

# A Literature Review on Material Management - Meta Analysis

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**Abstract:** Materials management is a tool to optimize customer service requirements at the same time increasing the profitability and making the best use of available resources. The basic objective of Materials Management is to ensure that the right item is and made available to the production at the right time, at the right place at the lowest possible cost. The effective way of material management will increase the level of production and reduced inventory cost. The primary issue in delaying the production process is improper material planning and poor inventory control. The aim of this study was to evaluate the role of materials management in organizational performance and profitability by identifying the general issues and challenges in the material management. This paper is submitted by studying various papers from different journals with the required knowledge.

**Keywords:** Material Management, Inventory Control, Organizational Performance, Profitability.

## I. INTRODUCTION

Materials management is an imperative business activity that tends to service and maintain a stable flow of raw materials, components, semi-finished products which are needed for manufacturing and for alternative operations of the companies. It is one of the best tools employed in several organizations to improve the efficiency of the production process at the same time creating profit by minimizing the value. In a firm it plays an important role within the progress of the economic process of the firm. Material management is the method of designing, executing and controlling the flow of material and product, and the main aim of material management is to supply materials at the right quality, quantity at the right cost and deliver it in the right time in order to improve the process of production activity. So the material management is an incredibly essential one for an industry. Without the concept of the proper material management it result in purchase of excess materials early and storing it within the inventory can result in over loading of stocks. This intends the poor material management. Material Management is the one of the important tool in material procurement planning and control at the same time it helps to enhance the performance. Materials management includes all the activities regarding the acquisition, handling and work process in the movement of materials and spares used in the production for final product.

## II. LITERATURE REVIEW

The following are the previous research review based on material management.

**Lenders. (1992)**, defines materials management organizational concept as having a single manager responsible for organizing, encouraging and managing all those activities that primarily concern the flow of a material into an organization. The above concepts are emphasized differently, but they all concern the management of materials and all begin with the supplier. Purchasing, receiving goods, quality control, handling of materials and internal transport are also included in the definition.

**Fadipe. (1996)**, defines material management as a confederacy conventional material activity found by a common idea, an integrated approach to preparation, procurement, transfer, flow and delivery of production materials from the raw materials level to the finished product stage. He further clarified that, this approach looks at the whole flow of materials and components from supplies to the manufacturing establishment which it stores, and production lines, and even after manufacturing, at the flow of parts and goods through hub and distribution centre and to customers.

**Achison. (1999)**, considers material management as, a concept involving an organizational framework that unifies into one functional obligation the systematic organizing and control of all materials from the identification of the need through distribution to customers.

**Kasim N. B., Anumba C. J. and Dainty A. R. J. (2005)**, described a key factor adversely affecting project performance is the improper handling and management of materials on firms. This paper reports on the early stages of research that is renewing a new ICT-based approach to fast-track material handling. They concluded that, it is clearly important to manage all materials from the design stage to the production stage. Poor handling of materials affects the overall performance of projects in terms of time, budget (cost), quality and productivity. The wastage of materials should also be minimised during production in order to avoid loss of profit for companies. There is a need to develop new approaches to materials management in fast-track projects in order to improve the efficacy of the production process.

**Hemsworth David, Martinez-Lorente Angel R., Clavel Jose´ G. (2006)**, reported that one important purchasing department decision was to standardize products. The primary aim of this research is to empirically examine the effect on purchasing and business efficiency of the standardization of materials and purchasing procedures. The findings of this study suggest that purchasing standardization has a substantial positive impact on both purchasing and business efficiency. They gave some points for a better understanding of how standardization in purchasing, standardization of materials and purchasing procedures, would affect the purchasing and business performance of a company. Thus, standardizing materials and purchasing procedures is important and help companies to meet their goals for material spending and improve the quality of materials, suppliers' on-time delivery, and inventory performance.

**KasimNarimah. (2007)**, reported that the materials management is particularly affected by shortages of materials, delivery delays, volatility in costs, damage and wastage, and lack of storage space. Thus, they reported on the early stages of research which is developing a new ICT-based approach to managing materials on projects. This was followed by exploring the ICT tools and techniques currently being employ on projects. In terms of time, budget (cost), efficiency, and productivity, poor handling of construction materials affects the overall performance of projects. The wastage of materials should also be minimised during projects in order to avoid loss of profit for companies. In order to increase the efficacy of the production process, there is a need to incorporate new approaches to materials management in projects.

**Linton, J.D. Klassen, R., & Jayaraman, V. (2007)**, developed the areas to include forecasting criteria for demand and quantity of materials, good supplier and consumer relationship, indigenous source of supply for foreign materials, improving skills of staff in material management, improved departmental performance, and research and development (R&D) in material management. The material management department oversees these operations. The materials management department will also be able to see the selection of employees for promotion, ordering, inventory control, store management and material handling and their training and placement.

