

# CONSTRUCTIONAL DEVELOPMENT OF GREEN BUILDING FOR SUSTAINABLE ECO FRIENDLY ENVIRONMENT

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## ABSTRACT

The concept of green building is not a new concept. It basically describes about the best use of natural resources so as to increase the potential and conserve the natural sources of energy which becomes economical and beneficial to the users. It is critical to predict an environment friendly green building at the initial stage of designing. It requires a lot of data, research analysis, and material cost analysis before predicting the actual design. Local environmental factors affect the performance of a green building to a great extent. The material selection for the green building has a significant effect not only on the cost but on the increases pollution also. This paper mainly describes about the literature review of green building and at the latter a socio economic analysis is being carried out for the system as a case study.

## Key Words

**Cost effective, Conservation, Sustainable Development**

## 1. INTRODUCTION

A well structured building is a very vital part of designing and increasing the economic growth of any country. It acts like a backbone for any country. Designing a building usually requires a lots of energy not in the form of material but also in the form of electricity, water and air energy. A newly constructed building generally produces a lots of pollution basically produced due to crusher and brick factory. The above mentioned problem not only creates an unhealthy environment but also create lots of pollution both locally and globally. When the net pollution quantity increases beyond its rated capacity it creates a global problem i.e. green house effect. The increasing in the green house effect not only creates a global problem but also affect the nature's natural process. The effect sometimes leads to the acid rain which is very effective to large building particularly marble building.

To avoid such global and local problem now building engineers are trying to develop the building which are not only economically viable but also eco friendly so as to create an sustainable environment. Many researchers are working on green technology and sustainable development. Sustainable development is a very big and complex concept to describe. In a broad sense it can be defined as to utilize the natural resources in a best way to meet our present demand and also allow the future generation to meet their own demand. Sustainable designed structure must be efficient in terms of less carbon dioxide emission can utilize the natural resources in best efficient manner, production of less green house gasses must be limited to its value i.e. defined by the Kyoto protocol. From living and healthy point of view it must be isolated to external noise, pollution prevention, improved in house air quality, effective vastu design, inexpensive in design structure and can last for not less than 25 years with less maintenance.

This paper generally describes about the research going on the sustainable building design concept. Conceptual frame work used in the field so as to increase the life cycle of building with less or almost zero risk. In the latter part it describes about the method and mitigation principles involved in the building pollution and its impact on the environment.

## 2. FACTORS AFFECTING THE GREEN BUILDING

In order to make a building for human adaptation it has to pass through a several design concept. In the modern world where people generally spend their 90% of time being present inside the house and nearly 70 percent in the office building so it is necessary to design a building which must give comfort to the individual living inside the room. Actually factors can be divided in to two groups like external factors affecting the building and internal factors design. External factors generally include the net wind storm on the building, and effect of pollution on the building produced from industrial

belt. Several internal factors like day light saving, thermal comfort, noise reduction affect the designing of the building.

**2.1 External factors**

**2.1.1 Effect of Wind Pressure.**

When a high pressure air strikes a large building it affects the construction of the building and also reduces the life span of the building to a great extent. The opposing building will slow down the wind pressure and hence acts like an obstructing surface to the building design. It will divide the wind into two paths i.e. one moving in the upward direction and other moves in the downward direction. The upward movement of the air will create a vortex near the striking surface and hence forms a wind shadow. The vertex creates a high pressure on the top side of the building and also creates a less pressure on the downstream side of the building. If a small whole is present on the surface of the building it may affect the whole and also affect the entire building. The pressure is neutralised but the building may get affected by this.

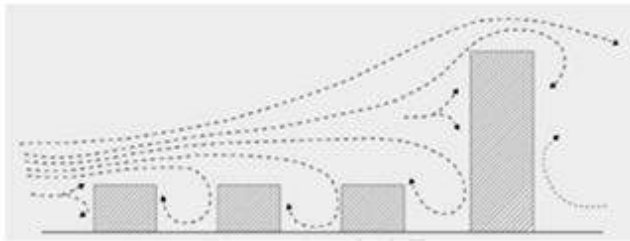


Fig:-1 Air Stream over Building

Figure 1 describes about the entire process. Three numbers of small building and a large building is opened to the wind surface. The small building near to the large one will create a large wind pressure at the bottom portion of the building. This will in turn affect the small and large building.

**2.1.2 Pollution From industries**

Industrial factors such as pollution produced from the mining and industry affect the building to a great extent. Industrial waste primarily affects the water and air.

Industrial water may contain some amount of acidic material, heated liquids, some kind of foaming agents, organic matter, particulate matter, and may contain nuclear matter. These unusable matters not only affect the aquatic life of the system but also affect the life of building near the submerged area. The toxic properties held by this material affect the building paint and also creates corrosion on the metal part of the building and hence affect the life cycle value of the building. The pollution produced from the industrial area basically contains sulphur, ammonia, oxides of some toxic materials. These particulate matters affect the paints of the building and also decorates the building materials.

