

Review of Inventory Management System to Ensure the Optimization of Resources

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Abstract - The inventory management system includes procedures for construction, transportation, identification, storage, and retrieval. Each has an unbreakable connection to productivity, schedule performance, and safety. Our study's primary objective is to examine the inventory management practices used and the efficient use of inventory at the construction site. One of the most utilized methods for classifying inventories and gathering data for a case study on a company is ABC analysis. The model is able to deal with both uncertain demand and supply. These results may primarily reflect the key elements that will have an impact on the inventory management system that can result in improved project management effectiveness & decreased material waste in the relevant construction industry region.

Key Words: ABC analysis, efficiency, Inventory management

1. INTRODUCTION

An effective and efficient organization depends on excellent inventory management. Additionally, it plays a crucial role in the management of materials and items that must be stored for later use, whether that is during manufacturing or later exchange activities, depending on the circumstance, for goods and services. The main objective of inventory management is to strike a balance between competing economic interests and not hold too much inventory. In order to prevent costs like storage, spoilage, theft, and obsolescence from occurring as a result, capital must be secured. Additionally, there is a need to make products and services available when and where they are needed in order to avoid the associated costs. The presence of excessive or inadequate volumes of inventory can lead to business failure. A company's profit and return on total assets can both be significantly boosted by excellent inventory management, one might conclude. Thus, inventory management is the term used suitably to describe the management of this economics of investment. As the main component on the asset side of the balance sheet for many businesses, inventory management is the subject of increased focus.

2. RESEARCH METHODOLOGY

The following methodology will be adopted-

- Examine historical writings to determine where project management practices currently stand in comparison to one another.
- Gathering data on the ongoing construction site development, including cost data, processing, maintenance, and storage procedures used in construction.
- Identify the different inventory management techniques in construction industry.
- Study the inventory control techniques in ABC analysis and EOQ model in inventory management.
- Develop best alternative method.

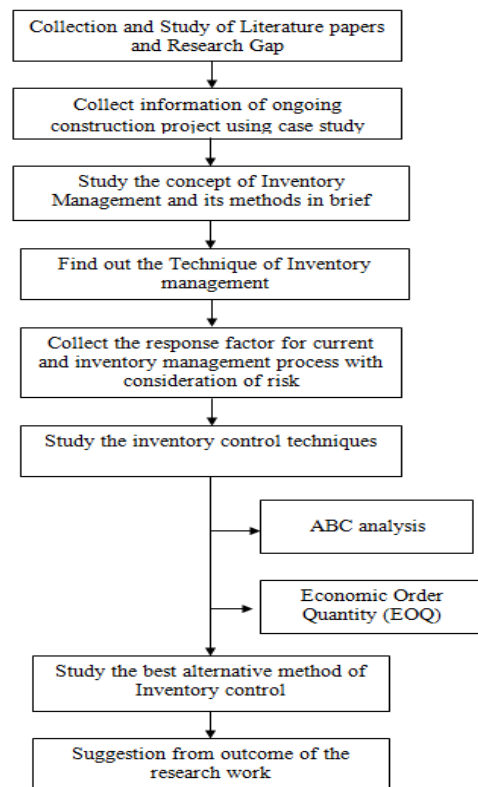


Figure 1: Flowchart of Methodology

3. LITERATURE REVIEW

Khyomesh V. Patel, Prof. Chetna M. Vyas,^[1]

This research aims to fill the vacuum left by poor materials management on construction sites. Running a productive and economical construction site depends on excellent material management. According to studies, the price of building equipment and materials may make up more than 70% of the total cost of a typical construction project. The productivity, cost effectiveness, and on-time the completion of a project can all be improved by proper management of this one key component. One of the major problems that contributes to the delay of construction projects is poor management of the equipment and supplies. The main findings of a study that examined the material management methods used by three well-known Ahmedabadi constructors are covered in this essay

Lukasz Rzepecki,^[3] The study provides a system that would allow a business it was operating simultaneously on several construction sites figure out and assess the costs related to inventory management. It is now possible to determine the lowest logistical expenses with the future supply schedule arrangements thanks to the development of mathematical models that mimic the functioning of supply logistics systems (delivery volumes in subsequent periods of the project execution). Based on this, the optimum supply chain management option will be selected. To demonstrate how the offered control can be applied in practice, an example is provided.

