

RETROFITTING OF STRUCTURE :AN REVIEW

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ABSTRACT:- The use of epoxy resins for repairing concrete cracks is the common technique to repair cracked concrete shape. In this paper, the effectiveness of 3 selected manufacturers of epoxy that are normally utilized in enterprise in New Zealand to restore cracked concrete beam are investigated. Multiple unreinforced concrete beams in which examined earlier than and after epoxy restore beneath vertical loads (Flexural load) to decided the effectiveness of the epoxy to repair the structural energy of continuity of the beam. The checks have been carried out the use of the 0.33 factor loading technique making use of a steady bending second to the center section of the beam span. The end result confirmed that the overall performance of the repaired beams varies relying at the epoxy kind and alertness strategies. It is tested that the viscosity of epoxy if vital make sure complete bonding and in flip reinstating the potential of the cracked sections.

Keyword – Concrete cracks ,epoxy injection, Flexural testing .

INTRODUCTION :

Many of the present concrete systems for the duration of the sector are in pressing want of rehabilitation, restore of re-production due to deterioration because of different factors like corrosion, failure of bonding among beam column joints, growth in carrier loads, and many others, main to cracking, spalling, lack of energy, deflection, and many others the want of for green rehabilitation and strengthening strategies of present concrete systems has led to studies and improvement of strengthening of shape. Although a majority of concrete systems have.

finished satisfactorily over the last years however many issues have arised because of mistaken best of materials, wrong specification, defective layout and errors in production system or severe environmental conditions .Cracks in concrete have many causes. They can also additionally best, or they'll suggest enormous structural misery or a loss of durability, cracks can also additionally constitute the full quantity of the harm, or they'll factor to issues of more magnitude. Their importance relies upon at the kind of shape in addition to the character of the cracking. To retrofit the cracks at the bolstered concrete beams has one-of-a-kind strategies. Here we're the use of epoxy mortar. For patching holes in severe temperatures, want an epoxy mortar restore that offer top notch flexibility and robust chemical proof against shape. This mission paintings focuses to retrofit the bolstered concrete beams the use of epoxy mortar and additionally to enhance the energy to enhance the energy of the beam.



Fig :- Different Repairing Method

NEED OF STRENGTHENING:

Following are motives to strengthening a constructing:

1. Building that is designed thinking about gravity load best i.e. with out thinking about gravity load best i.e. with out thinking about earthquake force.
2. Due non-stop studies and improvement attempt withinside the subject of earthquake resistant layout of shape
3. Analysis and layout extrade in codes and exercise and trendy and many others. accordingly shape ay be structurally
4. Inadequate as in keeping with latest p-practices, main to the requirement of strengthening.
5. Sometimes critical present constructing in a specific locality can also additionally require to be bolstered to view of earthquake pastime in a region.
6. The constructing wherein the earthquake resistance has deteriorated because of the component along with lower in harm and many others. energy of production fabric due the delay, fire

EPOXY INJECTION PROCESS:

The epoxy injection system starts offevolved with the software of a capping paste, which serves to seal the floor of the crack and assist bond the injection ports to the concrete. The injection ports, which may be both floor mount ports or socket mount ports, are the manner through which the epoxy resin could be brought into the cracks.

Once capping paste is used, ports are drilled or installed, and any unfastened fabric and dirt is cleared from in the cracks, epoxy injection can begin. Epoxy injection starts offevolved at the bottom port for vertical programs and on the widest a part of the crack for overhead or horizontal programs

The epoxy will take no less than 12 hours to therapy and could now no longer therapy in very low temperatures or therapy very slowly in temperatures underneath 50 levels F

- Once the epoxy has cured, ports may be removed and grinding of the capping paste can occur. In many cases, the floor may even be lined to get rid of any visible proof of cracks

- There are some strategies that inspectors can use to confirm that the epoxy injection system has been powerful and is enough to restore the structural harm.

SCOPE :

Now a days the repair of reinforced concrete structure is a major challenging job for civil engineers .The structure are affected by a lot of stress, Whenever the stress exceeds the limit the structures. Reconstruction of building in a way depletes our natural resourses is not economical. Retroffiting of a structure increases the life span of it with minimum or no usage of natural resourses.

