



SNS College of Technology
Department of Civil Engineering



19CEE409- Repair and Rehabilitation of Structures

UNIT I

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Unit-I

MAINTENANCE AND REPAIR STRATEGIES



Syllabus:

- ❖ Maintenance, repair and rehabilitation
- ❖ Facets of maintenance
- ❖ Importance of maintenance
- ❖ Various aspects of inspection
- ❖ Assessment procedure for evaluating a damaged structure
- ❖ Causes of deterioration



Repair: *To bring back the position of the structure to its previous condition so it gives performance same as previously.*

It doesn't cover the strength aspect of the structures.

Some examples of repair.....

Decoration of structure, Painting, White Washing

- Checking the wiring of building
- Replastering of any wall if required
- Repairing of damaged flooring
- Repair of door and window
- Checking or repairing of pipe line connections, gas line connections and plumbing serveries.
- Relaying disturbed roof tiles



- Rehabilitation: *Rehabilitation of a building means returning a building or a structure to a useful state by means of repair, modification, or alteration.*
- It is related to the strength aspect of structures.
- To Bring back the position and condition of the structure by considering the strength aspect.
- Some of the examples of Rehabilitation.....
 - To fill the wide cracks using some suitable material
 - Injecting epoxy like material in to cracks in walls, columns, beams, etc.
 - Removal of damaged portion of masonry and reconstructing it using rich mortar mix.



DETERIORATION



- ▶ The process that adversely affects the performance of a structure over time due to defects and damages occurred by naturally occurring chemical, physical or biological actions, repeated actions such as those causing fatigues, normal or severe environmental influences and wear due to use, abuse and others.



CAUSES OF DETERIORATION

- ▶ Design and construction flaws
- ▶ Environmental effects
- ▶ Usage of poor quality material
- ▶ Quality of supervision
- ▶ Deterioration due to corrosion
 - Spalling of concrete cover
 - Cracks parallel to the reinforcement
 - Spalling at edge
 - Swelling of concrete
 - Dislocation
 - Internal cracking & reduction in area of steel reinforcement



i) Design and construction flaws

- ❖ Design of concrete structures governs the performance of concrete structures.
- ❖ Well designed and detailed concrete structure will show less deterioration in comparison with poorly designed and detailed concrete, in the similar condition.
- ❖ The beam-column joints are particularly prone to defective concrete, if detailing and placing of reinforcement is not done properly.
- ❖ Inadequate concrete cover may lead to carbonation depth reaching up to the reinforcement, thus, increasing the risk of corrosion of the reinforcement.



ii) Environmental effects

❖ Micro-cracks present in the concrete are the sources of ingress of moistures atmospheric carbon di-oxide into the concrete which attack reinforcement and with various ingredients of concrete

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❖ In aggressive environment concrete structure will be severely reduces.



iii) Poor quality material used

- ❖ Quality of materials, to be used in construction, should be ensured by means various tests as specified in the IS codes.
- ❖ Alkali-aggregate reaction and sulphate attack results in early deterioration. Clayey materials in the fine aggregates weaken the mortar aggregate bond and reduce the strength.
- ❖ Salinity causes corrosion of reinforcing bars as well as deterioration of concrete.



iv) Quality of supervision

- ❖ Construction work should be carried out as per the laid down specification.
- ❖ Adherence to specified water-cement ratio controls strength, permeability durability of concrete.
- ❖ Insufficient vibration may result in porous and honey combined concrete, whereas excess vibration may cause segregation.



v) Deterioration due to corrosion

- ❖ Spelling of concrete cover
- ❖ Cracks parallel to the reinforcement
- ❖ Spelling at edges
- ❖ Swelling of concrete
- ❖ Dislocation
- ❖ Internal cracking and reduction in area of steel reinforcement.

THANK YOU