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Towards sustainable building-green building design and integration in the built Environment

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Abstract

Over the last twenty years the construction industry has made efforts to develop green building practices. Researchers within the field have provided theoretical knowledge on how to design green buildings and analytical environmental management tools have been developed to guide the practitioners. Sustainability is a multifaceted concept that encompasses the human, social, economic and environmental aspects of our society. It has led to the emergence of a larger concept of sustainable development. By definition it can be described as meeting the needs of the present without compromising the ability of future generations in meeting their own needs. One of the major business enterprises where sustainable development is occurring is in the construction industry, which has caused the emergence of sustainable building, or green building. This represents a great opportunity to design buildings that are resource efficient use less energy, curb wasteful practices from construction, and provide healthier environments for occupants. Green building development involves an integrated approach where building professionals collaborate closely on achieving sustainable goals and better efficiency in building projects.

Keywords: Green building, sustainable building, resource, healthier environment

Introduction

Green building - also known as sustainable or high performance building - is the practice of: Increasing the efficiency with which buildings and their sites use and harvest energy, water, and materials; and Protecting and restoring human health and the environment, throughout the building life-cycle: sitting, design, construction, operation, maintenance, renovation and deconstruction.

- The 'Green Building' concept is gaining importance in various countries, including India. These are buildings that ensure that waste is minimized at every stage during the construction and operation of the building, resulting in low costs, according to experts in the technology.
- The techniques associated with the 'Green Building' include measures to prevent erosion of soil, rainwater harvesting, preparation of landscapes to reduce heat, reduction in usage of potable water, recycling of waste water and use of world class energy efficient practices.

Objective

1. Efficiently using energy, water, and other resources.
2. Protecting occupant health and improving employee productivity
3. Reducing waste, pollution and environmental degradation.

Materials and indoor environmental quality

As we know, how buildings affect the health of their occupants is a major construction industry issue and principal concern of the green-building movement. It is brought about by various building design features that affect the overall makeup of the building's interior. The sick building syndrome (SBS) and building related illness (BRI) are major classes of problems associated with building health.

Table 1: Major indoor air pollutants in homes

Pollutant	Source	Health Effects
Tobacco Smoke	Cigarette, pipe cigar smoke	Eye, nose, throat irritation, headaches
Carbon Monoxide	Un-vented kerosene and gas heaters, leaking chimneys, furnaces	Fatigue, impaired vision, headaches, dizziness, nausea
Nitrogen Dioxide	Kerosene heaters, un-vented gas stoves, tobacco smoke	Eye, nose, throat irritation, impaired lung function
Biologicals	Paints, stains and strippers	Headaches, damages to liver and kidneys

The high-performance building movement has been very successful in integrating indoor environmental quality issues into the overall criteria for green building. Optimizing material selection is a key component of a green building. Environmentally friendly building materials are a growing field with more product choices every year. Material selection is a complex process involving many variables, and there is not necessarily one best method that can be used across the board for selection. Selecting environmentally preferable materials requires research, critical evaluation, and common sense.

Green building rating

Several green building rating systems have been developed to evaluate the energy and environmental performance that spans the broad spectrum of sustainability of a building. Green building rating systems are transforming the construction industry by focusing on high-performance, energy efficient, economical and environment friendly buildings. All green building rating systems are voluntary in nature.

LEED and Indian green building council

US Green Building Council (USGBC) founded in 1993 and launched Leadership in Energy and Environment Design (LEED) Version 1.0 in 1998 to promote the design and construction of buildings that are environmentally responsible, profitable, and healthy places to live and work. They are focused on integrating building industry sectors and leading a market transformation towards greener construction. LEED is a system for designing, constructing and certifying green buildings. It is a voluntary rating program based on which buildings are classified or certified as Silver, Gold or Platinum depending upon the number of points they acquire within the following building components.

- Sustainable site planning and design
- Water efficiency o Energy and atmosphere
- Material and resources o Indoor environment quality
- Innovation in design processes

GRIHA

GRIHA stands for Green Rating for Integrated Habitat Assessment, to encourage design construction and operation with green building principles for new commercial, institutional and residential buildings. This GRIHA rating system is developed by TERI (The Energy Resources Institute). The rating criteria are categorized according to three aspects:

- Site selection and site planning
- Building planning and construction, including design for efficient use of energy and water
- Building operations and maintenance

Energy conservation building code (ECBC)

The building sector consumes about 33% of electricity

consumption in India, which commercial sector and residential sector accounting 8% and 25% respectively. Electricity usage in commercial buildings has been growing at about 11- 12% annually. Building sector energy consumption has increased from 14% in the 1970s to nearly 33% in 2004-2005. The structure of ECBC is patterned like that of ASHRAE Standard 90.1-2004. ECBC establishes minimum energy efficiency requirement for building envelope, lighting, HVAC, electrical system, water heating and pumping system. Building designers can take several approaches to compliance with ECBC ECBC can be only applied to those buildings which has the connected load of 500 kW or grater, or a contract demand of 600 kVA or greater and a conditioned area of greater than 1000 square meters.

Conclusion

Improving the quality of life is a goal we all dream for, which can be achieved by using natural resources responsibly. Green building concept includes smart approach for the saving of energy; it saves our water resources and helps us for minimising wastages and maximising reuse. Green building concepts emphasises in to improving health and wealth of the society and more importantly connects us with nature. It helps for creating jobs, value of resources used, increases energy efficient way and adds financial benefits for the society. Green building concept is a future need of a country and it leads us towards the healthier and wealthier environment and as well as it shows the way to keep in touch with nature.

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