



Green Building Materials

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Abstract:

To reduce greenhouse gas emission as per the Kyoto protocol control over the global warming and climate change and to overcome from this issue green building serves the important role. In which we can use the environment friendly “Green” material which is also biodegradable, renewable, and recyclable. India is progressing towards developing to developed country in which Indian government is promoting the movement like “Make In India” under which the construction is rapidly growing. The demand of rapid construction forcing builders to use material which is harmful to Environment. In this paper we discussed about sustainable materials which can be used in rapid construction

Keywords

Sustainable Material, Environment friendly, cost efficient.

1. Introduction

‘The international workshop on “Sustainability through passive and low energy –climate responsive Architecture” was held in New Delhi, organized by the Center for advance studies in Architecture, School of Planning and Architecture – New Delhi from March 27 to 31, 1995. The participant of this workshop collectively agrees that “High energy consuming and environmentally damaging buildings can no longer be considered as sustainable. To achieve rapid improvements necessary in building performance there must now be greater collaboration between everyone involved with buildings: users, builders, governments, NGOs, teachers and the design professions’ [1]

‘Not only does the selection of wood harvesting, hard-surface paving, roofing materials influence energy production, these materials also affect our air quality. Dark color paving and roofs absorbs heat, contributing to heat island effect. The heat island effect is the phenomenon of urban areas being warmer than rural areas this effect is due to primarily to the increased use of materials that absorb heat

during the day and release it after sun set, rising the air temperatures on warmer days and incising energy demands because of greater air conditioning usages’ [2].



Fig. 1. Material Life Cycle [3]

2. Materials And Discussion

1) Smart materials

These materials reacts to the stimuli that include light, temperature, moisture mechanical force and electronic and magnetic fields. There are three types of Smart materials 1) Thermo responsive materials 2) Light responsive materials 3) stimulus (force) responsive material.

a) Thermo-Responsive Materials

Thermo-Responsive Materials are smart materials that transform due to a change in temperature.

b) Thermocromic

When temperature differences thermo cromic material changes color .When a thermocromic material absorb heat , its molecular structure and the



consequent light reflection of material also get changes.

For example, thermochromic materials mainly used for making: mugs that changes its color when its temperature get changed due to poured liquid in it; pen which changes its color on one's finger temperature.

Thermochromic Windows – This window films alter their color as well as reduce solar heat transmission by holding UV radiation.

Thermochromic Paints- This Paints change color based on temperature changes in outdoor environment.

c) Thermo tropic

When thermotropic material absorbs heat its molecular structure is altered, resulting in property changes.

In response to heat and temperature changes, this material undergo different property transformation, includes

Conductivity, transmissivity, volumetric expansion and solubility.

Thermo tropic window- This is one of the smart window system in today because when materials temperature exceeds a certain limit, the thermo tropic layer becomes milky white, while at low temperature no visual changes in it.

2) Biomaterials

Biomaterials are any Natural material that formed from living organism. Natural material basically comes from plants, animals or the earth. They are naturally occurring, renewable, and biodegradable materials which helps and good for building.

Natural Materials such as Bamboo, Straw bale, Mud and Clay, Rammed Earth

a) Bamboo

Bamboo is natural material that is light weight, flexible, durable and recyclable. Bamboo found in different climates from tropical areas to cooler high altitude areas. This material is one of the fastest growing natural materials.

b) Straw bale

It is an agricultural byproduct made from cereal crops steams such as wheat, oats, rice and others. It is very economical and do not required skill labor. Erecting walls can go very quickly.

c) Mud and clay

These materials are one of the most basic building materials including rock. Today also people use these natural materials to create shelter to suit their local weather conditions in all over the world. Mud and clay have very good thermal mass quality and keep the indoor temperature at constant level.

d) Rammed Earth

It is a compressed damp mixture of soil mixed with sand, gravel, clay and other stabilizers, These all stabilizers pressed by an external support frame to form a solid earth wall by molding a shape of wall section. It is a economical and versatile material. [4]

3. Conclusion

It is the time that we need to redefine our definitions of growth and modernism. Sustainable construction could be the only way for our better living in near future.

4. Acknowledgements

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5. References

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