

Construction: In relation with Sustainable Development

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Abstract— New trends in the field of construction require embedment of sustainability principles in the way the entire construction process is to be executed. Construction industry in India is growing day by day with lots of investment and is concerned with improving the social, economic and environmental indicators of sustainability. This increase in construction flow is also the reason and we know that we are endangering the future of forth coming generations by leaving depleted the natural resources which is slowly unbalancing the earth's environment. Hence, there is a need from all with an active effort for sustainable development and hence leave resources for the future generation to satisfy their needs. This paper seeks to review possible aspect where and how sustainability can be adopted and implemented and/or incorporated for sustainable development so that environmental issues can be considered.

Key words: Construction Industry, Sustainability, Sustainable Development

I. INTRODUCTION

Sustainability as a concept is very important for the construction industry, because the processes of construction projects have a great impact on the environment (Manoliadis et al., 2006). The policies and practices of the sustainable development refer to economy, environment and society. A fundamental example is required, a change of philosophy in how we understand the constraints related to time, cost and quality. The prospect of sustainability may include indicators of social performance and response to the environment (Vatalis et al., 2011). The strategic role of purchasing and supply as a lever for sustainable development is much more highlighted now than before. There are a number of key parameters for this increasing prominence of sustainability including an increased understanding of the science relating to climate change, pressure from various stakeholders upon the organizations for the implications of their activities, and much more in respect to environmental issues and social issues and its action by organization.

II. SUSTAINABLE DEVELOPMENT

“Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”

Sustainable development is about integration: developing in a way that benefits the widest possible range of sectors, across borders and even between generations. In other words, our decisions should take into consideration potential impact on society; the environment and the economy, while keeping in mind that: our actions will have impacts elsewhere and our actions will have an impact on the future. The concept of sustainable development has been used to articulate several essential shifts of perspective in how we relate to the world around us and, consequently, how we expect governments to make policies that support that world view.

The three main pillars of sustainable development on which it is based are; the social factors, environmental factors and the economic factors.

a) Social Factors

“An organization's impacts on social systems within which it operate - including impacts on stakeholders at the local, national and global levels.”

b) Environmental Factors

“An organization's impacts on living and non-living systems, including ecosystems, land, air and water.

c) Economic Factors

“An organization's impacts on the economic circumstances of its stakeholders and on economic systems at the local, national, and global levels.

III. NEED FOR SUSTAINABLE DEVELOPMENT

There are several challenges that need attention in the arena of economic development and environmental depletion. Hence the idea of Sustainable development is essential to address the following issues.

a) To curb or prevent the environmental degradation

b) To ensure a safe human life

c) To check the exploitative technology and find alternative sources

d) To check the over exploitation and wastage of natural resources

e) To regenerate renewable energy resources

IV. IMPLEMENTATION OF SUSTAINABILITY IN CONSTRUCTION INDUSTRY

As far as India is considered sustainable practices in construction industry is still a new concept and therefore such new and important concept must be adopted, so that at every project a detail analysis will be prepared for each stage of construction. And for this we need to have a grade based certification system or a comprehensive plan for sustainable construction of every structure in country. This can be done by considering sustainability at aspects as:

a) Careful Planning, design and specifications as per norms

b) Current Practices within the Construction Industry

c) Proper Material Conservation and its Selection as per necessity

d) Use of Construction Demolition and recycled Material

e) Energy Conservation

f) Innovation

g) People

A. Careful Planning, Design & Specifications as per Norms

Every new project begins with detail planning and therefore in this stage proper guidelines and considerations should be given to minimize the use of energy in operational stage by considering the effective utilization of nature. In India, Structures are designed well but there is no reference to any service life in most specification. To effect sustainable development, deeper study of various service life prediction

models and calculations are essential. To ensure better service life, Specifications must be performance based and not in their present form of being prescription based. Also, Specifications should keep in view to use eco-friendly and sustainable materials and methods for sustainable development.

B. Current Practices within Construction Industry

In any project big or small it is seen that wastage in the construction industry is as high as 38%. This shows that as per the current valuation, we spending more of 38 % more money and resources to be used in construction industry in India. Though this seems to be simple a large relatively and straight forward challenge this requires lots of attention and must be tackled for sustainable and economic growth of India. These wastages are activities that absorb resources, man hours and materials but create no value. Most developed countries have different forums / institutes / researchers / academic institutions for seeking solutions to mitigate these wastages and to develop lean construction practices that can help to solve this problem. Lean construction is a "way to design production systems to minimize waste of materials, time and efforts in order to generate the maximum possible value". While some novel initiatives are being taken in some parts of India to adopt leaner construction practices, India does not have a fully focused lean construction forum.

