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Review on Repair and Rehabilitation of Cold Storage

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Abstract: ***The purpose of the project is to gain fundamental and practical understanding on concrete repair and rehabilitation of the structures. Large number of reinforced concrete (RC) structure are deteriorating, often prematurely, and need remedial measures to reinstate their safety and/or serviceability. Consequently, the need for repair and protection has grown considerably in recent years. While costs associated with repair of deteriorating concrete structures can be substantial, costs resulting from poorly designed or executed repairs may be even higher. Repair methods need to be designed with consideration for the anticipated or desired remaining service life of the structure. A distinction must be made between repairs intended to stop deterioration fully and those merely aimed at slowing down deterioration processes for a limited period of time. Then the respective repairs will be studied and classified into cracks, corrosion of concrete reinforcement, seepage and deterioration of surface coating. Detailed study will be done on the causes for each repair and a suitable rehabilitation method will be suggested for each repair site by comparing various methods. This paper presents review of literature available on the repair and rehabilitation of cold storage and presented a complied review report.***

I. INTRODUCTION

Repair is the process of restoring something that is damaged or deteriorated or broken, to good condition. Repairs aim to strengthen the structure to its pre-disaster strength. Comparatively, repairs take the least amount of time and resources.

Rehabilitation is the process of returning a building or an area to its previous good conditions. Rehabilitation is the term used when the structure's strength is increased up to its original design strength.

Repair and Rehabilitation is very important in any construction of structure. Due to aging and life increasing of the structure, it is subjected to repairs. Repair leads to damage and failure of structure. So, in order to prevent damages and repairs in the structures these are very useful.

Repair and Rehabilitation is an Art of Civil Engineering work which enables to extend the service life of a structure. Repair and Rehabilitation is defined as the process of achieving the original state of structure when it undergoes any sort of defects or deterioration or destruction. Restoration of structure is an ultimate aim of Repair and Rehabilitation where it plays a major role by maximizing the functional utility of the structure. Repair and Rehabilitation technique is also used to modify a structure to meet new functional and other requirements. Many structures may need Repair and Rehabilitation for one of the following reasons

1) Deterioration due to Environment effect.
2) New functional or loading requirements entering modifications to a structure.
3) Damage due to accidents.

II. LITERATURE REVIEW

Pawandeep Kaur, Jaspal Singh

From this paper, Repair and Rehabilitation is necessary to save hazardous failure of structures due to deterioration. It is recommended for old buildings which have some signs like cracks, corrosion of embedded materials, etc. Therefore, timely maintenance of structures is required. As it was well known fact that the structure has been constructed for a service life of more than 50 years but in reality, this life remains elusive. So apart from the regular maintenance, extensive repair and rehabilitation of structures are necessary. In some cases, the repair of the structures are neglected or delayed due to lack of proper knowledge and financial ability which may lead to serious hazards. In this paper, different materials and methods used for the repair and rehabilitation of structures have been reviewed. Case studies pertaining to repair and rehabilitation of structures have also been discussed.

Stages of Repair: The various stages for the repair of concrete structures are as follows:

1) Removal of damaged concrete
2) Pre-treatment of surfaces and reinforcement
3) Application of repair materials
4) Repair Procedure

Repairing Materials

- Shotcrete
- Epoxy resins
- Epoxy mortar
- Gypsum cement mortar
- Quick setting cement mortar

The methodology for repair and rehabilitation are as follows:

- Grouting
- Guniting
- Routing and sealing
- Stitching
- Drilling and Plugging

Gomsa Ramesh 2021

From this paper, Repair, Rehabilitation and Retrofitting of Reinforced Concrete Structures by using Non Destructive Testing Methods we got to know that due to aging and life increasing of the structure, it is subjected to repairs. Repairs lead to damage and failure of structure. So, in order to prevent damages and repairs in the structures these are very useful. These are achieved by selection of suitable methods and proper construction and maintenance of the structure. By using suitable retrofitting methods, we can minimize the losses and damages in the construction of reinforced cement concrete structure.

