INTEGRATION OF SUSTAINABLE MATERIALS IN THE TRADITIONAL CONSTRUCTION JOBSITE

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ABSTRACT

The Survey reports on the inclusion of project management of construction experts of sustainable development in Ghana. A total of 122 construction professionals reportedly collected data through survey. At different times location, water, pollution, energy, human factors and materials were used. The study shows that the project success targets as they are fulfilled within the three goals influence construction professionals to deny the inclusion of the sustainability advantages in the measurements used to evaluate the project development. However, most houses in Ghana depend on electricity to a large extent, reducing occupants' comfort by the energy waste. Furthermore, the results showed that recycled construction materials are not properly utilised in households because of industry's lack of supply, competitive price of commodities and lack of usage advantages.

KEYWORDS: Sustainable Construction, Green Building, Sustainable Building, Waste, Project Management, Environment, Social, Economic

INTRODUCTION

The term sustainable building refers for building a structure for the entire life of the building that is eco-sensitive and resource-efficient. In terms of energy use, sustainable architecture incorporates a recyclable aspect throughout the building life cycle, from design to completion, subsequent activities, renovation and ultimately elimination. A stable built environment centred on resource conservation and environmental principles is the best potential concept of sustainable construction. The architecture, tenders, planning and organisation, sourcing and recycling of materials and minimization of waste can also be used for defining strong buildings. This includes a subset of activity of sustainability. Seven principles have been suggested by the CIB to direct decision-makers through the design phase: restrict the use of resources; recycle resources; preserving biodiversity; removing toxins; applying life cycle costs; and emphasising the level of efficiency.

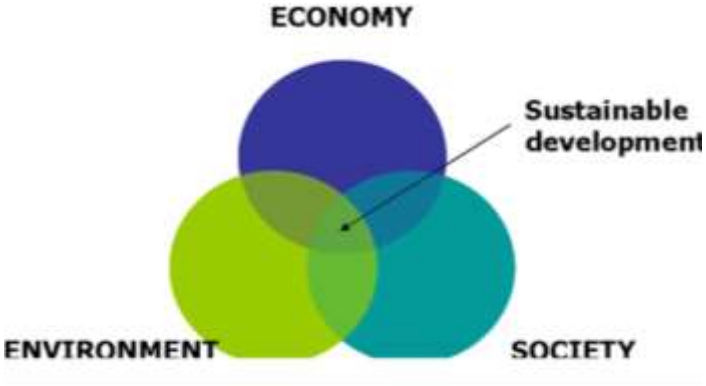


Figure1.1: Themes of Sustainable Development

LITERATURE REVIEW

Elke Knapen(2017) In view of the environmental, socio-economic and environmental issues, the sustainable development approach is seen as a route for the construction industry to advance towards sustainable development. It also demonstrates the industry's responsibility to maintain the environment. Different methods of development systems that are less harming to the atmospheric – i.e. increased waste control reuse through the handling of construction materials – i.e., waste management that benefits mankind and is effective for the businesses, contribute to sustainable architecture practises. In order to avoid waste streams linked to demolition, sustainable design starts at the building planning and finishes the final deconstruction and regeneration of materials throughout its lifetime. Sustainable development is then explained in four forms by the authors: social, economic and biotechnological.

Kelly, T.D (2016) The ways in which materials are collected, processed, manufactured, stored and transported to their end of life are subject to disclosure, particularly for energy, scientists and engineers. The material sustainability of businesses, nationals and individuals inherent in a wider perspective of sustainability relies on the capacity to supply materials that allow the generation and distribution of extraordinary energy, health care as well as food to processes which maintain industrialised society. Along with the creation of a permanent moving mechanism, while the sustainability of resources seen as a completely closed loop could appear unrealistic, the progressive material refinement of waste loops would draw human communities closer to the ideal, simplifying energy and natural resource systems.

Ammenberg, J. (2015) In this article, the principles of sustainability are practical in the building sector. The framework proposed focuses on the ecological three-pronged concept, including resource efficiency, cost-effectiveness and design for human adaptation. Each hypothesis involving strategies and approaches to be applied during the building project life cycle is explored according to a detailed literature review, including several case-studies to clarify the methods. The framework enables design teams to balance economic, social and environmental issues and transforms how builders think about the skills they need to assess projects to support the building industry.

Bichraoui, N (2013) The approach to sustainable architecture provides a tremendous chance in relation to such a large impact in the building sector to make a significant contribution to sustainable development. Sustainable is one of the toughest problems in the building sector and a detailed and dynamic concept. In order to work in a healthy world with improved social, economic and climate environments, the idea of sustainability consists of increasing standards of life. The planning, construction, rehabilitation, maintenance or re-use of an environmentally sustainable and resource-efficient project. The following targets should be selected: Ressource and energy efficiency; reducing CO2 and emissions of GHG; pollution prevention; reduction of noise; enhanced air quality indoor; and harmonisation with the setting.

