INDUSTRY RESPONSE ON THE USE OF ALTERNATIVE BUILDING MATERIALS IN THE NIGERIAN CONSTRUCTION INDUSTRY

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Summary

This research is based on the use of alternative building materials in the Nigerian Construction Industry. It looked into the level of awareness, perception of stakeholders, and benefits that could be derived from the use of alternative building materials. The results showed that 93.90 % of the respondents have knowledge about the existence of these materials while 80.30 % have at some point used these materials in the past however not as a complete replacement of conventional materials but either as composite together with conventional materials or as partial replacement of conventional materials. In conclusion some advantages that can be achieved when alternative construction materials are used include; provision of environmentally friendly materials, provision of a source of study and research, enlarging and promoting the economic strength of people and the nation amongst others.

Keywords: Cost Effectiveness, Building Standards, Laterite Soil, Burnt Clay, Straw, Mud Blocks, Mud Plaster.

1 Introduction

The need for research in new construction materials is driven by high cost of conventional materials, difficulty in accessing funds for construction/building development, as well as, the need to maintain ecological balance, population growth and face the challenges of housing (Construction crushers, 2011). Efforts are being made to substitute cement (wholly or partially) with locally available pozzolanic materials like volcanic ash, rice husk ash, sawdust ash, millet husk ash, pulverized fuel ash, and other materials.

The global trend towards increased environmental awareness has resulted in a surge of interest in ecologically friendly building materials and techniques. As a result, there has been interest in developing alternative building techniques and materials which are capable of meeting structural needs with lower energy and material consumption.

2 Aim and Objectives

The aim of the research is to investigate the barriers to the use of alternative building construction materials in the Nigerian construction industry, while the objectives are:

1. To investigate the perception of stakeholders on the use of alternative building construction materials.
2. To identify factors that determins the use of alternative building materials in the construction industry.
3. To evaluate the benefits that could be derived from the use of alternative building materials.

3 Results

Tab. 1 *General Background Of Respondents*

Respondents	Frequency	Percentage
Architects	17.00	25.80
Builders	16.00	24.20
Engineers	14.00	21.20
Quantity Surveyors	9.00	13.60
Estate Managers	5.00	7.60
Others	5.00	7.60
Total	66.00	100.00

Tab. 2 *Respondents' Organization/Industry*

Respondents	Frequency	Percentage
Building Manufacturing	5.00	7.60
Building Materials Supply	8.00	12.10
Government/Parastatals	14.00	21.20
Construction Consultancy	12.00	18.20
Private Construction Firm	20.00	30.30
Others	7.00	10.60
Total	66.00	100.00

Tab. 3 *Portion where the ACM were used*

Respondents	Frequency	Percentage
Walling (mud blocks, burnt bricks)	26.00	39.40
Flooring (broken bricks, laterite)	13.00	19.70
Roofing (palm fronds)	4.00	6.10
Foundation (corn stalks, periwinkle shell)	13.00	19.70
Others (groundnut shell)	2.00	3.00
Total	66.00	100.00

The use of Alternative Construction Materials brings positive contributions especially protection of the environment.

Tab. 4 *Perceptions of Stakeholders on ACM*

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
36.00	23.00	7.00	0.00	0.00	66.00

As a professional will you advice clients to adopt the use of Alternative Construction Materials.

Tab. 5 *Willingness to Advice Clients on the Need to Adopt the use of ACM*

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
16.00	25.00	3.00	15.00	7.00	66.00

Tab. 6 *Barriers to the use of ACM*

Barriers	Very High	High	Ave.	Low	Very Low	Rel. Index	%	Rank Order
Inadequate knowledge of materials	19	10	20	12	05	0.68	68.00	5th
More has to be done on the testing of these materials	25	31	09	02	00	0.83	83.00	1st
Low profit margin	09	22	27	05	03	0.69	69.00	4th
Attitude of stakeholders towards these materials	33	12	08	08	05	0.78	78.00	2nd
Lack of standards	31	12	12	06	05	0.78	78.00	2nd
Level of Competent labour	23	13	19	08	03	0.74	74.00	3rd
Lack of Government support /incentives	28	18	10	06	04	0.78	78.00	2nd
Marginal Cost Advantage	14	10	28	11	03	0.66	66.00	6th

Tab. 7 *Factors that determine the use of ACM*

Factors	Very Critical	Critical	Less Critical	Not Critical	Relativ e Index	%	Rank Order
Availability of materials in the market	21	31	13	01	0.77	77.00	7th
Poor Clients' interest	47	14	04	01	0.91	91.00	1st
Inadequate supply of the materials	26	24	14	02	0.78	78.00	6th
Lack of Labour	13	29	18	06	0.69	69.00	10th
Non compatibility with other materials	11	25	23	07	0.65	65.00	11th
Public Perception	42	12	09	03	0.85	85.00	2nd
Environmental Friendliness	30	13	14	09	0.74	74.00	8th
Lack of standards and specification	33	19	08	04	0.79	79.00	5th
Doubtful Durability and life span	35	19	08	04	0.82	82.00	4th
Low aesthetic value	22	26	09	08	0.73	73.00	9th
Poor social acceptability by the public	39	16	06	05	0.84	84.00	3rd
Non Commercial status	12	24	20	10	0.64	64.00	12th

From the research Architects and Engineers are more often asked for advice on choice of materials. From Table 1, builders and quantity surveyors sometimes assume the role of specifiers by virtue of their role as professional advisers to the contractor on construction matters, and producers of the bills of quantities with percentage respondents of 24.20 % and 13.60 % respectively. Most of the experience on the use of ACM's is on walling as this presents the least challenge to the experience and skill of those involved. This is evident in the number of respondents (39.40 %) who used it for walling and those (3.00 %) who used it for ceiling purposes. Alternative Construction Materials are most often used as partial replacement or as composite materials in construction as seen in table 8 where 37.90 % of the respondents used the materials as composites and 36.40 % used these materials as partial; replacement of conventional construction materials. Most professionals in the industry tend to agree that the use of ACM's contributes positively to the environment with 88.80 % of respondents agreeing. However, only 62.10 % will advise clients to use these materials on their projects.

4 Conclusion/Recommendation

The research findings shows that most stakeholders are aware of the existence of alternative construction materials (ACM) in the Nigerian construction industry. They have also used these materials in some way in the construction process however, these materials are not used completely as replacements for conventional materials but as either partial replacement of conventional materials or as a composite material with conventional materials. Stakeholders strongly agreed that the use of alternative construction materials can contribute positively to the construction industry especially in the protection of the environment.

1. This research recommends a need for further study on alternative construction materials with respect to testing of these materials so as to determine their actual properties and quantities available.
2. This research recommends the standardization of those alternative construction materials that have been discovered and tested and confirmed to have met specified standard
3. It also recommends the orientation of all professionals and potential clients of the industry on the need to adopt these materials.

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