

A Study of Inventory Control Technique on Construction Industry

Maheshkumar S¹ and Sindhu Vaardini U²

Post Graduate Student, M.E Construction Management, Department of Civil Engineering¹

Assistant Professor, M.E Construction Management, Department of Civil Engineering²

Kumaraguru College of Technology, Coimbatore, Tamil Nadu, India

Abstract: *Inventory control techniques are crucial in the construction industry to minimize wastage, maximize efficiency, and reduce costs. This literature review analyzes various inventory control techniques used in the construction industry, including Just-In-Time (JIT) inventory, Economic Order Quantity (EOQ), and Vendor-Managed Inventory (VMI). The review examines the advantages and disadvantages of each technique and highlights the challenges associated with their implementation in the construction industry. Additionally, the review explores the potential benefits of implementing innovative technologies such as radio frequency identification (RFID) and building information modeling (BIM) in inventory control in the construction industry. The findings suggest that the adoption of these techniques and technologies can enhance inventory control practices and improve the overall efficiency of construction projects.*

Keywords: Inventory management, Material, Procurement, Management

I. INTRODUCTION

The cost of construction projects is largely made up of the materials used. Inventory management helps companies to identify how much material stock to order at what time. Additionally, it keeps track of inventory from the time that things are purchased until they are sold. Because it helps to ensure that there is rarely too much or too little product on hand, inventory management is essential to the health of a business. The numerous strategies and procedures for purchasing goods are covered under inventory management. Maintaining inventories becomes almost essential because it is challenging to a real-world workplace scenario in which necessary materials will be instantly made available at the point of use. Each association are needing stock for simple running of its exercises. It also comprises the things that are employed as production-aiding supplies. An estimated 60–70% of the budget for a project is set aside for the inventory. One of the key components of current assets that enables a company's production and sales processes to run smoothly is inventory. The area of current asset management known as inventory management is focused on maintaining an optimal level of investment in inventory and implementing efficient control measures in order to reduce the overall cost of inventory. Planning, obtaining, storing, and providing the required material in the proper quantity and quality at the proper location at the proper time in order to coordinate and organize the production are all aspects of materials management for an industrial undertaking. The process through which an organization obtains the commodities and services it needs to fulfil its goals of purchasing, storing, and moving items is known as inventory management. Contrary to traditional accounting, inventory is viewed as creating costs or waste rather than enhancing and storing value. The control of non-capitalized assets (inventory and stock goods) is known as inventory management. Stock administration, a piece of inventory network the board, controls the development of items from makers to distribution centers and from these areas to retail locations. Keeping an intensive record of each new or returned thing as it enters or leaves a distribution center or retail location is a critical part of stock administration.

II. TECHNIQUES OF INVENTORY CONTROL SYSTEM

A portion of these administration techniques incorporate ABC Examination, without a moment to spare (JIT) fabricating, materials prerequisite preparation (MRP), monetary request amount (EOQ), and days deals of stock (DSI). There are others, yet these are the four most normal techniques used to dissect stock.

1. ABC Analysis: This is a technique that categorizes inventory into three groups (A, B, and C) based on the relative importance of each item to the business. The A items are the most important and typically require the most attention in terms of inventory management.
2. Just-In-Time (JIT): This is a system where inventory is ordered and received only when it is needed, reducing the amount of inventory that needs to be stored and minimizing waste.
3. Economic Order Quantity (EOQ): This is a mathematical formula used to determine the optimal order quantity and reorder point for inventory. It considers factors such as the cost of ordering, the cost of holding inventory, and the rate of demand.
4. Materials Prerequisite Preparation (MRP): This stock administration technique is deals conjecture reliant, implying that makers should have precise deals records to empower exact preparation of stock necessities and to convey those necessities with materials providers as soon as possible.
5. Days Deals of Stock (DSI): This monetary proportion demonstrates the typical time in days that an organization takes to turn its stock, including products that are a work underway, into deals. DSI is otherwise called the normal period of stock, days stock remarkable (DIO), days in stock (DII), days deals in stock or days stock and is deciphered in more ways than one.

