ISSUES PREVAILING DURING DEVELOPMENT OF GREEN PROJECT

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ABSTRACT

Recently, a trend of green concept and sustainable development been much talked into various conferences, seminars and the topic raises the human concern and their responsibility towards environment and nature. Although, this concept has not received a very wide acknowledgement in India, but there are certain organizations and experts who have started talking about green and sustainable development. But, development of green project has to achieve certain stages and must be started at the very initial stage of construction but, the past trends shows that, soon such new objectives vanishes into air as the concern group withdraw their supports. Although, experts admitted that, the green concept has various positive impacts towards environment and other natural resources but, still people are not keen to accept and implement the green concept. The current study is about identifying those issues and a problem which creates hurdle in acceptance of the green concept and also try to find out the solution or way-out which can help in effective implementation of green concept.

Key Words : Green concept, Sustainable development, Initial cost involvement, Government subsidy, Natural resources

INTRODUCTION

Sustainable development is not a new word but now a days, this terminology is being widely used in construction industry throughout the world.1 Sustainable development is being popularly used as because there is need to protect the environment and every human must play his part of role in this environment protecting process and construction industry is playing its role by promoting green building technology.2 Although, Indian construction industry is still not much known about this development procedure but people have started talking about the green building concept, though, they do not have a clear understanding of this concept and its implementation.

During the development of green project, various important steps and stages are suppose to be covered and the main framework starts at the design stage itself, where maximum part of green concept is covered and planned, but as the development of Green project is not an easy task, so required changes have to be done at later stage and even then the success is not assured. The objective of implementation of green concept is just to reduce the negative impact over environment and also to conserve and protect the natural resources such as clean water, air etc.3 But, these objectives can only be achieved, if the coming up construction projects are designed and developed in such a way, so that, they can save the resources at maximum level with minimum consumption.

Green project not only protects the environment but also proved to be financial benefit in the long run.

Green building concept

Green building concept the approach of civil engineering, where the construction projects are developed in such a way, that it can reduce the harmful effects on the environment and human life and sustainable development can be promoted, by practicing the green concept, the environmental efficiency can be increased and less energy can be utilized for the same quality work, which was earlier done with extra usage of energy. In simple terms, the green building helps
in meeting certain important aspects, such as developing healthy environment, less usage of electricity and water, saving of extra cost spent over resources etc.\textsuperscript{3}

Environmental sensitive projects are not a new phenomenon but, this process have been started in early 90s but it received the terminology as green building in recent years and in simple terms, green building can be explained as, the construction practices where the development been done by keeping sustainable environmental as prime motive and the wastage of resources can be minimized.\textsuperscript{4} In fact, the term green building is interchangeable used as sustainable building. Green building can be defined in much better terms by usage of below mentioned functioning parts:

**Energy**

Energy is one of the crucial element, which runs human life smoothly but, the usage depends upon the economic cost and also the negative environmental impact too in terms of burning of fossil fuel. Green building concept caters the need of reduction in energy consumption but this is not the sole idea behind the green building development.\textsuperscript{5}

**Water**

Water is also the non-renewal source of energy but not given the due importance in terms of resources management but the reduction in wastage of water also result in cost saving but more than that the green building concept formulate certain designs which helps in up gradation of ground-water level and the periodic drought can be controlled.\textsuperscript{6-10}

**Waste management**

Usually, the green building model uses the wastages as one of the important components in its development, such as fly-ash bricks, recycling of waste materials etc, which helps in eliminating the wastage by proper recycling of the used products and soil pollution can also be controlled.\textsuperscript{11}

**Environmental safety**

Hurricanes, droughts, floods, earth-quakes and other disaster activities have been increased since last decade as due to global warming and mis-management of natural resources but green building concept assures the sustainable development and safeguarding the ecological system.\textsuperscript{12}

**Issues in green building development**

Green building concept is one of the upcoming features in construction industry in India but, still this concept has not received whole-hearted acceptance as there are certain issues are involved during its development process. The issues have been categorized in two segments different i.e., technological and non-technological issues.

