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TO STUDY OF REPAIR AND REHABILITATION OF R.C STRUCUTURES

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Abstract — in the present time, usage of concrete as a main material for construction has been increased to many folds. Due to applied stresses and temperature variation, concrete may undergo deformations which affect the long-term strength and durability of concrete. In order to bring back the structural functionality and aesthetics repair of structures is essential. This dissertation is undertaken to study various types of crack formation in concrete structures and the materials and techniques used for repair of concrete structures.

Keywords— Distressed R.C. Structures, Repair, Rehabilitation, Non-Destructive Testing, Adhesives.

I. INTRODUCTION

The variety of materials which are used to repair concrete structures to be efficaciously durable is fairly inhibited. The materials which widely used are mortar and concrete. These materials are made practicable with the similar type of cement and aggregates as were utilized in the pristine structure. One of the world's most useful materials is concrete. Since concrete can be poured into place as a liquid, but hardens to resemble a material like natural rock, it makes a perfect building material. However, In terms of volume concrete is the material which is utilized the most in the world. The detection and efficacious rehabilitation of cracks are obligatory to establish the performance reliability and safety of structures. The process of detecting cracks and rehabilitate is involutes. Some materials have the potential to automatically repair cracks without human intervention. Repair and Rehabilitation is a process where a structure is enhanced to its existing condition with the probability that a structure will survive for a long time against the forces such as thermal, temperature and earthquake. The structural deterioration of structure can occur as surface scaling, cracking, corrosion, weathering, strength reduction etc. Concrete typically includes 60 to 75% aggregate, 15 to 20% water, 10 to 15% cement and 5 to 8% of air. Over 2 billion tons of concrete is produced every year. The average life cycle of concrete is 80 to 100 years. Therefore it is ensured that huge repair work is going to be carried out in 21st century. The repair of cracked or damaged structure is discussed under two distinct categories, namely, common or traditional procedures; and special procedures using the latest techniques and newer materials such as polymers, epoxy resins etc.

II. EXPERIMENTAL PROGRAM

- Casting of cubes (M30) Grade.
- Curing of cubes for 14 & 28 days.
- Compression Test of ordinary Concrete cubes.
- Repairing of Concrete cubes.
- Compression Test of Repaired Concrete cubes.
- Analysing the difference between both.

Method of Repair:

- Chemical Used for Repair: Lapox Lacrete Resin and Lapox Lacrete Hardener.
- Cost of Chemical Used: Hardener 350 Rs and Resin 500 Rs

Method of Application:

- Stir well each component separately before use in its original container.
- Take resin and hardener in ratio 2:1 (by weight) and ensure homogenous mixing.
- Clean, degrease and dry the surface before application.
- Apply the mix on object uniformly with help of brush, spreader or roller.
- If first coating thickness is not adequate, apply second coat.
- To achieve optimum results, allow material to cure for 24 hours.
- After use, close the original container tightly and store in a cool and dry place.

APPLICATION AREAS AND BENEFITS:

Application Areas of Lapox Lacrete Resin and Hardener:

- Waterproofing of terrace, bathroom, water tank and podium.
- Grouting of core – cut.
- Crack filling, injection grouting, primer coat and screed for epoxy flooring.
- Anti – corrosive coating for steel bars.
- Bonding of old to new concrete.

Benefits of Lapox Lacrete Resin and Hardener:

- Non - shrink.
- Resistant to oil, fuel and most chemicals.
- Certified by CFTRI for food grade applications.
- Resistant to vibrations.
- High coverage.
- High bond strength.
- Excellent barrier against water penetration.

MIX DESIGN TABLE:

TABLE 1

Mix Design			
Cement (kg)	**Water (lit)**	**Fine aggregate (kg)**	**Coarse aggregate (kg)**
368.88	175	728.2	1147.00
1	1.7	1.9	3

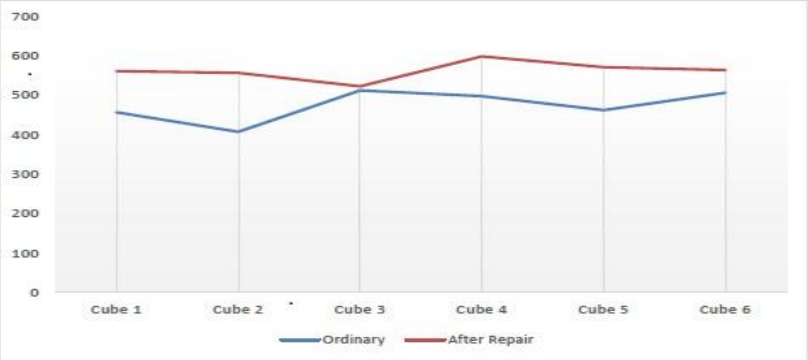



COMPRESSION LOAD TEST RESULTS:

Comparison of compressive strength of concrete cubes of nominal design (1:1.9:3) with concrete cubes after repair with lapox lacrete resin and hardener.

TABLE 2

No.	Compressive load in KN of Ordinary Concrete	Compressive load in KN After repair with chemical	Difference in load (KN)
1	456.5	561	104.5
2	407	556.5	149.5
3	512	522.5	10.5
4	497.5	598	100.5
5	462	571	109
6	506	563.5	57.5



III. CONCLUSIONS

Different types of cracks in concrete structures such as plastic shrinkage drying shrinkage and carbonation shrinkage were identified and studied. Analysed the actual repair and rehabilitation work at site. Types of materials such as modified polymer materials, cementitious materials and resin based materials were identified and studied. By using Lapox Lacrete Resin and Hardener as a repair material strength of cubes increased to the normal concrete cubes. The compressive load on Ordinary concrete cube was 407 KN and after repairing that cube with lapox lacrete resin and hardener chemical the load on cube was increased to 556.5 KN with difference of 149.5 KN load.
By this One can conclude that using Lapox Lacrete as repair chemical one can have good structural strength and increase the design life of structure in lesser period of time.

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