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Review Paper on Retroffiting of RC Structure

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Abstract: *Modification of existing structure to make them more resistant to seismic activity, ground motion or soil failure due to many reasons such as earthquake, bad quality of workmanship design environmental effects and etc. Many buildings are informally constructed in a traditional manner without formal design by qualified Engineers or Architects. Such buildings involve stone, brick, concrete blocks, rammed earth, wood posts and thatch roof or combination of some or all the above materials. They are built with mud, lime or cement mortar. Sometimes combination. of mortars having a mix is also used. The safety of these non-engineered. Buildings against earthquakes are of great concern especially because most losses of lives during past-earthquake have occurred in such buildings..*

Keywords: RC Structure

I. INTRODUCTION

Retrofit strategy refers to options of increasing the strength, stiffness and ductility of the elements or the building as a whole. In retrofitting, the structure must be designed so it is in keeping with its purpose of use and is both safe and durable, with consideration given to the ease of retrofitting construction and post-retrofitting maintenance, as well as overall economy and environment-friendliness. It aims to strengthen a structure to satisfy the requirements of the current codes for seismic design. Many options for retrofitting a structure are possible; the ones which are used traditionally for a long time now such as Addition Of New Shear Walls, Addition Of Infill Walls, Addition Of Wing (Side) Walls, Addition Of Buttresses, Jacketing Of Reinforced Concrete Members, Propping up, Steel collars, Casing, Building up, Bonding Steel Plates or Steel Jacketing However, with increase in research and introduction of new materials and technology there are new ways of retrofitting the structure with many added advantages.

1.1 Objective

1. Increasing the lateral strength and stiffness of the building, the ductility and enhancing the energy dissipation capacity.
2. Giving unity to the structure.
3. Eliminating sources of weakness or those that produce concentration of stresses
4. The retrofit scheme should be cost effective.
5. Each retrofit strategy should consistently achieve the performance objective.
6. Many environmental and natural disasters, earthquake being the most affecting of all, have also produced a need to increase the present safety levels in buildings.

1.2 Scope of Project

Retrofitting is the Science and Technology of strengthening the existing structures or structural elements to enhance their performance with new technology, features and components. Retrofitting of an existing reinforced concrete structure includes repair, rehabilitation (or) strengthening terms. The term retrofit is used if the damaged structure performance was satisfying than before with some additional resistance then the term retrofit will be representative. Now a day's many researchers have proposed many materials, methods and techniques for strengthening flexure deficient RC beams.

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The studies performed on the flexure retrofitted RC beams using traditional method like stitching (Hook Method) are studied. Further it is required to study the relative effect of these techniques on flexure carrying capacity of flexure deficient beams by retrofitting.

II. LITERATURE REVIEW

1. Advanced Retrofitting Techniques for RC Building: A State of an Art Review
Minakshi V. Vaghani, Sandip A. Vasanwala and Atul K. Desai
In this paper, efforts are made to describe the different retrofitting techniques available and its suitability for particular conditions. Jacketing is excellent for column but it may not be too effective for beam or slab. Finally, selection criteria for retrofitting technique are briefly discussed.

2 Seismic Retrofitting Of Reinforced Concrete Buildings Using Traditional And Innovative Techniques Giuseppe Oliveto and Massimo Marletta
After an introduction which explains why there are so many vulnerable structures in areas of high or moderate seismic hazard around the world, the authors consider the specific case of Eastem Sicily. The paper proceeds with an illustrative description of the seismic action and then addresses the problem of evaluating the seismic resistance and vulnerability of engineering structures.

3 New and emerging technologies for retrofitting and repairs
DrGopalRai CEO, R & M International Group of companies
To meet up the requirements of advance infra-structure new innovative materials/technologies in civil engineering industry has started to make its way. Any technology or material has its limitations and to meet the new requirements new technologies have to be invented and used.