REASONS FOR REPAIRS

- Permeability
- Curing
- Hydration
- Water cement ratio
- Air voids
- Improper compaction
- Over loading
- Over stresses
- Poor quality works
- Improper design

By following details gives an idea about tests and its uses and details as well.

S.No.	Tests	Details
1.	Rebound Hammer	A Qualitative field test to measure surface hardness of concrete
2.	Ultrasonic Pulse Velocity	A Qualitative field test to measure surface integrity and homogeneity of concrete structures
3.	Windsor Probe	Field test to measure strength of concrete
4.	Pull out	To Determine the compressive strength of concrete
5.	Pull off	To Determine the tensile strength of concrete

S. Raja Subramaniam 2016

Information regarding this paper discusses the Review of Repair and Rehabilitation of Heritage Buildings. Repair and Rehabilitation of heritage buildings has become a concern of greater importance over the world, notably in the developed countries. The major defects reported are discussed and a suitable and economical solution for a particular defect is identified by a tradeoff between cost, lifetime and adaptability of the solution.

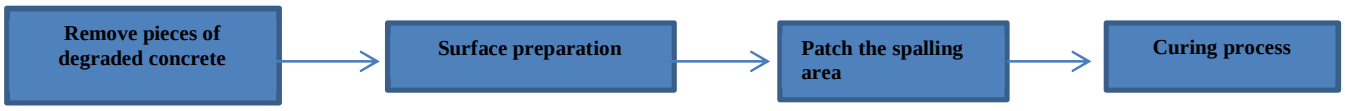
Problems, Causes and Solutions for the problems identified by the Authors

1) Roof leakages, These are also caused due to poor waterproofing, seepage of water and water logging. Epoxy Grouting, Stitching cracks should be done.
2) Vertical cracks and gaps, These are caused due to entry of rainwater from toilet area and environmental factors. Replacement of tile, with new clay roof tile and rearrange of sealant can be done.
3) Cracks in ceilings and walls and Roof surface, due to fungus, moisture content and air pollution, crack damage on masonry walls caused due to water seepage. Plastering will effective in such cases.

A.Z. Warid Wazien, *Mohd Mustafa Al Bakri* Abdullah , *Rafiza* Abd. Razak1, *Mohd M.A.Z.* Remy Rozainy , *Muhammad Faheem* Mohd Tahir1 , *M.A.* Faris , and *Hazamaah* Nur Hamzah 2016

In this paper they told about Cracking, spalling, surface deterioration, seepage and other concrete damage of the existing infrastructure have raised concern among residents, local authorities and developers. To simply patch up the spalling concrete as temporary solution and sooner or later, the cracks will return to haunt. It covers geopolymer repair materials which addressed in the field of concrete infrastructure rehabilitation.

Geopolymer had good repair characteristics and displays the potential as **an excellent repair material.**This method is widely used to restore the original conditions of the concrete structures.



Geopolymer, Substrate concrete with etched surface and cast against metallic formwork. Bond strength is not affected by low roughness surface treatment of concrete substate.

Waseem Khan, Saleem Akhtar and Aslam Hussain 2019
Repair and rehabilitation of existing damaged masonry and concrete structures has emerged as a big challenge for civil engineers globally. Every nation wants to retain its historical monuments as heritage buildings. Millions of dollar needs to be spent for repairing and rehabilitation of structures of importance. This paper presents an overview of various methodologies for repair and rehabilitation of existing masonry and concrete structures.

Following are the various rehabilitation methods for repairing and strengthening the masonry and concrete structures

- Using Similar materials
- Using Buttress

Crack Treatment

- Repointing
- Repointing by steel red
- Inserting and covering the cracks
- Pinning-repairing cracks using steel pins
- Stitching–sewing large cracks

III. CONCLUSIONS

1) Selection & evaluation of right repair material and protective coatings will save enormous money & time by reducing the repair costs of concrete buildings/structures.
2) To reduce the risks and with stand the environmental effects to the reinforced concrete structures. The study of repair and rehabilitation is most useful to gain knowledge on concrete structures and its repairs.
3) With the sustainable and comparable properties, geopolymer display a high potential for improvement and developed as an excellent repair material.
4) In case of existing cracks, after detail study and analysis of crack parameters, most appropriate method of correction should be adopted for effective and efficient repair of crack.
5) Study on rehabilitation of concrete and masonry structures described various methodologies for masonry elements which were grouped under various heads such as replacement of masonry, treatment of cracks.

