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Assessment of the Impact of Material Management Practices onBuilding Construction Sites in Auchi, Estako Local Government, Edo State.

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ABSTRACT
An effective material management system offers significant benefits to construction firms. However, traditional practices remain the most common approach on building sites in Auchi, Etsako West Local Government, Edo State. Currently, the study area relies on paper-based workflow, which generate excessive paperwork and contribute to poor material management. This study investigates these challenges with a view to understanding their impact on the efficient delivery of building projects.
Adopting a mixed-methods research design (quantitative and qualitative), the study utilise a multi-stage non-probabilistic sampling technique, specifically employing purposive sampling to focus on Auchi. The findings identify the most significant impacts of improved management as: enhanced field material control and supplier relations (3.71), superior material handling (3.75), a reduction in duplicated orders (3.65), and a decrease in overall material costs (3.51). The study concludes that implementing systematic material management—including accurate demand forecasting, proper storage, supplier collaboration, and the integration of technology—significantly improves performance outcomes. Consequently, it is recommended that effective material management be viewed not merely as a support activity, but as a strategic component of construction management that directly influences productivity, cost, and quality.

Keywords: Material Management, Building Construction, Auchi, Etsako West, Project Delivery, Mixed-Methods Research, Construction Productivity.

I. INTRODUCTION

Material management is a comprehensive process that coordinates planning, requirement assessment, sourcing, purchasing, transportation, storage, and control. Its primary goals are to minimize waste and optimize profitability by reducing material costs (Chetna, 2011). Conversely, improper handling and management practices on construction sites negatively impact total project cost, schedule, and quality (Ashwini, 2013). The challenges of material management are among the most critical issues facing construction sites in developing countries. As noted by Okolie, Ngwu, and Ezeokonkwo (2015), activities within the supply chain—from sourcing and transmitting purchase orders to controlling onsite wastage—are vital because they directly influence economic efficiency, material movement, productivity, and profit optimization.In Auchi, the consequences of poor management are increasingly evident. Many completed buildings pose a genuine threat to their occupants; the use of substandard materials has led to premature dilapidation and widespread wall peeling. These structural failures are often the result of inadequate quality control, poor financing, insufficient planning, and a lack of communication during the construction phase. By assessing the impact of current material management practices in Auchi, this study aims to recommend strategies that ensure the efficient delivery of building projects within stipulated performance benchmarks.

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II. LITERATURE REVIEW

2.1 Problems in Materials Management

Kasim, Anumba, and Dainty (2005) identify improper material management as a critical factor undermining project performance in terms of time, quality, cost, and overall productivity. Specifically, the late delivery of materials, unavailability of supplies prior to commencement, and excessive distances between storage and work areas are principal drivers of site inefficiency. Notably, waiting for the transportation of materials and equipment on-site is often the most significant bottleneck affecting worker productivity.Managing materials among subcontractors remains a pervasive challenge. Frequent shifting of materials across the site results in unnecessary labor and machinery costs (Anwar, 2015). Furthermore, site constraints—particularly in high-rise construction—often lead to acute space shortages. To mitigate this, contractors must often lease off-site warehouses, adding to the project's logistical complexity.Okolie et al. (2015) argue that material management is a primary challenge facing the Nigerian building industry. They emphasize that the entire supply channel—from sourcing and purchase order transmission to waste control—directly dictates economic effectiveness and profit optimization. Beyond logistical delays, several other factors adversely affect performance, including:

1.Financial Constraints: Cash flow issues stemming from delayed payments to contractors.

2.Technical Failures: Rejection of materials due to non-compliance with specifications or misuse of specifications.

3.Operational Inefficiency: Lack of proper work plans, improper health and safety procedures, and excessive paperwork.

4.Supply Chain Gaps: Material shortages and inconsistent delivery schedules (Aibinu and Odeyinka, 2006).

Furthermore, Dey (2001) notes that the common issues relating to materials management are as follows:

i. Receivingmaterialsbeforetheyarerequired,causing moreinventorycostand chances of deterioration in quality;
ii. Not receiving materials at the time of requirement, causing loss of productivity;
iii. Incorrect materials take-off from drawings and design documents;
iv. Subsequent design changes;
v. Damage/Lossofitems;
vi. Selection of type of contract for specific materials procurement;
vii. Vendor evaluation criteria;
viii. Piling up of inventory and controlling of the same; and
ix. Management of surplus materials.

Traditional material management methods rely heavily on paper-based documentation throughout the construction process. This reliance often generates excessive paperwork and contributes to systemic inefficiencies (Fomosa et al., 2002). Furthermore, manual recording and the exchange of material data within the supply chain are frequently error-prone, leading to significant delays and information gaps. The adoption of Information and Communication Technology (ICT) offers a transformative solution to these conventional challenges. Modern ICT systems streamline construction activities, making them both faster and more effective. With the continuous emergence of industry-specific software, ICT-enabled solutions now provide robust support for sophisticated material practices. For instance, intelligent systems can revolutionize supply management by automating and facilitating critical tasks such as bidding, requisitioning, and material ordering.