Lansford C. Bell and George Stukhart, Members, ASCE,^[4] Experts in the construction sector are beginning to recognise how crucial it is to focus on the materials management process as a proactive, observable entity that greatly influences construction costs. Recent years have seen the development of integrated raw material management solutions (MMS), also referred to as "total concept" systems, by the construction industry. These systems combine and integrate the operations for takeoff, vendor evaluation, purchasing, expediting, warehousing, and dissemination. Measurable increases in employment levels, a decrease in the surplus of bulk materials, a disappearance of the requirement for materials top managers, and cash flow savings are all outcomes of these materials management software. Although the costs of designing and implementing these systems can be high, the benefits far outweigh the disadvantages, especially when artisans use the systems to schedule their work around the availability of bulk supplies.

Monika Ramdas Nanaware, Prof. U. R. Saharkar,^[2] The basic elements of construction material management, the role of inventory management in material management, inventory processes, inventory control systems, key performance indicators of inventory management systems, inventory models, and inventory optimization are all covered in the paper, with a focus on the necessity of

material resource planning to maintain just-in-time inventories. Financial analysis of the effective use of inventory models in material management is offered in detail in the project's closing section, which deals with the ABC and EOQ Analysis of the Construction Company.

Olowolaju Monisola,^[5] Inventory is a vital asset, necessary for effective operation of any business organization. The absence of good inventory management practices in the Small and Medium Scale Industrial Enterprises (SMEs) necessitates a study to determine the actual reasons for non application of scientific inventory management techniques in the SMEs. Three hundred and twenty SMEs in Food, Textiles, and Wood and Metal Products sectors in South Western Nigeria were selected for the study. Two hundred and twelve organizations returned the questionnaire. It is established that non usage of scientific inventory techniques for better inventory decision was due to lack of skilled personnel and inadequate data to use inventory models; and low level of ICT in the SMEs. It is recommended that the SMEs should institute structure to improve the knowledge of their personnel about using quantitative inventory decision models and the SMEs should make the application of Information Communication Technology (ICT) for data management a priority

Prof. A. N. Eze, Uchenu, Chimezie Adamma,^[6] The purpose of the author's study was to determine how much the managers and accountants of SMSEs in Anambra State used inventory management strategies. The study was led by two research questions, and two null hypotheses were evaluated at the 0.05 level of significance. The survey also showed a substantial variation in the average evaluations of managers and accountants of SMSEs in Anambra for the use of inventory management techniques. The investigation came to the conclusion that SMSE managers and accountants did not use inventory management procedures to their full potential, which stunted their growth and slowed their development.

Pamela C. Nolz,^[7] In this article, we look at the challenge of creating a logistics system that will guarantee effective urban construction operations for a cutting-edge urban building region in Vienna. In order to maximize resource efficiency and minimize traffic associated with construction operations, we address the difficulties of organising personnel and the timely delivery and storage of material. Tactic and operational construction logistics planning are both included in the formulation of the problem, which is presented as a hierarchical optimization problem. On a weekly basis, a timetable of activities for various construction phases and the accompanying material transports and storage decisions are optimised, while on the operational level, the daily optimization of material transports—modeled as an inventory routing problem—is addressed. A mixed-integer programming formulation of the problem on each planning level is provided and solved using CPLEX. The suggested approach is tested on realistic data

from the city of Vienna. The results linked with different scenarios are analyzed to illustrate the value of the proposed approach for the design of construction logistics processes.

4. DATA COLLECTION AND ANALYSIS

A total of 30 respondents were asked to rate the variable on a 5-point scale, with strong agreement being the highest and strongly disagreeing being the lowest. Additionally, by speaking with professionals, the questionnaires construct validity and items gathered from various sources were reviewed, and the questionnaire was modified to meet the needs of the study. The months of March and April 2022 were used to carry out this investigation. To gather data, the researcher used a random sample technique. Based on the answer from the construction industries, the data were examined and the work flow was put into a typical technique to achieve the intended goal.

