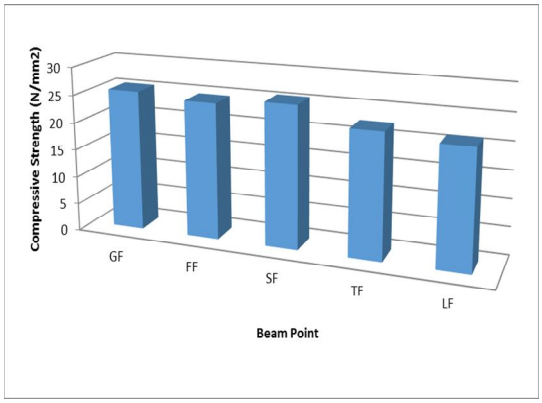


Fig 7 Rebound Hammer Test Result for All Floor Beam Point

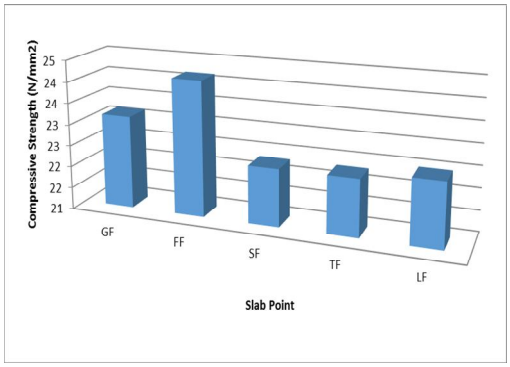


Fig 8 Rebound Hammer Test Result for All Floor Slab Point

## IV. CONCLUSION

Structural audit is the technical survey of the building to check strength, stability.

Such types of structural audit help in in improving safety, efficiency and gives the idea about strength of the structure by detailed technical inspection. In present study attempt have been made to carry out the structural audit RCC building by carrying site inspection, performing NDT tests on the structures. After performing and comparing NDT test it was observed that tests performed in case study one shows much better results. From structural point of view building is safe, sound and in efficient condition. Based on the procedures outlined in the IS 13311 (part 1 and 2) relationship between Compressive strength, USPV and Rebound number have been developed using graphs. A classic example of this application is SONREB method which was studied & developed in Romania first by correlating Rebound hammer number, USPV, compressive strength.

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