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GREEN BUILDING AND ITS RATING SYSTEMS

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Abstract As rightly said by many scholars we humans generally take for granted whatever is given to us for free, as the earth gives away everything to us for free we had long back started to take our mother nature for granted which has led to climatic changes, de-forestation, pollution and many such issues which will soon lead to the disastrous end of every living being on this planet. Ever since the growth of industries there has been a tremendous growth in new buildings. As in the statistics projected by 2060 most of the major cities will be a victim to consumption of polluted air and polluted water, a building being a major consumer of resources and energy, and in turn a major producer of pollutants it is necessary to put guidelines (rating systems) in its construction techniques, resource utility and waste management throughout its lifecycle for a safer future.

Index Terms - Rating System, Construction Techniques, Resource Utility and Waste Management.

1. Introduction

The only hope in saving our planet is by changing our lifestyles and moving more towards greener methods. The greener the methods we adopt the quicker the earth will heal. The earth is said to be 4.6 billion years old and the modern humans have just evolved about 0.8 million years ago in this short time period we humans have managed to consume around 50 percent of resources which in-turn has led to pollution and has led earth in a path of destruction. IGBC (Indian green building council) is one of the green building rating body which has certified over 4500+ buildings throughout India and plans to complete its 1 lac mark by 2025. It has over 5.27 billion sqft the second largest in the world for registered green building footprint.

2. Need for rating system

Construction industry is the largest consumer of resources such as water, electricity and energy and a major source of pollution. From the production of raw materials such as cement, gravel, crushed sand to its demolition every process is a major emitter of greenhouse gases. The building throughout its life cycle is a major polluter (waste water, garbage, etc.). The green building rating system plays an important role in keeping a check on these factors affecting nature and reducing its impact on nature.

3. Sustainable Building Life Cycle

Construction of a green building is a cradle to grave approach i.e. it starts from planning and designing phase to the reuse of demolition waste. The construction of any building can be classified into three phases, The Pre-Construction Phase, The Construction Phase and The Post Construction Phase.

A) Pre-Construction Phase

The Pre-Construction Phase includes planning of materials, technologies and construction techniques to be used in construction phase. The materials, technologies and techniques will be discussed in the points below. The whole construction phase depends on how well the planning is done. The planner has to study the availability of material, cost impact and environmental impacts.

B) Construction Phase

The Construction Phase is the time when the plans come to life, in this Phase techniques of construction play a significant role along with energy efficiency and use of recyclable material for e.g. Energy efficiency can be done by providing energy by solar panels and these panels

can be reused in the post building phase Similarly for construction Alu-form can be used instead of conventional wood shuttering as it has 100 cycles and can be then recycled.

C) Post-Construction Phase

The Post-Construction phase refers to the time from when the building is completed for occupancy and use till its demolition waste. This phase includes maintenance of the building, regular servicing of technology, disposal of waste, water supply, Electricity Supply Etc. the waste generated after demolition is also to be considered to reduce the environmental effects.

4. IGBC rating system

In recent times there are many green rating systems but only three are recognized throughout the globe i.e. IGBC (L.E.E.D.), GRIHA, BEE, etc. the most commonly followed practice in India is IGBC- (Indian green building council) which follows the principals of LEED. The process consists of submission of documents and earning sufficient points to fall in one of the categories of the rating system, the process consists of two phases,

The preliminary phase: In this phase documents are submitted along with all mandatory backup’s and minimum no of credits after this submission a review is submitted by the third party within a span of 30 days

The Final submission: This phase includes justifications and clarifications for the review given in the preliminary phase and as the name suggests submitting all the documents. A review along with a pre-certificate is given to the owner for a time period of three years from the time the certificate is awarded, the owner has to submit all the remaining documents along with the construction progress report every six months to be eligible for a certificate.

The parameters to be considered while submission of documents is as follows,

Sr no	Category	Mandatory requirement	Points
1	Sustainable architecture design	0	5
2	Site planning and design	2	14
3	Water conservation	2	19
4	Energy efficiency	3	28
5	Building material and resources	1	16
6	Indoor environmental quality	2	11
7	Innovation and development	0	7
	Total	10	100

4.1 Sustainable Architecture and Design. The sustainable architecture and passive design credit depend on the preservation of site, integrated designs and passive design. The credit carries five points in total. The purpose of Green buildings is to safeguard the health of occupant post-occupancy. Not only that, it caters to the need of efficient use of energy, water and waste generation. The integrated design approach will help achieve the efficient use, as it will lead to enhancement of the performance of building. The site preservation encourages the concept of retaining the site’s original features viz; contours, water table, rocks etc. By doing so, the site’s natural environment is retained thereby providing a positive environmental impact on the project. The passive architecture refers to the heating and cooling system and its impact on the project. The passive architecture will cater to the need of eliminating the dependency on the external sources for the heat and cool cycle of the environment, making the building self-reliant.

