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A Review on Assessment, Rehabilitation and Retrofitting of Fire Damaged Building

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ABSTRACT:

In this study I have tried to explain the process of Retrofitting and Rehabilitation of fire damaged concrete buildings. The process is divided into 3 categories; decision making, condition evaluation, rehabilitation & retrofitting. Evaluation method is based upon understanding the properties of materials at higher temperatures, condition survey and assessment. Visual inspection, hammering, chiseling etc. techniques are included in condition survey. In condition assessment we have 2 types of tests; non-destructive and destructive. These tests are selected according to the performance, efficiency etc. The study of feasibility is required to make right decisions for the rehab of fire damaged building.Before concluding upon any decisions, the entire salient facets better beinclusive element of our feasibility study. As a pivotal element of our research, entirely fresh type of Feasibility analysis model is constructed. The strong logical layout and well curetted composition is anticipated to play pivotal role before coming up to any decisions. Outcomes of our feasibility study can lead to effective rehabilitation by implementing the correct technicalities, only if it's deemed beneficial by the study.Multiple techniques including patch repair, FRP Reinforcing, soda blasting, steel jacketing, partial removal & replacement. Concrete jacketing, some retrofitting techniques can be implemented for the rehabilitation purpose of non-structural members or elements as well as retrofitting of structural.The advantages and disadvantages of these techniquesare being looked upon while keeping the efficiency, sustainability, economy, limitations at the center focus. Every single problem has its own uniquely applicable solution; hence we cannot really conclude a particular technique or even a group of comprehended techniques to be better than the rest of the techniques across all departments. Removing as well as changing has comparatively seemed to be more beneficial.Because this clearly seems to be more advantageous compared to theirnegligibly small negatives.

Keywords: - Retrofitting, Rehabilitation, FRP Reinforcing, Chiseling, Feasibility etc.

INTRODUCTION:-

The entirety of process will supposedly be managed by the here discussed study.The process starts from Evaluation of fire damaged buildings. Various techniques for evaluation of Concrete structures are available and commonly practiced but not every Technique is suitable for evaluation of fire damaged building. It has been set as a Goal to explore different methodologies and discuss most suitable and most Practiced ones in the text.With a view on constraints & deficiency, a particular technique or mixture of various techniques is decided to reach the Perfect assessment of damage caused to concerted buildings due to Fire incidents.

BACKGROUND:-

Multiple facets of damages incurred to buildings in fire incidents, such as NDTs for such buildings, Rehabilitation process of fire incurred buildings, Reconstruction of the structures for elevated temperatures and many more have been well elaborated through various journals as well as Articles& books publications.

Many Studies and researches have been done on various aspects too. But still a crying need have been felt for A structured study that takes care of matter right from the beginning (evaluation) And encompass the whole process till the very end (rehabilitation and retrofitting measures).

ASSESSMENT of FIRE DAMAGED BUILDING:

The level of impairment incurred to the building in the aftermath of a fire accident is clearly a factor of scale, time length, and higherescalated temperatures during such accidents and few others as well. A thorough inspection of the building should be followed upon the complete extinguishing of fire. This is required in order to evaluate if after the fire incident, is the building in condition to bare any amount of Load while ensuring no further subsiding of the building happens.

After structure of the building is secured, it requires to be properly checked. Requirements for the analysis are as following:

- Various technical approaches Fore.g.- Laboratory tests,
- We will also go through various practices in-use to manage all the gathered information.

Behavior of materials during fire :-

Various elements involved in the construction of a particular building can be widely differentiated from each other at times. Every single elemental component when put to test against fire behaves according to their individual physical-chemical criterions. The most Structures made of concrete are mainly composing of structural steel & the concrete itself, though what also come into play are the production methodology &its ingredient components as well.

Other materials like glass, aluminum, thermal insulations, wood, plastics etc. are also part of building. Investigate of the damage occurred to the building, requires the understanding of these materials especially those which are part of the Structural elements. Now, we will discuss the behavior of basic structural materials (concrete and steel).

REHABILITATION and RETROFITTING FIRE DAMAGED BUILDING:-

After it is established that rehabilitation of the building and retrofitting of the Structure is feasible both on technical and financial grounds, rehab of the building will be started. While discussing the rehabilitation and retrofitting of the building, various options open up. Each option has its own properties, feasibilities and Therefore shortcomings too. Similarly every case is a unique case as well and has its own requirements. In some buildings, we have the luxury to consider different Solutions and select from them but sometimes this is not possible due to some Restricting factor like services of the building doesn't permit that. For fire damaged building not many options are available for retrofitting of Structure. Most conventional ones are strengthening of structural members with Fiber reinforced plastic and replacement of damaged concrete either with Concrete or in-situ placement of concrete. These are quite commonly practiced and may not be very suitable in every case. Some new methods for retrofitting of Fire damaged structures will also be discussed that are not common for such Cases like steel jacketing, concrete jacketing or provision of extra members. These measures are usually used for other purposes like protection against earth Quakes but if chosen after careful analysis then may prove to be beneficial in Comparison to other more conventional measures. Different rehabilitation and retrofitting measures will be presented in this chapter with their respective mechanism, feasibility, pros and cons etc. These measures will then be assessed for various factors like sustainability, insurance factor, Safety etc. Hence at the end, it will provide help for designers to choose from the Solutions presented in the document according to the unique demands of the Building and specific goals of the project.

CONCLUSION:

Risk of fire is always there for all kind of buildings. Concrete buildings are no Exception to it. Though concrete buildings are more resilient to fire than others but a serious fire can inflict damage which depends upon salient features of fire and building. After fire is extinguished and structure is secured, condition survey and condition assessment is done over it. Condition survey is done by a team of Experts. Visual inspection, hammering and chiseling techniques are used for Condition survey. It gives basic idea about the building condition. AfterwardsCondition assessment is done, if it is felt to be required. In condition assessment, Different tests are conducted and their values are recorded, to access the true Condition of building. Different non-destructive testing and destructive testing

Techniques are used like Schmidt hammer test, UPV test, penetration resistance Test, core sampling and testing, petrography, deflection test, tensile test and SEM Microscopy. There is lot of other testing techniques available to serve the cause but these techniques are selected after careful selection on the bases of purpose, Economy, availability, accuracy, efficiency and damage to the building and Environment. Use of NDTs for evaluation of concrete strength is beneficial but Comes with accuracy of 65% to 85% (if properly conducted). More accurate and detailed techniques like core sampling, tensile test and petrography are bit costly. Sois should be used when felt highly required.

FUTURE SCOPE:

The study provides with a system to take care of fire damaged concrete buildings. It encompasses evaluation, decision making (feasibility study) and rehabilitation of fire damaged concrete buildings. Findings of the thesis can be helpful for Insurance companies, professionals of construction industry, banks/investors and especially fire rehabilitation companies. The study can contribute to the research That may be done in future on the topic Study introduces a total new analysis tool for feasibility Assessment of proposed solution for fire damaged concrete buildings but it isWithout any proven record as it is the case of all new tools. Hence can't be readily used as independent decision-making tool. Further improvement in structure and Philosophy will improve its capacity and efficiency.

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