4. Seismic Analysis and Retrofit Of Existing Multi-Storeyed Buildings In India - An Overview With A Case Study
Amlan K. SENGUPTA, CHEMURU Srinivasulu Reddy, Badari Narayanan V T and Asokan A
The paper presents a review of the existing retrofit strategies that are applicable for multi-storeyed residential reinforced concrete buildings addressed in the project. It also presents a case study of a three storeyed building, located in an urban area in earthquake zone III. After the earthquake in Bhuj, Gujarat, in 2001, there has been a concerted

III. METHODOLOGY

The evaluation of any building is a difficult task, which requires a wide knowledge about the structures, cause and nature of damage in structures and its components, material strength etc. The proposed methodology is divided into three components:

1. Condition Assessment based on (i) data collection or information gathering of structures from architectural and structural drawings (ii) performance characteristics of similar type of buildings in past earthquakes, (iii) rapid evaluation of strength, drift, materials. structural components and structural details. This component of methodology is primarily based on ATC-14 project and is used basically for undamaged existing structures.
2. Visual Inspection/Field Evaluation based on observed distress and damage in structure Visual inspection is more useful for damaged structures however it may also be conducted for undamaged structures,
3. Non-Destructive Evaluation (NDE) is generally carried out for quick estimation of materials strength, determination of the extent of deterioration and to establish causes remain out of reach from visual inspection and determination of reinforcement and its location.

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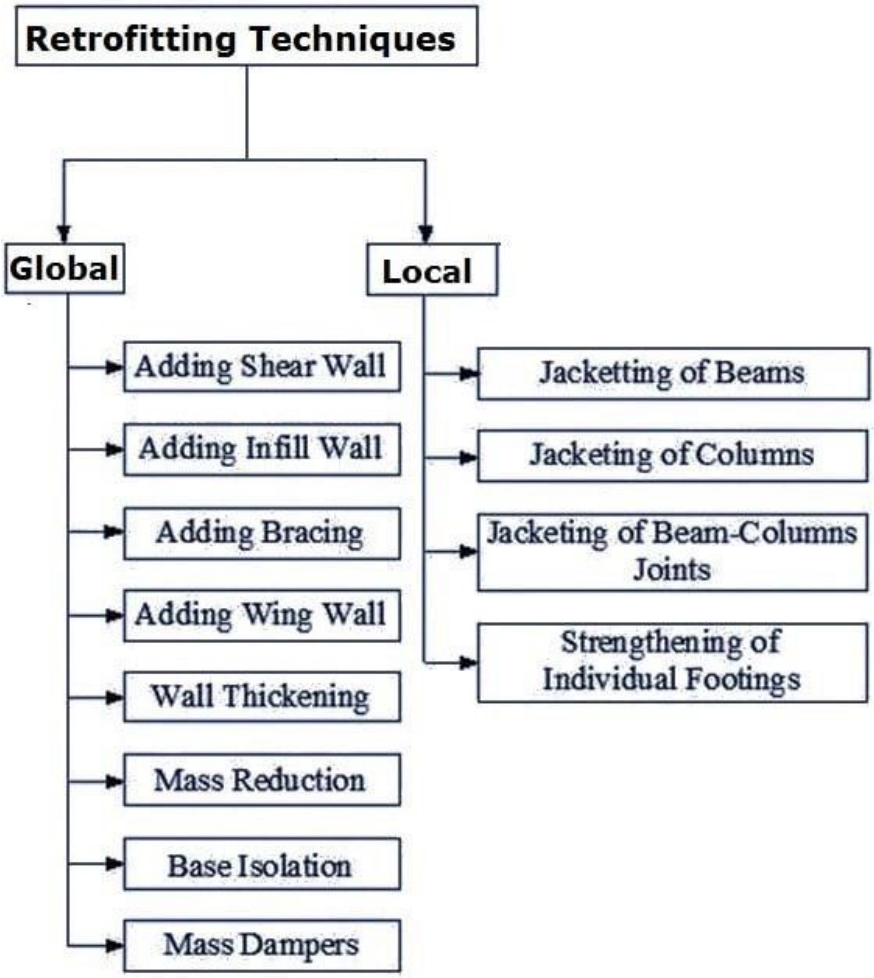
IV. METHODS OF RETROFITTING OF RCC STRUCTURE



4.1 Challenges and Technical Issues

The main concern with FRP composites is long-term durability because the materials do not have sufficient historical performance data in bridge applications. There is a concern among bridge engineers for the long-term integrity of bonded joints and components under cyclic fatigue loading There are concerns with improper curing of the resins and moisture absorption and/or ultraviolet light exposure of composites that may affect the strength and stiffness of the structural system. Certain resin systems are found ineffective in the presence of moisture, In the case of a glass fiber composite, moisture absorption may affect the resin and allow the alkali to degrade the fibers.