III. REVIEW OF JOURNALS

Al-Aidrous, A. H. M. H., Hern, N. J., Rahmawati, Y., Jahja, M., Yusof, K. W., Zawawi, N. A. W. A., & Utomo, C. (January 2022), By providing recommendations for improving inventory and procurement systems in infrastructure projects, such as developing a comprehensive procurement strategy that considers project requirements, selecting reliable suppliers, and improving communication and coordination among project stakeholders. The authors also suggest future research directions, such as investigating the role of technology in enhancing inventory and procurement systems in infrastructure projects.[1]

Malik, H., & Sharma, P. K. (May 2022), The various stages of inventory management, including procurement, storage, and distribution, and provide insights into the best practices for each of these stages. They also highlight the challenges faced by construction companies in managing inventory, such as the need to manage a large number of items, variable demand, and the perishable nature of some materials. Also discusses the role of technology in inventory management, highlighting the potential benefits of using automated inventory management systems and Radio Frequency Identification (RFID) technology.[2]

Subramani, T., Nair, V. B., David, A., Ghose, B. M., & Kumar, N. S. (May 2017), A survey of 72 construction companies and analyzed using statistical tools such as factor analysis and regression analysis. The analysis of the inventory management control they adopted and how they effectively utilise the inventory at the site. Tracking and locating of materials in construction site.[3]

Kulkarni, V., Sharma, R., Hote, M., & Civil, M. E. (2017), Overall, the study highlights the importance of effective material management in the construction industry and provides insights into the various factors that can affect the material management process. The findings of this study can be useful for construction companies in developing effective material management strategies and improving their overall operational efficiency.[4]

Nanaware, M. M. R., & Saharkar, U. R. (September 2017), The article concludes by discussing the potential benefits of using HIMT, such as reduced inventory carrying costs, improved cash flow, and increased efficiency in construction operations. The authors also suggest future research directions, such as the development of a software tool to automate the HIMT process and the exploration of the applicability of HIMT in other industries.[5]

Mohopadkar, J. S., & Patil, D. P. (2017), The authors discuss the various stages of inventory management, including procurement, storage, and distribution, and provide insights into the challenges faced by construction companies in managing inventory. They also highlight the benefits of effective inventory management, such as reduced costs, improved project efficiency, and increased customer satisfaction. The authors conclude by emphasizing the need for construction companies to adopt efficient inventory management practices to improve project performance. They recommend that companies invest in training programs to equip staff with the necessary skills and knowledge to implement these techniques successfully.[6]

PatilYogendra, R., &PatilDhananjay, S. (2015), The feasibility of implementing JIT inventory management in construction projects and highlights the benefits of adopting efficient inventory management techniques for project success. The authors' emphasis on conducting a feasibility study before implementation is particularly valuable, as it can help construction companies make informed decisions about whether JIT is appropriate for their project.[7]

Panigrahi, R. R., Das, J. R., Jena, D., &Tanty, G. (2015), The article analyzes the benefits of adopting advanced inventory management practices and provides insights into the best practices for successful implementation. They highlight that inventory management is critical for the success of manufacturing companies, as it can significantly impact production performance, customer satisfaction, and profitability. They discuss the various types of inventory, such as raw materials, work in progress, and finished goods, and provide insights into the challenges faced by companies in managing each type of inventory. It provides a useful summary of the impact of advanced inventory management practices on production performance in the manufacturing industry. The training programs is particularly valuable, as it highlights the importance of equipping staff with the skills necessary to implement advanced inventory management practices successfully.[8]

Patil, A. R., &Pataskar, S. V. (2013), The importance of effective material management in construction projects, highlighting that poor material management can lead to delays, cost overruns, and quality issues. They also note that the use of appropriate material management techniques can help improve project efficiency and reduce costs. Overall summary of the article is the material management techniques in the construction industry and highlights the benefits of adopting effective techniques for project success.[9]

Jarkas, A. M., &Bitar, C. G. (2012), To identify and analyze the critical factors that affect inventory and procurement systems in infrastructure projects. the authors identified several critical factors that affect inventory and procurement systems in infrastructure projects, such as procurement strategy, project size and complexity, material availability, lead time, and logistics. The authors also analyzed the relationships between these critical factors and their impacts on inventory and procurement systems.[10]

Doloi, H., Sawhney, A., Iyer, K. C., &Rentala, S. (2012), By discussing the importance of timely completion of construction projects and the increasing incidence of delays in the Indian construction industry. They then provide a literature review of the factors that contribute to delays in construction projects and develop a conceptual framework to analyze the impact of these factors on project performance. And the future research are the impact of delays on project cost and quality and developing a comprehensive risk management framework for construction projects in India.[11]

Nwachukwu, C. C., &Emoh, F. I. (2010), By providing a background of the construction industry in Nigeria and the challenges faced by project managers in ensuring project success. They then discuss the importance of a systems approach to analyzing material constraining factors and propose a framework that integrates the various factors that can impact the success of construction project management. Then suggest future research directions, such as investigating the role of technology in improving material management and developing a decision support system to assist project managers in addressing material constraining factors.[12]

Kazaz, A., Manisali, E., &Ulubeyli, S. (2008), The authors conducted a survey of 252 construction workers in Turkey to identify the basic motivational factors that impact productivity. The results indicate that the most significant motivational factors were job security, opportunities for personal development, and fair pay. The authors analyze the relationship between these motivational factors and productivity using regression analysis and find that all three factors have a significant positive effect on productivity.[13]

