A

Seminar report

On

GREEN BUILDING

Submitted in partial fulfillment of the requirement for the award of degree
Of Civil

SUBMITTED TO:

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Preface

I have made this report file on the topic **Green Building;** I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude to ……..who assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

Acknowledgement

I would like to thank respected Mr…….. and Mr. ……..for giving me such a wonderful opportunity to expand my knowledge for my own branch and giving me guidelines to present a seminar report. It helped me a lot to realize of what we study for.

Secondly, I would like to thank my parents who patiently helped me as i went through my work and helped to modify and eliminate some of the irrelevant or un-necessary stuffs.

Thirdly, I would like to thank my friends who helped me to make my work more organized and well-stacked till the end.

Next, I would thank Microsoft for developing such a wonderful tool like MS Word. It helped my work a lot to remain error-free.

Last but clearly not the least, I would thank The Almighty for giving me strength to complete my report on time.

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INTRODUCTION

1.1.GENERAL:

A green building, also known as a sustainable building, is a structure that is designed, built, renovated, operated, or reused in an ecological and resource-efficient manner. Green buildings are designed to meet certain objectives such as protecting occupant health; improving employee productivity; using energy, water, and other resources more efficiently; and reducing the overall impact to the environment

Green Building practices promote construction of buildings that are healthier for the occupants and healthier for the environment Sustainable or "green" building practices can reduce the tremendous impact that building design, construction and maintenance has on both people and nature. Energy and material consumption in buildings can contribute significantly to global climate change.

1.2.OBJECTIVITIES OF GREEN BUILDING*:*

- Conserve natural resources
- Increase energy efficiency
- Improve indoor air quality

1.3.REASON TO BUILT GREEN :

- Reduced urban island heat effect
- Reduced building heating and cooling effect
- Reduced air pollution and green house gases
- Increased building durability
- Increased health factor both inside and outside building
- Increased water conservation

1.4.ECONOMIC BENEFITS OF GREEN BUILDINGS*:*

- Improving occupant health
- Improving comfort , productivity
- Reducing pollution and landfill waste

CHAPTER-2

ELEMENTS OF GREEN BUILDING

2.1.GENERAL:

- Siting
- Energy efficiency
- Material efficiency

2.2.SITING:

- Start by selecting a site well suited to take advantage of mass transit.
- Protect and retain existing landscaping and natural features. Select plants that have low water and pesticide needs, and generate minimum plant trimmings. Use compost and mulches. This will save water and time.
- Recycled content paving materials, furnishings, and mulches help close the recycling loop.

2.3.ENERGY EFFICIENCY:

Energy efficient and environment conscious building design is essentially an integrated approach. The available options in architectural intervention, building materials and design methodologies need to be carefully evaluated to minimize energy usage, minimize the ecological degradation that may be caused by the construction of the building and provide cost effective solutions. The aim is to achieve the desired comfort with the least input of conventional energy. Nowadays, designers accomplish the task through solar passive design, use of renewable energy technology systems, and/or natural building materials. In general, energy efficiency in new buildings can be achieved through:

- Bioclimatic architectural principles;
- Load minimization by the incorporation of solar passive techniques in building design;
- Design of energy efficient lighting and HVAC systems.
- Use of renewable energy systems to meet a part of the building load.
- Use of low energy materials and energy efficient methods of construction.

Basic energy sources in an eco-friendly building complex

Sky	Sun	Air	Earth	Water
- day lighting - heat sink	- heating - electricity generation - day lighting - greenhouse effect - solar chimneys	- ventilation - heat sink	- roof gardens - earth berms for insulation	- roof ponds - fountains for humidification - rainwater harvesting

Fig.1.Basic energy sources

2.4.PASSIVE SOLAR DESIGN INTERVENTIONS:

The first stage of green building design is to incorporate solar passive design interventions and try to reduce the loads on conventional systems. Passive design elements are integral parts of any architectural components similar to walls, windows and roofs in a conventional structure. It is achieved by building orientation with respect to the sun, shading of windows, color, texture, landscaping etc. The solar passive design generally varies according to the climatic condition prevalent at the site. Useful daylight is harnessed through appropriate windows, skylights and light shelves. One of the passive solar cooling devices is the thermal chimney, which can be designed like a smoke chimney to vent hot air from the house out through the roof. However, one has to resort to advanced techniques of passive conditioning such as roof ponds, trombe2 walls, wind towers, etc in extreme climatic conditions.

