

Implementation of System Application Product (SAP) Materials Management (MM-Module) for Material requirement planning (MRP) in Sugar Industry

S. Chandraju^{*1}; B. Raviprasad¹; C. S. Chidan Kumar²

¹Department of Studies in Sugar Technology, Sir M. Vishweshwaraya Post graduate Center, University of Mysore, Tubinskere - 571402, Mandya, Karnataka, India.

²Department of Chemistry, Alva's Institute of Engineering & Technology, Shobhavana Campus, Mijar, Moodbidri - 574225, South Canara Dt. Karnataka, India

Abstract- SAP has been delivering on its Sugar industry strategy by expanding its capabilities for manufacturing and supply chain management, broadening its composite package applications in areas such as emissions management, pricing management, and manufacturing dashboards, and focusing on mid-market companies. To implement an integrated system of production planning and materials management, there must have a central database wherein anyone in the company can find out all there is to know about any material passing through the plant. Everyone must use the same rules and data structures when they enter data about material details. The integration of all material data in a single database object eliminates redundant data storage. Areas such as purchasing, inventory management, material requirements planning (MRP), invoice verification, and so on, can all use the same data. By implementing SAP (MM-Module) in sugar industry for Material requirement planning, the product can be ordered and received within safety period. Based on material group classified under ABC analysis. Planning can also be done on priority by calling vendors for particular commodities through online.

Index Terms- Materials Management, Material requirement Planning, System Application Product, Bill of product, Just in time

I. INTRODUCTION

MRP is simply materials management of input items to the production process where demand is relatively even over time. MRP comes in many forms but is primarily a computer-based integrated system with varying degrees of complexity and scope. The best example of a materials requirement planning system is the human brain, or any other brain for that matter, not only does it provide the action link to 'the knee bone is connected to the thigh bone, etc', it brings in the blood and nutrients to produce the final product of movement, intention and communication."

The implementation of MRP in sugar industry help them to plan and discuss about Materials requirements planning, referred to by the initials MRP, is a technique which assists a Sugar industry in the detailed planning of its production. MRP translates that aggregate plan into an extremely detailed plan

Requirement of production units. When and how many production units required,
Lead time requirements.
Level of Inventory at beginning of the planning horizon.
Scheduled receipts of inventory during period.
Other information's such as supplier names & addresses, lead-times and purchase quantities.

II. MATERIALS AND METHODS

Material requirements planning (MRP) is a computer-based inventory management system designed to assist production managers in scheduling and placing orders for dependent demand items. Dependent demand items are components of finished good such as raw materials, component parts, and subassemblies or which the amount of inventory needed depends on the level of production of the final product.

MRP systems offer a number of potential benefits to Sugar manufacturing firms. Some of the main benefits include helping production managers to minimize inventory levels and the associated carrying costs, track material requirements, determine the most economical lot sizes for orders, compute quantities needed as safety stock, allocate production time among various products, and plan for future capacity needs. The information generated by MRP systems is useful in other areas as well. "A range of people in a typical manufacturing company are important users of the information provided by an MRP system.

Evolution of MRP - Material Requirement Planning - The concept of Material Requirement planning (MRP I) was designed as a tool to help planners with the derivation of the quantities of various material or components that would be required for satisfying a demand and at the same time for deriving the capacity based plan for loading the orders for production on the shop floor. The concept which started as a less integrated mainframe tool has evolved over the years since 1960, from the time it was first designed, to now, where it is tagged as Material Resource Planning (MRP II), a much stronger integrated version of the first MRP, integrating it with the finance, human resource, purchasing and production modules of a business. It also had much stronger and complex codes to take care of a few constraints in capacity and material planning.

The MRP II jargon later took on to be called as ERP or Enterprise resource planning with the greatest possible

integration with a central database server, storing all the integrated data there for making the information and data available across the business, across business modules and across its vendors/suppliers and customers. With the evolution of ERP (a superior clone of the evolved MRP II) businesses took it as the most wildest tool that they could have to make their business run smoothly, in a much integrated fashion without losing any information or spoiling the intension of the information when it flows across the business.

SAP came across as the very first few companies which evolved the concept of MRP II in to ERP and earning for themselves a growing business by selling this new concept. Companies and businesses across the world made use of this ERP tool and the standard processes offered to profit themselves.