**Chary. (2008)**, noticed that inventory management allows the company to enhance the inventory by economic order quantity (EOQ) and by monitoring the system level by two bin methods and red line methods. Management of inventory saves the organization from unwanted losses by other departments. For three purposes, material inventory is maintained; precaution, speculation and transactions.

**DonyaviSohrab, Flanagan Roger. (2009)**, reported that a large part of the construction sector is represented by small and medium sized enterprises (SMEs). Large firms have the opportunity and capacity to use advanced information systems and management technology to monitor job and project materials. Materials can account for up to 70% of the construction cost of the project, hence any ways to minimize waste and improve productivity will have substantial cost and time advantages. A technology also helps in control the movement of products and support contractors with decreased costs and lower prices for consumers. They concluded that SMEs will increase their efficiency in the material management, and reduce their costs to improve the delivery of projects.

**Elijah E. Ogbadu (2009)**, carried out a study to improve benefit through better materials management. To that end, ninety-four (94) copies of questionnaires were issued, eighty-six (86) of which were rounded out and used for the report. All eighty-six respondents decided that a hitch in materials management is the delivery of low quality raw materials. He concluded that profitability was diminished by the inefficiencies, failure and shutdown of the factory. Profitability increased by maintaining good relationships with suppliers of spare parts to reduce losses resulting from frequent breakdowns. It focuses on how, through successful materials management, business organizations can achieve profitability.

**Khyomesh V. Patel and Chetna M. Vyas. (2011)**, stated that a void created by the absence of proper materials management on companies. Research has shown that materials and equipment may constitute more than 70% of the total cost for a typical project. One of the major problems in delaying projects is poor materials and equipment management. They concluded that there should be a centralised material management team co-ordination between the site and the organization, Proper control, tracking and monitoring of the system is required, Awareness and accountability should be created within the organization.

**Meghani Mahesh D., VyasChetna M., HinguRakesh J., J. J. Bhavsar. (2011)**, stated that, 4-M (Material, Manpower, Money, and Machine) play crucial role. This paper describes the key findings of research undertaken in Anand (Gujarat) India to examine the incidence of material waste at five construction sites located in Anand, India, at different locations. Any of this waste can be avoided by strict material oversight and monitoring. This cap extended beyond the permitted limit, even after any degree of wastage allowable in each project, which eventually affects project benefit or return on investment (ROI).To compare the waste of materials on various projects at Anand and give the appropriate recommendation for site waste reduction.

**James Monday Unam. (2012)**, the purpose of this study was to investigate the relationship between the management of materials and success of manufacturing companies. The findings provided the proof of a positive significant relationship between efficient material management and performance in the business. The study also found inter-departmental cooperation, successful inventory management, good relationship with suppliers were significant success factors of material management.

This study showed that priority must be given to Materials Management as a total concept for manufacturing industries to achieve remarkable success in their results.

**Georgekutty C. K., Dr. Georgemathew. (2012)**, had undergone literature review to identify the causes of production failure. In Kerala, a questionnaire survey was conducted. The major delay or in-completion of the project could be overcome by proper organizing and scrutinizing the procurement of material periodically to cut off unnecessary production costs.

**T. PhaniMadhavi, Steve Varghese Mathe and Roy Sasidharan. (2013)**, carried out case study in material management. The goal of the research was to understand all the problems that arise in the organization due to inappropriate application of material management. On-site research was done on management, inventory, purchasing practices, procurement and cost estimation. Stocks were evaluated by FIFO (First in First Out method). Cost estimation was evaluated by ABC analysis. Data were driven from the study and new technological implications such as RFID (Radio Frequency Identification), PDA (Personal Digital Assistant) were implemented which helps in proper scheduling and financial management.

**SitiRadziahLiwan, NarimahKasim, RozlinZainal. (2013)**, concluded that inventory is necessary because the correct quantity of inventory would ensure that all tasks can be carried out according to the organized schedules. Excessive paper-based documentation, lack of up-to-date information on the status of items, theft and labour intensive procedures are the key concerns within projects about material tracking practices. Therefore, advanced technologies such as RFID need to be used to strengthen material monitoring procedures for inventory management purposes in projects. They concluded that organizations should start introducing new technologies to simplify material monitoring activities, such as bar-coding, RFID, and wireless technology. Shifting from manual to automated monitoring of materials using technology is essential as it can enable material tracking for inventory management processes.