4.2 Site Selection and Planning. This credit carries fourteen points in total. Under this credit the building must abide by all the rules laid down by the local regulator. The site selected must cater need such as easy access to the public transport, availability of NG pumps within 3m radius, availability of low-emitting vehicles, charging station for electric vehicles etc. This will encourage the use of non-fossil fuels, thereby lessening the overall impact on the environment. Also, under this credit comes the trees and soil erosion sub-points. As per the credit, no trees shall be harmed during the construction and tree should be cut only if it disturbs/hampers the construction. Also, if the tree is cut necessary arrangement for its replantation must be made. By doing so we maintain the topographical features of site. Coming to the soil erosion which is far more a serious matter, the credit emphasizes to make arrangements so that the soil erosion is prevented. The building must be planned in such a manner that the outdoor environment is controlled positively.

4.3 Water Conservation. This credit consists of nineteen points in total. This credit looks after measures to conserve water by means of rainwater harvesting and fixing of water efficient plumbing fixtures. The harvesting of rainwater includes roof and non-roof measures. This is done mainly as an alternate water sources for non-potable purposes namely flushing, landscaping, air-conditioning etc. The IGBC strongly recommends use of plumbing fixtures with limited flow rates so as to avoid unnecessary use of water. This is achieved by installing the water-meters wherever possible so that the water usage is under control.

4.4 Energy Efficiency. This credit mandates use products, substances etc., which help lower the ozone depletion thereby contributing to positive environment impacts. This credit also mandates to optimization of energy consumption which can be achieved by making use of minimum-energy products etc. The building must have a commission plan for its equipment’s and systems so that the desired building

performance is achieved. At the same time the commissioning authority must have a 3 years' experience in commissioning. Under this credit also comes the use of eco-friendly products in the facility that will ensure reduced impact on ozone.

4.5 Building Materials and Resources. This credit contributes to 11 points. Under this credit, the concept of waste reduction is brought in. During construction of building, use of green materials in place of traditional materials, which lead to lesser impact on the environment. The credit mandates segregation of waste in the post-occupancy stage. This will eventually lead to the reuse and recycle of certain waste. The domestic waste segregation will lead to sending only particular waste to the landfill.

4.6 Indoor Environmental Quality. The credit accounts for eleven points as a whole. It mandates adequate fresh air ventilation, so that the indoor air quality is free from pollutants. It also mandates Tobacco smoke control; this will ensure that the non-smokers are less exposed to the harmful smoke of tobacco in the entire building. This can be achieved by placing signs of no smoking, or having a dedicated outdoor smoking zone or an indoor zone which completely exhausts the tobacco smoke from the rest of indoor environment. For the sake of the occupant's wellbeing and comfort, the CO2 levels should be constantly monitored. The lighting system of the building must be such that most of the light requirements are fulfilled by the daylight. Meaning the natural light must be well made use of, this will make sure that the dependency on the electricity is minimum during the day. To maintain the indoor environment, the furniture and ancillaries should be compliant to the green materials. The facility must also be user-friendly, i.e. it must cater to serve the differently abled persons. This can be achieved by having ramps, wide doors, etc.

4.7 Innovation and Design. As per this credit, at least one of IGB accredited professional must be on board of the planning team. This will ensure that the design caters to the successful green building requirements. When it comes to water saving, the credits suggest efficient use of water so that there is a reduction in overall use for potable water other than domestic purposes. This can be achieved by treating the waste water and using 10% of potable water at the time of construction, at the same time ensuring that the quality of construction is not compromised due to use of treated water in place of potable water. The design of the building must be optimized such that there is reduction of least five percent of cement and steel usage in the project. This can be achieved by innovation in designs.

5. Incentives for IGBC in INDIA

There is various aid provided by various state government for the motivating new buildings to adopt greener ways of construction some of the schemas provided are as follows,

Extra FAR Incentives

1. Punjab Urban Development Authority
2. Jaipur Urban Development Authority
3. Kolkata Municipal Authority
4. Pune Municipal Corporation
5. Greater Noida & Uttar Pradesh
6. Urban Development
7. Himachal Pradesh
8. Jharkhand

Financial Incentive/Assistance

1. Make in India
2. SIDBI
3. Industries & Commerce Department, Govt of Andhra Pradesh

Faster Clearance

1. MoEF

Other Incentives

1. Municipal Administration & Urban Development (MAUD), Govt of Andhra Pradesh

6. Conclusion

Despite the many initiatives taken by government and private sectors sustainable construction is at a very initial stage in India, this paper includes a basic methodology of green rating for a new building according to IGBC guidelines, it also explains the various parameters considered and the credits assigned by IGBC for rating a new building. From our study we hope that by 2050 50% of the buildings will be converted into green buildings.

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