



**SNS COLLEGE OF TECHNOLOGY, COIMBATORE-35
(AN AUTONOMOUS INSTITUTION)**



UNIT IV TECHNIQUES FOR REPAIR AND DEMOLITION

16CE425 – REPAIR AND REHABILITATION OF STRUCTURES

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16CE 425/ RRS/Maintenance & Repair



Techniques for Repair

- Rust eliminators and polymers coating for rebars during repair, Guniting and Shotcrete, Epoxy injection, Mortar repair for cracks, shoring and underpinning.
- Methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings and cathodic protection.



Repairing spalling and disintegration

- In the repair of a structure showing spalling and disintegration, it is usual to find that there have been substantial losses of section and/or pronounced corrosion of the reinforcement
- Both are matters of concern from a structural viewpoint, and repair generally involves some urgency and some requirement for restoration of lost strength



2. Guniting

- Guniting is also known as shotcrete or pneumatically applied mortar
- It can be used on vertical and overhead, as well as on horizontal surfaces and is particularly useful for restoring surfaces spalled due to corrosion of reinforcement
- Guniting is a mixture of Portland cement, sand and water, shot into the place by compressed air



- Sand and cement are mixed dry in a mixing chamber, and the dry mixture is then transferred by air pressure along a pipe or hose to a nozzle, where it is forcibly projected on to the surface to be coated
- Water is added to the mixture by passing it through a spray injected at the nozzle
- The flow of water at the nozzle can be controlled to give a mix of desired stiffness, which will adhere to the surface against which it is projected



Guniting

Guniting is mechanically applied material consisting of **cement, aggregates and water**.

The cement and sand are batched and mixed in the usual way and conveyed through a **hose pipe** with the help of compressed air.

A separate pipe line brings water under pressure and the water and cement aggregate mix are passed through and intimately mixed in a special manifold and then projected at **high velocity** to the surface being repaired.



In good quality work, a density around 2100kg/m^3 is achieved. For effective guniting, the nozzle should be kept at 60cm to 150cm from the work normal to the surface.

Before guniting is applied, the old concrete surface is prepared properly, all the **cracks treated** and the new reinforcement fixed in position.

Cracks wider than about 0.5 mm should be cut out and filled with hand-applied mortar or with gunite.



Shortcreting

Shortcrete is defined as “ **mortar or concrete** pneumatically projected at high speed onto a surface”.

Types of shorcrete:

- i) Dry mix
- ii) Wet mix

Dry mix:

Dry cement, sand and coarse aggregate are premixed with only sufficient water to **reduce dusting**.

ii) Wet mix:

The cement, sand and coarse aggregate are **mixed with water** and the resulting concrete is then pumped to the nozzle where compressed air propels the wet mixture onto the surface.



Applications :

Shortcrete has been used to repair :

- canal and spillway linings and walls
- the faces of dams, tunnel linings
- highway bridges and tunnels
- deteriorating natural rock walls and earthen slopes
- to thicken and strengthen existing concrete surfaces



1. Jacketing

- primarily applicable to the repair of deteriorated columns, piers and piles
- Jacketing consists of restoring or increasing the section of an existing member, principally a compression member, by encasement in new concrete
- The form for the jacket should be provided with spacers to assure clearance between it and the existing concrete surface



- The form may be temporary or permanent and may consist of timber, wrought iron, precast concrete or gauge metal, depending on the purpose and exposure
- Timber, Wrought iron Gauge metal and other temporary forms can be used under certain conditions
- Filling up the forms can be done by pumping the grout, by using prepacked concrete, by using a tremie, or, for subaqueous works, by dewatering the form and placing the concrete in the dry



3. Prepacked concrete

- This method is particularly useful for carrying out the repair under water and elsewhere where accessibility is a problem
- Prepacked concrete is made by filling forms with coarse aggregate and then filling the voids of the aggregate by pumping in a sand-cement grout



4. Drypack

- Drypacking is the hand placement of a very dry mortar and the subsequent tamping of the mortar into place, producing an intimate contact between the new and existing works
- Because of the low water-cement ratio of the material, there is little shrinkage, and the patch remains tight. The usual mortar mix is 1:2.5 to 1:3



5. Replacement of concrete

- This method consists of replacing the defective concrete with new concrete of conventional proportions, placed in a conventional manner
- This method is a satisfactory and economical solution where the repair occurs in depth (at least beyond the reinforcement), and where the area to be repaired is accessible
- This method is particularly indicated where a water-tight construction is required and where the deterioration extends completely through the original concrete section

**ANY QUESTIONS
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