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Impact of Material Resource Maintenance on Craftsmen Performance in Lagos State's Building Construction Industries

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Abstract

The study investigated material resource maintenance and its impact on craftsmen performance in Lagos State building construction industries. The study was guided by 3 objectives and 3 research questions. Descriptive survey design was adopted for the study. The population for the study comprised 201 craftsmen that are working in building construction industries in Lagos State. This includes all building construction craftsmen in registered building construction industries in Lagos state of Nigeria. Sampling was not necessary due to the manageable size of the population. A structured questionnaire containing 26 items was employed for data collection. The instrument was validated by three experts from the Department of Industrial Technical Education, Tai Solarin University of Education. Cronbach alpha reliability technique was applied to determine the internal consistency of the instrument, yielding a reliability coefficient of 0.86. Data collected were analyzed using mean and standard deviation. Findings revealed that most tools and equipment used by craftsmen in Lagos State's building industry are in poor condition ($\bar{x}$ = 3.65). The study further revealed that proper maintenance of tools and equipment significantly enhances the performance of craftsmen in setting out and foundation laying ($\bar{x}$ = 3.66), as well as in flooring and wall setting ($\bar{x}$ = 3.65). The study concluded that well-maintained hand tools and equipment are essential for effective building construction, as they offer ease of use and improve job performance among craftsmen. It was recommended that all tools and equipment used in building construction be properly maintained to ensure maximum productivity. Construction industries should provide high-quality tools and equipment for their workers, and regular workshops on the importance of maintenance should be organized to educate building construction craftsmen.

Keywords: Maintenance, Resources, Craftsmen, Performance, Building Construction

INTRODUCTION

Vocational and technical education is a crucial component of human capital development, particularly in developing countries where practical skill acquisition is necessary to drive industrialization and sustainable development. It equips individuals with the competencies required for various skilled occupations based on their interests and abilities, supported by relevant pedagogical foundations (Olaitan, 2020). In Nigeria, technical education sector plays a central role in preparing graduates for job in sectors such as agriculture, technology, home economics, and building construction. Among these, building construction stands out as a key trade area due to its direct impact on infrastructure development, economic growth, and societal well-being.

Building construction encompasses a broad range of activities including the erection, renovation, relocation, maintenance, and demolition of physical structures using specific materials, tools, and equipment (Dominik, Patrick & Erwin, 2014). It is also a major source of employment for workers who are regarded as craftsmen, particularly in urban and industrial areas like Lagos State. According to Edoka et

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al. (2013), building construction not only addresses the fundamental human need for shelter but also facilitates the creation of critical infrastructure such as schools, hospitals, office complexes, factories, and recreational centers.

A craftsman, according to NBTE (2014), is a person who has successfully completed a formal training programme (craft level) and is certified as competent to perform skilled work in a particular trade. In other words, craftsmen in vocational and educational contexts refer to skilled worker or artisans who applies manual dexterity, technical knowledge and creativity to perform specialized tasks in a particular trade and have been certified at the craft level of training. Consequently, as craftsmen transition from classroom learning to field practice, their performance in the construction industry becomes a direct reflection of their training and readiness. This point to the fact that performance of craftsmen in this sector is of significant interest to both education stakeholders and industry practitioners.

However, the performance of craftsmen in building construction industry is increasingly challenged by poor maintenance practices regarding tools and equipment. Hand tools such as trowels, shovels, head pans and more advanced construction equipment require regular maintenance to ensure their functionality, safety, and efficiency. Russell et al. (2010) emphasized that the misuse or neglect of such tools can lead to injuries, reduced productivity, and low-quality output. In Lagos State, it has been observed that many craftsmen operate with worn or malfunctioning tools without adhering to any form of routine maintenance. This lack of maintenance culture has become a major factor affecting job efficiency and overall construction quality on sites.

The American Society of Civil Engineers (ASCE, 2007) identified limited knowledge and improper handling of tools as factors that contribute to inefficiencies and structural failures in buildings. In many cases, construction systems are designed with minimal resilience due to poor planning or pressure to cut costs, resulting in a high rate of collapse or deterioration. In such an environment, technical graduates who lack maintenance competence are unable to perform optimally, thereby contributing to the growing concern over poor craftsmanship in the Nigerian construction industry.

