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## EFFECTIVENESS OF MATERIAL MANAGEMENT IN BHEL

S. Lasya priya (22D21E0043), MBA 2<sup>nd</sup> year

Mrs.Ch. Deepthi, Assistant professor, MBA department

SRIDEVI WOMENS ENGINEERING COLLAGE, VATTINAGULAPALLY.

### ABSTRACT

BHEL is India's largest engineering and manufacturing company in the energy and infrastructure sector. Founded in 1964, the company is one of the world's leading manufacturers of energy equipment and one of the earliest and most important contributors to the establishment of Atmanirbhar. The company offers a comprehensive portfolio of products, systems and services in cogeneration, hydropower, gas, nuclear and solar power, transmission, defense and aerospace, oil and gas, as well as new areas such as BESS and EV chargers provided to customers. Material management is the planning, procurement, storage, and provision of the right materials in the right quality, right quantity, right place, and right time to coordinate and plan the production activities of industrial enterprises. An integrative Method. Improper handling and storage of materials on the manufacturing floor makes it difficult to track and locate materials when needed. Inventory turnover ratio shows the relationship between cost of goods sold and average annual inventory level. These findings may reflect the main factors influencing material management systems, which can improve project management efficiency and reduce material waste in the respective regions.

### INTRODUCTION

Bharath Heavy Electrical Limited BHEL is India's largest engineering and manufacturing company in the energy and infrastructure sector. Founded in 1964, the company is one of the world's leading manufacturers of energy equipment and one of the earliest and most important contributors to the development of Atmanirbhar. The company is the 12th largest energy systems manufacturer in the world. In recent years, the concept of materials management has been widely used in developed countries to achieve more effective coordination and control of materials, handling costs, transportation and storage costs, insurance, disposal and obsolescence costs.

Materials management is the planning, organization, and control of the flow of materials from initial purchase through internal operations to service points and sales. BHEL attaches great importance to innovation and creative progress leading to the development of technologically competitive products and services.

Effective materials management at BHEL involves strategic planning, optimized processes, and efficient use of resources.

1. Inventory Management: Implement a robust inventory management system to minimize overstocks and stockouts. Regularly check inventory levels and adjust orders accordingly.
2. Supplier Relationship Management: Maintain closer relationships with suppliers to ensure on-time delivery, overstock, and stock-outs. Regularly check inventory levels and adjust orders accordingly.
3. Technology integration: Leverage technology for real-time tracking of materials, automatic reordering, and data analysis to predict demand and optimize inventory levels.
4. Demand Forecasting: Invest in accurate demand forecasting methods to predict material needs and reduce the risk of overstocking or shortages.
5. Standardization: Standardize materials wherever possible to simplify procurement, reduce costs, and increase storage and handling efficiency.
6. Risk management: Identify potential risks within your supply chain, such as geopolitical factors.
7. Regular audits: Conduct periodic audits of materials management processes to identify opportunities for improvement and ensure compliance with established procedures.
8. Training Program: Train staff in materials management best practices and emphasize the importance of accuracy, accountability, and adherence to established procedures.
9. Waste Reduction: Implement measures to minimize waste, including through increased inventory turnover, recycling, and optimizing material use.
10. Continuous Improvement: Promote a culture of continuous improvement and encourage employees to suggest and implement efficiencies in materials management processes.

## OBJECTIVES:

- \* To identify strategies used in Minimizing the material cost.
- \* To determine the desired quality of material at minimum cost.
- \* To Identify the methods used to purchase, receive, transport and store material efficiently.
- \* To identify the inventory turnover ratio of BHEL during 2019-2020 to 2021-2022.

**REVIEW OF LITERATURE:**

Materials management is an essential business activity aimed at providing and maintaining a steady flow of raw materials, parts, and semi-finished products needed for a company's manufacturing and alternative operations. It is one of the best tools used by several organizations to improve the efficiency of production processes while minimizing value and generating profits. Materials management includes all activities related to the work process of sourcing, handling, and transporting materials and spare parts used in the manufacture of finished products.

**Lenders** defines the organizational concept of materials management as a single manager responsible for organizing, promoting, and controlling all activities that primarily affect the flow of materials into an organization. Each of the above concepts is emphasized in a different way, but they all relate to materials management, and they all start with the supplier. Purchasing, receiving goods, quality control, material handling, and internal transportation are also included in this definition.

Cautious. (2008): states that inventory management allows companies to improve inventory through economical order quantities and system-level monitoring through two-box and redline methods. Inventory management protects the organization from unwanted losses from other departments. Material inventories are maintained by him for three purposes: Offering, Speculating, Trading.

