
STRUCTURAL AUDIT OF AMOLAKCHAND MAHAVIDYALAYA YAVATMAL**Asst. Prof. N. B. Kothari^{*1}, Gunjan Rathod^{*2}, Rutuja Pise^{*3}, Sanket Kamble^{*4},
Jay Tasar^{*5}, Vivek Jadhav^{*6}, Vaibhav Todase^{*7}, Mahendra Dhabarde^{*8}**^{*1}Assistant Prof. of Department of Civil Engineering, JDIET, MIDC Lohara Yavatmal, Maharashtra, India.^{*2,3,4,5,6,7,8} Student of Department of Civil Engineering, JDIET, MIDC Lohara Yavatmal, Maharashtra, India.

ABSTRACT

In the case of Construction industry, the life cycle of a structure can be divided into four important phases those areas Architectural planning, Structural planning, Construction, and maintenance. A structural inspections should be performed at least formerly every five years for any structure and every three years for structures aged 15 years. Every structure has its own service life it should stands on its position. But because of giving lower significance to maintenance structural damage has increased day by day and the structure is getting collapsed before its services live is completed which leads to the loss of parcels and life of mortal beings. Therefore, it is suggested to overcome the failure of the structure it is necessary to do a structural inspection and find the fault in the structure and also find out the root causes of defective mechanisms to avoid unborn problems. Erosion and aging appear to be the most common causes of structural member deterioration. moistness and leakage from crossbeams, fractures in walls, and other factors beget erosion in structural members. Auditing will help to apply formaintenance and formwork timely which leads to prolonged life of the structure and safety of the inhabitants.

Keywords:-Structural Audit, Defects, Visual Inspection, etc.

I. INTRODUCTION

In India, several historical structures have decreased strength in due path of time. If further use of similar deteriorated structures is continued it may jeopardize the lives of the inhabitants and girding habitation. Applicable conduct should also been forced to reform the performance of structures and restore the asked function of structures. therefore, it is of utmost importance to operate a structural inspection of buildings and observe for formwork will lead to the extended existence of the structure and the protection of the inhabitant. A structural audit is the basic fitness and overall performance check-up of the structure like a doctor checking the case. The structural audit helps to understand the status of the old structure. The structural audit should punctuate and probe all critical areas and recommend immediate remedial and preventive measures. It should cover the structural analysis of the being frame remedied critical member for all types of loadings. It also helps in delivering a strong structure with a cost-effective and applicable maintenance programs.

- What is a structural Audit?

A structural audit is an overall health and performance check-up of a structure like a doctor examines a case. It ensures that the structure and its demesne are safe and have no threat. It analyses and suggests applicable repairs and retrofitting measures needed for the structures to perform better in their service life.

As per clause No. 77 of the revised Bye-Laws of Cooperative Housing Societies, the society shall cause the Structural audit of the structure as follows

1. For structure aging between 15 to 30 times formerly in 5 years
2. For structure aging above 30 times formerly in 3 years

OBJECTIVE OF THE STRUCTURAL AUDIT:

- 1) To perform a preliminary inspection of the structure.
- 2) conduct visual examinations to emphasize critical areas.
- 3) To understand the present condition of the building.
- 4) To recognize the type of structural deformities.

- 5) To identify the problems that may occur due to the alteration and addition of materials or parts in the structure.
- 6) To find any signs of structural distress and deformation.
- 7) To improve the lifespan and efficiency of buildings.
- 8) To suggest necessary repairs and modifications in the building.

II. LITERATURE REVIEW

Pranjali. V. Kulkarni

has stated the current process of Structural Audit, there is a need to find the lacunas in the current process and modify the process for efficient implementation of Structural Audit. This research aims at finding out the lacunas if any in the current procedure and applying management principles to modify the structural auditing process and suggest some improvement measures to the governing body.

K. R. Sonawane

Has stated the life cycle of the structure can be astronomically divided into four phases i.e. architectural planning, structural design, construction, and conservation. In most structures, nearly care is taken in the first three cases but conservation is forgotten. Ignorance of conservation causes severe structural torture in the structure over a while. utmost of the structure constructed in the last 23 to 30 times is in severe structural torture and needs to repair, hence these structure needs a periodic check from the structural point of view to asses from structural health. Grounded on this check a decision regarding the structural health of the structure and the form needed can be taken. This paper deals with styles of estimating the inspection of structures whose life has crossed the age of 30 times.

Gaurav Sanjay Shinde

This review paper covers the study of Structural Auditing of Residential buildings. Currently, structural Auditing is necessary because of poor quality of construction, carelessness in supervision during construction, use of poor-quality accoutrements, and carelessness by labours during work because of similar reasons the quality of the structure goes down, and also automatically life of the structure goes down. Currently, life of the structure comes 60 years from 100 years because of similar reasons we need to do Structural Auditing of the structure after 15 years to check whether it's safe or not if not also remedial measures to be handed. Now while performing the inspection of a residential structure and we will conduct non-destructive testing on this structure like a Rebound hammer and ultrasonic pulse velocity meter test after getting the test results we will decide whether the structure is safe or not and if it isn't safe also remedial measures will be handed to increase the life of the structure.

Bhairavi Pawar

concluded that visual inspection is obligatory and judicious by professional experts. It is important to do the structural auditing and analysis for the health of existing building to find out present condition of the structure.