MRP in context with production management processes

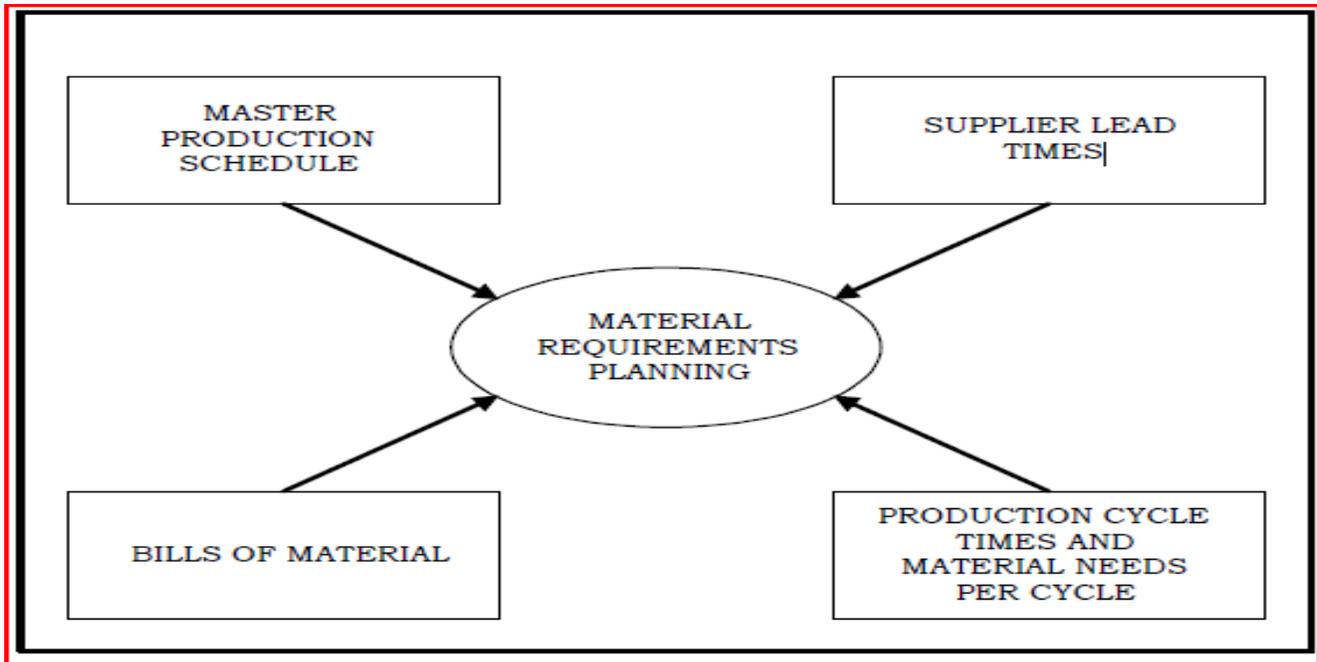


Fig 1.Flow chart of production Management

Overall View of the Inputs to a Standard Material Requirements Program and the Reports Generated by the Program

