

# Repair and Maintenance

# Maintenance And Repair Of Buildings.



## What is maintenance ?

- It is the work undertaken to restore or improve every facility in every part of a building , its services and surroundings to currently accepted standards and to sustain utility values of the facility.



## Objectives Of Maintenance :

- To preserve in good condition buildings and services.
- When deterioration occurs due to any reason it is inevitable to restore it to its original standard.
- To make improvements whenever required.
- To sustain utility value.

**A good maintenance team has to ensure**

- 1. Safety**
- 2. Efficiency**
- 3. Reliability**

## Maintenance operations have many facets such as :

1. Condition based maintenance :
  - It is the work initiated after inspection.
2. Fixed time maintenance :
  - Activities repeated at predetermined intervals.
3. Preventative maintenance :
  - This is intended to preserve by preventing failure and detecting incipient faults.
4. Opportunity maintenance :
  - Work done as and when possible within the limits of operational demand.
5. Day to day maintenance :
  - Its involves maintenance that has to be performed daily.
6. Shutdown maintenance :
  - Through overhaul and maintenance after closing.

## Maintenance operations have many facets such as :

- **Emergency maintenance** : Necessitated by unforeseen breakdown damage or a damage caused by natural calamity like earthquakes, floods ,etc.



Before



Before



After



After

Examples of some common maintenance works in a building are as follows : -

- **Maintenance Survey for water supply and sanitary system :**

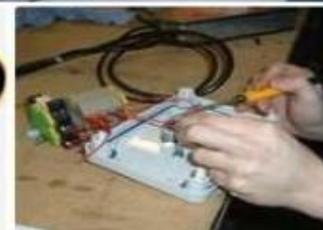
In case of water supply and sanitary system , periodic surveys are necessary to observe how the system is functioning. Normally inspection should start from the top and proceeded downwards. Drawings which indicate various services as laid should be obtained to facilitate survey.



## Maintenance of Electrical Installations :

The electrical installation is made safe by getting it installed and maintained through licensed persons. Its necessary that the installation is checked periodically and a proper record of such work is maintained. Recommended periodicity of checking is as follows :

1. Earthing test - Once a year
2. Insulation - Twice a year
3. Polarity - Once in five years.



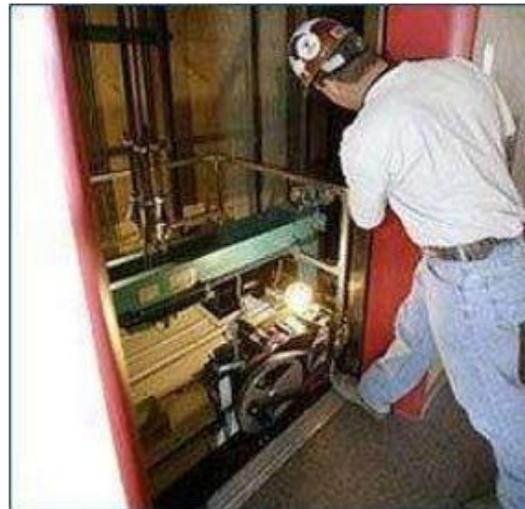
## Maintenance of Elevators

In multistoreyed buildings vertical transportation is an essential service. The vertical transportation is effected by lifts which could be of various types such as passenger lifts , goods lifts special lifts in hospitals , etc. Without adequate vertical transportation the entire activity in the multistoreyed building would come to a standstill.



Lift maintenance should cover :

1. All mechanical equipments such as sheaves , buffers door closers , floor selectors , limit switches , door hangers ,etc.
2. Interlocks – mechanical fastenings to the base and latching head is locked securely when door is closed. The electrical contact should not get made unless the door is fully closed and locked.
3. Hoist and governor ropes for wear and rust
4. Travelling cables – Make sure that they are properly hung and outer wrapping is not worn out to avoid short circuit.
5. Rails – Alignment , tightness of all plates brackets.



## Maintenance of walls to avoid efflorescence

Efflorescence is caused due to entry of moisture into the brickwork and soaking it to saturation. Once the moisture has entered it moves upward due to capillary action; reasons for entry of moisture are-

- Porous nature of structure
- Cracks in the wall
- Existing voids left due to bad workmanship
- Small trees and plants in the wall
- Nonexistence of damp proof course or failure of DPC

## **EFFECTS OF EFFLORESCENCE**

- Dry rot of woodwork
- Disintegration of masonry
- Damage to furniture
- Crumbling of plaster



## STEPS TO AVOID EFFLOROSCEENCE

Eradication of efflorescence is quite difficult and it is often termed as cancer of buildings .The first step to check efflorescence is to check the ingress of moisture in buildings if there is no failure of DPC efflorescence can be checked easily .

- Step one- ingress of water is checked
- Step two- plaster is removed both inside and outside and is left to dry
- Step three- voids in the wall are filled
- Step four- walls are washed with tamarind water to remove stains
- Step five- walls are replastered with cement mortar not leaner than 1:4 and a water proofing admixtures

## What is repair ?

It is defined as the process of restoration of a broken, damaged, or failed device, equipment, part, or property to an acceptable operating or usable condition or state.



