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APPLICATION OF GREEN TECHNOLOGY IN CONSTRUCTION INDUSTRY TO INCREASE THE LEVEL OF ECO-FRIENDLY ENVIROMENT

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Abstract - *In recent times the building industry has been seen as highly competitive and diverse. In order to remain progressive in such an environment, construction firms need to be aggressive when it comes to getting business. This is when importance of Green building construction takes part. Green Development helps to reduce the level of pollution in the environment and creates a good living of standard. This research mainly aims on the green building materials and methods used to create a good and durable construction. Initially through literature review, it is understood that how the concept of Green Technology is useful in construction industry to make an eco-friendly environment. Data is collected from the various case studies which include the Green Building concept. Data analysis is done for a proposed building which gives us benefits in reduce the cost of the energy and also give the idea about the use of renewable energy which reduce the cost of project. It is examined that by accepting the Green Technology in our development it will make an eco-friendly environment.*

Key Words: **Green Development, Eco-Friendly, Renewable resources.**

1. INTRODUCTION

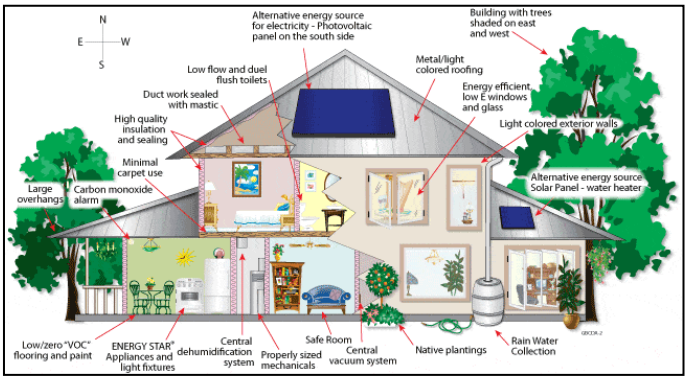
Green construction is mainly carried out by using of resource-efficient and environmentally development processes to ensure the building's sustainability throughout its lifetime. The concept of the Green building mainly includes construction processes, site planning, rehabilitation, reconstruction, and demolition with the least damage to the community. The use of green building materials and products promotes the conservation of our non-renewable resources. Consequently, maximum use of renewable building materials into development projects will help to minimize the environmental impacts caused by the production, storage, refining, manufacture, distribution, reuse, recycle and disposal of these raw materials from the building industry.

Green Construction in our day to day construction will help to reduce the effect of carbon dioxide by 40-50 % and thus it can reduce the level of global warming in the atmosphere. Through this concept is helps us to make durable and good looking building in the world. The rating system in India for the buildings which are made up of this technology are GRIHA & LEED. This rating system has certain criteria which includes a good site planning, natural day lighting design, use of more renewable energy, use of chemical free building materials, by using this it will hell to create a good living of standard for human beings.

Green Technology for the construction mainly aims on the proper site planning and design as it can save a lot of water by using STP(Sewage Treatment Plant), rain water harvesting, saving in energy by using solar panel. The placement of green buildings in the immediate area will thereby create a green zone and have a much eco-friendly environment in comparison to the past building with reduced heat impact.

The below figure illustrates the conceptual drawing (fig. 1) of GREEN BUILDING.

Figure: 1 Green Building Model



1.1 Objectives

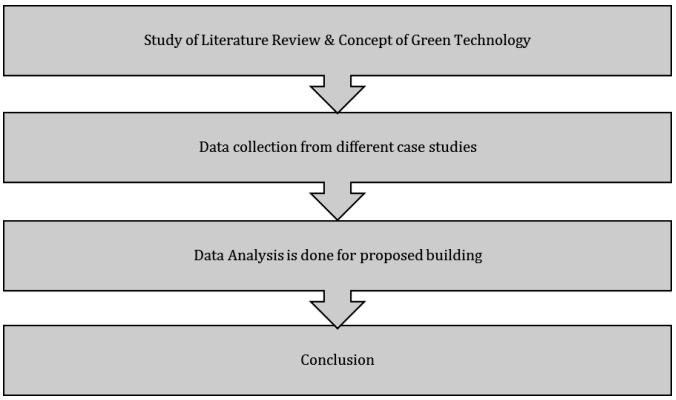
This analysis was done to fulfil the requirements: To study various technique and material used in Green construction. To improve the living standard and make attracting designs.

