

An Approach Towards Sustainable Affordable Construction

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Abstract: This paper aims to implementing sustainable practices in building construction. The practices include conservation of resources, cost efficiency. This can be achieved by the use of various building materials, construction strategies, and conservation methods. Each practice includes methods and techniques to be used in the building.

Keywords: affordability, conservation, sustainability, sustainable building materials.

1. Introduction

The building industry plays a very important role in the economy but is a major consumer of natural resources. Construction industry is also large polluter of these resources and carbon emission. As in India, construction sector produces 22% of total annual emission. In response to these appropriate strategies and techniques are needed to make building activities more sustainable. Sustainability is a concept which is an issue in the construction industry. The meaning of sustainability is to improve the lifestyle of people with better environmental, economic and social conditions. A sustainable project should be resource and energy efficient, have low CO₂ emission, it should be affordable to build. The concept of sustainability in the construction of buildings is to promote the efficiency and to reduce costs. There are various ways of achieving affordability it can be through less expensive materials or by reducing the time of construction etc. Sometimes a higher amount can be used to achieve the goal but it is assuming that the building will recover that cost in the future. The strategies for sustainable construction are presented which takes energy efficiency and affordability.

2. Strategies for achieving sustainability

To achieve a sustainable future in the building industry there are many strategies used to preserve resources and energy, like use of locally available materials, use of low flow fixtures, rain water harvesting, reusing waste water, as they will lead to energy saving, minimization of material waste and control on emission etc.

The various methods to make a building sustainable the following strategies can be adopted:

Conservation of soil: Soil is an important resource which the building industry depends upon as well as has a huge impact as

it causes soil erosion ground water contamination etc. In building construction, the excavated soil from the foundation can be further reused in landscaping, leveling and refilling of low areas.

Local materials: Naturally available material can be used in the construction as they have low embodied energy and are climate responsive. This ever increases the local economy and provides labor to locales.

Water conservation: Water conservation can be achieved through using low water fixture, rainwater harvesting and installing waste water recycling system.

Solar Photovoltaic (PV) Panels: PV panels or solar panels is used to produce electricity; it is even possible for them to produce 100% of the electricity consumption of the house. The cost of the system is high but the assistance from the government can make it affordable.

Solar Hot Water: Solar water heater reduces the use of energy in a home especially in the cold region. They are more affordable than PV system. In case of high demand solar water heater uses electricity or gas to fulfill the need therefore the use of gas should be preferred as it emits less greenhouse gases.

3. Sustainable building materials

Earth: Earth is the oldest building material it can be used in different forms in different ways by using compressed earth blocks and non-erodible mud plaster.

Compressed Earth Block: It is also known as adobe blocks. It is a developed form of molded earth blocks. They are manufactured by using compacting raw material earth mixed with a stabilizer such as cement or lime using manual soil press.

Non erodible Mud Plaster: Central Building Research Institute (CBRI), India has developed an economical and effective way to protect the mud walls by applying this mud plaster. It is prepared by mixing bitumen cutback with a specified mud plaster. This even provides resistance from water.

Aerocon Panels: These are made of two fiber reinforced cement sheets engulfing a light-weight core consisting of Portland cement, binders and a mix of siliceous and micaceous aggregates.

These panels are eco-friendly, on-site curing, no wet plastering and light weight, high thermal insulation, faster

construction, fire resistant, properties, water and termite and weather resistant, excellent sound reduction.

Fly Ash: The residue produced by burning coal and the fine glass powder recovered from its gases is called Fly Ash. Fly Ash can be used in many ways in building materials.

Fly Ash Brick: It is a construction material, which is self-cementing. Fly ash bricks are energy efficient, have lower water penetration, light weight, thermal insulation and cost effective (it costs 20% less than clay brick manufacturing).

Ferro-Cement: Ferro-cement is a construction material consists of cement mortar and wire meshes. The construction cost of the material is low. It is light in weight.

Cement Concrete Hollow Blocks: These are better option than burnt clay bricks as they are cost effective, durability, fire resistance, partial resistance to sound, and thermal insulation. Their thermal insulation is better because they have cavity in between them. They require less mortar and are larger in size which leads to the cost reduction in construction.

4. Conclusion

The paper aimed to develop an approach towards sustainable and affordable construction.

It shows the relation between sustainable construction and affordability as it can be achieved by using appropriate construction strategies which will lead to the conservation of environment by different ways like reducing the carbon emission, waste of materials and energy, use of recycled materials. The affordable factor can be achieved by using cost effective materials and energy saving techniques as not only the building will be affordable at the time of construction but also in future by reducing different demands like electricity. As the application of these techniques and material can help a building to achieve sustainability as well as affordability in construction.

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