C. Material Conservation & Selection

At present we are tackling with concrete jungle which shows how much it is being used. Concrete is the largest material which has a per capita consumption of 1.5 tons per annum in India. Concrete is widely used because it has the capacity to utilize locally available ingredients, develop adequate engineering properties for a variety of applications, easily adapt to any shape and size and has comparatively low initial and maintenance costs. Though concrete is not a big energy consumer concrete and particularly cement still remains a major energy 'sink' due to its large volume of production and also environmentally unsustainable due to large quantities of CO₂ emission associated with its manufacture. Since Raw materials for concrete include non-renewable natural resources like lime stone aggregates, River sand and aggregate etc and are very easily available use of it has been increased in last few decades.

D. Use of Construction Waste & Recycling the Aggregates

Construction demolition is also taking place in large amount which leaves a considerable amount of material which can be reused. In India, the use of recycled aggregates is still a new topic and at very rare sites it has been practiced. At present, the construction and demolition waste has substantially increased as new super structures which are being built on land after tearing down the smaller structures that previously existed. It is estimated that the construction industry in India generates about 10-12 million tons of waste annually. Recycling of aggregate material from construction and demolition waste may reduce the demand of aggregates and also provide economical solution for small structures. There is also an increasing-acute shortage of dumping grounds and landfills particularly in metropolitan cities.

E. Energy Conservation

Since sources of good quality, aggregates are fast depleting, the concrete industry in India needs to prepare itself to use locally available 'marginal' aggregates. The use of local materials helps reduce the carbon footprint associated with transport. Thus, from sustainability angle, the emphasis should be placed on using locally-available aggregates, even if there are small deficiencies in their quality. It has been amply demonstrated that desired properties of concrete can be obtained by intelligent blending of available aggregates with crushed sand, inert fillers, supplementary cementitious materials and chemical admixtures. Another important issue is that river sand and other construction materials are usually transported by road. India has a well-developed and efficient rail and water transport system that need to be leveraged by the construction industry. This is not only more sustainable option but also most cost effective.

F. Innovation

Every company at all time tries new strategies so as to overcome the last project deficiencies and hence Innovation in this field has been given considerable importance so as to generate new ideas to obtain competitive advantage. It is helps in generating and developing new concepts and helps in use of new products from the market and new processes and ways of working. It has been observed that the greater the sustainability greater is its effect on the project in terms of positive impact which helps to complete the project as per the policy and standards of procurement.

G. People

For sustainable development, people working in construction industry must be aware of importance of their work and for this they shall be equipped with necessary skills required. It is a basic need of industry in India as most labours in our country are not skilled and hence it's the major obstacle which needs to be tackle for sustainable development.

V. SUSTAINABLE CONSTRUCTION

Sustainable construction can be considered as an investment in the future. Through conservation of energy, water and natural resources by re-use, recycling, innovative design and the minimization of waste and pollution we can meet our needs without compromising he needs of future generations. The promotion of sustainable construction is a major part of the Government's policy on Sustainable Development, which recognizes that our economy, environment and social wellbeing are interdependent. Sustainable Construction is the set of processes by which a profitable and competitive industry delivers built assets (buildings, structures, supporting infrastructure and their immediate surroundings that enhance the quality of life and offer customer satisfaction. The Sustainable construction represents one way of approaching the complex issues of sustainability and their application to the construction process. The foundation for the whole process lies in balancing financial, environmental and operational considerations.

The construction industry is one of the main contributors to the depletion of natural resources and a major cause of unwanted side effects such as air and water pollution,

solid waste, deforestation, toxic wastes, health hazards, global warming, and other negative consequences and hence its very necessary to be aware of the ill effects and to get a one-step solution so as to minimize the impact on natural resources which can be attained only by being sustainable.

VI. CONCLUSION

The aim of a traditional construction is to complete the development as cheaply as possible, but at the same time care should be taken not to harm the nature by means of construction waste. A sustainable construction project; therefore, must aim to redress the imbalance caused. It should aim to balance the financial, environmental and operational aspects of every decision, every material and every system in the development. The best we can hope for at this stage of our own development is to do our best to reach the right decision, based on the information available and to be opened and honest about the decision-making process, so that others can follow it (or avoid it).

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