**Lenin P., Krishnaraj L., Prasad D.Narendra, Kumar V.R Prasath. (2014)**, argued that the lack of proper management of materials on sites created a gap. Research has shown that in projects, construction materials account for 60-70% of the overall cost. Material mismanagement decreases the revenue of the contractor, contributing to enormous losses, and leaving the project in great difficulty, so careful management of this single largest component will increase a project's competitiveness and cost efficiency and help ensure its timely completion. The findings obtained from the evaluation factors shows that design problems, market conditions, store problems, contractor difficulties and external problems are the top five key causes of cost overruns. The results obtained are given: the identification of variables influencing time and cost overruns indicates that the cost overrun of projects is responsible for design problems, customer problems, contractor problems, site problems, labor and equipment problems, store problems, external problems, and market condition problems.

**Pauline JerutoKeitany, Daniel M. Wanyoike and Salome Richu. (2014)**, evaluated the role of material management in organizational performance. Finally, due to inventory management system participation, it was concluded that there was an improvement in organizational efficiency. Additionally, the results showed that by acquiring and delivering the required materials within the shortest time in lead time was extremely important.

**Olusakin S Akindipe. (2014)**, has shown that the management of raw materials in manufacturing organisations is a critical operational problem. His paper aims to bring to the fore, through theoretical analysis, the important problem of inefficiency in the practice of raw material management and its impact on production operations of manufacturing concerns. The paper concludes that, should practitioners become pragmatic through the implementation of the solutions provided, productivity in raw materials management and production operations can be achieved.

**NwosuHyginusEmeka. (2014)**, examines the effect of the management of materials in companies. The sample size of 368 was chosen from the total staff strength of 4648 to check the company's profitability. Z-statistics were used for hypothesis testing and found that the procurement of materials, storage of materials, inventory of materials, interdepartmental collaboration have a significant impact on the profitability of companies. Therefore, based on the above results, the study concludes that successful management of materials is important for companies to make profits.

**SiddharthNair, SimranSinghOberoi and ShubhamSharma. (2014)**, explained the advantages of the organization's material handling by his paper. The author also stated that the material management objectives of continuous uninterrupted supply of raw materials ensure a high turnover in inventory, providing a purchasing economy and minimize waste, minimize total procurement costs and maintain a high level of cooperation and collaboration with user departments. He concluded that unnecessary investment in stocks would be avoided, there will be no stoppage of work due to lack of materials, efficiency will be increased, inventory losses will be reduced and waste will be minimized as a major benefit of material management.

**S.Sindhu, K.Nirmalkumar and V.Krishnamoorthy. (2014)**, stated that inventory management system includes methods of procurement, storage, identification, recovery, and transport and construction. The first part is focused on questionnaire surveys carried out in different businesses. In the second part, the results were analyzed by using Statistical Package for Social Sciences SPSS. One of the conventionally used methods to define inventories is ABC analysis, and a firm's case study is collected. Some points were mainly based on construction industries: the role of the contractor in material management, the need for stock

management, the management of stock in company development, the value of stock comparison of other works, the maintenance of safety in storage.

**Ashokkumar. (2014)**, stated that industry growth depends on the quality of projects. In the success of projects, quality is one of the important factors. This project focuses primarily on the significance and variables that influence quality control in the execution process. He concluded that, due to quality deficiencies, the main factors affecting are quality and growing construction costs. This study will create awareness of quality control for especially small-scale enterprises at all levels of companies. He gets the key variables and problems that impact the output and provide an opportunity to figure out the remedial action. This research is helpful in reducing waste of materials, waste of workmanship, waste of time and indirect costs.

**Deepak Hajoary. (2015)**, goal is to explain the roles and tools of the manufacturing sector in material management. In several fields, these tools are currently being used. It illustrates the different obstacles to the introduction of products associated with every manufacturing sector. Poor material handling can create significant disadvantages for any industry.

**Ibegbulem Andreas Brutus and OkorieChiyem. (2015)**, aims at finding out how an organization can tackle the problems and identified how effective material management can increase the profitability of an organization. The study revealed that material management used by the organization contributes to the profitability of the company, adequate storage facilities prevents interruption on production process among other things.

**KwadwoBoatengPrempeh. (2015)**, given the significant contributions made by the manufacturing sector to the Ghanaian economy, this study considers it appropriate to assess the influence of successful inventory management on the profitability of Ghanaian manufacturing firms. In the analysis, the Ordinary Least Squares (OLS) described in the form of a multiple regression model were used. From the findings of the report, it can be recognized that inventory management of raw materials is a major factor that has a significant positive relationship with the productivity of manufacturing companies in Ghana. Therefore, raw materials management is an important factor to consider in improving or boosting the output of producers in Ghana.