**Technological issues**

Green project development consists the technological configuration, designs and processes which have to be managed end to end, so that the interplaying factors can be executed properly. But, the management of processes and designs are not an easy task, which sometimes ends up in complex situation or failure of the project.

**Management of industrial pollution**

The process of green building starts from the usage of industrial wastage where the wastage been implemented in production process but the industrial wastages have to be addressed with right methodology so that, the after effects and negative emissions can be eliminated at right time during the development process and the processes must be taken care during the development pipeline itself in spite of managing the issues at the completion stage, which usually ends up in poor management of negative impacts of emissions and other issues.\textsuperscript{13}

**Effective integration of human resources**

Green project development is a new concept which cannot be solely achieved by one single group but the effective partnership and understanding of architect, engineers, manufacturers and researchers are required with proper explanation of everybody's responsibility at each level but, there is higher possibility of arising of situation, where the interests of involved parties can conflict and the work may turn up failure.\textsuperscript{14-16}

**Management of projects**

Management of manpower as well as process factors is equally important as important as green development project itself. But, the development of green project not only depends upon the
technical and civil aspects but there are certain parallel issues also, which should also be catered properly. The other secondary aspects can be political, environmental, legal or social and these issues may not be affecting the development directly, but the future maintenance and usage depends upon these issues only. Lekan states that, the project development team must use certain tools, such as system measurement tool etc so that, if any deviation is noticed then that can be corrected on time and progress can also be noticed properly.3

**Green project delivery system**

Construction projects need to take the clearance certificate from the State Government, National Government and Local Authorities stating that, the project has been completed in all cases and all the basic amenities are available in project and no further development is pending from the developer's side but, the certificate issuing authority must take care that the sustainable project must ensure all the promises and the project is developed as per the clear instructions and policies of the authority, which is usually missing in Indian system.3

**Non-technological issues**

Non technological issues comprise the cost part, maintenance, education and knowledge of the end users, which impacts the development procedure. Technological issues can be sorted out by the technical engineers but, elimination of non-technical issues requires the support of various parties.

**Integration issues**

Construction projects requires participation of various contractors and parties but currently, all the construction parties works being indepand where one party does not want interference of other party during their work but the development of green project requires the contribution and planning of all participants at the same time but this forceful act may lead to project failure. Bilau states that the green concept is not a part of whole development but the green concept is itself a whole idea which cannot be added or removed at later stage, the concept is implemented at all level of development.

**Resistance to change in attitude**

Green concept is new and fresh which may not be much known to general population and in such situation the risk of acceptability prevails as people would not like to invest their capital in green projects. Green project requires certain technical knowledge which has to be implemented throughout the project and people are habitual of building in traditional manner and they would like to use familiar materials, so implementing the green concept is little tougher for them.4 As it is very difficult to make the people understand about the value and benefit of recycling of products and materials.

**Educating the people**

Currently, green concept is taught at graduation level in civil engineering, which is totally theoretical and there is as such no practical experience is imparted to students, so the education of green concept left no use. In fact, the students and upcoming generation should be taught from the school level with practical experience. The long term process can substiantly make impact among the upcoming generation but take a long time for acceptability.1

**Green concept cannot be implemented on existing buildings**

In a study conducted in 2006 states that, the green concept implementation process have been focused on upcoming buildings only and there is vast stock of existing older building where the green concept cannot be implemented and these buildings are located in posh or premium area.1

**Lack of infrastructure**

Green concept may be getting popular among people but the development is not supported by the infrastructure. For example, when the building is developed with the concept of green project then the green concept starts from the approach road to the project itself. But, the infrastructure development authority never thought about the development of bycycle tracks or pedstration path.1

**Initial capital cost**

Green project fails at the very initial stages just because of the initial cost involved in green concept development. The green project
demands approximately 30% higher price than the normal project and requires the regular maintenance too. Although, this initial investment will result in better long term returns but, the shortsightedness of general public usually do not go for this green concept.