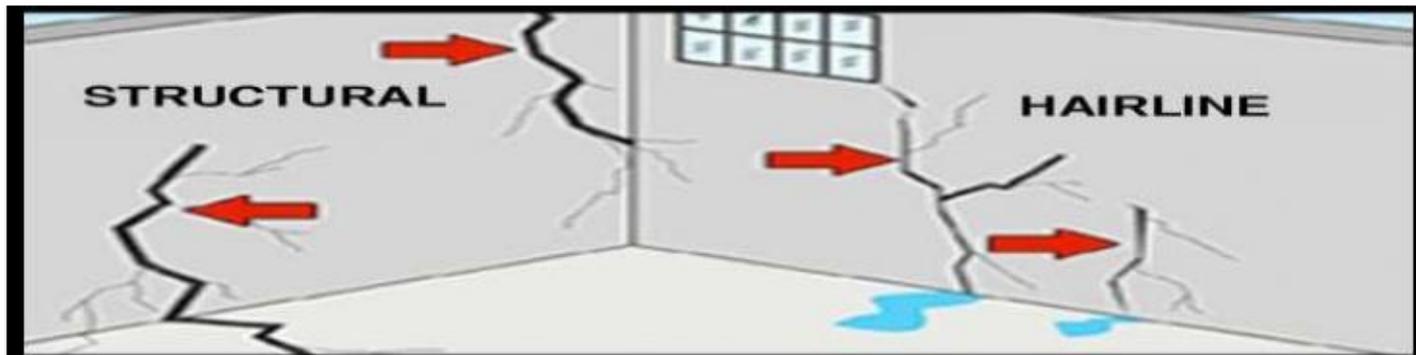
Some common types of repairs are as follows :

1. Patching up of defects such as cracks and fall of plaster.
2. Repairing doors, windows, replacement of glass panes.
3. Checking and repairing electric wiring.
4. Checking and repairing gas pipes, water pipes and plumbing services.
5. Re-building non-structural walls, smoke chimneys, boundary walls, etc.
6. Re-plastering of walls as required.
7. Rearranging disturbed roofing tiles.
8. Relaying cracked flooring at ground level.
9. Redecoration — whitewashing, painting, etc.

**Examples of some common repair works in a building are as follows :-**

### REPAIR OF CRACKS IN WALLS

Cracks are signs of distress in structural and non-structural members caused due to separation of joints , development of fissures , shearing, separation of members built with different materials . Cracks may be at different locations like – vertical, horizontal, inclined ,separation at the roof level just below the junction of RCC slab and masonry wall , in parapet , at junctions of RCC columns etc. They may be wide narrow or hairline and can be of varying depths. They are classified broadly as structural and non structural cracks; with structural cracks forming due to incorrect design faulty construction, and non structural cracks forming due to internal stresses .