Reuter, M (2013) Construction specialists have begun to track and remedy the environmental damage incurred by their activities. Architects, consultants, developers and others involved with the building sector have a remarkable chance to reduce the impact of the environment by meeting sustainable design planning objectives. Whereas they focus on wider global objectives, current strategies, technologies, and processes in the field of sustainability (project-specific level) have been particularly sluggish to tackle interconnected micro-levels[8]. The priorities of sustainability must be transposed into practical behaviour, especially on the micro-level, through a systematic approach to decision making. Emerging technologies, including the Building Research Method in Environmental Assessment (BREEAM), the Leadership of Energy and environmental design (EED), etc.

METHODOLOGY

The thesis was conducted in three rural towns in Ghana with many construction events. The growing population of these cities due to the need for more housing, homes and infrastructure exhibits a high number of construction industries within selected cities. As a result, commodities such as water, land, energy and air increase the amount of waste collected throughout the entire building period of these selected cities. Construction projects like government and the business sector are considered.

Data Collection Technique

A multi-approach was introduced for data collection to incorporate the capabilities of each methodology. Interviews of surveys and questionnaires is used as a point of comparison for respondents in the building sector. These processes of collection are highly compatible and have no advantage over others. This approach has been chosen to enhance the genuineness, scope and depth and experience in data processing. A survey was sent to building experts in the construction industry to provide, remove and criticise validation responses and justify them. The test preliminary to remove any ambiguity allowed the questionner to be finalised. The approach allows researchers to understand whether interviewees comprehend the questions and can give useful answers and thereby determine whether the data collection procedure is feasible.

Survey

Specially refined written and printed surveys with many standardised questions have been given to create experts with various credentials to analyse knowledge. The aim of the process was to provide the planning professional with insight into sustainability ventures. The questionnaires were divided into four sections and based on fundamental objectives. The likert level was used to display the response in the format below;

strongly disagree = 1, Disagree =2, Neutral = 3, Agree =4, strongly agree = 5.

The first phase was to obtain answers from professionals in the sample industry. Academic responses directly used in this analysis at the second level.

SAMPLING

The minimum statistically suitable sample dimensions of 122 that were selected correctly used the Kish test for the subject community to describe the reaction sample size of the analysis. The respondents were chosen randomly to learn about their views on Ghana's sustainability ventures like academic, state and private constructibility professionals in houses.

The sample size was determined by means of the next equation: $$n = \frac{n'}{1+(\frac{n'}{N})}$$

Where:

n = sample size

N = total population $n' = \frac{S^2}{E^2}$

E = Sampling propagation loss maximum permissible

S = Maximum default of the population element estimation.

$S^2 = p*(1- p)$

P = Population elements of the specified class proportion.

A cumulative mistake of 0.05 at 95 percent confidence, E = 0.025 and p = 0.5;

$$S^2 = 0.5 * (1 - 0.5)$$
$$S^2 = 0.25$$
$$E^2 = 0.025^2$$
$$E^2 = 0.000625$$
$$n' = \frac{0.25}{0.000625}$$
$$n' = 400$$
$$n = \frac{n'}{1+(\frac{n'}{N})}$$

The total population value (N) of 175, $n = \frac{400}{1+(\frac{400}{175})}$

Hence: $n = \frac{400}{3.286}$

n = 122

The required sample size for the survey is therefore = 122

Data Presentation and Analysis

The information was edited, coded, and placed in the social scientist statistical package version 16 of the computer (SPSS). In Microsoft Excel tables and bar chart data is shown and organised. Both data collected were analysed in two respects: an average index and a frequency study. The frequency analysis was used as a preliminary analysis to show the frequency and the percentage. Five common measurements range from extremely contradictory (1) to strongly acceptable (5) for the response of the respondent.

