www.ijarp.com ISSN 2456-9992 Page: 01-07

International Journal Advanced Research Publications

Case Study

Volume: 02
Issue: 04

"A STUDY ON OPTIMIZING INVENTORY AT PRAVEEN ENGINEERING PRIVATE LIMITED" AT HOSUR

K. Gowtham*[1], Mrs. S. Janaki[2] Assistant Professor

[1]**II Year MBA, Department of Management Studies** Adhiyamaan College of Engineering, (Autonomous) Hosur, Tamil Nadu, India.

[2]Department of Management Studies, Adhiyamaan College of Engineering (Autonomous) Hosur, Tamil Nadu, India.

Article Received: 09 March 2026, Article Revised: 29 March 2026, Published on: 19 April 2026

***Corresponding Author: K. Gowtham**

II Year MBA, Department of Management Studies Adhiyamaan College of Engineering, (Autonomous) Hosur, Tamil Nadu, India.

DOI: https://doi-doi.org/101555/ijarp.2769

ABSTRACT

Inventory management plays a critical role in ensuring operational efficiency and cost control in manufacturing organizations. This study focuses on optimizing inventory management practices at Praveen Engineering Private Limited, a company engaged in manufacturing automobile load body components. The research identifies key challenges such as overstocking, stock shortages, inefficient storage practices, and lead time variability.

The study adopts a quantitative research approach using tools such as ABC analysis, Economic Order Quantity (EOQ), demand forecasting, and regression analysis. Data was collected from primary and secondary sources including ERP records, inventory ledgers, and production reports.

KEYWORDS: Inventory Optimization, ABC Analysis, EOQ, Demand Forecasting, Manufacturing Efficiency, Inventory Control.

INTRODUCTION

Inventory in a manufacturing organization should not be viewed merely as stock but as a strategic asset that plays a vital role in ensuring overall operational success. Effective inventory management is essential for maintaining production continuity, as the availability of raw materials directly influences uninterrupted manufacturing processes. At the same time, it

contributes significantly to cost control by minimizing carrying costs, reducing wastage, and avoiding unnecessary capital blockage. Furthermore, efficient inventory practices enhance customer satisfaction by enabling timely production and delivery of finished goods.

In the context of the study, the presence of multiple product types such as various tipper bodies and e-commerce load bodies increases the complexity of inventory management. Each product category requires different combinations and quantities of materials, making planning and control more challenging. The major materials involved, including sheets, tubes, coils, and fasteners, are common across different models and form the backbone of the production process. Therefore, managing these materials efficiently is critical for achieving optimal inventory levels and ensuring smooth organizational performance.

1. RESEARCH BACKGROUND & PROBLEM

Research Background:

Manufacturing organizations operate in a highly dynamic environment where several external and internal factors influence inventory management. One of the major challenges is demand variability, as fluctuations in customer orders make it difficult to accurately predict material requirements. In addition, supplier delays often disrupt the timely availability of raw materials, leading to uncertainties in production planning. Cost fluctuations of raw materials further complicate procurement decisions, as unexpected price changes can impact overall production costs and profitability. These challenges highlight the need for effective and systematic inventory management practices to ensure operational stability and efficiency.

Problem Statement:

The organization currently faces several issues related to inventory management that affect its overall performance. Overstocking of materials leads to increased carrying costs, blocking valuable working capital and occupying storage space unnecessarily. At the same time, stockouts of critical materials cause production delays and disrupt workflow continuity. Poor layout and storage practices make it difficult to identify and retrieve materials quickly, resulting in inefficiencies in handling. Additionally, inefficient material movement between storage and production areas increases time consumption and labor effort. These problems collectively reduce productivity and emphasize the need for inventory optimization.

2. OBJECTIVES

- To analyze the current inventory levels and understand stock availability across materials
- To identify inefficiencies in inventory management such as overstocking and stockouts
- To reduce carrying costs by maintaining optimal inventory levels
- To improve the inventory turnover ratio for better utilization of resources
- To apply inventory control techniques like ABC analysis and EOQ for effective decision-making

3. REVIEW OF LITERATURE

- **Zabraoui (2025):** Hybrid AI models improve inventory efficiency.
- **Bhavikatta (2025):** AI reduces stockouts and boosts efficiency.
- **Guo (2025):** Flexible strategies improve supply chain resilience.
- **Kathiriya (2025):** RFID improves inventory tracking accuracy.
- **Wu (2026):** AI enhances inventory decision-making.

4. RESEARCH GAP

The literature on inventory management shows strong progress from basic models like EOQ to advanced techniques such as analytics and AI. However, many traditional models rely on fixed assumptions that do not reflect real-world uncertainties like demand fluctuations and supply disruptions. There is limited use of business analytics and modern tools in practical applications, especially in small and medium enterprises.