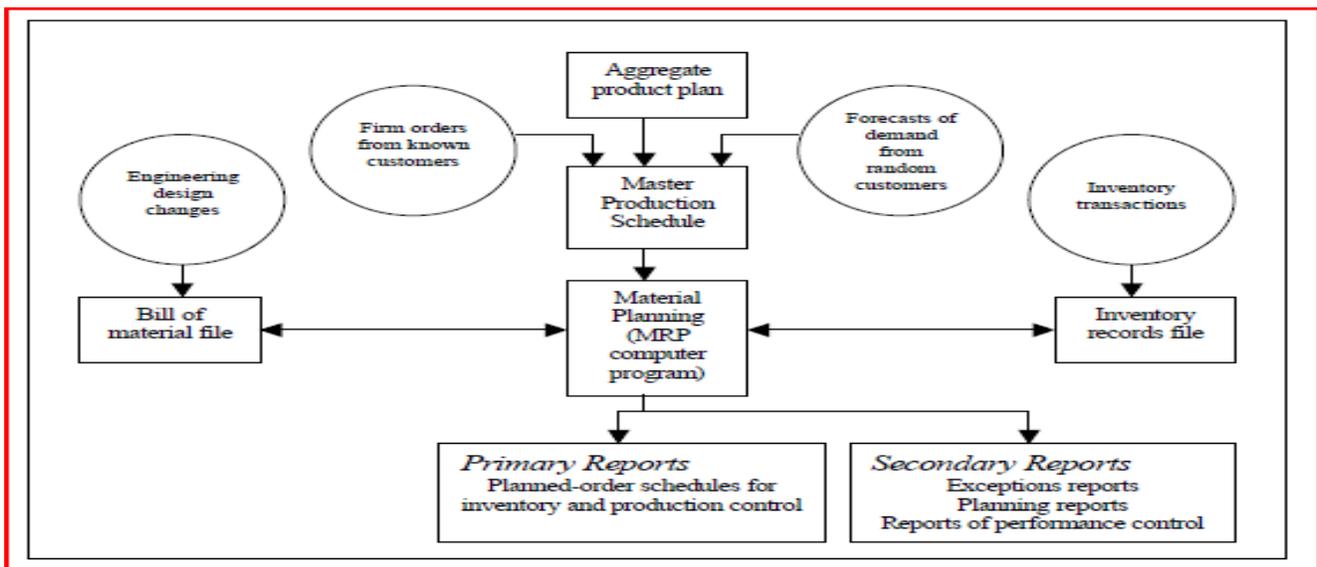


Fig 2. Process of generating reports

III. DESCRIPTION

Material Requirements Planning is a time phased priority-planning technique that calculates material requirements and schedules supply to meet demand across all products and parts in one or more plants.

Information Technology plays a major role in designing and implementing Material Requirements Planning systems and processes as it provides information about manufacturing needs (linked with customer demand) as well as information about inventory levels. MRP techniques focus on optimizing inventory. MRP techniques are used to explode bills of material, to calculate net material requirements and plan future production.

Object of Material Requirements Planning - The globalization of the economy and the liberalization of the trade markets have formulated new conditions in the market place which are characterized by instability and intensive competition in the business environment. Competition is continuously increasing with respect to price, quality and selection, service and promptness of delivery. Removal of barriers, international cooperation, technological innovations cause competition to intensify. In terms of manufacturing emphasis is placed on reducing cost while improving quality. In addition, other factors such as timely delivery of the product become critical (this is captured by emphasis in Just in Time or JIT in short) techniques.

MRP systems use four pieces of information to determine what material should be ordered and when.

- The master production schedule, which describes when each product is scheduled to be manufactured;
- Bill of materials, which lists exactly the parts or materials required to make each product;
- Production cycle times and material needs at each stage of the production cycle time; and,
- Supplier lead times.

The master schedule and bill of materials indicate what materials should be ordered; the master schedule, production cycle times and supplier lead times then jointly determine when orders should be placed

The Master Production Schedule includes quantities of products to be produced at a given time period. Quantities are included both at aggregate and detailed levels. Aggregate may refer to monthly production and detailed may refer to weekly or daily production. The master production schedule takes the form of a table in which rows represent products and columns represent time components. Entries of the table map to units of each product to be produced at a given time period.

Bill of Materials gives information about the product structure, i.e., parts and raw material units necessary to manufacture one unit of the product of interest.

MRP was pioneered in the 1970's with the work of Orlicky. Later evolved or became part of integrated to Manufacturing Resource Planning systems (or MRPII). MRPII is a computer based planning and scheduling system designed to improve management's control of manufacturing and its support functions.

Classes of MRP user/companies - MRP systems fall into four categories, often identified as ABCD, in terms of use and organizational implementation.

Class A represents full implementation of MRP. MRP system is tied up with company's financial system and includes capacity planning, shop floor dispatching, and vendor scheduling as well as links with human resource planning. There exists continuous monitoring of performance and inventory records and master production schedules are accurate.

Class B represents a less than full implementation. MRP system is confined in the manufacturing area; however, it encompasses master production scheduling.

Class C represents a classical MRP approach in which the system is confined to management of inventories.

Class D represents a data processing application of MRP. System is used for keeping track of data rather than as decision-making tool.

IV. APPLICATION OF MRP

Types of firms / organizations that MRP can be applied - MRP is being used in a variety of industries with a job-shop environment (meaning that a number of products are made in batches using the same productive equipment). But the processes mentioned are confined to job runs that alternate output product and do not include continuous process such as petroleum or steel. MRP is most valuable to companies involved in assembly operations and least valuable to those in fabrication.

