

**Necessity for
sustainability in
developing countries
environmental
sciences essay...**



Sustainable construction is the application of sustainable development practices to construction, which can have big impact on the quest for a sustainable built environment (Asad and Khalfan, 2007). With high environmental standards the sustainable constructions are designed and constructed and thereby these minimise the requirements in energy, reduce water Consumption, and using the materials which makes the environment with low impact. For instance: low embodied Energy, resource efficient, minimise wastage, conserve / enhance the natural environment and safeguard human health and wellbeing. Not only Sustainable construction focuses solely on environmental issues. More broadly, sustainable construction encompasses three major areas such as economic, environmental and social performance of the industry. The UK Government's strategy for more sustainable construction DETR (2000) suggests some key factors for action by the construction industry by widening these basic objectives. These includes, 1. Design for minimum waste 2. Applying lean construction principles 3. Minimising energy in construction and use 4. Pollution reduction 5. Preservation and enhancement of biodiversity 6. Conservation of water resources 7. Respect for people and local environment 8. Setting targets 9. Monitoring and reporting in order to benchmark the performance. Most of the above points basically make good trade sense e. g. Lessening waste increases efficiency. Sustainability is of increasing importance to the efficient, effective & responsible operation of trade. Similarly Reddy (2009) identified the key working principles of sustainability as shown below in the figure 2. 9.

2. 8 Benefits of sustainable construction

The welfares in executing sustainable practices in construction can be congregated under social, environmental and economic aspects. All these comprises of improved regulatory compliance requirements; risks and liabilities are when minimised; enhanced reliability among customers and peers; whenever there is decrease in harmful impacts to the environment; whenever we can prevent the pollution and waste it shows result in cost reduction; how to improve project and site safety(by minimising damages which are related to releases, environmental spills and emissions); developed interactions with stakeholders such as, community groups, government agencies and clients (Christini et al, 2004). In addition, plummeting environmental control safeguards ideal use of resources and enforces events which improve the company's competitiveness (Kein et al, 1999). WRI Report (2006) summarizes the number of Tangible and Intangible benefits of sustainable construction as mentioned below. Tangible benefits_ Cost saving from improved energy management. _ Cost saving from operation efficiencies_ Increased revenues and new markets from providing low-carbon products and servicesIntangible benefits_ Competitive positioning in the market_ Improved shareholder relations_ Employee-related benefitsThe triple bottom line such as the social, economic and environmental performance of the industry is addressed cohesively by Sustainable construction. Economic benefits includes increasing profitability by making more efficient use of resources, including labour, materials, water and energy in turn enabling being more competitive (Bharadwaj et al., 1993). The environmental benefits thwarts harmful and potentially irreparable effects on the environment by careful use of natural resources, <https://assignbuster.com/necessity-for-sustainability-in-developing-countries-environmental-sciences-essay/>

minimizing waste, protecting and where possible improving the environment. The social benefits include enlightening health and safety, enhancing site and welfare conditions, and avoiding noise and dirt (which would inconvenience local residents) and working closely with clients, suppliers, employees and local communities (Mohamed Salama and Hana, 2010).

Necessity for Sustainability in developing countries

In the developing countries the fraction of the construction industry on the total energy consumption and GHG emissions is much greater than in the developed countries due to the rapid economic growth and fast urbanization, which increases the energy production and usage. Also, population growth in these countries persuades the delinquent of pollution and waste generation, which produces CO₂ emissions in the atmosphere. Urban areas are mostly positioned in coastal locations where economic assets and residents increasingly find themselves at raised risk of climate related events. Case studies show that transportation infrastructure in coastal areas is vulnerable to sea level rise and extreme climate events (Gasper, 2011). According to the White House Initiative on Global Climate Change, in the developed countries the CO₂ emission levels are reducing from 1995 levels whereas this level is increasing in the developing countries from 1995 levels, (Figure 2. 12). This shows a clear indication that the developing countries are to be in a critical situation to reduce the CO₂ emission levels. Figure 2. 12: Total World Emissions levels at 1995 and expected levels in 2035 undercurrent trends, (Source: <http://clinton4.nara.gov/Initiatives/Climate/greenhouse.html>)

Conclusion

Construction sector and construction activities are considered to be one of the major sources of economic growth, development and economic activities. Construction and engineering services industry play an important role in the economic uplift and development of the country it can be regarded as a mechanism of generating employment , giving career opportunities to number of skilled, unskilled and semi-skilled work force. And it also plays important role in making income in both the informal, formal divisions. It supplements foreign exchange earnings derived from trade in engineering services and in construction material. Construction sector is a main sector plays vital role in the Economy of any country. Sustainable construction is essential in order to achieve competitive advantage through innovation and efficiency, more than that to tackle the environmental impacts being faced all over the world. It is more essential for the developing countries as the total CO2 emission levels are still increasing in the developing countries when this reducing in the developed countries as they have taken more initiatives to tackle this issue. It is obvious that the developing countries must take this as a serious threat to the economic development of the countries. The discharge of GHG emissions one way the country's economy will strengthen and other hand, the CO2 level will reduce by managing the usage level of the components causes. The energy safeguarding and reduction in the CO2 emission levels can be achieved by recognizing the innovative ideas and executing sustainable practices in businesses and industries. The next section provides the level of environmental impacts due to the construction industry and the main sources for CO2 emission within the industry.