**S. Anup Wilfred, M.D. Deepak, N. Shivaram, M. Nataraj and Yaseen Khan (2015)**, made a systematic case study of material management the study was made to find out the problems arising due to the inappropriate material management. Because of these concerns, there would be an increase in project costs. So he underwent ABC analysis and analysis of the S curve. The ABC analysis includes a full study of the volume of content used. Analysis of the S curve was helpful in identifying the project deviations. The profit rate is given by class A materials. The deviation from the scheduled project was detected by the study of the S curve and necessary steps were taken.

**Anwar Zeb, Sohail Malik, ShaziaNauman, HashimHanif and Muhammad Osama ShahbazAmin. (2015)**, performed a questionnaire survey based on his previous studies for which he had collected data for about 20 years. The survey was conducted in Pakistan. He has selected five variables that are restricted on-site storage, difficulty in transporting, disputes between staff, difficulty in advancing at work due to improper storage of materials and company complexity. From that study, he concluded that increasing space for storage of materials, proper communication and material handling would help complete the production on time. He added that better outcomes will be provided by careful monitoring of work progress and material management.

**Dr. NgwuChukwemeka, Dr. Okolie Kevin C., Dr. Ezeokonkwo John U. (2015)**, identified the key areas in which material management is inadequate and so improvements were made that changes could be made to increase productivity. For proper review and recommendations, the data collected formed the context of the standardized questionnaires. The ninety questionnaires launched at the sites, eighty-seven were duly completed and returned. The material schedule will also help in the scheduling of supplies, identifying the necessary materials and making deliveries at scheduled times and dates. Since the problem areas have been detected, contracting organizations should take steps to improve their performance. By engaging full-time estimators or quantity surveyors and material controllers, this could be done.

**Abhilin G B, Vishak M S. (2015)**, the main objective of the analysis was to determine the role of the materials management in projects. ABC analysis is one of the conventionally used techniques for classifying inventories and gathering business case studies. Accurate material use, stocked material, and location of material can be obtained by using the ICT technique. However, most contractors have not currently used such materials management methods and techniques, such as: generating data for categories of materials, local suppliers, international suppliers, and cost of materials, updating data for local suppliers, international suppliers, cost of materials when changing, and using the internet to understand new materials and their costs, including a list of project materials.

**Gulghane A. A., Prof Khandve P. V. (2015)**, stated that depending on the type of project, the overall cost of materials can be up to 60 % or more of the total cost of the project. This gives light to the fact that in managing the overall project expense, pre-planning and material procurement are equally important. It shows that it is important to reduce material waste during the construction processes in order to prevent loss of profit. It is noted that extensive research has been undertaken at a particular stage of a project to examine individual construction waste management strategies.

**R. Lakshmi. (2015)**, evaluated the use of Quality Function Deployment (QFD) as a management tool in order to support project managers. Within the project, the project manager is mainly responsible for ensuring that the design meets all customer

expectations and is properly planned, and that quality control/assurance procedures are properly administered. He discovered that there is a positive and significant relationship between problems with materials management and the regular failure of the factory. Because the presence of materials management issues results in the breakdown of the plant, this can be expected. Out-of-stock and the absence of replacement parts disrupt production and impair profitability. He demonstrated how profitability can be achieved by efficient materials management with special attention to materials purchasing, obtaining, storing and issuing.

**H. Mallawaarachchi, S. Senaratne. (2015)**, explained that a balance between cost, time and quality is always required to the construction projects. High quality and low cost can be accomplished, but at the expense of time, and conversely, high quality and a fast project can be achieved, but at a cost. The aim of this research is, to investigate the importance of quality for the success of the project. In addition, poor quality could lead to additional costs for the company, which could create costs due to failure, assessment and prevention. It is essential to introduce a proper quality management plan at the start of the project, where quality drawings, quality standards and design will improve the quality of the project.

**K. Boopathi and A. Krishnamoorthi. (2016)**, carried out a research on material management the author had an opinion that the cost of the project is rising mainly due to poor management of materials. There was no spike in project costs because he had adopted a reasonable scheduling strategy. The cost of materials reflects 50 percent of the usual overall cost.

**P.Ezhilmathi, Dr.T.Shanmugapriya. (2016)**, describes a critical aspect of the industry is material management. By filling in the gaps and creating an environment conscious and resourceful result, the successful materials management plan strengthens an operational master plan. Planning and building design for the movement of materials, the procurement of spare parts and replacements, quality control in the buying and ordering of parts, and the requirements for the ordering, shipment and storage of the necessary materials handled by materials management. In order to optimize resources and maximize productivity, performance and complete projects on time, better construction management is required.