Maintenance, as defined by Bakare (2014), is a systematic and regular activity aimed at keeping machines, buildings, and equipment in good working condition. It includes preventive measures such as cleaning, inspecting, and lubricating, as well as corrective and predictive maintenance strategies to identify and address potential issues before they escalate. Olaitan, Asogwa, and Abu (2013) added that effective maintenance reduces operational downtime, prevents accidents, and improves the reliability of tools and machinery. In the context of building construction, maintenance not only improves the performance of workers but also ensures that the structures they build are safe and durable.

Despite these benefits, many craftsmen in Lagos State lack the practical skills and knowledge required to carry out proper maintenance of material resources. As Taylor (2001) observed, the lack of professional growth and skill updating among Nigerian construction workers has led to the use of outdated methods and inferior materials. This results in poor workmanship, structural weaknesses, and frequent building failures. Such challenges highlight the urgent need to evaluate and assess the role resource maintenance and the performance of craftsmen in the construction sector.

It is against this backdrop that this study seeks to investigate material resource maintenance and its impact on craftsmen performance in Lagos State building construction industries. The study aims to explore how proper maintenance practices particularly of hand tools and construction equipment can enhance job performance, reduce workplace hazards, and promote higher standards in building projects.

Statement of the Problem

Hand tools and equipment are essential facilities in the construction of various types of buildings including houses, shops, and commercial structures across the world. Their frequent use in building projects is largely due to their convenience, portability, and effectiveness in executing specific tasks. When properly maintained, these tools significantly contribute to improved job performance, especially in critical construction activities such as setting out, foundation laying, flooring, and wall erection. Despite their importance, field observations in Lagos State reveal that many

building construction craftsmen, particularly craftsmen, operate with poorly maintained hand tools and equipment. This neglect has reportedly resulted in reduced productivity, increased workplace injuries, and poor-quality construction outcomes.

The lack of maintenance culture among these personnel not only undermines their performance but also raises concerns about the overall competence of graduates emerging from technical institutions. The persistent low performance observed among building craftsmen in Lagos State calls for a closer examination of the role that maintenance or lack thereof plays in their day-to-day work. Specifically, there is a need to determine whether improper maintenance of hand tools and equipment contributes significantly to their low productivity. Hence, this study seeks to investigate material resource maintenance and its impact on craftsmen performance in Lagos State building construction industries.

Purpose of the Study

The main purpose of the study was to investigate material resource maintenance and its impact on craftsmen performance in Lagos State building construction industries. Specifically, the study was to:

1. Determine the status of various tools and equipment used for building construction by craftsmen.
2. Establish how proper maintenance of tools and equipment can enhance the performance of craftsmen in setting out and foundation laying.
3. Establish how proper maintenance of tools and equipment can improve the performance of craftsmen in flooring and wall setting.

1.3 Research Questions

1. What is the status of various tools and equipment used for building construction by craftsmen?
2. How can proper maintenance of tools and equipment enhance the performance of craftsmen in setting out and foundation laying?
3. How can proper maintenance of tools and equipment improve the performance of craftsmen in flooring and wall setting?

METHODOLOGY

The study employed a descriptive survey research design. The total population for the study was two hundred and one (201) craftsmen that are working in building construction industries in Lagos State. This includes all building construction craftsmen in registered building construction industries in Lagos state of Nigeria. Information about the respondents was obtained from registered construction industries. Therefore, there was no sampling since the population was manageable. A structured questionnaire was employed as the instrument for the data collection. The instrument has two sections. Section A elicits the demographic information of respondents while section B covers the measuring items for the study, it has a total of 26 items. The instrument adopted a 5-point scale of Strongly Agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly Disagree (1). The instrument underwent validation by three experts from the Tai Solarin University of Education, Ijagun, Ogun State, Nigeria. To ensure internal consistency of the questionnaire items, the Cronbach's alpha reliability method was applied, yielding a reliability coefficient of 0.86. The researcher personally distributed the questionnaire copies to respondents across various registered building construction industries in Lagos State, with the assistance of two trained research assistants. Data collected were analyzed using mean and standard deviation. Items with a mean score of 3.00 or above were interpreted as “Agree,” while those with a mean score below 3.00 were interpreted as “Disagree.”