2.5.RENEWABLE ENERGY TECHNOLOGY:

Renewable energy systems are installed for meeting a partial load of the building, thus considerably reducing the overall electrical and thermal load. Solar energy could be utilized for a variety of purposes and in a number of ways: generating electricity, providing hot water, and heating, cooling, and lighting buildings.

- Solar photovoltaics (PV) - provide electricity for lighting
- Solar thermal systems - used for heating water or space heating
- Transpired solar collectors - preheat air for the building's ventilation system.

2.6.MATERIAL EFFICIENCY:

- Select sustainable materials and products by evaluating several characteristics such as reused and recycled content, zero or low off gassing of harmful air emissions, zero or low toxicity, sustainably harvested materials, high recyclability, durability, longevity, and local production. Such products promote resource conservation and efficiency.
- Use dimensional planning and other material efficiency strategies. These strategies reduce the amount of building materials needed and cut construction costs.
- Reuse and recycle construction and demolition materials.
- Require plans for managing materials through deconstruction, demolition, and construction.
- Design with adequate space to facilitate recycling collection and to incorporate a solid waste management program that prevents waste generation.

CHAPTER-3

METHODS AND MATERIALS

3.1.SITE AND LANDSCAPING:

- Recycled plastic has been developed into a wide range of landscaping products. Plastic lumber is widely used in outdoor furniture and decking. Plastic lumber has advantages over wood in that it is impervious to moisture and will not warp, rot, or check.
- Traffic stops and bumpers are also being made from recycled plastic, replacing concrete and asphalt.

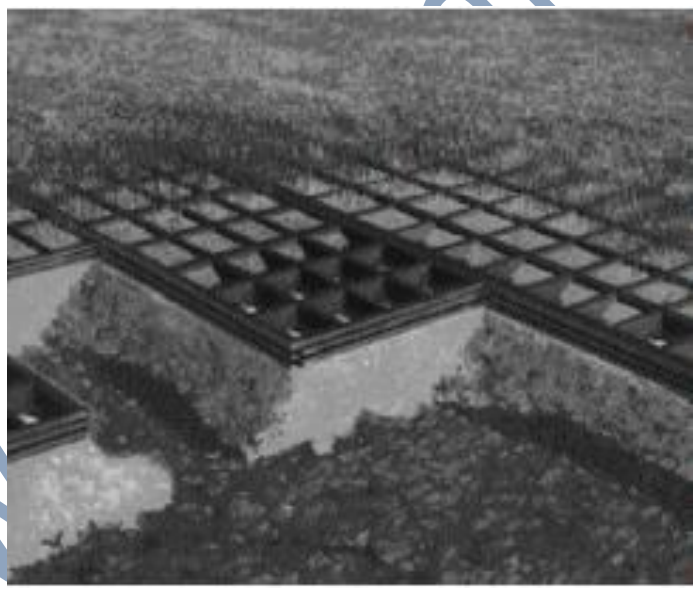

Fig.2.Porous pavement system made from recycled concrete

3.2.STRUCTURAL FRAMING:

- Joist and truss systems, using fabricated lumber or a combination of dimensional lumber and steel, are also moving from commercial to residential construction.
- Open-web joists and trusses are more economical than traditional 2x12 wood members,

and the manufacturing system ensures even quality.