The average index was determined according to the following formula:

$$\text{Average Index} = \frac{\Sigma \alpha i \ xi}{\Sigma \ xi}$$

Where:

αi - Constant expressing the weight given to i

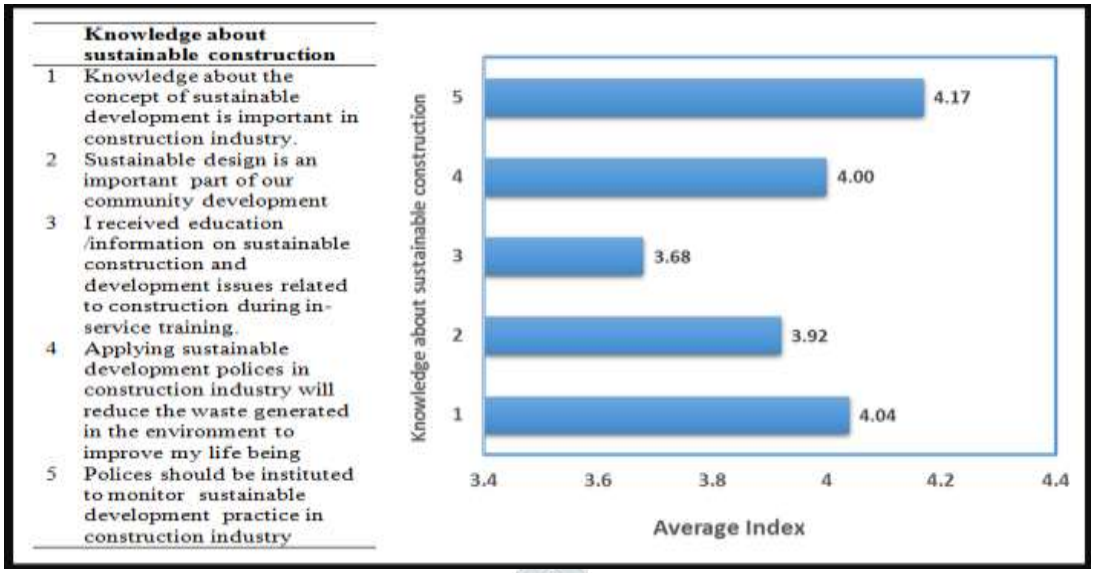
xi - Variable expressing the frequency of the response for i = 1, 2,3,4,5

RESULT

There were four groups of participants: employees, supervisors. The demographic characteristics of respondents have shown that managers are the majority of respondents (59%). This is because in the contracting business there were one or two supervisors in each unit. Most people have 2-5 years' experience with the least number of participants with a rich 20-year experience (Table 2). The interviewees also represent several organisations, several of whom work in contracting companies (46 percent). This is possible because further study is needed in this area. Staff in the administration of Ghana will do other private employment at leisure. The table also reveals that most interviewees (41 percent) participate in government and private enterprises. Among those polled, the majority (54%) are from firms aged 20 years. This includes companies with 6-10 years of service in the construction industry, 11-20 years respectively with a ratio of (20%) and (18%).

Table1.1: Knowledge of sustainable construction

	Knowledge about sustainable construction
1	Knowledge about the concept of sustainable development is important in construction industry.
2	Sustainable design is an important part of our community development
3	I received education /information on sustainable construction and development issues related to construction during in-service training.
4	Applying sustainable development polices in construction industry will reduce the waste generated in the environment to improve my life being
5	Polices should be instituted to monitor sustainable development practice in construction industry



DISCUSSION

Increased study and understanding of the importance of sustainable development in the design project will help building professionals better sustainability and healthy ecosystems. The concept process should take place in these technical entities. Confirm that an early stage of construction awareness is designed to improve building sustainability in order to mitigate disruptions, water waste, power, resources and soil and minimise the financial expense of buildings in sustainable architecture. Key to our community's success are knowledge about environmental development values and facets of sustainability. The construction professionals are responsible for sustainable design, but their significance is uncertain. It can be applied to ensure the natural world by on-site preparation by applying clinicians to the importance for long-term processes of the concept.

The emphasis of project management is much more concentrated on the three core concepts that will ensure more efficient welfare, energy, water and other resources and reduce the overall environmental pressure for current and future generations. Furthermore, every topic is linked together. Creation cannot be maintained without these topics. Policies during planning and construction in order to ensure affordable development could be taken into consideration further. However, throughout the planning phase, the building firm concentrates on such issues including the selection of components and the suppliers, the sustainability of products, rules, recruiting and others. This is because these factors have a significant impact on sustainable building design. If customers will attain the net ultimate benefit from growth, long-term economic health can come to fruition.

CONCLUSION

In addition to completing the projects in a timely, cost-efficient, and quality manner, the difficulty facing the construction sector today is to balance various constraints, such as economic, environmental and social requirements. Other conditions that cause waste are included in our atmosphere. The increases in demographic growth, demand for increased services and facilities and a rise in wages are all variables that need a high standard of living. It is also important that action is taken through renewable technology at all points in the building life cycle to provide for choice without regret. The operation was carried out at each stage at a different level because no coordination was established between the parties involved. The materials used in the construction are the most important items to consider while designing a sustainable house. This affects the house's longevity. Material wastes became more important as the bulk of construction inputs originated in non-renewable sources.

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