RESULTS AND DISCUSSION

Results

Table 1. Mean Response on Status of Various Tools and Equipment Used for Building Construction by Craftsmen.

S/N	Items	$\bar{X}$	S.D	Remarks
1	Most tools and equipment used by craftsmen are not in good working condition.	3.50	0.70	Agree
2	A significant number of tools used by craftsmen are outdated	3.68	0.68	Agree
3	Craftsmen often complain about malfunctioning equipment during site work.	3.79	0.82	Agree
4	Adequate quantity of tools is available for most building tasks.	3.50	0. 64	Agree
5	Some essential equipment for building construction are missing on many work sites.	3.56	0.79	Agree
6	Tools used for setting out are generally well-maintained and available.	3.88	0.84	Agree
7	Craftsmen have access to modern measuring and alignment tools.	3.59	0.68	Agree
8	The quality of tools used by craftsmen meets industry standards.	3.62	0.82	Agree
9	Tool and equipment inventory is usually checked before construction commences.	3.65	0.70	Agree
10	Craftsmen are provided with safety-tested and certified tools.	3.78	0.65	Agree
	Average Mean	**3.65**		

Table 1 presents mean responses on the various tools and equipment used for building construction work by craftsmen. The mean values of all the items ranged from 3.50 to 3.88 and revealed that trowels used for construction work are not appropriate, Hand tools available for construction work are not original, Equipment for construction work are not obsolete and other types of tools and equipment utilized by craftsmen in building construction activities in Lagos state. However, the average mean of the data is 3.65 which is above 3.00 the minimum level of agreement. Therefore, table revealed based on the respondent's opinion that various tools and equipment utilized by craftsmen are poor in Lagos State.

Table 2 presents mean responses on how proper maintenance of tools and equipment enhance the performance of craftsmen in setting out and laying of foundation. The mean values of all the items ranged from 3.51 to 3.79 and revealed that regular maintenance of tools ensures more accurate setting out, properly maintained tools reduce errors during foundation marking, maintenance enhances the reliability of tools used in setting out and excavation, malfunctioning tools slow down foundation laying operations, maintenance reduces the risk of tool-related accidents during foundation work among others. However, average mean of the data is 3.66 which is above 3.00 the minimum level of agreement. Therefore, the table revealed that proper maintenance of tools and equipment enhances the performance of craftsmen in setting out and foundation laying in Lagos State.

Table 3 presents mean responses on how proper maintenance of tools and equipment improves the efficiency and effectiveness of craftsmen in setting out and laying building foundations. The mean values of all the items ranged from 3.52 to 3.89 and revealed that Filling of the room spaces with high quality hardcore becomes easier when well-maintained hand tools are used, properly maintained tools facilitate effective ramming of hardcore to ensure leveling with foundation base among other tasks. However, the average mean of the data is 3.71 which is above 3.00 the minimum level of agreement. Therefore, the table revealed that Proper maintenance of tools and equipment enhances the performance of craftsmen in flooring and wall settings in Lagos State.

Table 2. Mean Responses on How Proper Maintenance of Tools and Equipment Enhance the Performance of Craftsmen in Setting out and Foundation Laying.

S/N	Items	$\bar{X}$	S.D	Remarks
1	Regular maintenance of tools ensures more accurate setting out.	3.57	0.77	Agree
2	Properly maintained tools reduce errors during foundation marking.	3.61	0.68	Agree
3	Maintenance enhances the reliability of tools used in setting out and excavation.	3.79	0.70	Agree
4	Malfunctioning tools slow down foundation laying operations.	3.58	0.66	Agree
5	Craftsmen perform better when they use calibrated and maintained tools.	3.51	0.57	Agree
6	Maintenance reduces the risk of tool-related accidents during foundation work.	3.72	0.64	Agree
7	Periodic servicing of leveling instruments ensures higher accuracy in layout.	3.78	0.68	Agree
8	Timely maintenance leads to higher efficiency during initial stages of building construction.	3.62	0.78	Agree
9	Foundation work progresses faster when tools are in optimal condition.	3.64	0.70	Agree
10	Maintenance records help improve decision-making during tool usage in foundation projects.	3.79	0.65	Agree
	Average mean	**3.66**		

Table 3. Mean Responses on How Proper Maintenance of Tools and Equipment Improve the Performance of Craftsmen in Flooring and Wall Setting.