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Material use in construction industry and CO2 emissions

Since 1900, the usage of the materials had been become significant in the construction industry. Using of materials in construction industry has risen to an alarming level (Eddy Krygiel and Bradley Nies, 2008). Figure 3. 3 shows the materials flow (in tons) in various industries from the year 1900. Figure 3. 3: Materials flow in various industries, (Source: Eddy Krygiel and BradleyNies, 2008, p. 30)

Waste generation

One of the main components that lifts the landfills is the waste generated from construction sites and it also involves fuel consumption for transportation for its disposal, and land contamination. There are different types of materials which are used in the construction among that materials, concrete was found to be the most significant element with about 75% collected from general civil works construction site as construction waste (Shen et al., 2009).

Non availability of sustainable materials

Sustainable constructions requires an appropriate sustainable materials supply chain and availability of their technical details during the design stage in order to incorporate into the design for later construction. Maria Alkinson, GBCA Executive director says that this is one the greatest challenges facing by the construction professionals. There is a limited understanding to use these resources, though there are wide data bases available nowadays. Usually, the concrete is readily available and can reach site as soon as ordered, whereas sustainable materials like wood etc. sufficient quantity is

not available always readily. Non availability of sustainable materials at the same time as readily availability of un-sustainable materials, acts as barrier to use sustainable materials in construction. Sustainable materials can be used in constructions by organizing in advance and procuring at right time and right quantities.

Lit.. Conclusion

In the developing countries specifically including India, Sustainable construction practices, have to be attained as soon as possible, as the building and construction sector in these countries is still under progress and growing very fast. Furthermore, the shift towards sustainability in the construction sector may play an important role to shift the economic structure towards sustainability and to optimise the wellbeing of the society (UNEP, 2003). In all the stages of construction, practices are to be followed to the successful completion in the sustainable construction.. Hence this dissertation specifically explores sustainable construction practices in the construction in the India to assess the cost-effectiveness and sustainability as part of this research study.

3. 2 Closed Structural

The structural and functional advantages of hollow sections (Figure 8) have always appealed to the engineers. Till 1959, square and rectangular hollow sections were shop fabricated by welding or jointing together structural plates and sections. This involved expensive fabrication, restricting architectural expressions to traditional steel forms. Research and development of hollow sections are carried out by an international

organization, CIDECT (Headquarters: Paris). In India, TATASTEEL adopted this
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concept. The excellent distribution of the material around the centroidal axis of closed structurals exhibits remarkable strength qualities, and thus offers decisive advantages in its applications. Compared to conventional sections, hollow sections result in reduced use of steel (Table 2). Figure 8. Rectangular and Square Sections (Sinha, 2003a)

Property of Closed Structural

Application in Structural Systems

Steel Saved Compared to Conventional Sections(%)

Symmetry about all axes Tension Ties 15 Higher Radius of

Gyration Compression struts 45 Higher Lateral Rigidity Flexural

Members 25 Higher Shear Area Members under Shear 40 Greater Enclosed

Torsional Area Members under Torsion 80

3. 5 Urban Construction Strategies

Large-size precast piers are used in the construction of flyovers over existing roads or other utility services that are too important to be closed or dismantled for the construction work of the flyovers (Figure 11a). These massive precast structures are erected at site with large capacity cranes that are themselves not to restrict the flow of traffic (Figure 11b). In addition, the Indian Society of Trench less Technology (INDSTT) introduced the trench-less pipe laying technology to assist in interruption free reconstruction in urban environments. Besides project design, development, implementation and monitoring are gradually getting transferred to the computers by consultants, project owners and contractors. Some leading corporate agencies

are planning initiatives for web-enabled design, control and monitoring of construction projects.

(b)

Figure 11: Massive Pre-cast Piers used for flyovers without disruption of underlying services and utilities: (a) JJ Hospital Flyover on Precast Piers in Delhi, and (b) Transportation of Precast Piers from site of construction to erection site (Bhattacharya, 2002)