Conditions for implementation - Several requirements have to be met, in order to given an MRP implementation project a chance of success:

- Availability of a computer based manufacturing system is a must. Although it is possible to obtain material requirements plan manually, it would be impossible to keep it up to date because of the highly dynamic nature of manufacturing environments.
- A feasible master production schedule must be drawn up, or else the accumulated planned orders of components might "bump" into the resource restrictions and become infeasible.
- The bills of material should be accurate. It is essential to update them promptly to reflect any engineering changes brought to the product. If a component part is omitted from the bill of material it will never be ordered by the system.
- Inventory records should be a precise representation of reality, or else the netting process and the generation of planned orders become meaningless.
- Lead times for all inventory items should be known and given to the MRP system.
- Shop floor discipline is necessary to ensure that orders are processed in conformity with the established priorities. Otherwise, the lead times passed to MRP will not materialize.

V. IMPLEMENTATION PROCEDURE OF MRP

Inputs to a standard MRP program

Demand for Product -Product demand for end items stems from two main reasons. The first is known customers who have placed specific orders, such as those generated by sales personnel, or from inter department transactions. The second source is forecast demand. Demand from known customers and demand forecast are combined and become the input to the master production schedule.

Bill of Materials File -The bill of Materials file contains the complete product description, listing materials, parts, and components but also the sequence in which the product is created. The BOM file is often called the product structure file or product tree because it shows how a product is put together. It contains the information to identify each item and the quantity used per unit of the item of which it is a part.

Inventory Records File -Inventory records file under a computerized system can be quite lengthy. Each item in inventory is carried as a separate file and the range of details carried about an item is almost limitless. The MRP program accesses the status segment of the file according to specific time periods. These files are accessed as needed during the program run.

The MRP program works as follows:

- □ A list of end items needed by time periods is specified by the master production schedule.
- □ A description of the materials and parts needed to make each item is specified in the bill of materials file.
- □ The number of units of each item and material currently on hand and on order are contained in the inventory file.
- □ The MRP program “works” on the inventory file. In addition, it continuously refers to the bill of materials file to compute quantities of each item needed.
- □ The number of units of each item required is then corrected for on hand amounts, and the net requirement is “offset” to allow for the lead time needed to obtain the material.

VI. VI.BENEFITS

Primary Reports - Primary reports are the main or normal reports used for the inventory and production control. These report consist of

1. Planned orders to be released at a future time.
2. Order release notices to execute the planned orders.
3. Changes in due dates of open orders due to rescheduling.
4. Cancellations or suspensions of open orders due to cancellation or suspension of orders on the master production schedule.
5. Inventory status data.

Secondary Reports - Additional reports, which are optional under the MRP system, fall into three main categories:

1. Planning reports to be used, for example, in forecasting inventory and specifying requirements over some future time horizon.
2. Performance reports for purposes of pointing out inactive items and determining the agreement between actual and programmed item lead times and between actual and programmed quantity usage and costs.
3. Exceptions reports that point out serious discrepancies, such as errors, out of range situations, late or overdue orders, excessive scrap, or nonexistent parts.

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AUTHORS

First Author – S.Chandraju, M.Sc., M.Phil., Ph.D., F.S.E.Sc, Department of Studies in Sugar Technology, Sir M. Vishweshwaraya Post graduate Center, University of Mysore, Tubinskere, Mandya - 571402, E-mail :Chandraju1@yahoo.com
Second Author – B.Raviprasad, B.E.,MBA., Research scholar,Department of Studies in Sugar Technology, Sir M. Vishweshwaraya Post graduate Center, University of Mysore, Tubinskere, Mandya - 571402, E-mail : ravimandyaster@gmail.com

Third Author – C.S. Chidankumar, M.Sc., Ph.D., F.S.E.ScG.
Madegowda Institute of Technology, Bharathi Nagar, Mandya-
571422, Karnataka, India, E mail: chidankumar@gmail.com

Correspondence Author – S.Chandraju, M.Sc., M.Phil., Ph.D.,
F.S.E.Sc, Department of Studies in Sugar Technology, Sir M.
Vishweshwaraya Post graduate Center, University of Mysore,
Tubinskere, Mandya - 571402, E-mail :Chandraju1@yahoo.com