METHODOLOGY

Study, design and survey
We opted for questionnaire distribution mainly for this article and little dependent on literature survey too. The main objective of the questionnaire is to research about the problems and issues arising during the green project development, to this, we participated in conference held at PHD chamber of commerce regarding green building and building rating system in July 2013 and the visitors were surveyed from there. The respondents were architects and B.Arch. and M.Arch. students from Jamia Milia University, New Delhi, India and also certain other experts from the green building field itself. All the participants were having good knowledge and understanding about their subjects and have enough experience to discuss the green building matter openly at any discussion forum. The respondents were kind to provide the first hand information for the purpose of research and approximately, we were able to get 90 questionnaires filled from all the category of participants and the questionnaire were being analyzed with the software package MS-excel and SPSS 17.0.

Questionnaire designing
The questionnaire consists eight questions based on close ended options and open ended questions and the data has been collected in form of qualitative data and analyzed the responses with help of excel by drafting charts, which helps us in understanding the factors which actually affects the development procedure of green building. The questionnaire consist the questions based as below:

- First question is about, that whether implementation of green concept is difficult in upcoming projects and the second question supports the first questions by providing the reasons of difficulties.
- Third question of the questionnaire is that, what steps can be taken to strengthen the green project concept and its implementation and next is that, what steps can be taken to reduce the initial investment used in green project development.
- Fifth question is that, how to connect the end users with green project concept and next question is that, whether the benefits of green concept are visible to the end users.
- Last two questions are open ended questions asking about the visible results to the end users and the government initiation to develop to green project concept respectively.

RESULTS AND DISCUSSION

The sample consists of 90 respondents including male and female out of which 42 respondents were B.Arch. students, 10 respondents were experts from the green building concept field and rest 38 respondents were M.Arch. students from Jamia Milia Islamia University, New Delhi, India. The age group of the 80 respondents doing B.Arch. and M.Arch. belongs to 18 to 23 years and the experts belong to the age bracket of 40 years to 60 years.

Implementation of green project is difficult task
Here, from the above mentioned details and after analysis of entire 90 questionnaires, we get derived the results (Fig. 1). Here, the response of all the 90 respondents have been converted into cent percentage and the chart has been prepared. Here, we took 90 as 100%. As per the questionnaire result, 78% of the respondents states that, they think that, implementation of green concept in upcoming projects is difficult task whereas
22% of the respondents states that, implementation of green concept is not a big deal and can be easily implemented in upcoming construction project.

Reasons, which make implementation of green concept as difficult task
The reasons related to implementation of green concept is difficult task depends upon the question asked earlier, that implementation of green project is a difficult task or not and if someone feels that, the implementation is difficult then the respondents can answer this question by choosing options. The response is calculated in Fig. 2.

The above mentioned chart shows that, 34% of the respondents agree that, lack of technical knowledge is one of the main issue and other major 34% of the respondents states that, Initial cost investment is one of the major issue, which makes the implementation of green concept as difficult task, whereas 11% respondents states that, people are not much concern about the environment and rest 22% of the respondents did not answer this question as they were not eligible to answer this question because if their previous reply.

Steps to strengthen green concept
Although, implementation of green concept may be a difficult issue but cannot be taken as impossible task, in fact the need of hour says that the government or the society must take certain steps to strengthen the implementation of green concept in upcoming projects. The results been shown from 90 respondents are as below in Fig. 3.
The above mentioned graph shows that, the highest number of respondents agrees that there should be a particular area of specialization for the upcoming civil engineers, whereas the second highest vote goes to borrowing the technical know-how from foreign nation. Rest 11% of the respondents accepts that, either implement the theoretical knowledge directly or spread the green concept information since school and initial education days. Although, as per my own perception, I am not comfortable with the last two responses as the direct implementation of theoretical knowledge may prove to be impractical at later stage and as the green concept education is little technical so this cannot be imparted at initial education level.

**Steps to reduce the initial cost investment**

Usually, while implementing the green concept for new upcoming project development then the cost of development automatically rises by 30% to 40% at initial level and later stage there is higher chances of further investment in terms of maintaining the building. The result have been shown in Fig. 4.