Issues such as poor data quality, lack of industry-specific studies, and weak integration of financial and operational metrics also exist. Additionally, areas like multi-criteria inventory classification and supply chain risk management are still underdeveloped, highlighting the need for more practical and data-driven research.

5. METHODOLOGY

The study adopts a descriptive and analytical research design to examine and evaluate inventory management practices within the organization. Data for the study is collected from both primary and secondary sources.

Primary data is gathered through interviews and direct observation of inventory and warehouse operations, providing practical insights into real-time processes and challenges. Secondary data is obtained from ERP systems and organizational records, which offer

structured and historical information for analysis.

To support the study, various analytical tools and techniques are used, including MS Excel for data processing, ABC analysis for inventory classification, Economic Order Quantity (EOQ) for determining optimal order levels, and forecasting methods to predict future demand and improve inventory planning.

6. DATA ANALYSIS

The analysis of weekly production data for different load body types indicates the actual demand pattern that must be supported by inventory planning. It is observed that the production of 5 CBM bodies ranges between 2 to 4 units per day, making it a high-frequency product with consistent material consumption throughout the week. Similarly, 6 CBM bodies show moderate but stable production levels, varying between 2 to 4 units daily. In contrast, 8.5 CBM and 23 CBM bodies are produced in lower quantities, typically between 1 to 3 units per day, but they require a higher amount of materials per unit.

TABLE 1.1 – ABC ANALYSIS OF DALIY PRODUCTION UNIT

LOAD BODY	day 1	day 2	day 3	day 4	day 5	day 6	day 7
5 cbm	3	4	3	3	4	2	3
6 cbm	2	3	3	4	2	2	2
8.5 cbm	2	1	1	2	1	2	1
23 cbm	1	1	2	3	2	1	2

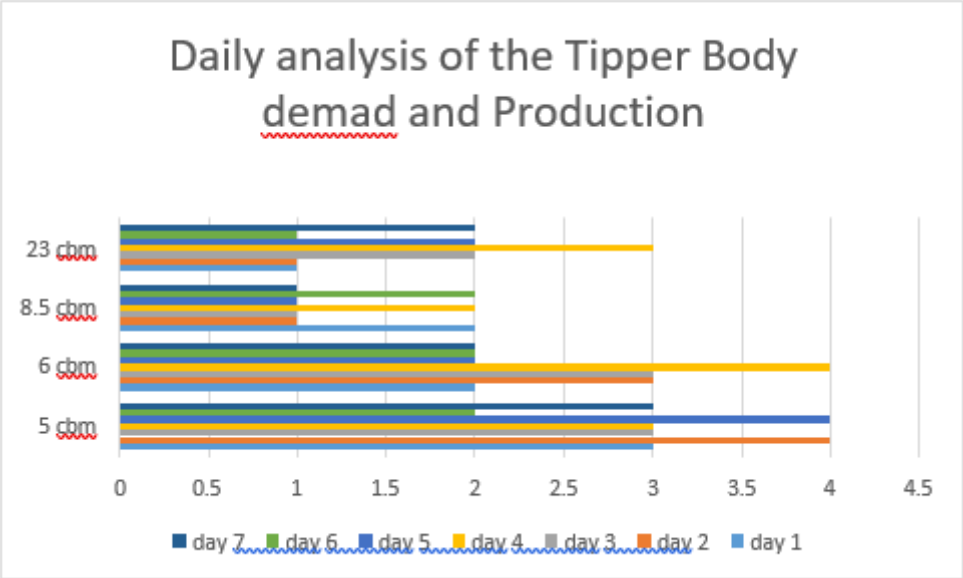

DIAGRAM 1.1

TABLE 1.2 – QUANTITATIVE ANALYSIS.

5cbm	Jeyam Auto	Shivam Fastners	Wipro	Sheets	Tubes	Paints	Coil	Sealend
1	152	141	5	12	8	10	15	5
6cbm	Jeyam Auto	Shivam Fastners	Wipro	Sheets	Tubes	Paints	Coil	Sealend
1	160	163	8	16	10	12	18	8
8.5cbm	Jeyam Auto	Shivam Fastners	Wipro	Sheets	Tubes	Paints	Coil	Sealend
1	200	241	8	20	16	14	25	10
23cbm	Jeyam Auto	Shivam Fastners	Wipro	Sheets	Tubes	Paints	Coil	Sealend
1	281	250	15	30	38	20	50	18