**JusohZairra Mat, JusohZairra Mat, KasimNarimah. (2016)**, stated that material management is an important component of project management, as materials make a significant contribution to the overall cost of the project. It also plays a key role since the accomplishments of each construction project depend on adequate resources. Consequently, the purpose of this paper is to describe the influence of material management factors on project performance. The author concludes that time, quality, productivity and performance are influenced by the availability of sufficient materials and equipment. Appropriate quality material has effect on time, cost and quality. Reasonable adjustments have an effect on time performance. Effective handling of materials has an effect on waste performance.

**ShetSayali, NarwadeRaju.(2016)**, suggested that 60-80 % project cost is the average material cost. Price, quality & time are essential objectives of material management. The use of material management methods will accomplish this. ABC analysis, VED analysis and SDE analysis are various material processing techniques. ABC Analysis is focused on material inventory value. VED analysis gives importance to the utility of the material, while SDE analysis gives market access to the material. They give some points that should be taken into account when ordering. I) Schedule of activities II) Sum of needed material. III) Capability of transport & time taken to reach the site. IV) Past records of suppliers, venue. 67.30 % project price is 23.07 % of the material. The expense of 30.76% of the material is 25.01%. 7.69% of the overall project cost is 46.17 % of the material. In contrast to other methods, ABC analysis offers less interest charges. It demonstrates that the study of ABC is more economical than any other methodology.

**M Veera Krishna, Satyanarayana D, Dr. Rao K Sambasiva. (2017)**, suggested that materials are the fundamental core organs of any product that accounts for around 60 to 70% of the overall production cost. The materials management would try to solve problems, such as scarcity of materials, delivery delays, price volatility, damage and waste, and lack of storage space. They concluded after review that the products are handled in a series of steps, such as sourcing, transport, shipping, grading, storage, maintenance of the warehouse, supply to production centres, etc. Minimizing the risk at all of the above levels not only makes management better use of resources, but also acts as a competitive advantage.

**Antony A. Roger, Navodaya V. (2017)**, studied that even though the materials and components used in construction cost more than 60% of the total cost of the project, techniques for handling them depend entirely on human abilities. The combination of Near Field Communication (NFC) and Global Positioning System (GPS) technologies are used in this approach, which can enable low-cost, easy-to-implement material and component detection and tracking solutions. This system is completely automated and offers efficient identification and monitoring in all phases, such as development (offsite), en-route (transport), construction site, etc (onsite). This technology leads to the acquisition of real-time and accurate details on construction resources. It also helps to quickly share the data with all the project's players. This approach uses the combination of NFC and GPS as a powerful portable instrument that allows field data to be reliably, fully and almost instantaneously obtained, stored, exchanged and reused.

**KulkarniVikram, Sharma Rohit, HoteMohit. (2017)**, focused on the study of factors in projects that influence successful management of materials. In Maharashtra, they researched nine distinct small, large & medium enterprises. They concluded that in applying material management strategies on sites, the large companies are strong & competent enough. Since they do

not use any tools, medium-sized companies have some technological as well as some seasonal problems. Owing to lack of information about material management, small companies lack behind in material management relative to medium & large firms. Finally, they concluded that it was difficult for small and medium-sized businesses to employ successful software to monitor the flow of materials.

**PatilHarshal M., Prof. Sarode G.C. (2017)**, reported that as compared to other industries in the world, the construction industry now a day is very progressive and creative industry. Every construction industry focuses on financial benefit, people's needs, and different fast track techniques to complete the job. The correlation coefficient between project costs and material management costs for 15 locations was analyzed. The findings showed that overall project costs and project material management costs are perfect and optimistic.

**Anton Saukkonen. (2017)**, the purpose of his research was to improve the materials management system of the organization, which included the inventory control and costing model. Concerning the optimum values of the decision variables, the optimization of the overall inventory cost was introduced. The author defined the most suitable inventory management approach on the basis of the collected information and built a model. In addition, the built model contained a costing model where, on a common or different basis, the elements of the overall inventory cost could be shown, evaluated and measured. As a result, the built model may be used as a guide for inventory operations in the decision-making process. Regarding the minimum objective value of the total cost, the model will determine the optimal order quantity and reorder point decision variables.

**DagimWoldie. (2018)**, the main objective of the thesis is to define the role of material management in organizational success. The outcome of the thesis shows the study found that planning and use practice exists, but federal proclamation is not well obeyed. It concluded that the dedication to material procurement is not accompanied by sufficient law-based procedure. In addition, inventory management systems are only used on average because they lack accuracy and depth. Annual inventory practice, however, means a lingering year to collect information on materials acquired and used.

**Dr. Cross Ogohi Daniel. (2019)**, objective is to find out how an organization can fix the issues and determine how effective material management can improve an organization's profitability. The analysis revealed that the organization's inventory management contributes to the company's profitability, and that adequate storage facilities, among other items, avoid interruptions in the production process.