It is not recommended to use this system as compressive reinforcement. While FRP materials can support compressive stress, there are numerous issues surrounding the use of FRP for compression. Micro buckling of fiber can occur if any resin voids are present in the laminate, they can buckle if not properly adhered or anchored to substrate

The high strength, high fatigue resistance, lightweight, and corrosion resistance of composites are highly desirable characteristics for bridge applications. Currently, these new materials are a direct technology transfer from the acrospace industry, and they are far more advanced than those required by civil applications. Most of the advanced composite materials that are cured at high temperature produce high quality components and possess excellent characteristics.

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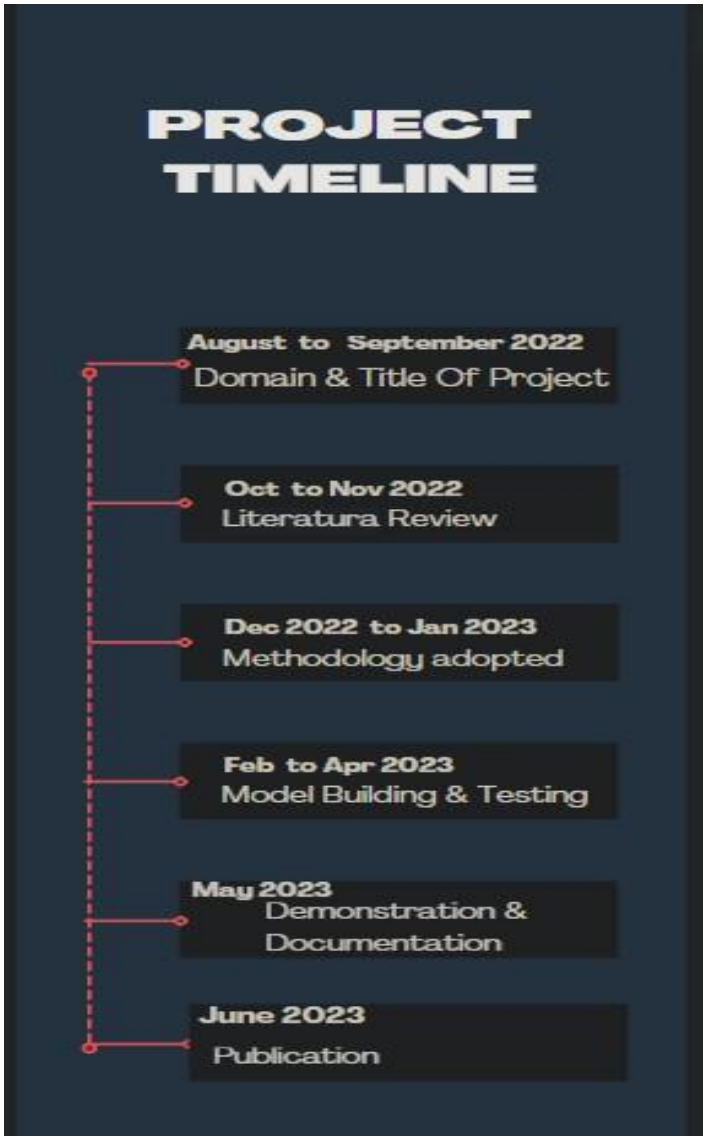
V. PROJECT TIMELINE



VI. CONCLUSION

[1]. To meet up the requirements of advance infra-structure new innovative materials/ technologies in civil engineering industry has started to make its way.

[2]. Any technology or material has its limitations and to meet the new requirements new technologies have to be invented and used. With structures becoming old and the increasing bar for the constructed buildings the old buildings have started to show a serious need of additional retrofits to increase their durability and life.

[3]. Many environmental and natural disasters, earthquake being the most affecting of all, has also produced a need to increase the present safety levels in buildings. The understanding of the earthquakes, world over, is increasing day by day and therefore the seismic demands imposed on the structures get revised frequently.

[4]. Similarly, the design methodologies valve with the growing research in the area of seismic engineering and certain popular old design philosophies, such as sofistorey structures, are no longer considered acceptable for earthquake resistant design. Many of the existing lifeline structures were analyzed, designed and detailed as per the recommendations of then prevalent codes. Such structures, pose a need to undergo re-evaluation process, say, every ten years.

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