

RECCOMANDATION FOR SYSTEMATIC AND PRECISE FRAMEWORK OF STRUCTURAL AUDIT OF RESIDENTIAL BUILDING

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ABSTRACT

Currently, Safety of old buildings is one of the critical issues in India. Though, there are many practices to conduct structural audit of such buildings, the issues of structural safety audit remains uncertain due to inconsistency of such practices. The study attempts to evaluate gaps in current such local practices of structural audit of residential buildings. Thereby, intends to offer insights to generate more precise framework of structural audit.

Keywords: Old Buildings, Structural Audit, Procedure, Framework, Lacunas, recommendation

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INTRODUCTION

India is a heritage of old building and Structures. Rapid Infrastructural Development from 1980, has resulted in construction of many new multi storied Building. These buildings have age more than 30 years. In Due course of time this buildings have reduced Strength due to Material Deterioration, Unexpected over Loading, Structural Deficiency or Physical Damages. If, further use of such deteriorated structure is continued it may cause severe loss of life and Property. Structural Audit is the overall Health Checkup of a building to ensure that the building is Safe and has no risk. It also suggests some Repair and Retrofitting measures required to increase the Serviceability of the building. Structural Audit has many synonyms such as Condition Assessment of Building, Performance Assessment of Building, and Post Construction Evaluation of Building, Damage Assessment of Building etc. Structural Audit is an important tool for knowing the real status of the old buildings. It is necessary for maintenance and Repair of Existing Structure having age more than 30yrsThe Audit highlights & investigates all the risk areas, critical areas of the Building and also suggests if building needs immediate attention. It also covers the structural analysis of the existing frame and pinpoints the weak structural areas

for static, wind & earthquake loads. If the building has changed the user, from residential to commercial or industrial, this should bring out the impact of such a change.

The Structural Audit is carried out by Appointing a Structural Engineer. He Examines the Structure by Visual Inspection of the Building and if required the Non Destructive Tests are carried out according to requirement of Structure. There is demand of appropriate actions and measures for all such building structures to improve its performance and restore the desired functions of structures which may leads to increase its functional life. The periodical structural auditing and diagnosis for health of existing buildings is thus utmost important for finding the present serviceability and structural viability of structures.

The major issues in executing the Structural Audit are Peoples are not aware about the importance of the Audit. They do not come forward. There are many misconceptions about the audit such that the buildings will be demolished. Secondly there is no Standard or Legal Procedure to Carry out Structural Audit. It completely depends on knowledge and Experience of Structural Engineer. The aim of the Study is to find the Lacunas in Structural Audit Process and to put forward some recommendations for new framework.

METHODOLOGY

1. Initially the Procedure of Auditing is studied with the help of Literature Survey and data collected from various Structural Auditing Firms.
2. To find the lacunas in the procedure if any.
3. To study the various Structural Audit Report Format
4. To form a Report Format this includes major causes of failure and quantifying the Structural Defects.
5. Framing some recommendations for Simplifying the framework of Structural Audit Procedure

FIELD WORK

STRUCTURAL AUDIT REPORT FORMAT

Name of Building:

Name of owner:

Address:

Contact no:

Year of Construction:

Name of Structural Engineer for Audit:

VISUAL INSPECTION:

I) General Observations

SR.NO	DESCRIPTION	REMARK
1	Type of building	
2	Age of building	
3	Mode of use	
4	No of wings	
5	no of stories	
6	No of flats	
7	Architectural plan available	
8	Structural plans available	
9	Building plan approval date	
10	occupation certificate date	
11	Last repair date	
12	Cost of repair	
13	Details of repair	

II) Structural Observations:

SR. NO	DESCRIPTION	LOCATION OF COMPONENTS	GRADE
A	SETTLEMENT		
I	Columns		
ii	Walls		
iii	Cracks in columns., walls, joint at plinth		
B	CRACKS		
I	Column		
ii	Beams		
iii	Slab		
iv	Plaster		
V	External walls		
vi	Internal walls		
C	CORROSION OF STEEL/EXPOSED STEEL		
SR.		LOCATION OF	