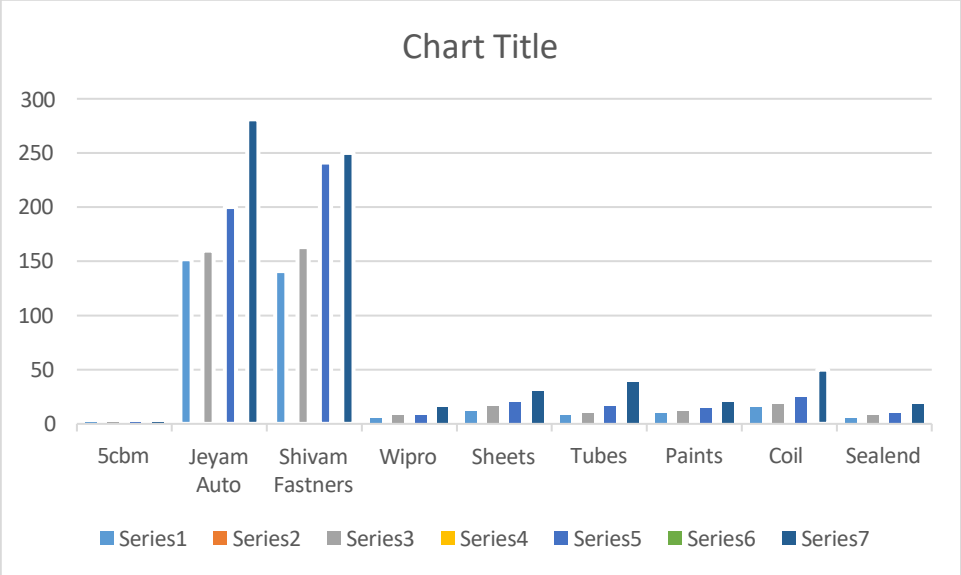

DIAGRAM 1.2

The analysis clearly indicates that the identified materials and their required quantities must be adequately maintained in inventory to ensure smooth and uninterrupted production operations. Maintaining sufficient stock levels for these materials is essential to avoid stockouts, which can lead to production delays and operational inefficiencies. Proper inventory planning based on these requirements helps in ensuring continuous material availability, thereby supporting a stable and efficient workflow.

7. INTERPRETATION

The analysis of inventory data reveals clear distinctions between production frequency and material consumption across different load body models. Models such as 5 CBM and 6 CBM are produced at a higher frequency, resulting in continuous and consistent demand for

materials.

This creates sustained pressure on inventory levels, requiring regular replenishment to ensure uninterrupted production. On the other hand, models like 8.5 CBM and 23 CBM exhibit significantly higher material consumption per unit.

Overall, the findings highlight the need for a balanced inventory strategy that focuses on maintaining sufficient stock for high-frequency models while carefully controlling inventory levels for high-consumption models to minimize costs and improve efficiency.

Moreover, it is observed that certain materials such as fasteners, sheets, tubes, and coil are common across multiple models, which highlights the importance of integrated inventory planning to avoid duplication and excess stock.

It is also evident that improper balancing between high-frequency and high-consumption models may lead to either stock shortages or overstocking, emphasizing the need for accurate demand forecasting and efficient inventory control techniques.

8. FINDINGS

The analysis highlights several key issues affecting inventory management within the organization. Materials are not systematically arranged, making it difficult to identify and retrieve items efficiently. Additionally, the long distance between the store and production area leads to delays in material movement and increased handling time. Stock shortages are also observed, indicating gaps in inventory planning and control. Furthermore, poor inventory monitoring practices and inefficiencies in the MRN system contribute to inaccuracies in stock records and disrupt smooth operational flow.

9. SUGGESTIONS

The study recommends implementing ABC analysis to prioritize inventory control by focusing on high-value materials, along with the use of the EOQ model to determine optimal order quantities and reduce overall costs. Improving storage practices through the adoption of the 5S methodology will enhance organization and accessibility of materials. The introduction of ERP-based tracking systems can ensure accurate and real-time inventory monitoring. Additionally, reducing the distance between the store and production area will improve material flow and efficiency. Strengthening supplier coordination is also essential to ensure timely delivery of materials and minimize delays in production.

10. CONCLUSION

Inventory optimization significantly enhances overall organizational performance by improving cost efficiency through reduced carrying and ordering costs. It ensures a smooth production flow by maintaining the right quantity of materials at the right time, thereby minimizing delays and interruptions. Additionally, it enables better utilization of working capital by avoiding excess inventory and reducing funds tied up in stock.

11. FUTURE SCOPE

Future research can focus on advanced technologies such as AI-based inventory systems to improve decision-making and automation, IoT tracking to enable real-time monitoring of materials, and predictive analytics to enhance demand forecasting and optimize inventory levels.

12. REFERENCES (APA STYLE)

1. Wilson, R.H. (1934). Inventory Control Model.
2. Ohno, T. (1988). Just-In-Time System.
3. Lee, H.L. (1997). Bullwhip Effect in Supply Chain.
4. Simchi-Levi, D. (2003). Supply Chain Management.
5. Gunasekaran, A. (2004). ERP in Inventory Management.
6. Ramanathan, U. (2006). ABC Analysis Approach.