Osmani, M., Glass, J., & Price, A. D. (2008), The authors present the results of a survey of architects in the UK to understand their perspectives on construction waste reduction by design. The survey results indicate that architects are aware of the importance of construction waste reduction and are willing to take action to reduce waste. However, they face barriers such as lack of knowledge, lack of client demand, and cost considerations. That greater collaboration among all stakeholders in the construction industry is essential to achieving sustainable construction practices.[14]

Toor, S. U. R.,&Ogunlana, S. O. (2008), The survey results indicate that the most significant problems causing delays are inadequate planning and scheduling, design changes, and inadequate communication and coordination. The need for further research to explore the problems causing delays in major construction projects in other contexts and to identify additional strategies for mitigating delays.[15]

Tam, V. W., Shen, L. Y., Fung, I. W., & Wang, J. Y. (2007), The regulatory framework for controlling construction waste in Hong Kong, including the Waste Disposal Ordinance and the Construction Waste Disposal Charging Scheme. And also analyze the costs and benefits of implementing the governmental ordinances and find that the benefits of reducing construction waste outweigh the costs of implementing the ordinances.[16]

Navon, R., & Berkovich, O. (2006), They then describe the automated model, which is based on a set of algorithms and rules that enable real-time monitoring and control of materials in construction projects. To identify potential shortages or surpluses, and take proactive measures to address these issues. The future research as to investigating the impact of the model on project cost and schedule performance and exploring the use of other technologies, such as RFID and GPS, in materials management.[17]

Assaf, S. A., & Al-Hejji, S. (2006), The results of a survey of construction professionals in Saudi Arabia to identify the causes of delay in large construction projects in the country. The survey results indicate that the most significant causes of delay are inadequate planning and scheduling, design changes, and financial problems. They suggest that improving planning and scheduling, managing design changes more effectively, and ensuring adequate financial resources are available can all help to reduce delays.[18]

Kadir, M. A., Lee, W. P., Jaafar, M. S., Sapuan, S. M., & Ali, A. A. A. (2005) , The conclusion of emphasizing the importance of addressing labor-related factors to improve labor productivity in the construction of residential projects in Malaysia. The authors suggest that effective human resource management practices, such as training programs and career development opportunities, could contribute significantly to enhancing labor productivity in the industry.[19]

Ekanayake, L. L., & Ofori, G. (2004), The potential benefits of using the BWAS, such as reducing waste generation, minimizing waste disposal costs, and promoting sustainability in the construction industry. The authors suggest future research directions, such as developing a comprehensive waste management plan based on the BWAS results and evaluating the economic feasibility of sustainable building designs.[20]

Odeh, A. M., & Battaineh, H. T. (2002), The causes of construction delays in traditional contracts and classify these causes into eight categories, such as design changes, material shortages, and weather conditions. The future research directions of the paper, such as investigating the causes of delay in other types of contracts, such as design-build and construction management contracts.[21]

Manavazhi, M. R., & Adhikari, D. K. (2002), The article also reviews various case studies of highway projects in Nepal, analyzing the causes of procurement delays and providing recommendations for addressing them. The authors suggest solutions such as streamlining bureaucratic procedures, enhancing coordination between stakeholders, and improving contractor experience and capacity. The authors' emphasis on proactive procurement management is particularly valuable, as it highlights the need for construction companies to address potential procurement delays before they occur.[22]

Makulsawatudom, A., Emsley, M., & Akintoye, A. (September 2001), The review of the journal on factors that affect productivity in the construction industry, including labor productivity, materials management, and technology adoption. They suggest that improving labor productivity can be achieved through better training and education, while improving construction technology can be achieved through the adoption of modern construction techniques and equipment. The further research to explore the relationships between these factors and to identify additional strategies for improving productivity in the construction industry in Thailand.[23]

Ogunlana, S. O., Promkuntong, K., & Jearkjirm, V. (1996), The author states that construction professionals in Thailand, Malaysia, and Singapore to identify the factors causing delays in construction projects in the three countries. The survey results indicate that the most significant factors causing delays in Thailand are inadequate planning and scheduling, design changes, and financial problems, whereas in Malaysia and Singapore, the most significant factors are labor productivity and material shortages.[24]

IV. CONCLUSION

Inventory management techniques are critical for the construction industry to manage the flow of materials and supplies necessary to complete projects efficiently and effectively. As the influencing factors are collected from the study of literatures and articles. For that Questionnaire survey is created and distributed to Engineers, Supervisors, Consultant, Contractor, Project manager, Purchase manager to identify the influencing factors affecting the inventory management

and the results are analyzed in the project phase II. The significance of inventory management techniques on the construction industry cannot be overstated.

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