1.2 Scope of Work

The scope of this research work is to study the construction with the concept of Green Technology for all construction project to reduce the cost and create a good living standard.

2. METHODOLOGY

The method for this research is shown in diagram:



- In the First step, gather information about recently published literatures and concept of Green Technology.
- The Second step is about collection of data of various materials and methods from case studies.
- The third step is about, how to utilize materials and methods in Construction site.
- The last step is about saving the energy as well as use renewable resources in the Green Building Construction.

3. MATERIALS AND MERHODS USED IN GREEN BUILDING

The data collection for this research work is based on the three case studies which are based on the concept of the green technology. Through this data collected it will be helpful to recognize the methods and materials used in this technology.
Materials & Method Used:-

1. Radiant Cooling Slab
2. Chilled Beam System
3. Solar Panel
4. Waste Management Process
5. Low VOC Paint
6. Fly ash Bricks
7. Sewage Treatment Plant
8. Natural Light And Air
9. Grass Paver Tiles
10. Gypsum Plaster
11. Natural Daylight Control Glass
12. Rain water harvesting

Chilled Beam System:

The method of 'chilled beam' air-conditioning system shown in a 40% drop in energy consumption.

This is a very creative & attractive air conditioning system, where air conditioning is carried out by air flow through diffusers and the movement of chilled water to the diffuser points. Chilled Beam system are use to maintain 26 degree Celsius temperature in building

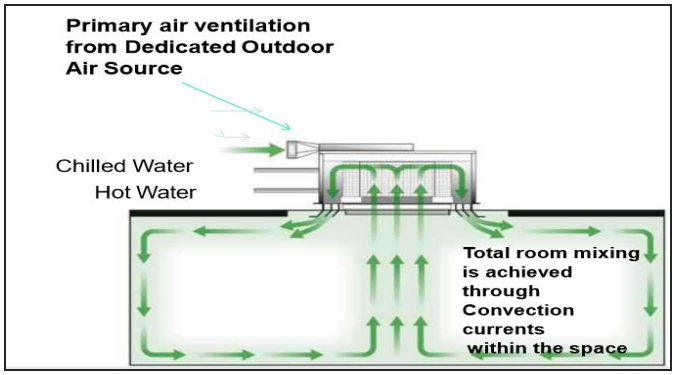


Figure: 2 Chilled Beam System

Waste Management Process:

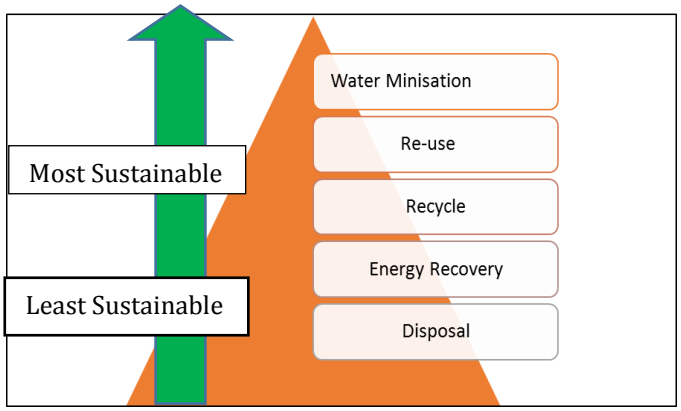


Figure: 3 Waste Management process

Radiant Cooling Slab:

In the radiant cooling slab the pipes are installed before the concrete is placed. The piping is done in such a way that the cold water circulates in the pipe and through the same the hot water goes back so with this continues flow of the water it keeps the ceiling, surface cool from the outside temperature. It has a good quality of the thermal comfort and it maintains a good indoor air quality. This system requires 75% less air compared with the conventional systems.