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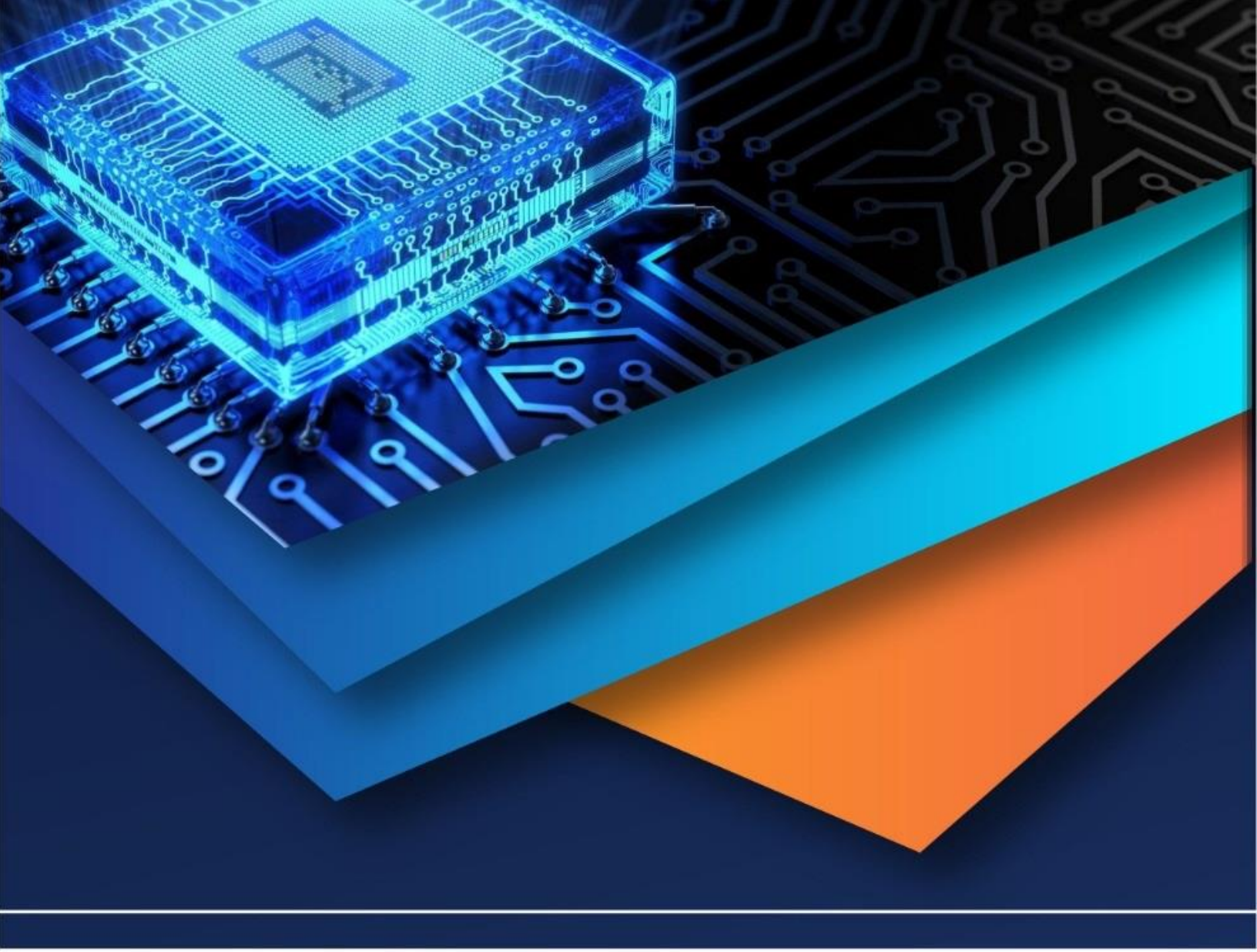

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