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Review Study of Retrofitting of Institutional Building into Green Building

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Abstract – Retrofitting can be defined as changing, modifying certain parts, aspects of a structure with new or better parts which will prove to be beneficial for the user of the building & building itself. In a similar sense, Green Retrofit can be done by changing certain parts of building that damage the environment and changing it with sustainable alternatives which will increase the life of the building and reduce the life-cycle cost of the same. This can also be achieved by undertaking many practices which not only enable conservation the natural resources but also enable us to enhance the environment and contribute towards adopting & encouraging sustainable construction practices. primary work started with literature review. With the help of studying different research papers & Case studies. Able to identify the parameters of green retrofitting & how the implementation of the same can be done. Also able to identify the cost benefit parameters & how the cost benefit analysis can be done of the different structures like institutional buildings, residential buildings, commercial buildings, etc. Starting with the literature review & identifying the different parameters we then went to the next step that is selection of the parameters.

Key Words – Comparison in Cost-Benefit; Saves Energy; Recycled Material; Led Lighting

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1. INTRODUCTION

Retrofitting is defined as the addition of new features to the buildings, different structures, bridges etc. & help to increase resistivity, strength & overall lifespan of the structure. Retrofitting an existing building can prove to be one of the most environmentally sustainable, cost-effective method for enhancing & upgrading building quality & living standards, it can also help to prolong the life of existing buildings. Implementation of retrofits of building and industries and converting the same should be promoted. Further analysis has been carried out in order to provide a complete range of quantitative data on the direct and indirect impacts of retrofitting on the environment, the cost differences between retrofitting with traditional structural design, the cost of maintenance as well as the effect on end users and the surrounding area of the modified structures.

The ecological impact of buildings has been increasingly misleading. Many companies understand the importance of green buildings and sustainability as part of their responsibility for more than just the bottom line. Green or legitimate practices in commercial buildings create healthier and more resource-efficient patterns of maintenance and operation.

Retrofitting Benefits

Green Buildings will benefit greatly, both directly and indirectly. The main physical benefits are reduction in water consumption and energy consumption starting from the first day of ownership. Power efficiency would vary from 20 to 30% and water conservation from 30 to 50%. The impalpable advantages of green innovative buildings include better air quality, wonderful sunshine, health & comfort of tenants, safety benefits and the preservation of country's limited resources.

Importance of green building in India

In a growing country with a huge population like India, several infrastructure constructions along with real estate development collectively are supposed to be maintained with the advancement in time. Many road projects, metro rails are being brought up. Residential and commercial construction work is a never-ending story. Improper resource & material management processes are leading to severe complications leading to the water scarcity, high price of electricity and on top of it the rising pollution

which is proving to be poison for our health, so green building in the country is necessary.

2. PROBLEM STATEMENT

"Study of Retrofitting in Institution Building"

3. OBJECTIVE OF THE STUDY

As decided an actual building will be selected and analysis will be conducted on a 3-story school building with a ground floor parking lot located in Pune, Maharashtra. Many parameters found in the building were not in line with our approach, but we think we will make the desired changes as it was not so old building and there is ample space for implementing Green techniques under the influence of Green building organizations. Sections, such as rainwater harvesting and successful management of solid waste, were not met and needs more capital, same applies for making use of solar power. Therefore the main function in the prevailing building to make it 3 star rated green building whether LEED rated or IGBC rated or applying mixed parameters enlisted by them**.**

- To understand important aspects of retrofitting through literature study done on many research papers.
- To apply the concepts & parameters of green retrofitting which are found suitable & feasible coming out of our literature.

4. REVIEW OF LITERATURE

4.1 Nushrat and Saad Bin (2017)

stated the economic benefits and welfare of the green building. Elements of the green structure were investigated and a SWOT analysis was performed. In financial analysis, total economic costs and non-financial costs are calculated. Additional costs for the construction of the green building are calculated. In excess it is possible to calculate the benefits associated with the green structure.

4.2 Claudio Favi et al., (2018)

introduced a new and systematic approach to dealing with uncertainty and empathy analysis in the Life Cycle Assessment (LCA) through the decision-making process in structural adjustment. This paper proposes a possible LCA approach to constructing remodeling steps through a simplified case study of structural remodeling, which includes internal overlays as remodeling steps.

4.3 Muhammad Khairi et al., (2017)

stated the importance of restoring the existing building to a green building in order to reduce reliance on the construction of new buildings. They discussed the application, the advantages and disadvantages of renovating an existing building. Retrofitting is one of the most environmentally friendly and effective solutions to improve the energy efficiency of a building.

4.4 Hadas Gabay et al., (2014)

posed questions about building a cost-benefit model based on voluntary green construction estimates, and focused on office buildings of different sizes and levels. They have proven to be one of the best ways to lead to higher savings in resource utilization, as well as other savings, which reduce initial investment.

4.5 Eugen Mitrica (2019)

measured the cost-benefit analysis method of return on investment. To make the most of a green building renovation a large amount of investment is required. We need to compare the future flow of annual energy savings with investment. The benefits created by conserving energy and thus reducing carbon footprint, can be very appealing.

4.6 A.Sharma et al., (2013)

studied the existing building of the Indian Institute of Technology Roorkee Central Library which was researched and recommended reimbursement for sustainable aspects such as site planning, energy and water use, building materials and resources and the quality of home space. Green measures for reimbursement for 5 years or less can reduce energy consumption and carbon emissions by 40%.

4.7 Binoy and Sharadindu (2017)

stated Sustainable development means meeting current needs without negotiating the potential for future needs. They study the amount of electricity generated by renewable energy. This paper suggests various ways in which we can restore existing properties by considering cost limits.

4.8 Alok Thacker and Deepa Joshi (2018)

conducted green research in the existing educational environment and made recommendations for green restructuring using the LEED measurement system. Cost analysis was performed to implement the proposed green remediation measures. Investment payment period checked.

4.9 Nandish Kavani & Fagun Pathak (2015)

studied the restoration of an existing building in a green building by considering energy, water and building materials and cost considerations in accordance with the LEED rating system and proposed measures to improve green building performance to make it more efficient..

4.10 Mohd. Ahmed & Mohd Abul Hasan et al., (2018)

set out comparisons between the world's green equity measurement systems and introduces an understanding of the features and objectives of the green equation system. To qualify for a green or sustainable building, developed and developing countries have their own rating systems and certification mechanisms..

4.11 Stefano Cascone (2018)

states that to improve the energy efficiency of existing buildings, a retrofit with a green roof is an effective solution. This study of effective thermal simulation estimates the energy efficiency that results from the use of two different types of green roofs installed on the flat roof of a multi-storey residential building.

5. SUMMARY

This concept of retrofitting benefits from making use renewable sources of energy and making it the primary source, such as the making use of sunlight and converting it into electricity by means of photovoltaic panels and the use of plants and bushes on vertical wall which maintains the indoor temperature gardening in house balcony, LED lighting which saves energy, grass pavers which helps in runoff and recharges the ground water, making use of high reflective paints & aluminium paints by applying them on exterior walls of any building. There are also other approaches used, such as the use of low-impact building materials, green materials recycled materials for which the cost for construction and installation have also been measured. The research focuses on favourable results after the building has been transformed into a green building. Costs and benefits of such retrofit, comparisons between the two systems are used in the cost-benefit study.

6. CONCLUSION:

The Study is established from the following:

1. Study of research papers based on retrofitting of old buildings into green building.
2. Study of case papers, literature reviews & future scope of the research papers.
3. understand important aspects of retrofitting through literature study and done on many research papers.

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