**TABLE I: MAJOR FINDINGS FROM THE LITERATURE REVIEW**

The following table represents that major Key factors of the research papers,

S.No	Year	Paper Title	Author	Industry	Key factors
1.	1992	PURCHASING AND MATERIAL MANAGEMENT.	Lenders, M.	General	Purchasing, receiving goods, quality control, handling of materials and internal transport in entrepreneurial firms.
2.	1996	ESSENTIAL TOPIC IN PURCHASING AND SUPPLY MANAGEMENT.	Fadipe, N.	General	Channels from which flow of materials occurred.
3.	1999	INDUSTRIAL PURCHASING AND SUPPLY.	Achison, C.	General	Organizational Framework.
4.	2005	IMPROVING MATERIALS MANAGEMENT PRACTICES ON FAST-TRACK CONSTRUCTION PROJECTS.	Kasim N. B., Anumba C. J., Dainty A. R. J.	Construction Industry	The early stages of research that is developing a new ICT-based approach to managing materials on fast track schemes.

5.	2006	AN EMPIRICAL STUDY ON THE IMPACT OF STANDARDIZATION OF MATERIALS AND PURCHASING PROCEDURES ON PURCHASING AND BUSINESS PERFORMANCE.	Hemsworth David, Martinez-Lorente Angel R., Clavel Jose´ G.	Commerical Product ManufacturingIndustry	To examine empirically the effect on purchasing and business efficiency of the standardization of materials and purchasing procedures.
6.	2007	IMPROMNG MATERIALS MANAGEMENT PRACTICES IN PROJECTS.	KasimNarimah.	Construction Industry	Materials management is affected shortages of materials, delivery delays, volatility in costs, damage and wastage, and lack of storage space.
7.	2007	SUSTAINABLE SUPPLY CHAINS: AN INTRODUCTION.	Linton, J.D. Klassen, R., &Jayaraman, V.	General	Forecasting criteria for demand and quantity of materials are good supplier and consumer relationship, indigenous source of supply for foreign materials, improving skills of staff in material management, improved departmental performance, and research and development (R&D) in material management.
8.	2008	ECONOMIC ORDER QUANTITY MODEL USED IN INVENTORY MANAGEMENT.	Chary	General	Economic order quantity (EOQ) and by monitoring the system level by two bin methods and red line methods.
9.	2009	THE IMPACT OF EFFECTIVE MATERIAL MANAGEMENT ON CONSTRUCTION SITE PERFORMANCE FOR SMALL AND MEDIUM SIZED CONSTRUCTION ENTERPRISES.	DonyaviSohrab, Flanagan Roger.	Construction Industry	A large part of the construction sector is represented by small and medium sized enterprises (SMEs).
10.	2009	PROFITABILITY THROUGH EFFECTIVE MANAGEMENT OF MATERIALS.	Elijah E. Ogbadu.	Benue Brewery Limited.	Relationship with suppliers

11.	2011	CONSTRUCTION MATERIALS MANAGEMENT ON PROJECT SITES.	Khyomesh V. Patel and Chetna M. Vyas.	Construction Industry	Delaying construction projects is poor materials and equipment management.
12.	2011	A STUDY ON BASIC MATERIAL WASTE IN BUILDING INDUSTRY: MAIN CAUSES AND PREVENTION.	Meghani Mahesh D., VyasChetna M., HinguRakesh J., J. J. Bhavsar.	Construction Industry	Construction, 4-M (Material, Manpower, Money, Machine) play crucial role.
13.	2012	MATERIALS MANAGEMENT FOR BUSINESS SUCCESS: THE CASE OF THE NIGERIAN BOTTLING COMPANY Plc.	James Monday Unam.	Bottle Manufacturing Company	Inter-departmental cooperation, successful inventory management, good relationship with suppliers
14.	2012	HALL MARKS IN CONSTRUCTION MATERIAL MANAGEMENT.	Georgekutty C. K., Dr. Georgemathew.	Construction Industry	Project could be overcome by proper organizing and scrutinizing the procurement of material periodically to cut off unnecessary production costs.
15.	2013	MATERIAL MANAGEMENT IN CONSTRUCTION – A CASE STUDY.	T. PhaniMadhavi, Steve Varghese Mathe and Roy Sasidharan.	Construction Industry	The key procurement concern is related to schedule delays and the lack of stated project quality. In order to avoid this scenario, essential resources such as capital, workers, time, etc. must often be devoted.
16.	2013	MATERIALS TRACKING PRACTICES FOR INVENTORY MANAGEMENT IN PROJECTS.	SitiRadziahLiwan, NarimahKasim, RozlinZainal.	Construction Industry	Inventory is necessary because in construction project the correct quantity of inventory would ensure that all tasks can be carried out according to the organized schedules.
17.	2014	ANALYSIS OF IMPROPER MATERIAL MANAGEMENT AFFECTING COST IN CONSTRUCTION PROJECTS.	Lenin P., Krishnaraj L., Prasad D.Narendra , Kumar V.R Prasath.	Construction Industry	The lack of proper management of materials on construction sites creates a void.
18.	2014	ASSESSMENT OF THE ROLE OF MATERIALS MANAGEMENT ON	Pauline JerutoKeitany, Daniel M. Wanyoike and Salome Richu.	Cooperative Creameries Limited	Materials management is a method to maximize efficiency by minimizing costs and making the best



