



**JECRC Foundation**



JAIPUR ENGINEERING COLLEGE  
AND RESEARCH CENTRE

## JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTER

Class – 3rd Year - V Semester: B.Tech. (Civil Engineering)

Subject – Repair and Rehabilitation of Structures

Ch – **Repair Techniques- UNIT-5**

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# VISSION AND MISSION OF INSTITUE

## Vision

To become a renowned centre of outcome based learning, and work towards academic, professional, cultural and social enrichment of the lives of individuals and communities.

## Mission

**M1.** Focus on evaluation of learning outcomes and motivate students to inculcate research aptitude by project based learning.

**M2.** Identify, based on informed perception of Indian, regional and global needs, areas of focus and provide platform to gain knowledge and solutions.

**M3.** Offer opportunities for interaction between academia and industry.

**M4.** Develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge in a range of professions.

# VISSION AND MISSION OF DEPARTMENT

## **Vision**

To become a role model in the field of Civil Engineering for the sustainable development of the society.

## **Mission**

**M1.**To provide outcome base education.

**M2.**To create a learning environment conducive for achieving academic excellence.

**M3.**To prepare civil engineers for the society with high ethical values.

# CONTENTS

## **Repair Techniques-**

1. Grouting
2. Jacketing
3. External bonded plates processes
4. Under Water Repair

# 1. Grouting

**Grout** is usually a mixture of cement, sand, and water or chemicals that are used to fill gaps. They are used in repairing concrete cracks, filling seams and gaps in tiles, gaps for sealing and waterproofing, and for soil stabilization.

**Grout** varieties include tiling **grout**, flooring **grout**, resin **grout**, non-shrink **grout**, structural **grout** and thixotropic **grout**. There are a number of **different types of grout** and they each serve a purpose, which is analysed below under divisions and sub-divisions.

The purpose of grouting can be either to strengthen a formation or to reduce **water** flow through it. It is also used to correct faults in concrete and masonry structures.



## 2. Jacketing

**Jacketing** is a technique used to increase the strength of existing structural members (e.g. Columns, Beams etc.) by providing a “Jacket” of additional material around the existing member. This additional material can be of several types e.g. concrete, steel or FRP etc.

Concrete **jacketing** or retrofitting is a procedure by which we can increase the strength of a building structure. It is the modification of existing structure to make them more resistance to seismic activity, ground motion and soil failure due to earthquakes.



### 3. External bonded plates processes

#### Steel plate bonding:-

The technique of strengthening concrete structures by bonding steel plates to the external faces, using epoxy adhesive, was pioneered in the late 1960s. It has been used extensively in the UK since 1975 when the M5 Quinton Interchange was strengthened. Most applications have been to increase flexural strength or stiffness by bonding plates to the soffits or top surfaces of beams and slabs.

Work in the laboratory has shown that the shear strength can be increased by bonding plates to the side faces of structural elements.

Plates are generally mild steel and at least 4 mm thick to prevent distortion during the preparation process. The maximum practical plate length is 6 metres. Bolts are required at the ends of plates to prevent local high shear and normal stresses causing peeling failure.

Solutions for structural strengthening offered by Concrete Renovations Ltd include:

- Plate bonding using carbon fibre
- Carbon fibre wrapping
- Carbon rod reinforcement replacement
- Sprayed concrete placement

We also offer structural strengthening solutions for masonry, including:

- Brick stitching
- Wall-tie installation
- Helifix and Helibeam installation

Concrete Renovations Ltd installed over 500metres of Sika Carbodur Carbon Fibre structural strengthening to the Cripps building at Cambridge University.





## 4. Under Water Repair

Guniting or Shotcrete Method to **Repair Underwater** Concrete Structures. This **technique** is the best option when large surface area or columns or beams are encased and usually dry process is used. In the dry method, dry mix is transferred by a hose and water is added to the dry mix at the nozzle.

**Following are the different methods to repair underwater concrete structures:**

Surface spalling **repair**.

Large scale **repair** of **underwater** structural concrete.

Preplaced aggregate concrete.

Injection **technique** for restoring **underwater** concrete structure.

Guniting or shotcrete method to **repair underwater** concrete structure.



Thank You