

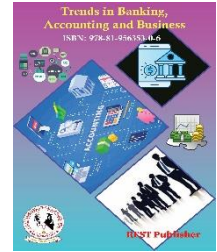


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A Study on Impact of Material Requirement Planning with Special Reference to Micro-Tech CNC Private Limited at Hosur

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Abstract. This paper presents a theoretical MRP model which includes both demand and supply uncertainties from quantity and timing variations. The model suggests empirical methodologies to estimate the variances of final outputs and components for estimates of safety stock requirements to reduce uncertainty. This paper suggests methodology for safety stock estimates to alleviate demand uncertainty for trade-to-stock organizations and made-to-order organizations and to estimate safety stock for the production systems to alleviate supply uncertainty. Material Requirement Planning (MRP) with Dynamic Lot Sizing application can be used by companies for quantity, time and inventory costs problems, thus reducing the excess raw materials that occur, ensuring the smooth production and improve productivity and profitability. Material Requirements Planning is a widespread management tool which helps to control the inventory with the help of forward planning with the help of backward technique. It is simply a computer-based system of controlling inventory inflow and outflow. Material Requirements Planning help in preparing master production schedule which help in maintaining economic order quantity. It is not a onetime process, but it is a continuous adjustment of raw materials requirements with the changes in production schedule. Material Resource Planning helps in reducing the wastage and it increases productivity as it follows Just in Time approach for the availability of Raw Material.

Keywords: Material Resources Planning (MRP), Master Production Schedule (MPS), Bills of Material (BOM), Raw materials.

1. INTRODUCTION

Material requirements planning (MRP) is an inventory management system that is completely operated digitally through a wide variety of computer-based platforms. MRP is exclusively designed to improve the inventory efficiency of a business by estimating quantities of raw material and scheduling timely deliveries. In addition, the material requirements planning system (MRP) helps businesses maintain low inventory levels by controlling manufacturing, purchasing, and delivery activities. MRP is crucial to a manufacturing operation's efficacy, productivity, and ultimately profitability. Manufacturers would not be able to meet customer demand for affordable and quality products if they lacked the necessary raw materials and components. They will also struggle to change production in response to changes in demand.

2. OBJECTIVES

1. To ensure that raw materials are readily available for production and products are readily available for delivery to customers.
2. To minimize inventory levels, reduces customer lead times and to improve customer satisfaction.
3. To sustain the lowest raw materials and finished product levels in store.
4. To organize manufacturing, delivery schedules, and purchasing activities.
5. To help production and procurement planners create feasible and realistic plans so they can quickly initiate the procurement or production processes.

3. SCOPE OF THE STUDY

Materials planning and control: Based on the sales forecast and production plans, materials planning, and control is done. This involves estimating the individual requirements of parts, preparing materials budget, forecasting the levels of inventories, scheduling the orders and monitoring the performance in relation to production and sales.

Purchasing: This includes the selection of sources of supply finalization in terms of purchase, placement of purchase orders, follow-up, maintenance of smooth relations with suppliers, approval of payments to suppliers, evaluating and rating suppliers.

Stores management or management: This involves physical control of materials, preservation of stores, minimization of obsolescence and damage through timely disposal and efficient handling, maintenance of store records, proper location and stocking.

Inventory control or management: Inventory generally refers to the materials in stock. It is also called the idle resource of an enterprise. Inventories represent those items, which are either stocked for sale or they are in the process of manufacturing, or they are in the form of materials, which are yet to be utilized.

4. LITERATURE REVIEW

The Review of related literature involves the systematic identification, location, and analysis of documents containing information related to the research problem. **Chandraja [2012]** in a sugar industry MRP is implemented using System Application Product (SAP) Materials Management (MM-Module). By executing SAP (MM-Module) in sugar industry for Material requirement planning, the product can be indented and received within safety period. **Karen Santin [2015]** Implemented MRP planning tool in furniture industry using MRP. In this paper improvements were seen in inventory cost reduction, greater effectiveness in the production & manufacturing processes, and better understanding in information accuracy. MRP is implemented, based on related Organizational Changes required and internal personnel allocation. **R. John Milne [2015]** In MRP system for determining optimum lead time that is to be used by the system, mixed integer programming model was proposed. The MIP contains a set of integrated constraints that determine planned orders like how an MRP system would be while executing these planned orders under capacity and component availability constraints. Experimental results— using data from a DRAM manufacturer—indicate that the proposed method for determining planned lead time is superior to a commonly used ad hoc method for determining the planned lead time used by an MRP system. **George Ioannou [2012]** In a manufacturing system when a new order comes with unique processing requirements it directly enters into make to order manufacturing system for such products based on the current status of the system finishing time is estimated. In this case we focus on the multi machine and multi product manufacturing environment without the knowledge of configuration of resources. For lead time estimation of MRP system simple, iterative algorithms were used.