		ORGANIZATIONAL PERFORMANCE- A CASE OF NEW KENYA COOPERATIVE CREAMERIES LIMITED, ELDORET, KENYA.			use of available resources in meeting customer service requirements.
19.	2014	THE ROLE OF RAW MATERIAL MANAGEMENT IN PRODUCTION OPERATIONS.	Olusakin S Akindipe.	Production	Management of raw materials.
20.	2014	MATERIALS, MANAGEMENT AND FIRM'S PROFITABILITY.	NwosuHyginusEmeka.	Commerical Product ManufacturingIndustry	Procurement of materials, storage of materials, inventory of materials, interdepartmental collaboration.
21.	2014	MATERIAL MANAGEMENT.	SiddharthNair, SimranSinghOberoi and Shubham Sharma.	Production	Uninterrupted supply of raw materials ensure a high turnover in inventory.
22.	2014	PERFORMANCE ANALYSIS OF INVENTORY MANAGEMENT SYSTEM IN CONSTRUCTION INDUSTRIES IN INDIA.	S.Sindhu, K.Nirmalkumar and V.Krishnamoorthy.	Construction Industry	Inventory management system includes methods of procurement, storage, identification, recovery, and transport and construction.
23.	2014	STUDY OF QUALITY MANAGEMENT IN INDUSTRY.	D. Ashokkumar.	Construction Industry	The growth of the construction industry depends on the quality of construction projects.
24.	2015	ASSESSMENT OF MATERIAL MANAGEMENT & IMPORTANCE IN MANUFACTURING BUSINESS ENTERPRISE.	Deepak Hajoary	Commerical Product ManufacturingIndustry	Poor material handling can create significant disadvantages for any industry.
25.	2015	ASSESSMENT OF MATERIALS MANAGEMENT AND PROFITABILITY OF AN ORGANIZATION.	Ibegbulem Andreas Brutus and OkorieChiyem.	Production	Storage facilities.
26.	2015		KwadwoBoatengPrempeh.	Commerical Product ManufacturingIndustry	

		THE IMPACT OF EFFICIENT INVENTORY MANAGEMENT ON PROFITABILITY: EVIDENCE FROM SELECTED MANUFACTURING FIRMS IN GHANA.			The influence of successful inventory management on the profitability of Ghanaian manufacturing firms
27.	2015	AN EMPIRICAL CASE STUDY OF MATERIAL MANAGEMENT IN RESIDENTIAL PROJECT.	S. Anup Wilfred, M.D. Deepak,N. Shivaram, M. Nataraj and Yaseen Khan.	Construction Industry	ABC analysis and S curve analysis.
28.	2015	FACTORS AFFECTING MATERIAL PROCUREMENT, SUPPLY AND MANAGEMENT IN PROJECTS OF PAKISTAN: A CONTRACTOR'S PERSPECTIVE.	Anwar Zeb, Sohail Malik, ShaziaNauman, HashimHanif and Muhammad Osama Shahbaz Amin.	Construction Industry	Restricted on-site storage, difficulty in transporting, disputes between staff, difficulty in advancing at work
29.	2015	APPRAISAL OF THE EFFECTS OF MATERIALS MANAGEMENT ON BUILDING PRODUCTIVITY IN SOUTH EAST NIGERIA.	Dr. NgwuChukwuemeka, Dr.Okolie Kevin C., Dr. Ezeokonkwo John U.	Construction Industry	Identified the key areas in which material management is inadequate and so improvements were made that changes could be made to increase productivity
30.	2015	EFFECTIVE MATERIAL LOGISTICS IN INDUSTRIES.	Abhilin G B, Vishak M S.	Logistics	The analysis was to determine the role of the materials management in projects. ABC analysis is one of the conventionally used techniques for classifying inventories and gathering business case studies.
31.	2015	MANAGEMENT FOR MATERIALS AND CONTROL OF WASTE IN INDUSTRY: A REVIEW.	Gulghane A. A., Prof Khandve P. V.	Production	The fact those in managing the overall project expense, pre-planning and material procurement are equally important.
32.	2015	IMPROVEMENT OF DECISION MAKING PROCESS IN CONSTRUCTION SUPPLY CHAIN	R. Lakshmi.	Construction Industry	The use of Quality Function Deployment (QFD) as a management tool in order to support project managers