Figure: 4 Radiant Cooling Slab

4. DATA ANALYSIS

The data analysis for this research is carried out for a proposed building which not a part of green building. Thus, by using the various methods and materials in construction will help to saving in energy and more use of the renewable resources. This will also help to reduce the cost of the project and will also help to get benefits from the production of the renewable energy. Several materials used in proposed building are solar panel, grass paver tiles, rain water harvesting, sewage treatment plant, triple glazed window.

A. Solar Panel

Solar Capacity	200 kwh
Panel required	600
Type of Panel	Polycrystalline solar panel
Panel Size	2m X 1m
Area Required	1400 TO 1500 sqmt
Total cost	80 lakh

Table: 1 Proposal for solar panel

Benefits of solar panel

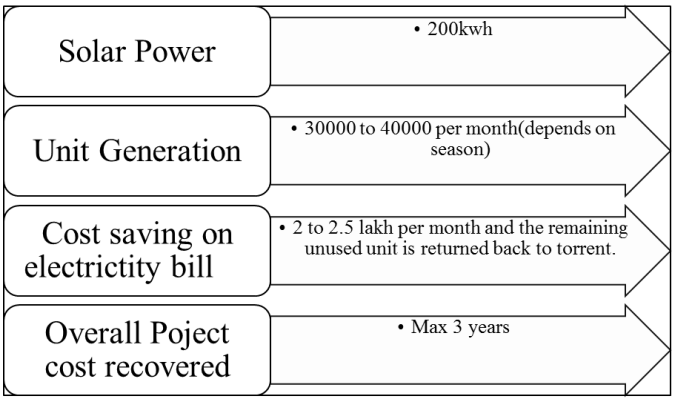
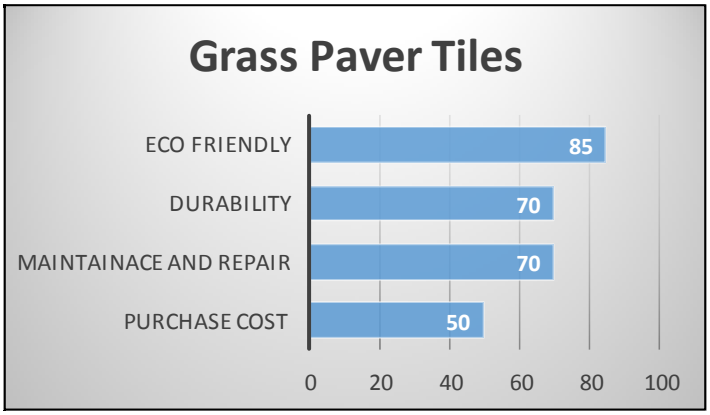


Figure: 5 Cost Benefits

B. Grass paver tiles

Vitrified Tiles	Grass Paver Tiles
Size:-2' X 2'	Size:- 300mm X 300mm
Cost-800/-box include 4 piece	Cost- 40/-piece
Area to be covered – 11250sqft	Area to be covered-11250sqft
Total cost of Purchase- Rs 562500/-	**Total cost of Purchase- Rs 450000/-**