Deepak Hajoary. (2015) objective is to explain the role and tools of the manufacturing department in materials management. These tools are currently used in several areas. This illustrates the different barriers to product adoption associated with each manufacturing sector. Improper material handling can cause significant damage to any industry.

**Functions of material management:**

Materials management includes all aspects of materials cost, supply, and usage. The main functions of materials management can be divided into four categories:

1. Material Planning and Control
2. Purchasing
3. Stores Management
4. Inventory Control or Management
5. Value Analysis
6. Ergonomics
7. Just-in-Time (JIT)

We have covered all the above features of material management.

1. Materials Planning and Control: Materials Planning and Control, or MPC for short, begins with forecasting and estimating. Sales forecasts and production schedule forecasts are used to perform the remaining functions. In a manufacturing system, production managers take the lead in planning future production. The need for parts and materials is determined based on the production plan.
2. Purchasing Management: This function begins with the selection of suppliers, followed by determining purchase terms, placing orders, tracking, maintaining good relationships with suppliers, approving payments to suppliers, and evaluating and evaluating suppliers. In medium and large scale industries, separate departments called purchasing departments or procurement cells are established with appropriate autonomy and are empowered to make purchasing arrangements based on the requirements of other departments. This department maintains contact and contracts with suppliers and regularly receives offers. The department's endeavor is to purchase quality products at fair prices. Purchasing is a management activity that goes beyond a simple purchasing process and includes tactical, planning, and policy activities that cover a wide range of related and complementary activities.
3. Store Management: This function begins with material receipt, physical management of materials, storage within the store, minimizing obsolescence and damage through timely disposal and efficient handling, maintaining store records, and ensuring proper Deal with location and storage. The receiving department, as a function of store management, is responsible for unloading materials, counting quantities, determining quality, and shipping to stores. The purchasing department is also informed about the receipt of various materials.
4. Inventory Management or Inventory Management: Inventory usually refers to materials in stock and is also considered as unused resources of the company. Inventory refers to items held for sale, items in progress, or items held in the form of materials that have not yet been used. The time lag between receiving purchased parts and converting them into final products and shipping them varies by industry and depends on production cycle times. Therefore, for the system to operate efficiently, it is necessary to maintain various types of suppliers that act as buffers between supply and demand.

Importance of material management is crucial for BHEL:

1. Cost Management: Efficient materials management allows you to control procurement costs, reduce inventory costs, and minimize waste, contributing to overall cost efficiency in your operations.
2. Operational Efficiency: Streamlining material processes ensures that the resources you need are available when you need them, reducing downtime and increasing operational efficiency in manufacturing.
3. Customer Satisfaction: Effective materials management ensures timely production and delivery of quality products, meeting customer expectations and increasing satisfaction.

4. Resource Utilization: Proper material planning and inventory management optimizes the utilization of resources such as raw materials, labor, and storage space, increasing resource utilization.
5. Competitive Advantage: Efficient material management provides a competitive advantage by enabling BHEL to offer competitive prices, faster delivery times, and higher quality products compared to its competitors. It becomes the source of
6. Cash Flow Management: By minimizing excess inventory and negotiating favorable terms with suppliers, BHEL can effectively manage cash flow and allocate resources to other important areas of the business.
7. Risk Mitigation: Materials management strategies can help identify and reduce risks associated with supply chain disruptions and ensure a steady flow of materials for production.
8. Adaptability to market changes: Through effective materials management, BHEL is able to respond quickly to market changes and adapt its sourcing and production strategies to changing customer requirements and industry trends.
9. Compliance and Ethics: Adhering to ethical sourcing practices and adhering to environmental and legal standards in materials management enhances BHEL's long-term reputation and sustainability.
10. Supporting innovation: Proper materials management frees up resources for research and development and fosters innovation in product design and manufacturing processes.
11. Environmental Impact: Sustainable materials management practices reduce our environmental impact by minimizing waste, promoting recycling, and encouraging the use of environmentally friendly materials.
12. Supply Chain Resilience: A well-managed material supply chain increases BHEL's resilience to external shocks and uncertainties, ensuring continuity of operations even under difficult circumstances.

