



Investigation into the Modern Construction Skills Required of Blocklaying, Bricklaying and Concreting Work Craftsmen in Building Construction Industry in Niger State, Nigeria

Hassan Haruna, Umar Ibrahim Yakubu, *Ayegbokiki Sunday Tunde, Esan Martins Taiwo

Building Technology Department, Federal Polytechnic, Ede, Nigeria

Abstract The study investigated the modern construction skills required of Blocklaying, Bricklaying and Concreting Work Craftsmen in Building Construction Industry in Niger State, Nigeria. In the study, skills improvement needs in the use of advance tools and equipment; the skills improvement needs in bonding walls unit; the skills improvement needs in plastering and rendering wall finishes and the skills improvement needs in the production of concrete structures were determined. Data for study was obtained through the administration of structured questionnaire. A sample of 66 blocklaying, bricklaying and concreting work craftsmen and 40 building professionals were randomly selected in building construction industry in the three geo-political zones of Niger State, Nigeria. Mean statistics and standard deviation tools were employed to analyze the data related to the four research questions. The findings revealed that three items out of the thirty items were accepted as the highly required modern construction skills; twenty six items were established as the required modern construction skill while, one item was moderately required as the modern construction skills. It was therefore recommended that National Board for Technical Education (NBTE) should consider inclusion of the identified skills in the curriculum. Building construction industry should organize workshop for their craftsmen on the areas where skills improvement are needed. Council of Registered Builders of Nigeria (CORBON) and National Institute of Building (NIOB) should organize workshops and seminars that will expose the craftsmen to the modern skills required in the industry.

Keywords Blocklaying, Bricklaying, Concreting, Craftsmen, construction industry

Introduction

The growth of new technologies in the Construction Industry is expected to have impact on the way construction is performed in the future. With any new methodologies, there are expectations of change in the composition of the workforce. New construction technologies may requires the accomplishment of new skills. However, it is predictable that the workforce in the industries improve on their skills ([1]. For the construction industry to grow, it needs the right types of skilled workers to enable it attain the technological development, as skill is one of the vital aspects of construction work [2]. Bricklaying and Concreting work craftsmen are persons who are likely to possess range of skills, knowledge, understanding and ability to work on commercial and residential projects where bricks, block stone, glass block or terra cotta are laid for interior and exterior walls, partitions, fireplaces, chimneys [3].

It has been verified that the conventional technologies used for construction and maintenance of buildings are inefficient and resource wasteful due to enormous amount of resources consumed [4]. The On-going technological changes in work, tools and materials are likely to have impact on the skills required by building trades workers in the future. This is because of pattern shift from the conventional system of building



construction to best practices of construction such as: Smart buildings (Intelligent building), system buildings (Off-site panels), unitized building system (Modular building) and energy reduction (green building) which has necessitate the need for improvement on better skills and grasp of environmentally-friendly materials and technologies that are energy efficient and greener in the construction of building [5]. It is on this background that this paper is set to investigate the modern construction skills required of Blocklaying, Bricklaying and Concreting work Craftsmen in building construction industry in Niger state, Nigeria.

Aim and Objectives

The aim of the study was to investigate the modern construction skills required of blocklaying, bricklaying and concreting work craftsmen with a view for effective performance in building construction industry in Niger State. Specifically, the objectives of the study are to determine:

1. The skills improvement needs in the use of advanced tools and equipment for building operations.
2. The skills improvement needs in bonding walls unit.
3. The skills improvement needs in plastering and rendering wall finishes.
4. The skills improvement needs in the production of concrete structures.

Research Questions

1. What are the skills improvement needs in the use of advanced tools and equipment for building operations?
2. What are the skills improvement needs in bonding walls unit?
3. What are the skills improvement needs in plastering and rendering wall finishes?
4. What are the skills improvement needs in the production of concrete structures?

Research Methodology

Information for the study was collected through the use of a structured questionnaire designed to assess the views of the respondents (craftsmen and building professionals) on the modern construction skills required of Blocklaying, Bricklaying and Concreting work Craftsmen in building construction industry in Niger state, Nigeria. Respondents were asked to rate their perceptions regarding the level of significance of these requirement on a five point Likert ordinal scale where 5 = highly required, 4 = required, 3 = moderately required, 2 = less required and 1 = not required. The study was carried out in the three geo-political zones of Niger state. The questionnaires were administered to craftsmen and building professionals. A total of 50 building professionals and 70 blocklaying, bricklaying and concreting work craftsmen were randomly sampled. Out of 120 total number of respondents, 106 were retrieved which represent 88%.

Data obtained from the survey were analysed using Statistical Package for Social Sciences (SPSS). Mean and standard deviation were employed to answer the research questions. To determine the acceptance level, the resulting mean scores was interpreted relative to the concept of the lower and upper limit of numbers 1–5 as used on the rating scale adopted for the study [6]. Items having their mean rating between 0.50-1.49 were not accepted which means not required. Items between 1.50-2.49 were also not accepted hence, less required. Items with mean rating between 2.50–3.49 were accepted thus moderately required. Items having their mean rating between 3.50–4.49 were accepted which means required while; items with mean rating between 4.50-5.00 were accepted thus highly required.