		MANAGEMENT USING ANALYTICAL HIERARCHY PROCESS.			
33.	2015	IMPORTANCE OF QUALITY FOR PROJECT SUCCESS.	H. Mallawaarachchi, S. Senaratne.	Construction Industry	A balance between cost, time and quality is always required to the construction projects.
34.	2016	MATERIAL MANAGEMENT AND COST ANALYSIS ON CONSTRUCTION PROJECT.	K. Boopathi and A. Krishnamoorthi.	Construction Industry	Scheduling.
35.	2016	STUDY ON MATERIAL MANAGEMENT – AN ART OF REVIEW.	P.Ezhilmathi, Dr.T.Shanmugapriya.	Construction Industry	Planning and building design for the movement of materials, the procurement of spare parts and replacements, quality control in the buying and ordering of parts, and the requirements for the ordering, shipment and storage are necessary
36.	2016	A REVIEW ON IMPLICATION OF MATERIAL MANAGEMENT TO PROJECT PERFORMANCE.	JusohZairra Mat, JusohZairra Mat, KasimNarimah.	Construction Industry	To describe the influence of material management factors on project performance
37.	2016	AN EMPIRICAL CASE STUDY OF MATERIAL MANAGEMENT IN CONSTRUCTION OF INDUSTRIAL BUILDING BY USING VARIOUS TECHNIQUES.	ShetSayali, NarwadeRaju.	Construction Industry	ABC analysis, VED analysis and SDE analysis further while ordering Scheduling of activities, Sum of needed material, Capability of transport & time taken to reach the site and Past records of suppliers, venue should be considered.
38.	2017	RISK MANAGEMENT IS KEY ENABLER IN MATERIALS MANAGEMENT.	M Veera Krishna, Satyanarayana D, Dr. Rao K Sambasiva.	Construction Industry	Materials are the fundamental core organs of any product that accounts for around 60 to 70% of the overall production cost.

39.	2017	MATERIAL MANAGEMENT ON FIRMS USING ICT STRATEGY.	Antony A. Roger, Navodaya V.	Construction Industry	Near Field Communication (NFC) and Global Positioning System (GPS) technologies are used in this approach, which can enable low-cost, easy-to-implement material and component detection and tracking.
40.	2017	FACTORS AFFECTING MATERIAL MANAGEMENT ON CONSTRUCTION SITE.	Kulkarni Vikram, Sharma Rohit, Hote Mohit	Construction Industry	Study of factors in projects that influence successful management of materials.
41.	2017	STUDY OF CORRELATION FACTORS OF MATERIAL MANAGEMENT IN INDUSTRY.	Patil Harshal M., Prof. Sarode G.C.	Construction Industry	Project cost and materials management relationship.
42.	2017	DEVELOPMENT OF MATERIALS MANAGEMENT SYSTEM – A CASE BLACK BRUIN.	Anton Saukkonen.	Spare Part Manufacturing Industry	Inventory management approach in the organisation.
43.	2018	THE ROLE OF MATERIAL MANAGEMENT ON ORGANIZATIONAL PERFORMANCE: A CASE STUDY IN COMMERCIAL BANK OF ETHIOPIA.	Dagim Woldie.	Commercial Bank	Define the role of material management in organizational success.
44.	2019	EFFECTS OF MATERIALS MANAGEMENT ON THE PRODUCTIVITY OF AN ORGANISATION.	Dr. Cross Ogohi Daniel.	Commercial Product Manufacturing Industry	Inventory management practices in the organisation.

The major findings of literature review,

1. From the above concepts it has been shown how profitability can be achieved by constructive materials management with special attention to the procurement, acquisition, storage and distribution of materials.
2. There is a positive and significant correlation between issues in materials management, plant disruptions, and the profitability of manufacturing firms.
3. An organization can achieve significant cost savings; improve production efficiency, and increase profitability and competitiveness through effective management of materials.
4. There is need to train the staff in the field of material management for the further enhancement.
5. The cost of production or the price of raw materials should always be taken into consideration by organisations before arriving at selling price.

6. In order to increase the quality and time execution of their projects, management should also include materials management in their strategic planning.
7. In order to encourage quality awareness, materials management policies should be initiated.

### III. CONCLUSION

This paper presents a review of literature in material management. The review has been made around forty four papers regarding material management. From the literature review it is very clear that material management plays a vital role in success of firm. Whether it is a small firm or large firm the material management should be done. But it is also observed that most of the studies were conducted in the areas concerned with mass production system. No studies were found to be done in the area of continuous production system. This gap is to be filled.

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