## RESEARCH METHODOLOGY:

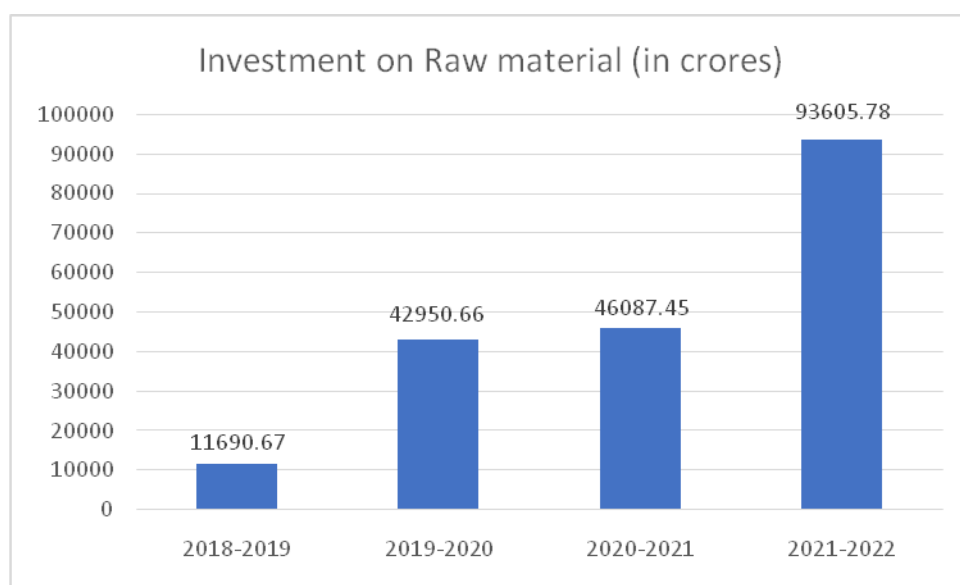
This study is mainly based on secondary data. Relevant information in this regard has been collected from various sources such as BHEL's annual reports and website. Additionally, references from libraries were used and material from journal articles, textbooks, and research papers were also considered. The study period is from 2002-2003 to 2011-2012. Therefore, various sources were used to collect relevant data. Analysis is primarily done using various statistical measures such as percentages and averages.

**DATA ANALYSIS:**

- The investment on raw materials over a period of 4 years from 2018 to 2022 is presented in the following table.

- **investment on raw materials:**

| Year      | Investment on Raw material (in crores) |
|-----------|--|
| 2018-2019 | 11690.67                               |
| 2019-2020 | 42950.66                               |
| 2020-2021 | 46087.45                               |
| 2021-2022 | 93605.78                               |

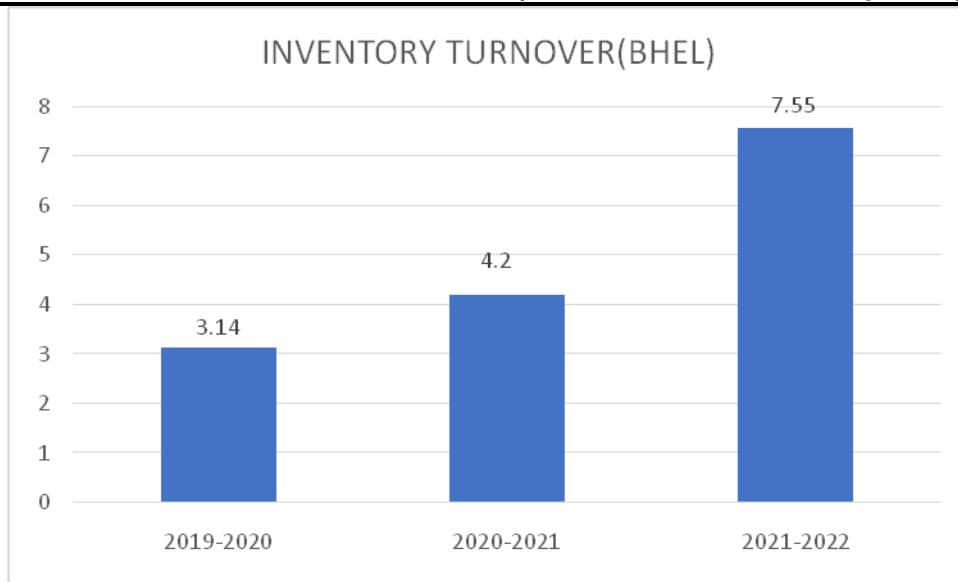


**Interpretation:**

The graph above shows investment in raw materials over a four-year period from 2018 to 2022. Investment in raw materials from 2018 to 2019 was \$11,690,677 million. Last year 2021-2022, investment in raw materials amounted to Rs 93,657.8 million. Investment in raw materials is gradually increasing.