Key:

\bar{x}_1 - Mean score of Craftsmen

\bar{x}_2 - Mean score of Building Professionals

\bar{x}_A - Average mean of Professionals and Craftsmen

SD₁- Standard Deviation of Craftsmen

SD₂- Standard Deviation of Building Professionals

SD_A- Average Standard Deviation of Professionals and Craftsmen

N - Number of Craftsmen and Building Professionals



Results and Interpretation

Table 1: Skills improvement needs in the use of advanced tools and equipment for building operations.

S/N	Items	\bar{x}_1	\bar{x}_2	\bar{x}_A	SD ₁	SD ₂	SD _A	Decision
1.	work with crane machine in the cause of operation	4.64	4.75	4.61	0.47	0.44	0.46	Highly Required
2	use Theodolite instrument to check for squares of walls angle	4.09	4.25	4.17	0.63	0.84	0.73	Required
3	operate wall panel screwing machine remotely	3.95	3.63	3.79	0.97	0.44	0.70	Required
4	operate slab profiling tool for easy slab set	3.79	3.75	3.77	0.87	0.84	0.85	Required
5	erect and dismantle restricted height scaffolding	3.64	4.75	4.11	1.39	0.43	0.92	Required
6	handle polycarbonate brick trowel for plastering	3.45	3.75	3.60	1.04	0.44	0.74	Required
7	use power tool to cut blocks to shape	3.61	3.25	3.43	1.49	1.10	1.29	Moderately Required
8	use Darby tool on undercoat plaster to achieve a flat surface	3.65	3.75	3.70	1.28	0.84	1.06	Required
9	operate explosive power tools for demolition	3.45	4.75	4.10	1.30	0.44	0.87	Required
10	Use hydraulic automatic break down pile cap to facilitate placement of pre-cast capping beams	4.59	3.95	4.27	0.66	0.82	0.74	Required

Source: field work 2015

Table 1 revealed that the skills with mean score between 4.59 - 4.64 and standard deviation 0.47 - 0.66 respectively are highly required by Craftsmen while the skills with mean score between 3.63 - 4.75 and standard deviation 0.43 - 0.44 respectively are required by Building Professionals. However, the respondents moderately required item 7 whose mean score are 3.61 and 3.25 respectively with standard deviation 1.49 and 1.10. This implies that the respondents agree that the listed skills improvement needs in the use of advanced tools and equipment for building operations are required.

Table 2: Skills improvement needs in bonding walls unit

S/N	Items	\bar{x}_1	\bar{x}_2	\bar{x}_A	SD ₁	SD ₂	SD _A	Decision
1	Install pre-fabricated beams into the correct position.	4.61	4.65	4.63	0.74	0.66	0.70	Required
2	Install closed panel walls, based on structural frame system	4.59	3.95	4.27	0.66	0.82	0.74	Required
3	Direct the lifting operation of the beams and place accurately on pile caps	4.52	4.75	4.64	0.81	0.44	0.62	Highly Required
4	Install pre-cast foundation beams system	4.64	4.90	4.77	0.72	0.30	0.51	Highly Required
5	Install pre-cast post-tensioned concrete beams on prepared concrete piles	4.36	4.25	4.31	0.87	0.44	0.66	Required
6	Erect expanded polystyrene (EPS) wall panel supported with wire mesh on both surface	4.39	4.35	4.37	0.84	0.73	0.79	Required
7	Construct walls using sand-bags	4.45	4.35	4.40	0.77	0.86	0.82	Required



	(earthbags)							
8	Erect pre-fabricated chimney stacks made of lightweight material	4.26	3.70	3.98	0.99	0.56	0.78	Required
9	Install EPS fascias at the wall corner edge	3.98	4.70	4.34	0.51	0.46	0.49	Required
10	Install pods in its final position	3.61	4.45	4.03	0.69	0.75	0.72	Required

Source: field work 2015

Table 2 shown that the skills with mean score between 3.98- 4.64 and standard deviation 0.51 - 0.72 respectively are highly required by Craftsmen while the skills with mean score between 3.70 - 4.90 and standard deviation 0.99 - 0.56 respectively are highly required by Building Professionals. This denotes that the respondents reach a decision that the listed skills improvement needs in bonding wall unit are required.