5. RESEARCH METHODOLOGY

Research methodology is the specific procedures or techniques used to identify, select, process, and analyse information about a topic. In a research paper, the methodology section allows the reader to critically evaluate a study's overall validity and reliability. Methodology of research provides a framework for how research is planned, conducted, and analysed, and it guides researchers in making decisions about the most appropriate methods to use in their research. This research is explained in descriptive analysis. It is the overall strategy or approach used by researchers to conduct research.

6. DATA ANALYSIS

The systematic application of statistical and logical techniques to describe the data scope, modularize the data structure, condense the data representation, illustrate via images, tables, and graphs, and evaluate statistical inclinations, probability data, and derive meaningful conclusions known as Data Analysis. These analytical procedures enable us to induce the underlying inference from data by eliminating the unnecessary chaos created by its rest. Data generation is a continual process; this makes data analysis a continuous, iterative process where the collection and performing data analysis simultaneously.

Pie Chart: A pie chart is a graphical representation technique that displays data in a circular-shaped graph. It is a composite static chart that works best with few variables. Pie charts are often used to represent sample data—with data points belonging to a combination of different categories.

Bar Chart: Bar charts consist of multiple price bars, with each bar illustrating how the price of an asset or security moved over a specified time period. Each bar typically shows open, high, low, and closing (OHLC) prices, although this may be adjusted to show only the high, low, and close (HLC).

ANOVA: ANOVA (Analysis of Variance) is a collection of statistical models used to assess the differences between the means of two independent groups by separating the variability into systematic and random factors. It helps to determine the effect of the independent variable on the dependent variable.

7. FINDINGS

1. Accurate inventory control: MRP helps in maintaining accurate inventory control by tracking the levels of raw materials, components, and finished goods in real-time. This ensures that there is no shortage or excess of inventory, which can lead to production delays or increased costs.
2. Efficient production planning: MRP helps in efficient production planning by forecasting the exact quantity of raw materials and components required to manufacture a product. This allows manufacturers to optimize their production schedules, reduce lead times, and improve customer satisfaction.
3. Cost reduction: MRP helps in reducing costs by eliminating excess inventory, reducing lead times, and optimizing production schedules. This leads to cost savings in storage, handling, and transportation of raw materials and finished goods.
4. Improved supplier management: MRP helps in improving supplier management by providing real-time information on the availability of raw materials and components. This allows manufacturers to work closely with their suppliers and ensure timely delivery of materials, reducing production delays and costs.
5. Better decision-making: MRP provides accurate and timely information on inventory levels, production schedules, and supplier performance. This allows manufacturers to make informed decisions on production planning, inventory control, and supplier management.

Suggestions

1. Accurate forecasting: Accurately forecast demand for your products by analysing historical data, market trends, and customer behaviour. This helps to determine the appropriate levels of inventory and production.
2. Efficient inventory management: Implement effective inventory management techniques such as just-in-time (JIT) inventory and safety stock levels. JIT inventory helps to reduce the amount of inventory on hand, while safety stock levels ensure that you have enough inventory to meet demand during unexpected fluctuations.
3. Integration with other systems: Integrate your MRP system with other systems such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems to get a comprehensive view of your business operations.
4. Real-time data tracking: Use technology such as barcoding and RFID to track inventory in real-time, so you can quickly adjust inventory levels when necessary.
5. Collaboration: Foster collaboration between different departments such as production, sales, and purchasing to ensure that everyone is working towards the same goal.
6. Continuous improvement: Continuously monitor and evaluate your MRP system to identify areas for improvement and make necessary adjustments to ensure that your system is operating at peak efficiency.

8. CONCLUSION

Material Requirement Planning is an effective tool for production planning and inventory management. By providing timely and accurate information about material requirements, MRP enables companies to make informed decisions and optimize their production processes. With the help of MRP, companies can reduce inventory costs, minimize waste, and improve customer satisfaction by ensuring timely delivery of their products. However, it is important to note that MRP is not a standalone solution and needs to be integrated with other systems and processes to ensure its effectiveness.

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