Herein, the above mentioned graph shows that 67% of the respondents admits that, existing green project development techniques are expensive and time consuming so, there should be new development of cost effective technique which not only reduce the initial investment.
whereas the rest 33% of the respondents states that, the government should comeup with certain new subsidy plan where the rates should be subsidized for green project development.

**Real life experience to end-users**

Usually, there are not much green project existing in India and nor they are open for general public view, so there is lack of real life experience among end users, that reduces the connection between End users and green concept. The results related to experience shown in Fig. 5.

![Fig. 5 : Real life experience to end users](image)

The above mentioned graph shows that, 56% of the respondents agrees that, the government should develop certain green projects and convert them successfully for public view and education, which will surely increase the awareness about the green concept and rest of the respondents states that, either the upcoming projects must be converted in green concept compulsory or organize certain conferences or seminars to educate the people.

**Visible results of green concepts**

Green project concept may not have been implemented very frequently, due to which the end users may not see any visible results but, we have asked to experts and future architects that, whether there is any visible result shown because of implementation of green concept implementation are visible whereas 33% of the respondents were not sure about the visible results.

![Fig. 6 : Visible results of green concept](image)

The above mentioned graph shows that, approximately 67% of the practioners states that yes the results of green concept
Shown visible results as per experts

The question is connected with above mentioned, where the experts have to answer that, whether they could notice the visible results and here, the experts and the respondents have to answer, if they have noticed any visible results then what the results were. The concept is shown in Fig. 7.

![Fig. 7: Visible results as per experts](image)

The above mentioned graph shows that, 100% of the respondents are agree with the fact, that the most common visible fact of green concept is power saving and out of all those 100% respondents, 45% of the respondents add that, other than power saving, the implementation of green concept also results in healthy environment and whereas the 11% of the respondents states that, it also benefits by offering prestigious environment related awards. Green concept is however related to Environmental safety and government can play the important role in implementation of green concept at wide level. Although the responses have been taken from the respondents that, what the government can do, so that, the Green concept can receive the wide acceptance among the people and results have been shown in Fig. 8.

![Fig. 8: Government steps for green concept](image)

The maximum respondents states that, the government can help in implementation of green concept by providing subsidies whereas 12% of the respondents states that, the government should focus towards development of technical knowhow and other 11% of the respondents indicate awareness among End Users as a priority.
respondents states that there should be cost effective techniques and rest respondents states that, conferences and seminars are enough to make people understand about the green building concept. Furthermore, out of 67% respondents who were in favor of Government subsidy states that there should be strict licensing system as well as the end users should be taught about the benefits and the awards can be given to green building members which may attract the people to move for green building concept.

CONCLUSION

At present, the implementation of green concept may not be there due to certain prevailing issues such as initial cost involvement, unawareness etc. but, the acceptance of the concept can be attained by little interference of Government organizations and upcoming construction project developers, the main finds are herewith:

- As per the analysis, approximately 78% of the respondents agree with the fact that, the implementation of green concept is not an easy task and require a complex set of techniques and know-how.
- The main reasons of non-acceptance of green concept are due to lack of technical know-how and huge initial financial investment.
- Green concept can be very well accepted but, before that, expert technical know-how is required either by means of creating specialized fresh civil engineering graduates or by borrowing the techniques from foreign experts.
- For the wide acceptability of green concept, it should be better that, there should be development of certain cost effective green concept techniques or either government may support by providing the subsidy in initial project development stage.
- Currently, end users are not willing to spend on green concept, because they are not able to connect themselves with any green project, so it should be preferred that any project should be converted successfully into green concept and that should be open for public view.

- More than 65% of the respondents states, that the benefits and impact of green concept are visible and can be seen by the way of effective power saving, healthy and pollution free environment, whereas the prestigious awards can also be one reason.
- Although, the green concept may not be widely recognized but, it’s a high time that, government should take certain serious steps for the implementation in benefit of Mother Nature. Herewith, the maximum respondent’s states that at initial level, government should start with subsidy program as its support and later on other things such as creating awareness programs, strict licensing system can be done. Although, the cost effective technique is also in demand.

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