Table 3: Skills improvement needs in plastering and rendering wall finishes

S/N	Items	\bar{x}_1	\bar{x}_2	\bar{x}_A	SD ₁	SD ₂	SD _A	Decision
1	Place expanded polystyrene (EPS) panel on the wall surface for thermal protection	3.88	3.65	3.77	0.51	1.48	0.99	Required
2	Cover sandbag walls with chicken mesh wire, dampened and plastered.	3.73	3.90	3.82	0.71	0.30	0.51	Required
3	Fix the internal lining and decoration	3.67	4.05	3.86	0.66	0.68	0.67	Required
4	Finish plasterboard (taping and coating)	4.64	4.64	4.73	0.49	0.45	0.47	Highly Required
5	Construct vinyl wall where additional protection is required	3.38	4.65	4.02	0.78	0.48	0.63	Required

Source: field work 2015

Table 3 revealed that the skills with mean score between 3.73- 4.64 and standard deviation 0.71 - 0.30 respectively are highly required by Craftsmen while the skills with mean score between 3.65 - 4.65 and standard deviation 0.48 - 1.48 respectively are highly required by Building Professionals. This signifies that the respondents reach a decision that the listed skills improvement needs in plastering and rendering wall finishes are required.

Table 4: Skills improvement needs in the production of concrete structures

S/N	Items	\bar{x}_1	\bar{x}_2	\bar{x}_A	SD ₁	SD ₂	SD _A	Decision
1	Arrange hard-core on sea bed for the construction of low line artificial Island	4.61	4.25	4.43	0.65	0.44	0.55	Required
2	Construct the pioneering (innovative) concrete pre-cast block	3.61	4.28	3.95	0.86	0.82	0.84	Required
3	Arrange the pioneering concrete pre-cast blocks on hard-core to keep the Island low and reduce the inverted water waves.	3.56	4.68	4.12	0.84	0.47	0.66	Required
4	Inject liquid cement into the sand to seal the sea bed to allow excavation of basement	3.67	4.05	3.86	0.66	0.68	0.67	Required
5	Cast concrete with lightweight disposable plastic formwork on top of prepared typical pile cap	3.58	4.65	4.12	0.86	0.48	0.67	Required

Source: field work 2015



Table 4 shows that skills with mean score between 3.58 – 4.61 and standard deviation 0.86 – 0.44 respectively are required by Craftsmen while the skills with mean score between 4.05 – 4.65 and standard deviation 0.68 – 0.48 respectively are highly required by Building Professionals. This implies that the respondents agree that the listed skills improvement needs in preparing concrete structure are required.

Discussion of Results

The results of the study revealed that all the items perceived the modern construction skills required of blocklaying, bricklaying and concreting work craftsmen. This finding is in agreement with Commonwealth of Australia [7] who noted that skills improvement is necessary for blocklaying, bricklaying and concreting work craftsmen occupation which is acquired through training. Furthermore, blocklaying, bricklaying and concreting work craftsmen must have the skills in application of basic levelling procedures, explosive power tools, operate elevated work platform, erect and dismantle restricted height scaffolding, carry out basic demolition,. This view concord with Peterson [8] who asserted that Information and Communication Technology (ICT) skills in building construction industry is aim to improve workforce in their daily task and to ensure the skills support the industry growth potentially.

Yet another finding indicated the requirement for modern construction skills of blocklaying, bricklaying and concreting work craftsmen in bonding wall unit. This finding was concord by the World Skill International (WSI) [3] who viewed blocklaying, bricklaying and concreting work craftsmen as a person who is expected to possess a range of skills, knowledge and able to work on commercial and residential projects where they lay bricks, chimneys acid-resistant brick to kiln and tanks balconies among others. The findings of this study confirmed the study by Datergeom [9] who posited that the need for skills development in the construction industries can be viewed from the introduction of new technological changes such as the new, stronger and lighter materials such as plastics, composite fibres and expanded polystyrene (EPS) among others, increase utilization of assembled component and the adaption of new construction process and prefabricated component.

Conclusion

Based on the findings of this study, it was concluded that blocklaying, bricklaying and concreting work craftsmen require modern construction skills in the use of advance tools and equipment for building operations. This is because the contemporary construction activities that are changing from traditional method to modern method of construction are aimed to assist the blocklaying, bricklaying and concreting work craftsmen in their daily activities. Furthermore, the modern construction skills in bonding wall unit is essential for blocklaying, bricklaying and concreting work craftsmen to perform effectively in the new form of construction emerging, such as off-site (pre-fabrication) method of construction.

Lastly, the modern construction skills in preparing and production of concrete structures is imperative for blocklaying, bricklaying and concreting work craftsmen in the construction of pioneering pre-cast block concrete, arrange hard core on sea bed for the construction of low line artificial Island.

Recommendations

The following recommendations were made based on the findings of the study:

- National Board for Technical Education should consider inclusion of the identified skills in the curriculum.
- Building Industries should organize workshop for their craftsmen on the areas where skills improvement are needed.
- Training should be organized by the management of the construction firms and should accord priority attention to the modern skills of construction which in-turn ensure a constant supply of competent craftsmen for the construction industry.
- Council of Registered Builders of Nigeria and National Institute of Building should organize workshops and seminars that will expose the craftsmen to the modern skills required in the industry.



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