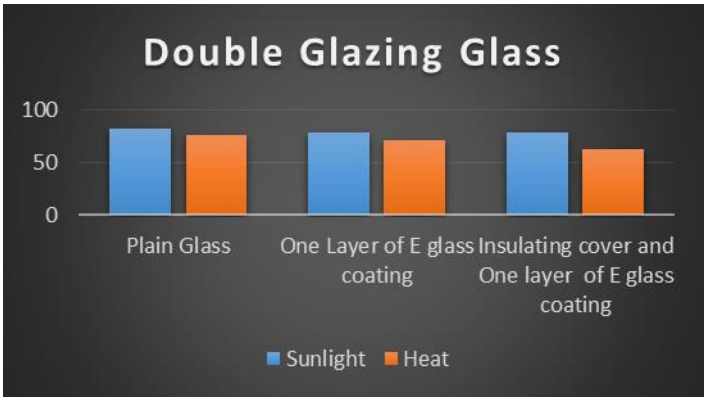
Table: 2 Cost Comparison



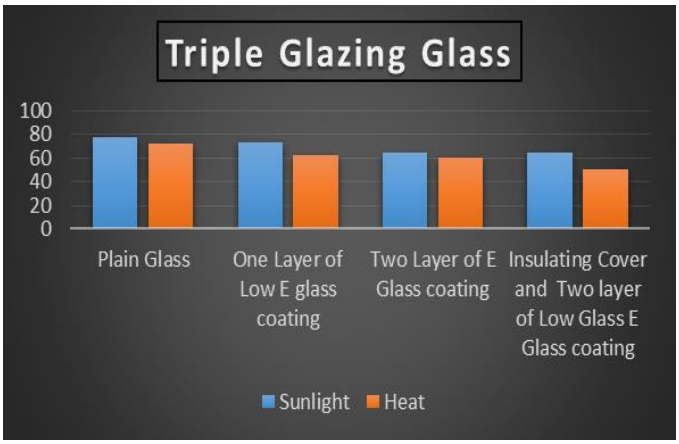
Graph: 1 Grass Paver Tiles

C. Triple glazed window

Comparison based on Sunlight and Heat Pass through it.



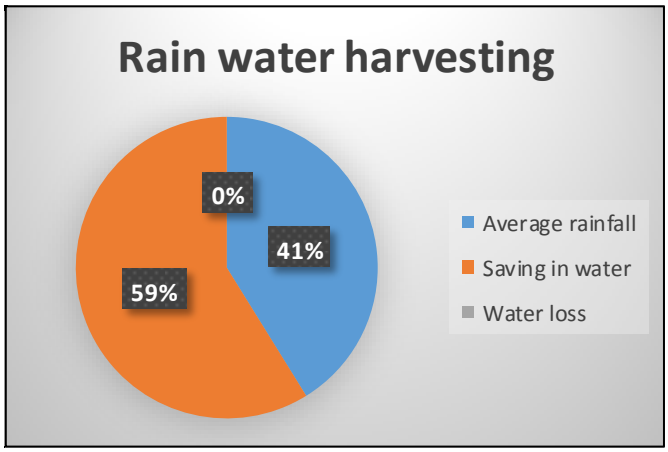
Graph: 2 Double Glazing Glass



Graph: 3 Triple Glazing Glass

D. Rain Water Harvesting

This method is the part of the Green Building Technology as it saves a lot of water that is used for various other purposes at site. A pipe of 75mm to 100mm is installed at terrace through which the rain water goes to the cleaning where, it is purified and this purify water is sent to the underground water tank or sump constructed at site. From there the water can be used for various activities going at site. The saving in water is clearly understood from the below graph.



Graph: 4 Saving In Water

5. CONCLUSION

From, above data collected and analysis done through that at the end there is lot of saving in the energy, cost reduction, less use of non-renewable resources.
Green Technology helps to create a good living standard by reducing the level of carbon dioxide from the atmosphere and develop eco-friendly environment.
The analysis suggested to accept the materials and method based on this concept as soon as possible in today's construction industry as it is being developed day by day.

Then, Green Building future scope is to create a eco-friendly environment, more use of the renewable resource, more and more saving in the water as well as energy, reduce in the emission of the carbon dioxide, reducing the wastage and recycling of the materials use at site and to create more attractive design of the buildings

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