2.2 Impacts of Material Management Practices in Building Construction Site

An effective material management system can bring many benefits for a company. Previous studies by the Construction Industry Institute (CII) concluded that labour productivity could be improved by six percent and can produce 4-6% in additional savings (Iyas, Reuf and Yahya,2012). Among these benefits are:

i. Reducing the overall costs of materials
ii. Better handling of materials
iii. Reduction induplicate orders

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iv. Materials will be on site when needed and in the quantities required
v. Improvementsin labour productivity
vi. Improvementsin project schedule
vii. Quality control
viii. Better field material control
ix. Better relations with suppliers
x. Reduce of materials surplus
xi. Reduce storage of materials on site
xii. Labor savings
xiii. Stock reduction
xiv. Purchase saving
xv. Better cash flow management

III. METHODOLOGY

This study adopted a mixed-methods research design, incorporating both quantitative and qualitative survey approaches to address the research questions and hypotheses. Auchi, the administrative headquarters of Etsako West Local Government Area in Edo State, Nigeria, served as the primary study area. Strategically located at approximately 7.18°N and 6.26°E, Auchi is a vital regional hub for trade, education, and administration, connecting Edo State to Kogi, Kwara, and Delta states. The study population comprised 401 site-based professionals, including quantity surveyors, builders, and architects, all of whom are registered with their respective professional bodies within Edo State. Using the Taro Yamane formula for sample size reduction, a sample of 200 respondents was determined. A multi-stage, non-probabilistic sampling technique was employed, utilising purposive sampling to specifically select the Auchi region. Data analysis was conducted using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS). The results are presented through descriptive statistics, including:
Tables and Percentages
Mean and Standard Deviation
Relative Importance Index (RII)

IV. FINDINGS

4.1 Response Rate

A total of 401 questionnaires were administered, 250 (62%) were retrieved while 200 (80%) were validly and returned. The high response rate response rate recorded by the researcher could be attributed to the data collection procedures; for instance, the researcher pre-notified the potential participants for the survey, the researcher administered the questionnaire with the help of research assistants and follow up calls were also made to clarify queries as well as to prompt the respondents to fill the questionnaires.

Table 4.1: Distribution and Responses Rate of Questionnaires

Area of population	**Questionnaire distributed**	**Questionnaire retrieved**	**% response**	**Questionnaire Validly filled**	**% response**	**Remarks**
Auchi	401	250	60	200	81.2	Good

Source: Field Survey Result, 2025

4.2 Testing/Ranks of Variables

Question: What is the Impact of material management practices within the study area

Table: 4.2: Impact of material management practices within the study area

S/N	Impact of material management practices within the study area	5	4	3	2	1	SUM	MEAN SCORE	STD	RANK
1	Reducing the overall cost of materials	40	84	31	28	17	702	3.51	273.12	4th
2	Better handling of material	57	83	17	40	3	751	3.75	291.34	2nd
3	Reduction in	82	43	29	16	30	731	3.65	282.99	3rd

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	duplicated orders									
4	Materials should be on site when needed and in the quantities required	41	49	54	38	18	657	3.28	256.2	5th
5	Improvements in labor productivity	29	17	56	39	59	557	2.78	212.1	9th
6	Improvements in project schedule	21	65	25	39	50	568	2.84	217.6	8th
7	Quality Control	25	37	56	62	20	585	2.92	223.1	6th
8	Better field material control	85	43	29	16	27	743	3.71	289.7	1st
9	Better relations with suppliers	58	34	31	46	31	741	3.71	289.7	1st
10	Reduction of material surplus in construction projects	23	63	39	64	11	563	2.81	215.0	7th

Source: Filed Survey, 2025

The table presents responses on 13 key impacts of material management practices on construction projects.Each item was rated on a 5-point Likert scale (5 = Strongly Agree, 1 = Strongly Disagree). The Mean Score (MS) indicates the general level of agreement, while the Standard Deviation (SD) measures the degree of variation in responses.The ranking is based on the mean score, showing which impacts are perceived as most significant.

Better field material control & Better relations with suppliers (Rank 1st): Both scored the highest (MEAN = 3.71, STD = 289.7), indicating that respondents perceive efficient field material control and strong supplier relationships as the most significant impacts of good material management.This suggests that when materials are properly tracked and suppliers are reliable, project execution becomes smoother, reducing delays, losses, and mismanagement.Strong supplier relations can also ensure timely delivery, quality assurance, and sometimes cost savings through negotiated terms.