- Wood, a natural product, is subject to a widerange of variables that can affect its structural strength. Improved sound ratings are also a benefit of these systems. Lumber recovered from demolition is being used in renovations and new construction, for both environmental and aesthetic reasons.
- Timber-framed structures are often dependent upon recycled wood due to the difficulty in obtaining large logs.

3.3.FLOORING:

Finished flooring is available in a wide range of materials and styles. The decision about the type of flooring (e.g., carpeting versus tile) is generally determined by the program of the building.

Fig.3.Tile flooring

- Natural fiber carpet cushions can be made of jute felt. Jute is a renewable crop material, with a very little energy required in the growth and manufacturing process. It biodegrades upon disposal, and can be recycled.
- Linoleum, a product made of linseed oil, compressed cork and wood flour, resin binders, and pigments, is a low-tech and low-energy alternative to vinyl. Because linoleum is made of natural, non-toxic materials, any VOCs it emits are primarily from the oxidation of the linseed oil..
- Ceramic tile is another flooring material noted for its long life, even in high-traffic areas. It is nontoxic, stain-resistant, and inert when discarded in landfills.
- Glazed and unglazed tile can be made using recycled glass as filler, which allows the firing temperature to be lowered.

3.4.ROOFING:

A roof should be a symbol of safety, stability, durability and protection from Mother Nature. According to the Spray Polyurethane Foam Alliance (SPFA), spray polyurethane foam (SPF) roofing systems are noted for their long life, renewable and energy saving characteristics, as well as their ability to help control moisture in buildings.

- SPF roofing systems are resistant to leaks caused by hail, wind-driven debris, and high wind blow-off.
- The SPF's wind uplift resistance exceeded the capacity of UL's equipment - validating SPF roofing systems' excellent wind up-lift resistance.
- SPF eliminates thermal bridging by providing a continuous layer of insulation over existing thermal bridges in the roof deck. Also, SPF roofing systems typically are coated with light colored, reflective coating, which reduces the amount of heat transported inside the building through thermal bridges.

Fig.4.Roofing

3.5.SKYLIGHTS AND SKY ROOFS:

- Skylights and sky roofs are increasingly popular, as a way of bringing daylight deep into the interior of a structure.
- Periscope- it has a sunlight-gathering acrylic dome on the roof, internal
  - Reflector , and a diffuser lens that emerges within the room.
  - This brings the advantages of natural daylight into a space without the heat gain of traditional skylight
- The size of the tube allows it to be installed between roof rafters, so no cutting and rerouting of structural members takes place. A 13"-diameter tube provides a summer noon output equivalent to 600 incandescent watts of lights and illuminates up to 150 square feet.

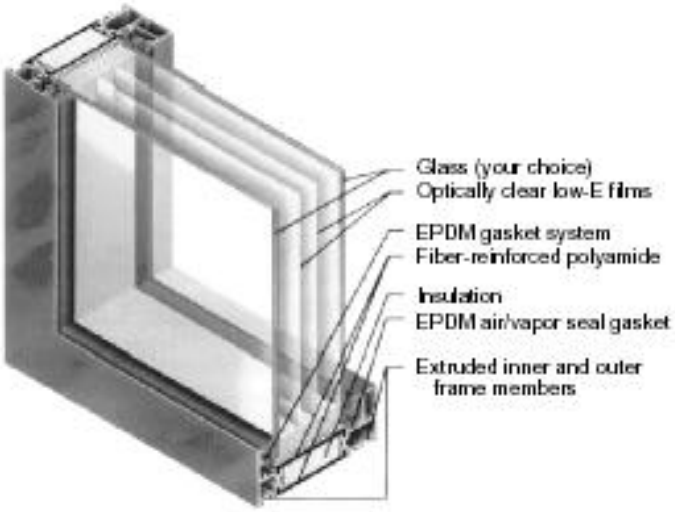

Fig.5.Double-paned glass with air spaces and UV protection

Fig.6.Openable skylights provide daylighting and natural ventilation.