**2.2 Internal factors**

**2.2.1 Thermal Comfort**

Thermal comfort is the most vital part of any building. It assists the individual living inside the building to carry out a healthy and prosperous life. It became an important goal of every building designer. The environmental parameters such as temperature humidity and air pressure affect the building structure. So while designing and building some designing concept are to be implemented very carefully like low E-window, Highly reflective window, tinted glass window so as to avoid the blister hot sunray coming from the outside into the building at the same time also protect the house from the cold air in the winter season. Building must be designed in such a way so as to increase the thermal comfort in both summer and winter.

Table:-1 Thermal Resistance Of Wall Component

Sl No.	Type	Wood	Steel
1	Clear Wall	11.8	7.21
2	Corner	11	6.34
3	Roof wall	9.0	0.89
4	Wall Ceiling	9.0	3.82
5	Window Side	8.4	4.00
6	Window Sill	9.2	3.23
7	Door Side	10.4	4.33
8	Door Header	8.72	4.00
9	Overall Wall	10.21	6.01

**2.2.2 Daylight Saving Scheme**

Daylight saving scheme basically involves designing a building which will utilize the maximum amount of day light and there by decrease the net electricity bill spend on the artificial lightening system. Day light means that where everything is clearly visible.

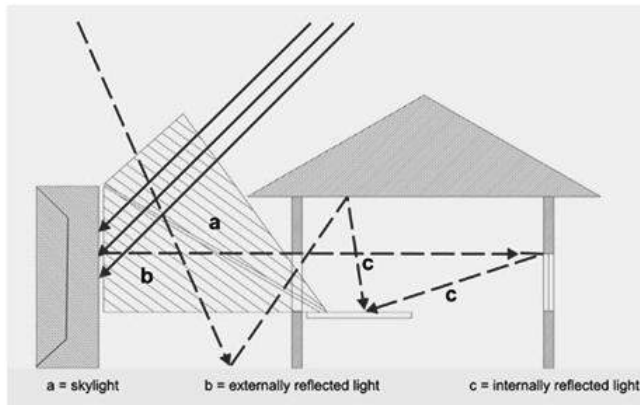


Fig-2 Daylight Structure

Light coming from the sun generally reflected from the sky i.e. diffused light, reflected from the ground surface, and walls enters in to the room. To reflect more amount of light it is usual practice to paint the room with light colour, in strong sun shine. Sometimes glare are produced due to excessive light intensity. Care must be taken to avoid such things. Day light acts as a most suitable agent for day light saving scheme. Glass window can be installed which not only protect the house but also reflect the light to the ceiling of the roof so as to maximize the light. For high contrast sometimes glass reflector may be installed on the opposite side of the window.

### 2.2.3 Natural Ventilation.

Ventilation is the second most important thing for a building from its design point of view. Ventilation can be of two types such as natural ventilation and forced ventilation. Natural ventilation is the process in which cold and oxygenated air will enter into the room. Natural ventilation not only save the money but also passes the free and safe air into the building. It reduces the outside pollutants and remove heat from space. The window and door position are the key structure for designing any types of building. The effective way of using the outdoor air is the cross ventilation and installation of wind chimney. Designing of natural ventilation also reduces the cost of designing of the building.

### 2.2.4 Protection against natural Hazards

The building is more affected by the natural hazards. Some natural hazards like earth quake and storms damage the entire building structure. The damaged system adds an extra cost of redesigning the building, repairing the building and lost infrastructure. These adds an extra cost the whole designing system. Sometimes hazards like hurricane, tornados damage the entire building. So in the modern world designing a building is not just to put a brick it something different from that of the traditional use of resources. In flood area building can be elevated from its base to sufficiently high value so as to protect the building from the natural damage of flood. Water system must be kept at a sufficient distance from the building so as to avoid it from the leaves of the tree which are planted around the building. This achieves the clean water system for the building.

## 3 COMPARISON BETWEEN GREEN AND CONVENTIONAL BUILDING

Green building boom is increasing day by day. It is expected that about 10 percent of the houses globally became green by the year 2050. This increase in the green building and large amount of acceptance is not because of the technology but also value added benefit of the system. A green building is naturally effective by reducing the water cost, energy consumption cost and heating cost. A perfectly designed green building reduces the cost of energy consumption by 50 percent of that of the conventional building. Instead of all these advantages the design cost is generally 20 to 30 percent more as compared to the ordinary home. Green building are more environment friendly and hence reduces the health insurance cost to a great extent. Eco friendly green homes generally take or use less amount of energy and hence also produce less amount of waste in terms of both toxic and non-toxic form.

## 4 CONCLUSION

Sustainable design for building will drag the system towards a highly economic development environment. This can achieve economic, social and environment balance among the country and also create a sustainable and environment friendly environment. If the gap between the environment and building is bridged then it can lead to a better environment with highly economic significance. The global environmental concern about the Kyoto protocol has dragged the focus of many engineers to design a green and sustainable building for the world. While designing the building focus must be given to some major areas like efficiency of the system, cost effective and optimized use of natural resources. All these effect must be considered into account at the early stage of designing a building plan. In addition to this technique energy efficient can be designed by installing roof top solar panel and small wind turbine on the top of the building. Rain water harvesting can be employed to store the water in the rainy season and can be used for gardening. The biggest challenge now a days is to integrate all these efforts into a single idea and its successful implementation.

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