NO	DESCRIPTION	COMPONENTS	GRADE
i	Column		
ii	Beams		
iii	Slab		
D	LEAKAGES & DAMPNES AND WATER PROOFING		
i	External walls		
ii	Toilet		
iii	Terrace		
iv	Top floor slab		
v	Inspection of Over Head water tank		
vi	Inspection of underground water tank		
vii	Leakages & damages:-plumbing lines/waterlines, drainage lines		
E	DEFLECTION/SAGGING		
i	Beam		
ii	Slab		
iii	Overloading on Slab		
iv	Cantilever Deflection		
F	CONDITIONS OF OTHER COMPONENT		
i	Staircase		
ii	Balcony		
iii	Flooring		
iv	Ducts		
v	Terrace		
vi	Pluming System		
vii	Electric Supply Line		
viii	Water Supply Line		

III) RESULT:

SR.NO	DESCRIPTION	REMARKS
1	Non Destructive Test Recommended	
2	Test Results	
3	Repair and Retrofitting Suggested	
4	Conclusion	

The remarks of Structural Audit Report should be given in grades and Color Coding instead of description so as to simplify it for Non Technical Persons.

The Grades can be given as follows:

Sr.No	1	2	3	4
Grade	0 to 3	3 to 5	5 to 7	7 to 10
Description	Major Distress	Considerable Distress and Repairable	Moderate Distress and Repairable	Sound Structure
Color Code	Red	Yellow	Blue	Green

Standard Certification by the Structural Engineer for Structural Audit

In accordance with Section 28(6) of the Building Control Act (the "Act") and Regulations 4 and 5 of The Building Control (Inspection of Buildings) Regulations (the "Regulations"),

I, _____, the Structural Engineer appointed by the building owner under section 28(3) of the Act have personally conducted an inspection of the condition and structure of the building and hereby submit the report of the results of my inspection.

I certify that the inspection was carried out and the report was prepared by me in accordance with the provisions of the Act and the Regulations

 Structural Engineer for Structural Audit

 Date

 (Signature and Stamp)

From the above work and Study there are following Flaws in Structural Audit Process:

- 1) Structural Audit is an Overall health Checkup of a Building.
- 2) Structural Audit should be carried out for every building whole age is above 30 yrs.
- 3) General health Checkup of the building can be carried out with the help of Visual Inspection.
- 4) If further necessary Non Destructive Test should be carried out depending on the condition of the building.
- 5) There is no Standard or Legal Procedure of Structural Audit.
- 6) Structural Engineers have their own formats for report.
- 7) There is no any serviceability index or Safety Index to assess the building; it completely depends on the experience of the Structural Engineer.
- 8) The Ratio of old Buildings: Structural Engineers is very low so and also the available structural Engineers are busy in new Projects it is very difficult to assess all the buildings.
- 9) The society is not aware about the Structural Audit process and it's Importance.
- 10) Structural Audit is of no importance if the suggested repair and retrofitting measures are not carried.

RESULT AND DISCUSSION

Recommendations for New Framework:

- 1) After going through research papers and Visiting to Audit firms it is found that there is no any legal Procedure to conduct the Structural Audit. Therefore there should be Legal and Universal Procedure to Carry out Structural Audit. Such that both the Contractor and Owner to implement them as a part of Normal Operation.
- 2) There should be organized Structure of Audit Body including representative of all Departments.
- 3) According to Survey we came to conclusion that the condition of Structure is evaluated mostly on the basis of experience of Structural Engineer, therefore some imperial formulae or weighages must be given to the degree of distress of the Structural Member such that the Structural Audit report could be easily understood by Non technical Person.
- 4) People in the Society are not aware about importance and necessity of Structural Audit, Some awareness programs and drives must be carried out.
- 5) It should made mandatory to all Structural engineers to Construct and Repair equal number of Buildings every year.

CONCLUSION

Extensive literature review and local study arrived at the conclusion that there is clear gap in the uniformity of process of structural audit. Usually, it is done at a basic level, customized as per client's requirements. Rather than a uniform framework, structural audit process shows diversity at many levels and platforms. It hampers in understanding and evaluation of basic building safety issues. Therefore, there is threat in implications of uniform remedial measures.

The current study put emphasis on the awareness and recommendations on the requirement of uniform framework for such process. So that there will be uniformity in the remedial measures; and thereby, safety can be assured at a specific common platform.

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