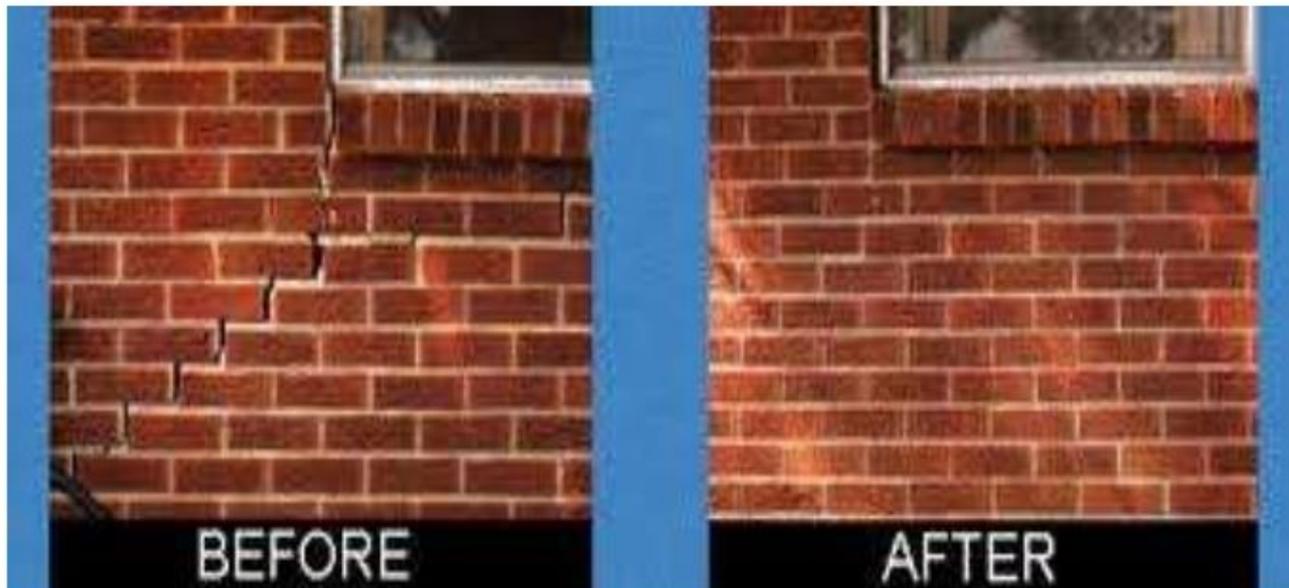


## **DIFFERENT METHODS OF REPAIR OF CRACKS**

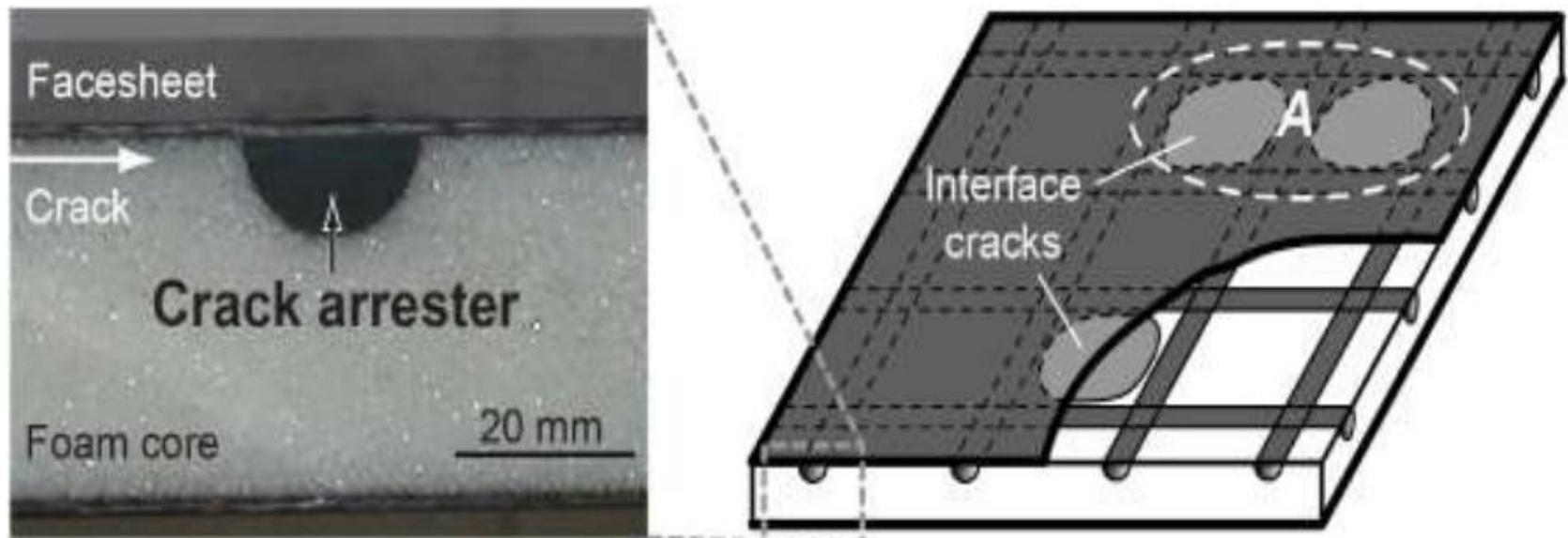
1. Non structural or surface cracks -They do not require elaborate measures as they prevail on the surface only. After removal of the rendering, cracks if observed in masonry are cut v shaped upto a depth of 12-30 mm and filled with cement mortar 1:4 and then the surface is replastered.



2. Very heavy cracks – If there are very heavy cracks all over the external load bearing wall along with signs of settlement, the wall is considered beyond repair and needs replacement. The load carried by the wall is supported on props, the old wall is demolished part by part and then rebuilt either in brickwork or suitable RCC framework.



3. RCC band (crack arrestor) - an active crack in progress may be arrested by providing an RCC band along the line of crack. RCC band helps in checking further cracking and provide adequate strengthened sections for brickwork. The brickwork has to be opened on either side of the crack upto a depth of 100 to 150mm or one third the thickness of the wall ; the exposed surface is roughened and cleaned , the reinforcement mesh is placed and filled with good concrete . The procedure is repeated on both sides of the wall



3. Cracks over arch openings - In old buildings we can see cracks over arch openings . It indicates that the arch has reached the limit of its load transfer mechanism. If the cracks are not severe they are repaired by driving metallic wedges from below.
4. Stitching - stitching is done to repair cracks of brickwork.
5. Cracks observed at junctions of two different materials RCC columns and masonry walls
  - a. RCC columns and masonry wall - cracks appear due to difference in thermal coefficients of the two materials and can be prevented by inserting GI butterfly ties between RCC column and brickwork. The ties are provided at alternate layers of brickwork.
  - b. In buildings having this problem and water entering from the crack and causing dampness of the wall , the external plaster on the outer face 100mm on either side of the crack may be taken out and replastered after fixing chicken wire mesh over the crack. In all cases of junctions rendering should be one after fixing chicken wire mesh.