- **To make an analysis inventory turnover ratio of BHEL**

| YEAR      | COST OF GOOD SOLD(BHEL) | AVERAGE INVENTORY(BHEL) | INVENTORY TURNOVER(BHEL) |
|-----------|-------------------------|-------------------------|--------------------------|
| 2019-2020 | 21332.33                | 6786.71                 | 3.14                     |
| 2020-2021 | 26237.44                | 8536.24                 | 4.20                     |
| 2021-2022 | 32506.13                | 10099.25                | 7.55                     |
| AVERAGE   | 36874.86                | 12203.77                | 14.89                    |

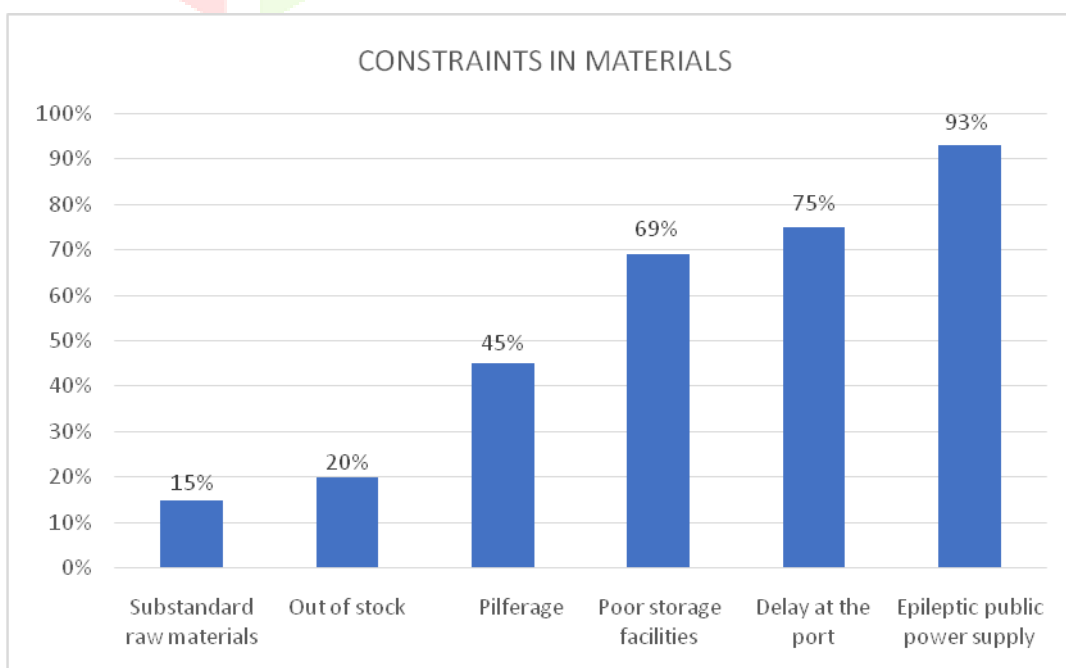


**Interpretation:**

From the above graph, you can see the inventory turnover ratio of BHEL. This ratio was calculated for various manufacturing costs and average inventory levels from 2019 to 2022. Inventory turnover ratio was 7.55 times.

• **CONSTRAINTS IN MATERIALS**

| Particulars                   | % of constraints in materials |
|-------------------------------|-------------------------------|
| Substandard raw materials     | 5%                            |
| Out of stock                  | 8%                            |
| Pilferage                     | 10%                           |
| Poor storage facilities       | 15%                           |
| Delay at the port             | 69%                           |
| Epileptic public power supply | 83%                           |



Interpretation:

The graph shows that the percentage of inadequate storage facilities is 69%. As a result, the company cannot store enough raw materials and 20% of raw materials are out of stock.

## FINDINGS

- Efficient warehousing minimizes production costs.
- Effective inventory management minimizes investors' financial investment.
- Investments in raw materials and inventory turnover are increasing, but the company needs to adopt various strategies to continuously improve its storage and transportation facilities.

## CONCLUSION:

BHEL is India's largest engineering and manufacturing company. BHEL is a leading supplier of equipment and systems to the industry. Overall, BHEL is the best product supplier and manufacturer so far. Materials management is an important management tool that greatly helps in obtaining supplies of the right quality and quantity at the right time. It provides proper inventory management and helps in establishing healthy disposal and disposal methods, thereby increasing the efficiency of an organization, large organization, or household. All of this contributes to a healthy work environment.

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