

Environmental Issues in Construction and Green Technology

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Abstract

Environmental considerations and energy efficiency should be part of building design and purchasing criteria. This is balanced appropriately with other important criteria, such as product safety, price, and performance availability. The last decades have witnessed a rapidly growing number of studies on green building. This paper reports a critical review of the existing body of knowledge of researches related to green building.

Keywords - Nature, Design, Construction, Maintenance management, Environment

I. INTRODUCTION

An environment is one of the most discussed issues today. The environment is the space surrounding the man, air, water, soil, climate, the flora, and the fauna. The man has no separate existence independent of his environment. We enjoy the benefits of the 'Prakriti' or 'Nature' by forming a part of an ecological system closely related to other components. A balance in the equilibrium of the dynamic environment depends upon the mutual interaction of these components. The process of generation counterbalances the process of degeneration. Hence, the delicate equilibrium has to be maintained by suitably managing the various components.

The Indian philosophy has always been laying great stress on 'respect for nature.' The survival threats we are facing today provide us with a challenge to build a world of a clean environment. Right from the first United Nations Conference on the human environment held in Stockholm in 1972, it has been recognized by nations and people that a clean environment is the fundamental right of every individual. Our collective responsibility is to preserve the life support system on this earth, not only for the present generation but also for future generations. All our activities should harmonize ourselves with nature and develop within its majestic beauty and power. In keeping with this principle, it is well said that you can never take from nature more than what you can give it.

II. ROLE OF CONSTRUCTION MANAGERS

Construction managers are among the major environmental changes. When no construction or facility existed earlier, where it was covered with

With dense forest and wild animals, rivers, and waterfalls, the construction managers have to move in with his construction team, equipment, and construction giant national and international projects. The very nature of his profession demands a great deal of interaction with the environment. The construction manager must have a sound knowledge of the various environmental issues that his construction may create. All of these aspects are to be analyzed carefully during the planning stage. Like various alternate sites, construction methods and various other factors must be given a detailed and careful study. Finally, the best possible alternative which has the least environmental problems is to be chosen. Today, many of our water resources, power, chemical, and other projects are under controversy due to inadequate environmental issues analysis.

III. IMPACT OF CONSTRUCTION INDUSTRY ON ENVIRONMENT

The construction industry can impact the environment in many ways, including emissions to air, land contamination, noise pollution, waste disposal, and discharges to water.

Taking time at the start of a project to understand its potential environmental impacts can bring business benefits, including reduced waste disposal costs and less time wasted clearing up after incidents. For example, a site waste management plan can cut the amount of waste produced considerably and increase resource efficiency. On the other hand, firms can incur substantial fines for depositing construction waste anywhere other than an official waste disposal site or undertaking work that results in polluted water being released into the local water supply.

IV. CONCEPT OF GREEN BUILDINGS

Green building (also known as green construction or sustainable building) refers to a structure and using a process that is environmentally responsible and resource-efficient throughout a building's life-cycle: from sitting to design, construction, operation, maintenance, renovation, and demolition. This requires the design team's close cooperation, the architects, the engineers, and the client at all project stages. The Green Building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

Although new technologies are constantly being developed to complement current practices in



creating greener structures, the common objective is that green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution, and environmental degradation

V. ADVANTAGES OF GREEN BUILDINGS

Green design is not merely the use of energy-efficient materials. It also involves creating products and systems that leave a light footprint on the environment over the full life-cycle, i.e., from production to transportation, installation, use, and renewal. As such, the sustainable green design should be thought of as a process, not just a goal—allowing for a broader evaluation of the environmental, economic, and societal impacts of a product, as single units and as part of their environment.

Green building practices aim to reduce the environmental impact of the building. The first rule is that the greenest building is the building that doesn't get built. Since construction almost always degrades a building site, not building is preferable to green building in terms of reducing environmental impact. The second rule is that every building should be as small as possible. The third rule is not to contribute to sprawl, even if the most energy-efficient, environmentally sound methods are used in design and construction.

Green building brings together a vast array of practices, techniques, and skills to reduce and ultimately eliminate buildings' impacts on the environment and human health. It often emphasizes taking advantage of renewable resources, e.g., using sunlight through passive solar, active solar, and photovoltaic equipment, and using plants and trees through green roofs, rain gardens, and rainwater reduction run-off. Many other techniques are used, such as using low-impact building materials or using packed gravel or permeable concrete instead of conventional concrete or asphalt to enhance groundwater replenishment.

When considering environmental issues in construction and life cycle, some focus on evaluating manufactured products in terms of waste disposal is to be taken. A systems approach allows for determining the environmental impact of a product in terms of energy consumption at each stage of a product's life cycle, beginning at the point of raw materials extraction from the earth and proceeding through processing, manufacturing, fabrication, end-use, and disposal. Transportation of materials and products to each process step should also be included.

VI. FACTORS TO BE CONSIDERED IN PLANNING

In the planning process for all types of big construction projects, the following aspects have to be considered:

- (i) Environmental Impact Assessment (EIA): This is a method to bring out the potential effects of human activities on environmental systems. This is to be prepared to compare the development options and judge the merits of alternative sites for locating the projects.
- (ii) Environmental Impact Statement (EIS): The preparation of EIS follows that of the EIA. This should cover the following items:
 - A brief description of the project and the existing environment
 - What are the adverse and beneficial impacts? (Short and long term both)
 - Whether the impacts are reversible or irreversible?
 - A detailed account of the measures proposed for mitigation and protection of the environment.
 - Analysis of alternative considerations and which are best suited and least suited
 - An account of the future status of the environmental conditions
 - Summary and conclusion, detailing the gains and losses.
- (iii) Environmental Management Plan (EMP): For the measures recommended in EIS, the EMP is the implementation plan. It contains a detailed account of how the protection measures should be implemented. It also contains the implementation methodology for each one of the mitigative protection and enhancement measures.

VII. CONCLUSION

In support of the systems approach to sustainable and green building design, we can address the following issues for building design, systems, and products:

- (i) Environmental considerations and energy efficiency should be part of building design and purchasing criteria, balanced appropriately with other important criteria, such as product safety, price, performance, and availability.
- (ii) Energy efficiency and environmental performance should be evaluated using a "systems" approach, focusing on how individual components interact within the building system and identifying options with the greatest potential for improving energy efficiency and reducing overall environmental effects.
- (iii) Any process for establishing "sustainable" building/product criteria should be science-based, transparent, open to all stakeholders, and consider any new and significant information.

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