Better handling of material (Rank 2nd, MEAN = 3.75, STD = 291.34): This ranks just below the top, showing that careful handling of materials is highly valued. Proper handling reduces damage, wastage, and rework, which directly contributes to both cost efficiency and quality. It is critical on construction sites where materials are often exposed to harsh conditions or complex storage logistics.

Reduction in duplicated orders (Rank 3rd, MEAN = 3.65, STD = 282.99): Duplicated orders waste resources, increase costs, and cause storage issues. A good material management system ensures accurate tracking and forecasting of material needs, avoiding unnecessary procurement.Ranking third indicates respondents see this as a substantial operational benefit.

Reducing the overall cost of materials (Rank 4th, MEAN = 3.51, STD = 273.12): Cost reduction is important, but it ranks below control, handling, and order accuracy. This implies that while financial savings are significant, practical control measures are seen as more immediately impactful.Effective cost reduction often comes as a consequence of proper material management practices rather than as a direct standalone effect.

Materials should be on site when needed and in the quantities required (Rank 5th , MEAN = 3.28, STD = 256.2): Ensuring materials are available just-in-time helps avoid project delays and idle labor.Respondents rank this moderate-high,

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reflecting its operational importance, though it may be secondary to overall control and supplier relations.

Quality control (Rank 6th, MEAN = 2.92, STD = 223.1): Maintaining quality through proper material management ensures standards are met, which reduces defects and rework.The slightly lower ranking suggests that while quality control is essential, it may be seen as dependent on proper handling and field control.

Reduction of material surplus in construction projects (Rank 7, MEAN = 2.81, STD = 215.0): Excess material leads to waste, additional storage needs, and cost overruns.Though important, respondents consider it less critical compared to ensuring materials are handled correctly and efficiently on site.

Improvements in project schedule (Rank 8th, MEAN = 2.84, STD = 217.6): Timely completion is a benefit of proper material management, but it is ranked lower, suggesting scheduling improvements are indirect results of better material control and handling rather than primary impacts.

Improvements in labor productivity (Rank 9th, MEAN = 2.78, STD = 212.1): Material management can enhance labor efficiency by providing workers with the right materials at the right time.Its ranking as the lowest implies that respondents may view labor productivity improvements as secondary effects of strong material practices rather than direct outcomes

Table 4.7:Descriptive Statistic

Statistic	Value
N (Valid)	203
Minimum Mean	3.73
Maximum Mean	1.44
Range (Mean)	1.43
Average Mean Score	2.19
Average Std. Deviation	1.33

Source: Computation SPSS

:Material management practices have no significant impact in building construction sites in the study area

Coefficient	3.783
Probability 0.321	0 .0081

Source: Field Survey, (2025)

Decision

The regression analysis yielded a coefficient value of 3.783 with an associated probability (p-value) of 0.0081. The coefficient of 3.783 indicates a strong positive relationship between the independent variable and the dependent variable. This means that for every one-unit increase in the predictor variable, the outcome variable increases by approximately 3.783 units, suggesting that the variable under consideration exerts a substantial influence on the dependent variable. More importantly, the probability value of 0.0081 is less than the standard significance level of 0.05. This implies that the relationship observed is statistically significant and did not occur by chance. Therefore, there is sufficient empirical evidence to conclude that the

independent variable significantly affects the dependent variable in the study.

V. Conclusion

The study concludes that effective material management has notable positive impacts on construction projects. The most significant impacts identified were better field material control and better relations with suppliers, indicating that proper material management enhances coordination, accountability, and supply chain efficiency. Other important impacts include better handling of materials, a reduction in duplicated orders, and a reduction in overall material costs. However, impacts related to improvements in labour productivity, project scheduling, and waste minimisation ranked relatively low. This suggests that while material management contributes to operational efficiency, its indirect benefits on productivity and scheduling are less visible or not fully realised in the study area.

VI. RECOMMENDATIONS

Based on the findings and conclusions of this research, the following recommendations are made:

1. **Strengthen Planning and Scheduling:** Proper planning and scheduling of material procurement and usage should be implemented before project commencement to prevent shortages, waste, and delays.

2. **Enhance Monitoring and Control:**Regular site inspections and audits should be carried out to monitor material flow, detect misuse or theft, and ensure that materials are used in line with project specifications.

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Life Science Reporting
Nolifesciencethreatwaspractisedinthisresearch

Data Availability
Alldataunderlyingthefindingsofthisstudyarefullyavailableandcanbeaccessedwithoutrestriction.Thedataare includedassupplementaryfileswiththissubmission.

StatementofEthicalApprovalandinformedconsent
Allrelevantethicalapprovalforthisstudyandnecessaryinformedconsenthasbeenobtainedandmaintained.

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