An overview of the various methods utilised for the inventory management system in the case study of construction enterprises is provided by the questionnaire survey. It is much easier to define the goal of the current study and to directly contribute to the project's successful completion as a result of the exhaustive literature review. A limited amount of research has been done, in particular, to examine stock control in building projects. The effectiveness of the inventory management is impacted by this. Making sure the project runs efficiently is vital to produce the intended performance. To find out how construction industry professionals felt about their organization's inventory management system, a quiz questionnaire was undertaken.

Table 1: Various Views For Study In Inventory Management System In Construction Industry

Sr. No	Questionnaire
1	How to Accepting goods before scheduled date
2	Which Categories of professionals for managing in site
3	How to way Change order affects material quantity and quality
4	How do you Control in stock overflow in construction site?
5	How to maintain Criteria for stock materials in you project?
6	What challenges are faces in Data related to inventory
7	How many Distance from project site to storage yard
8	Effects of material quantity variation in site

9	Can you use Emphasis on software than skilled manpower
10	Do you use in Future of inventory management system?
11	What is your Growth of company by managing stock
12	Can you maintain Importance to stock comparing other works
13	Involvement of contractor in material management
14	Managing stock in growth of company
15	Describe how you Method of categorizing the items
16	Why the Need for stock management
17	Do you track items at the stock locator level
18	Describe how you perform a physical inventory. Do you use physical inventory tags?
19	Provisions made for obsolete and inactive item
20	How many inventory items do you hold?
21	What basic information do you record about item
22	How many receiving transactions do you perform on average monthly
23	How many issue transactions do you perform on average monthly?
24	How to provide Training for stock management practices
25	Kind of material stock maintained in greater quantity
26	Your site how to maintain safety in storing
27	What is Major benefits of inventory management applicable in project
28	Which Type of material access available for stock data
29	Which Type of stock management system adopted in your project

5. APPLICATION OF INVENTORY MANAGEMENT

Through the use of various inventory strategies executed on a micro- or mini-computer, small firms, both manufacturers and merchants, now have the chance to dramatically lower costs associated to inventory. The two types of inventory techniques are those for finished goods with independent demand and those for goods with dependent demand (manufacturing-in-process items and raw material). Material

requirements planning (MRP) systems are currently usable on micro- and minicomputers, and their application is expanding quickly. These MRP systems assist a small factory plan, manage, and schedule work centres, as well as the inventory levels of dependent demand products. Savings opportunities with independent demand items can be found in a number of approaches. There are three categories of independent demand item techniques: continuous review models, periodic review models, and mixed models. The continuous review model (reorder point/economic order quantity model) is the one that is presented the most frequently. To issue a replenishment order on the day the reorder point is achieved, national evaluation models, meanwhile, make the implicit assumption that a perpetual inventory be maintained. Therefore, continuous review models presumptively presume that point-of-sale data is being gathered. While the continuous review method is particularly useful for automated tracking inventory that capture point-of-sale data, it is not useful for manual systems that handle a wide variety of commodities.

6. CONCLUSION

Inventory management has advanced greatly to solve the escalating problems faced by the majority of corporate organizations as a result of the distinct qualities of inventory as an asset. A questionnaire was used to get opinions from owners, consultants, and contractors regarding the factors affecting the success of construction projects. They should be more concerned with conformance to project specifications in order to avoid conflicts, concerns with timing and expenses, and other performance issues. Quality materials ought to be given greater weight in order for contractors to perform better in terms of cost, time, and quality. Implementing an inventory management system can be fixed by including contractors in material procurement. Contractors must maintain a record of their inventory and shopping lists, compute material utilization, and store their supplies securely. A company's project completion within a given budget and time period is stated to be greatly dependent on the inventory management system in place. The inventory management crew in any building project will undoubtedly work under intense stress.

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