Monis Azhar

concluded the pulse frequency experiment have very good potential for solid control, especially by starting consistency and identifying breaks and imperfections it utilization in anticipating quality is significantly more restricted due to many variables affect the relationship between intensity and heart rate

III. METHODOLOGY

As we know concrete is extensively used as a construction material because of its high strength-cost rate in numerous operations. Concrete constructions are generally anticipated to give trouble-free service throughout their intended design life. still, these prospects aren't realized in numerous constructions because of structural insufficiency, material deterioration, unexpected loadings, or physical damage, and therefore, Civil structures like structures, heads, and islands are subordinated to nonstop deterioration over the time For structural auditing we've chosen an Institutional structure positioned at Yavatmal and andisquisition can be carried out by

• Visual inspection-

way of inspection in order to carry out a structural inspection of an old RCC structure is named of age around 30 years.

The step involved in the structural audit carried out are as follows:

Step 1 Preparation of architectural and structural plan of the structure. These plans are helpful in the structural computation, relating or pressing critical areas in the structure.

Step 2 Recommendation of remedial measures or retrofitting.

Step 3 Preparation of structural audit report.





3.1 VISUAL INSPECTION:

The first stage of a structural inspection consists of a visual examination that should lead to the identification of defects, material declination, and distortion of any sections or interior components. However, additions, or reserves are demanded, if differences. These examinations are carried out in order to ascertain cracks diversions in retaining walls, leakages, and concrete continuity. Moistness in the walls is also audited along with varying loads on the structure that may have passed. Visual testing is presumably the most important of all non-destructive tests. It can frequently give precious information to the well-trained eye. Visual features may be related to workmanship, structural utility, and material deterioration and it's particularly important that the mastermind is suitable to separate between the colourful signs of distress which may be combated. These include, for case, cracks, pop-outs, palling, decomposition, colour change, riding, staining, face mars, and lack of uniformity. expansive information can be gathered from visual examination to give a primary suggestion of the condition of the structure and allow the expression of a posterior testing program. The visual examination still shouldn't be confined only to the structure being delved. It should also include bordering structures, the girding terrain, and the climatic condition. This is presumably the most delicate aspect of the whole structural disquisition or any individual work since what appears egregious tone may not be so to another. The significance and benefits of a visual check shouldn't be undervalued.

3.2 Types of Defects:

At the time of the visual, we see the different types of defects as follows

Sr. No.	Defects	Images	Causes
1.	Cracks on Slab		Poor Concrete Curing Uneven Sub-grade
2.	Cracks on Column		Due to elastic deformation, shrinkage, and creep in the RCC column Due to Seepage.
3.	Cracks on Chajja		Due to corrosion of reinforcement Due to the provision of insufficient reinforcement covering

4.	Spalling of Chajja		<p>Inadequate depth of cover to reinforcement. Bond failure. Corrosion of embedded reinforcing steel.</p>
5.	Cracks in Wall		<p>Initial shrinkage of brickwork. Thermal movement of building materials. Creep movement. Growth of vegetation.</p>
6.	Dampness of Wall		<p>Due to accumulation of water on the roof. Due to leakage in the plumbing system. Defective parapet wall, window seal.</p>
7.	Honey Combing of Column		<p>There is less cover for the reinforcement bar. Use of larger size aggregate in excessive amounts. Improper compaction of concrete.</p>

IV. REMEDIAL MEASURES

1. In case of rain water pipes, probable location is at the intake mouth of the roof level, the joint is repaired with sand cement mortar
2. Remove the plaster and apply new plaster with damp proof agent.
3. Provide RCC jacketing to the Chajja where the reinforcement is largely corroded.
4. Guniting should be provided to beam and column where crack is developed.
5. Stitching should be done to improve the strength to the wall.
6. Epoxy Injection is used to fill the cracks.
7. Paraffin Oil Can be painted over the surface where leakage takes place.
8. To avoid dampness apply bituminous paint/Sheets.

V. CONCLUSION

For all types of structures, a structural audit is necessary so that applicable remedial measures can be recommended for all types of structural blights and damages. So that it continues to serve strength and utility demand. For any structure, it's necessary to carry out a structural inspection at least formerly in every five years. For structures aged 15 years structural inspection should be carried out formerly in 3 years

It's observed that the main cause of damage to structural members is due to corrosion, aging, seepage of rain water, bad quality of material used, corrosion and vegetation. So, the strength and utility of the structure can be increased by taking necessary measures such as similar to waterproofing to stop the seepage of water into structural members so as to avoid further corrosion.

VI. REFERENCES

- [1] Pranjalt V. Kulkarni, Sachin V. Admane, "Simplifying and Managing the process of Structural Audit": Engineering and Scientific International Journal (ESIJ), Volume 2, Issue 1, January-March-2015.
- [2] K. R. Sonawane, Dr. A. W. Dhawale, "Structural Audit: A Case Study of Nashik Residential Building, Maharashtra, India", International Standard Serial Number (ISSN), Volume 4, Issue 6, June 2015.
- [3] Gaurav Sanjay Shinde, Dr. S. J. Arwkar, "A Review on Structural Audit of Residential Building" International Research Journal of Engineering and Technology (IRJET), Volume 5, Issue 07 July 2018.
- [4] Bhairavi Pawar, Dhiraj Phapale, Akash Suryavanshi, Ms. Swati Bhangale, "Structural Audit of a Residential Building" International Journal of Engineering Research & Technology (IJERT), Volume 11, Issue 04 April 2022
- [5] Monis Azhar Ansari, Shrikant Solanke, Aashish Soni, "Structural Audit of a 30-year-Old School Building and its Strengthening" Journal of Emerging Technologies and Innovative Research (JETIR), Volume 7, Issue 6 June-2020
- [6] A. B. Mahadik, M. H. Jaiswal, "Structural Audit of Building", International Journal of Civil Engineering Research, Volume 5, Number 4-2014.
- [7] B. H. Chafekar, K. B. Kale, P. A. Shinde, "Structural Audit", International Journal of Civil and Structural Engineering Research (IJCSER), Volume 1, Issue 1, March-2014.