Bye-Laws

1. As per clause No.77 of revised Bye-Laws of Cooperative Housing Societies: “The Society shall cause the ‘Structural Audit’ of the building as follows:

* For building aging between 15 to 30 years once in 5 years
* For building aging above 30 years Once in 3 years

1. Taking into consideration all such above & other nuisance factors, the local civic body (BMC), has amended the MMC Act, by inserting section 353-B, which lawfully makes it mandatory for the building owners (Society) to conduct “Structural Audit”, for ALL those buildings which are over 30 year of age.

Such structural audit by the society which is in Municipal Corporation limits shall be conducted by the approved engineers from the corporation panel. In case of other society such structural audit shall be carried out by the government approved structural engineers / architect.

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| Classification of Bldg. - | Category |
| To be evacuated /demolition immediately | C1 |
| To be evacuated and/or partial demolition requiring major structural  repairs | C2-A |
| No eviction only structural repairs. | C2-B |
| No eviction needs minor repairs only | C3 |



**What is Structural Audit?**

Structural Audit is an overall health and performance checkup of a building like a doctor examines a patient. It ensures that the building and its premises are safe and have no risk. It analyses and suggests appropriate repairs and retrofitting measures required for the buildings to perform better in its service life. Structural audit is done by an experienced and licensed structural consultant.

**Stages in Carrying Out Structural Audit**

Study of architectural and structural drawings, design criteria, design calculations, structural stability certificate of existing structures.

If architectural and structural drawings are not available, as built drawings can be prepared by an engineer.

**Visual Inspection**

Need of visual inspection

* to recognize the types of structural defects
* to identify any signs of material deterioration
* to identify any signs of structural distress and deformation
* to identify any alteration and addition in the structure, misuse which may result in overloading.

Scope of visual inspection

The inspection report should reveal the following listings along with photographs and

Sketches.

**a) General information of the building**

* Name and address of the building
* Number of stories in each block of building
* Description of main usage of building viz. residential, commercial, Institutional.
* Maintenance history of the building

**b) Structural System of the building**

* Sub structure: Settlement of columns or foundations, Settlement of walls and floors.
* Deflection and cracks in Retaining wall, Soil bearing capacity through trial pits or from adjacent soil data.
* Super structure: Materials used and framing system of structure, identification of the critical structural members like floating columns, transfer beams, slender members, rusting of exposed steel and its extent.
* Mention the status of all building elements like beams, slabs, columns, balconies, canopy, false ceiling, chajja, parapet and railings with respect to parameters deflection, cracks, leakages and spalling of concrete. Likewise, verify the status of water tank, staircase, and lift and lift machine room.

**c) Addition or Alterations in the building**

* Identification of change of occupancy
* Alteration or addition of partition walls
* Alteration or addition in loadings stacking
* Alteration or addition of toilets, water tank
* Alteration or addition of balcony

**d) Dampness and leakages**

* Detect the dampness in walls
* Identify the leakages in terrace, toilets, plumbing lines, drainage lines and overhead tanks.

**Destructive testing**

To verify the integrity of a component, it is always possible to cut or section through the components and examine the exposed surfaces Components can be pulled or stressed and pressurized until failure to determine their properties of strength and toughness. Materials can be chemically treated to determine their composition. These are some forms of destructive testing. Unfortunately this approach of destructive testing renders the component useless for its intended use as against non-destructive testing which can be performed on the components and machines without affecting their service performance.

**Non Destructive and Destructive Testing**

In addition to visual inspection, the real strength and quality of a concrete structure need to be checked with non-destructive tests. A number of non-destructive tests (NDT) for concrete members are available to determine present strength and quality of concrete. Some of these tests are very useful in assessment of damage to RCC structures subjected to corrosion, chemical attack, and fire and due to other reasons. **Non-destructive testing** (**NDT**) is a wide group of analysis techniques used in science and technology industry to evaluate the properties of a material, component or system without causing damage. The terms **Non-destructive examination**, **Non-destructive inspection** and **Non-destructive** **evaluation** are also commonly used to describe this technology, because NDT does not permanently alter the component being inspected, it is a highly valuable technique that can save both money and time in product evaluation, troubleshooting, and research. Common NDT methods include ultrasonic, magnetic particle, liquid penetrate, radiography, remote visual inspection (RVI), eddy current testing.

**The list of the NDT COMMONLY used in the field are as follows**

1. Rebound Hammer Test

2. Pulse Echo Method

3. Impact Echo Method

4. Ultra Sonic Pulse Velocity Method

5. Probe Penetration Test or Windsor Probe Test

6. Ground Penetration Radar Method

7. Carbonation Test

8. Half Cell Potential Meter Test