Environment

The preserving of environment is a great challenge in a developing country like India, which has a fragile environment that is faced with high levels of land degradation (e. g., erosion, aridity, desertification, drought, flooding, and alkalinity and salinity of ground). The rapid urbanization alongside associated problems like pollution of air and pressure on existing infrastructure with regard to waste management, pose a race against time. Many countries, mainly industrialized ones, have taken steps to ensure that the reduced use of construction materials, techniques and practices, which result in operations and products that have lower environmental impact (Aggarwal, 2003). Developing countries like India can derive valuable lessons from these steps. Some of the desirable steps are: (a) Government action – The Government need to enforce legislation and regulation on environmental performances. Licenses and approvals need to be regulated with transparency to ensure that all organizations in the industry operate in an environment friendly manner. Tax holidays and special grants may be introduced to encourage environment protection. A policy of certification and labeling of products need to be brought into practice. (b) <https://assignbuster.com/necessity-for-sustainability-in-developing-countries-environmental-sciences-essay/>

Market forces – Project clients need to insist on better environmental performance of construction companies. Experience from other construction firms adopting or benefiting from good environmental practices need to be disseminated to all. (c) Institutional initiatives – Professional bodies need to take interest in providing support services to construction firms to function in an environment friendly manner. (d) Operational environment – Pressure groups and informed users need to work continually to prevent deterioration of the environment. The practice of being engaged in a continuous search for inputs and ways of working which will minimize the negative impact of construction activity on the environment should be encouraged among construction companies and practitioners. Also, openly discussing detailed case studies of good practices would be useful. The feasibility of preparing good-practice manuals suitable for use in various contexts may be investigated.

3.3 Pre-engineered Buildings (PEB)

These are a special class of buildings, which are constructed by assembling pre-built primary framing systems with other secondary structures and claddings (Figure 9). Various types of framing systems such as clear span rigid frames, beam and column frames, space saver frames, single slope, multi-span and lean-to frames are available depending upon the needs of the builders. They are also built to accommodate various sidewall heights, bay spacings and loading conditions. The invention of these buildings has greatly increased the speed of construction. However, concerns have been expressed over the multi-disaster resistance of these buildings. Hence, full scale testing should be conducted on them and especially on their

connections to confirm their reliability in sustaining hazards. Figure 9: A three-storey Pre-Engineered Building under construction by assembling of pre-engineered components, and in finished state. (Source: www.hcisteel.com, 2004) Findings/conclusion

Conclusion

The results of the online questionnaire survey from the industry professionals presented an insight view on sustainability and its impacts to the environment. The responses of the construction professionals showed their interest to adopt the sustainable practices in constructions and consequently they have expressed their general awareness, views and opinions on the chosen topic. They have also agreed on various aspects of sustainable practices and their needs, benefits. "Energy saving" and "increased productivity" were rated as the top 2 ranked benefits among the various benefits. These benefits of sustainable practices not only limited to cost saving but also quicker construction conclusion and CO₂ emissions reduction benefits also achieved. There are some barriers for the application of sustainable practices were identified from the literature reviews and rated them based on their influence level. The lack of time for innovation was selected as the top rated obstacle for sustainable practices. In this context Othman (2010), demonstrates that the innovation in the construction industry bring the sustainability through the new or significantly improved production or delivery methods. This consists substantial changes in equipment, software, techniques, and the process which in turn reduces the production costs, expedites the delivery or increases quality. The "

Regulators and controllers of earth quakes which allows a better operation

and structural behavior., Automated systems in buildings which can help in reducing the impacts on environment caused by the buildings" are the new technologies which are currently used in the overseas countries, but it is not introduced in the India. The local government and authorities should encourage the organisations to establish these types of sustainable replacements technologies and adopt the sustainable practices in all construction sectors. Bhattacharya, C., (2002), " JJ Hospital Flyover – Precast Piers," Gammon Bulletin, Vol. 126, April-June 2002. Sinha, R., (2003a), Closed Structurals Bulletin, Issue 13, Tata Pipes. www.hcisteel.com; 5 February 2004 Eddy Krygiel and Bradley Nies (2008) Green BIM: Successful Sustainable Design with Building Information Modeling. Indianapolis, Indiana: Wiley Publishing, Inc. Gasper R et al (2011) 'Social and economic impacts of climate change on the urban environment.' Current opinion in Environmental sustainability 3, 150-157 UNEP (2003), United Nations Environment Programme, Division of Technology, Industry and Economics (DTIE), International Environment Technology Centre (IETC);" Basic Principles and Guidelines in Design and Construction to Reduce Greenhouse Gases in Buildings", Japan, 2003. Available from www.unep.or.jp/ietc/kms/data/2842.pdf, [22 June 2011] Shen Li-yin et al (2009) 'Benefit analysis on replacing in situ concreting with precast slabs for temporary construction works in pursuing sustainable construction practice.' Resources, Conservation and Recycling 53, 145-148 White House Initiative on Global Climate Change, The Greenhouse Effect and Historical Emissions, Available at <http://clinton4.nara.gov/Initiatives/Climate/greenhouse.html>, Retrieved on [09 June 2011] Reddy S B N (2009) " Management of natural resources in construction" Available at <http://www.slideshare.net/saibhaskar/natural-https://assignbuster.com/necessity-for-sustainability-in-developing-countries-environmental-sciences-essay/>

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