3.6.INSULATION:

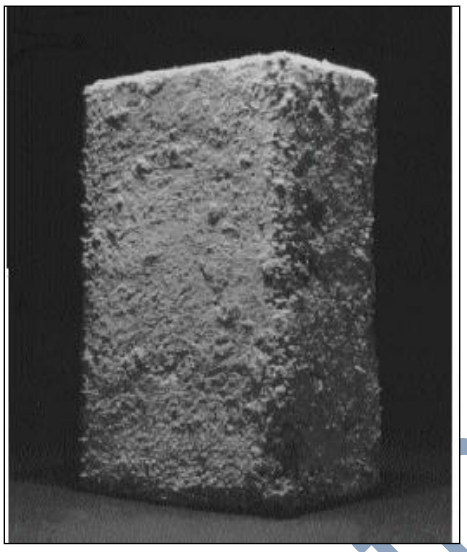

Fig.7.Insulation

- Though insulation is one of the best ways to reduce energy consumption and building operating costs. Insulation also offers acoustic benefits. In contemporary construction, the familiar fiberglass insulation has been supplemented by hi-tech polymers and old-fashioned cotton.
- A spray-applied thermal and acoustic insulation made from recycled paper fibers, with an acrylic-based adhesive, it is non-toxic.

3.7.GLAZING:

- Windows and skylights allow daylight to reach the interiors of buildings, reducing the need for artificial light. Operable units assist in ventilation and cooling, reducing or eliminating the need for mechanical equipment.
- Windows are the weakest point in the building envelope in terms of energy loss. Improved glazing techniques offer low-emissivity glass and inert gas-filled air spaces between panes.
- Heat gain through direct solar radiation is the easiest to prevent, by providing shading

devices and using low-emissivity (low-E) glass. Low-E glass acts as a radiation mirror, reflecting infrared (heat) rays back to the source. This prevents solar heat gain in the summer and retains heat within the building during the winter.

- The transparent film allows daylight to enter the room but blocks ultraviolet radiation (UV). UV is responsible for fading and deterioration of textiles and is a primary cause of skin cancer.
- Fiberglass window systems offer advantages over aluminum or vinyl. Like vinyl and aluminum, they are low maintenance, but they will not warp or rot. In addition, they have a longer life and a lower embodied-energy content.

3.8.ECO FRIENDLY CONSTRUCTION:

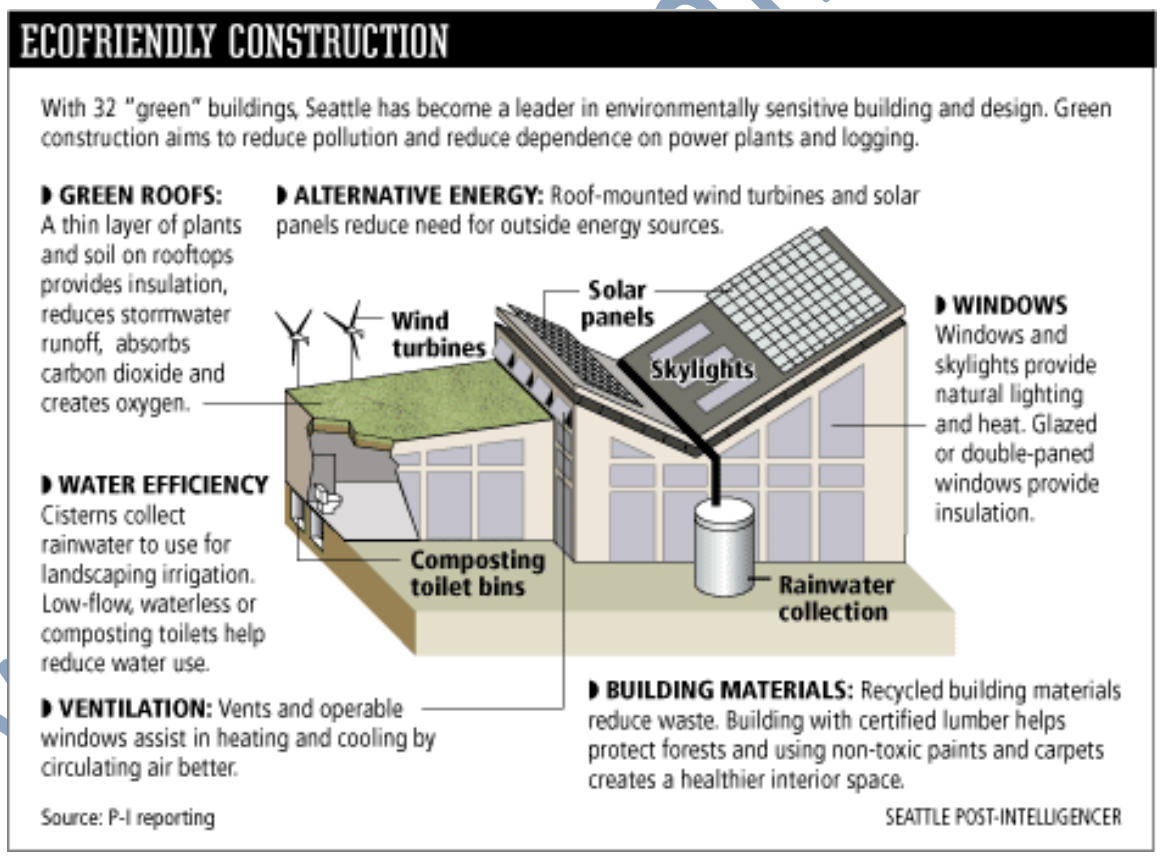

Fig.8.Ecofriendly Construction

3.9.DRIP IRRIGATION:

Description:

Drip irrigation systems provide a landscape, thus preserving soil moisture, and significantly reducing water waste from overspray.

Application:

Install drip irrigation systems in place of standard sprinkler systems for all landscape applications except turf.

Benefit:

Drip irrigation systems dramatically reduce landscape water use and lower water costs.