- **Reduction of inertia force:** Avoiding local overloads, by removing heavy architectural elements may do this, by building uniform partition walls of light material, by eliminating the storage heavy materials, mostly at the upper floors etc.
- **Increase in energy dissipative characteristics:** This may done by employing material and device in energy dissipative properties, by providing the reinforced concrete frames with partition walls having energy dissipative characteristic, by — filling of the non- functional of R.C. structure deformable materials etc.
- **Elastic characteristic:** This can be recovered by the accurate proportionality of stiffness of the structural member though or more extensive changes.
- **Recovery of the force resistance and ductile capacity:** This can be done by proper design of degree of strengthening and by using strengthening material, which can provide sufficient ductility to be strengthened member

LITERATURE SURVEY :

Ohki. kenji, and bcsho, santoshi sept. (1980), Five one storey, on bay. one 1/2 of scale bolstered concrete frames adhere examined to be able to attain the designing information tor a seismic strengthening of the prevailing morioka station constructing of the Japanese country wide railway. In of them, the prevailing frames in which enhance with metallic plate encasing. It became showed that those enhance frames all have pattern earthquake resistance properties. compared with the prevailing frames and monolithically solid shear walls. According to the plan for the development of latest Morioka station constructing for the Tohoku Shinkansen (bullet train) strains of JNR beneathneath structures part of new station constructing properly be located at the antique station constructing now in use. has necessitated the seismic strengthening in a few manner or the alternative of the antique one storey give a boost to concrete station constructing with one storey basement in guidance towards growing earthquake hundreds from the first rate shape to be constructed upon it

McAdams et al.,(1998) have studied the Epoxy resins have been first commercialized in 1946 and are broadly utilized in enterprise as shielding coatings and for structural applications, consisting of laminates and composites, tooling, molding, casting, bonding and adhesives, and others.1,2 The capacity of the epoxy ring to react with a number of substrates offers the epoxy resins versatility. Treatment with curing dealers offers insoluble and intractable thermoset polymers. Some of the traits of epoxy resins are excessive chemical and corrosion resistance, accurate mechanical and thermal properties, terrific adhesion to numerous substrates, low shrinkage upon cure, accurate electric insulating properties, and the capacity to be processed beneathneath a number of conditions. Depending at the particular desires for sure bodily and mechanical properties, combos of alternatives of epoxy resin and curing dealers can commonly be formulated to satisfy the marketplace demands. However, in phrases of structural applications, epoxy resins are commonly brittle and notch sensitive. As a end result, remarkable attempt has been centered on longevity development at some point of beyond 3 decades

Wen-Cheng Liao, (2010,The fundamental goal of this examine became to broaden and validate a seismic layout technique for RC SMF that's capable of produce systems with predictable and meant seismic overall performance. Based on overall performance restriction states of goal float and favored yield mechanism, this

layout technique debts for inelastic structural behaviour directly, and almost gets rid of the want for evaluation or new release through nonlinear static or timehistory evaluation after preliminary layout.

Farid and S. Ahmad (2011), This paper provides the end result of an experimental research at the strengthening of current cracked Rc members. The beams have been then repaired with the software of polymer changed mortar method and a development within the load wearing became located within the beams after the retrofitting.

Susanne Heyden (2014), This paper provides the consequences of an experimental examine to analyze the behaviour of structurally broken full-scale bolstered concrete beams retrofitted with laminates in shear or in flexure. It became located that the performance of the strengthening method through carbon fibre bolstered polymer in flexure various relying at the length. The fundamental failure mode within the experimental paintings became plate debonding in retrofitted beams.

CONCLUSION :

- Epoxy Injection Systems may be very powerful at repairing concrete cracks, delaminations, and hole planes whilst used in keeping with production recommendations.
- Job evaluation and right education are very vital to insuring the most overall performance from the Epoxy Products, or some other concrete restore products , The proper equipments is vital. Proper setup non-stop blending epoxy injection machines have to constantly be used with out a exceptions.
- Injection group of workers and control have to have the schooling and enjoy to do the paintings proper the primary time. Epoxy injection needs to be completed proper the primary time . There isn't anyt any 2nd chance , so it's far vital that your injection paintings be completed via way of means of nicely educated and equipped ,skilled personnel .

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