S/N	Items	$\bar{X}$	S.D	Remarks
1	Filling of the room spaces with high quality hardcore becomes easier when well-maintained hand tools are used	3.58	0.78	Agree
2	properly maintained tools facilitate effective ramming of hardcore to ensure leveling with foundation base	3.70	0.60	Agree
3	Using well maintained equipment conserves craftsmen energy in laying damp proof course over the floor area	3.89	0.58	Agree
4	Maintained hand tools or equipment help in fixing formwork against the external sides of the walls to a depth above the wall	3.81	0.64	Agree
5	Properly maintained tools assist in wetting the rammed hardcore and walls thoroughly and treat the internal faces of the formwork with used motor oil.	3.52	0.70	Agree
6	Placing of mixed concrete is always carried out by using good and well-maintained tools and equipment	3.78	0.66	Agree
	Average mean	**3.71**		

DISCUSSION OF FINDINGS

The study reported that the tools and equipment's available to building craftsmen are generally poor in quality and condition. This finding is consistent with previous studies such as Ogunde et al. (2016), which documented that many small and indigenous construction firms in Nigeria, particularly in Lagos State, often rely on substandard or obsolete tools due to financial constraints, limited access to modern equipment, and poor procurement practices. The implications of this situation are far-reaching: inadequate tools reduce work precision, lower productivity, increase the risk of workplace accidents, and hinder effective skill application during critical tasks such as setting out and foundation laying.

Furthermore, the research found that proper maintenance of tools and equipment significantly enhances the performance of craftsmen, particularly in setting out and foundation laying tasks. These stages of construction require accuracy, reliability, and steady control to execute operations such as measurements, leveling, and alignment. Poorly maintained or defective tools can severely compromise the integrity of such tasks. Supporting this, the International Labour Organization (2015) asserts that maintenance and inspection routines are crucial for safe and efficient work environments. Tools that are consistently cleaned, calibrated, sharpened, or repaired not only enhance accuracy but also reduce operational downtime.

In addition, the work of Oseghale, Oseghale, and Omoruyi (2021) on material and equipment management in construction projects in Lagos and Abuja further reinforces this finding. Their study highlights that regular maintenance practices and site organization reduce job inefficiencies and improve the reliability of both materials and tools. When craftsmen are trained in institutions that prioritize equipment maintenance, they are better prepared for real-world construction environments, showing improved job readiness and skill application.

Practical validation of this finding can be seen in the Lagos State Government's "Master Craftsman Project," an initiative that trains and equips local artisans and craftsmen with standard tools and working gear. Reports indicate that over 200 trained craftsmen were provided with updated equipment after undergoing competency-based training (PM News, 2017). This government-led initiative confirms that investment in both training and tool support leads to better on-the-job performance, especially in foundational processes such as setting out and base construction. Consequently, these findings suggest that the integration of tool maintenance protocols into the curriculum of technical colleges is essential. Training should encompass preventive maintenance strategies, early fault detection, and minor tool repairs (Olagunju 2012)

CONCLUSION

Findings of the study underscore a direct relationship between the condition of tools and the effectiveness of craftsmanship in the building sector in Lagos State. While the poor state of tools limits the performance of trained craftsmen, the proper maintenance of tools enhances the practical efficiency of craftsmen, especially in tasks like setting out and foundation laying. Stakeholders are therefore urged to invest in quality equipment, promote regular maintenance routines, and incorporate tool management training into technical education curricula to foster sustainable development in Nigeria's industry involved in building construction.

RECOMMENDATIONS

Based on findings, the study recommended the following:

1. Tools and equipment's used in building construction should be kept in good condition for optimum efficiency
2. Building construction industries should always give their employees top-notch tools and equipment for improved performance.
3. Regular workshops and seminars on essence of maintaining tools and equipment should be organized for building construction craftsmen.

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