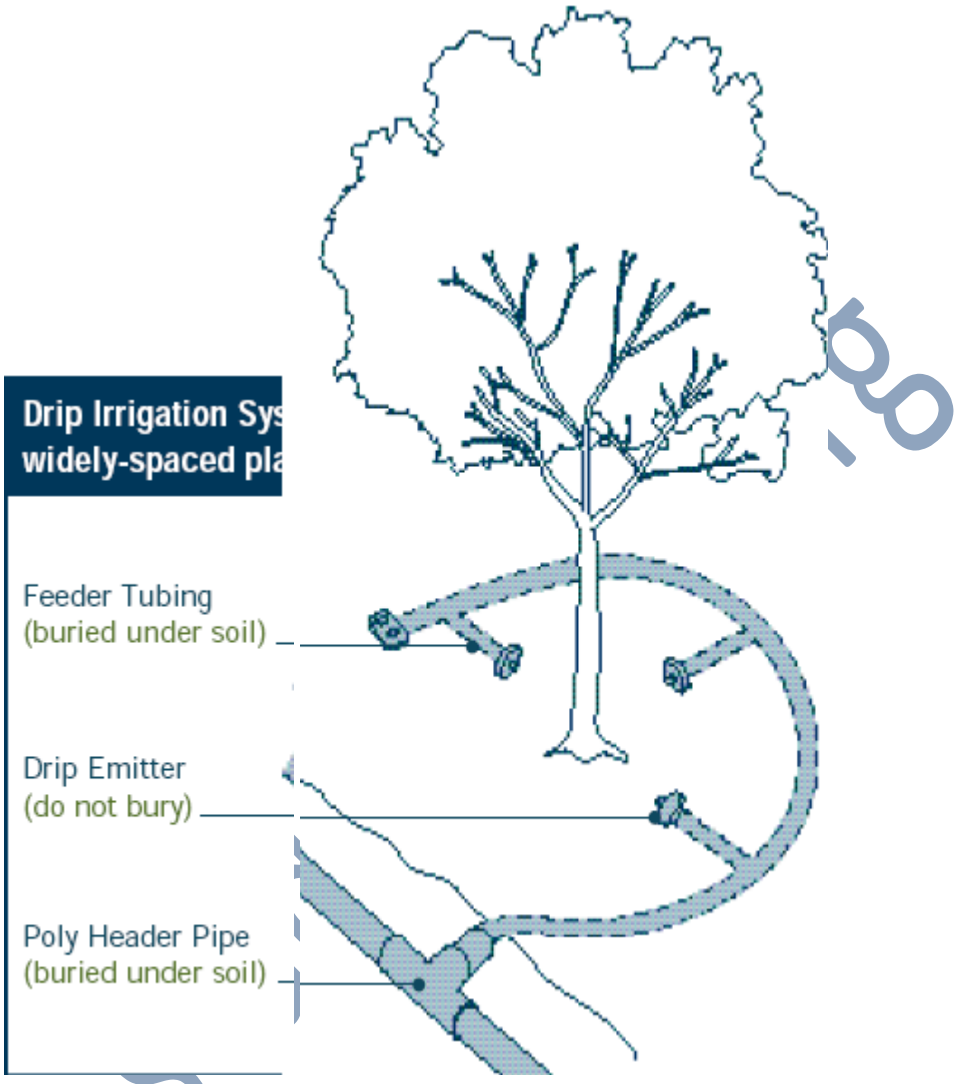

Fig.9.Drip Irrigation

CHAPTER-4

INDOOR QUALITY ENVIRONMENT

4.1.GENERAL:

- Indoor environment quality is a mixture of the air your breathe, the lighting from indoors and outside, noise levels, and even the electro magnetic fields produced by electric power – consuming devices.
- The basic design, building materials used, and operating efficiency of your green home can help greatly reduce the threat to you and your family of indoor environmental problems.
- A green home is designed, constructed and can be easily maintained to be free of unhealthy levels of indoor air pollutants- such as radon gas, excess moisture, mold and mildew , formaldehyde , passive tobacco smoke, particles and dust-mite allergen(feces) – that can impact occupant health.

4.2.GUIDELINES:

- Very basic materials, building techniques and designs distinguish an energy efficient home. Sealing up air-leaks like construction cracks and holes is very important.
- Increased attic, wall and foundation insulation, and installing high-performance windows and better doors completes the building “shell”.
- Using efficient electric lighting and plug-in appliances, and upgrading to high efficiency furnaces, heat-pumps and boilers further reduces energy waste.
- A floor plan and building orientation designed to admit winter solar heat, ample day lighting and avoids summer-time sun further reduces energy waste. Such a “package” may save up to 65% in your green home versus typical homes utility bills.

4.3.DURABILITY:

The durability of materials is an important factor in analyzing a buildings lifecycle costs. Materials that last longer will, over a buildings useful life, be more cost effective than materials that need to be replaced more often. By looking at durability issues, the selection of initially expensive materials like slate or tile can often be justified by their longer life spans.

4.4.REUSABILITY:

Reusability is a function of the age and durability of a material. Very durable materials may have many useful years of service left when the buildings in which they are installed is decommissioned, and may be easily extracted and reinstalled in a new site. These materials are used in the renovation of old buildings as well as in a construction.

CHAPTER-5

CONCLUSION

With increasing degradation of the environment because of increased energy consumption, environment, conscious building design has become urgent. The benefits of green design to society in general , and building owners and users in particular , are manifold. The construction of such buildings results in reduced destruction of natural habitats and bio-diversity , reduced air and water pollution , less water consumption, limited waste generation and increased user productivity. With increasing threat on our planet earth caused by depleting resources and increasing emissions it is absolutely pertinent that all our future buildings should be designed to function as “green buildings”.

Reference

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