

Performance Improvement of an Industry by using (MRP) Software

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Abstract— This industry is only based upon the price level of items; they do not have any proper inventory status. This results into either too much of stock or sometimes stock out conditions. Hence need of scientific approach and mathematical modelling of process is there. Online information regarding the inventory status cannot be observed. The in-house transactions that take place for the particular section are very complicated. Thus it results into improper ordering and scheduling process. The forecasting procedure presently followed is manual. So every time large number of calculations has to be done. This makes the process complicated and time consuming & also unavoidable manual errors in calculations may hamper the method.

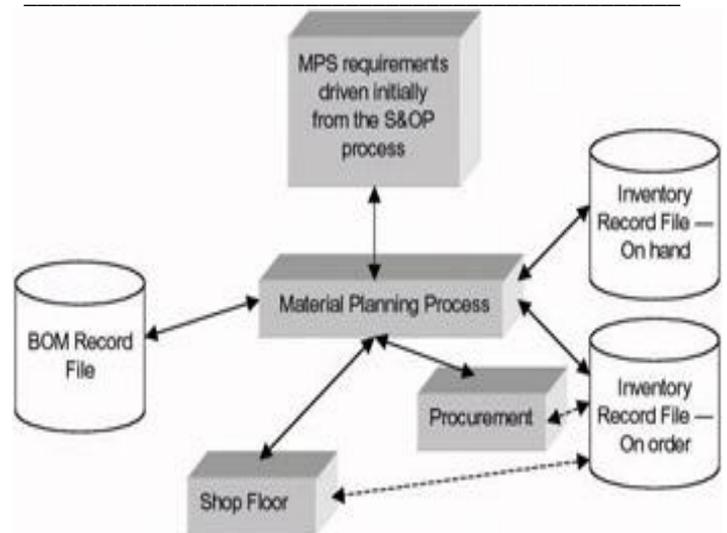
The methodology used in developing the proposed MRP software adopts the following components namely a) Problem analysis b) Software algorithm c) Software input d) Software output. In Problem analysis it is useful to form a bill of material & it is convenient to order the items by levels. The level of an item is the maximum number of stages of assembly required to get the item into an end product. If a specific final item named 'A' for a manufacturing firm. In software algorithm structure has been used to declare the variables of each item (item ID, item name, inventory level, lead time, number of item needed for each upper item, upper item ID, Number of lower item etc). Input the total number of level and information of each item (bill of materials). Input the total number of deliveries and timing & required quantity of final item for each delivery which Show the output of MRP that is the time-phased requirements for assemblies, parts and raw materials. Show the final inventory level of all items.

Index Terms—MRP, MPS, BOM, Lead time, inventory, software, visual basic 6.0

I. INTRODUCTION

Materials Requirements Planning (MRP) is a computer-based production planning and inventory control system which is concerned with both production scheduling and inventory control. It is a material control system that attempts to keep adequate inventory levels to assure that required materials are available when needed. The main purpose of MRP software is to facilitate the calculation of requirements of materials and timing. Thus it is a technique for determining the quantity and timing for the acquisition of dependent demand items needed to satisfy master production schedule (MPS) requirements by converting three inputs, bill of material, inventory data and master production schedule into time-phased requirements for subassemblies, component parts and raw materials, working backward from the due date using lead times and other information to determine when and how much to order [1]. The major objectives of an MRP system are to 1) ensure the availability of materials, components, and products for planned production and for customer delivery 2) maintain the lowest possible level of inventory 3) plan manufacturing activities, delivery schedules, and purchasing activities.

The output of the system guide both Purchase and the manufacturing activities of the organisations. The output indicate when and what quantities are to be purchased or manufacturer. These quantities are the net requirement. The net requirement are then covered by the planned order and the order quantities either match the net requirement or the calculated by employing several lot sizing techniques designed to take into account the economics of the ordering. An effective materials management process ensure that the right kinds of the material are at the right place whenever needed.



II. OBJECTIVES

Objectives of MRP should be identified with regard to inputs and outputs associated with it. Inputs are delineated with master production schedule, bill of materials.

Therefore, a clear specification of MRP objectives should be associated with a respectively clear description of objectives of MRP inputs as well as MRP outputs.

This project plans to computerize the entire materials management system considering the materials management planning and the inventory control so as to answer the questions for requirement of materials and further for faster and proper scheduling and communication which is necessary for inventory control.

Basic objectives are-

- 1) To classify the parts according to the Cost-Quantity Analysis.
- 2) To give a proper ordering procedure, when to order and how much to order, keeping in mind lead-time for the items.
- 3) To reduce the inventory level so as to reduce the total carrying cost using MRP.
- 4) To provide an efficient way to prepare materials information through VB forms for the departments.
- 5) The package should assist, in the updation of the stores.

Software and Hardware requirements:

Software requirements:

- 1) Microsoft Visual Basic 6.0 Enterprise edition.
- 2) Microsoft Access
- 3) Microsoft Windows 98

Hardware requirements:

- 1) System: IBM PC/80
- 2) Main memory: 64 MB (min.)
- 3) Hard disk memory: 1 GB (min.)
- 4) Processor: Pentium IV (or higher)
- 5) Monitor: VGA 15"
- 6) Disk driver: CD Drive.

III. HISTORY

Before 1960's there was no satisfactory method available for handling the inventory of dependent items. A firm's formal inventory system was often patterned after order points and either misapplied or broken down into a maze of informal method when it comes to handling dependent items. There was no feasible method of keeping accurate records of thousands of inventory items to keep them out of too much scheduling trouble. Unfortunately, these did not always achieve the intended objective, however they always made a contribution to the inventory carrying and storage costs. During the 1960's the computer opened the door to an inventory system that could keep up to date records on the status of all inventory in stock. This brought a better understanding of production operation and new ways of managing production. It also brought out some new terminology, such as priority in material requirement planning system and capacity planning. The American production and inventory control society (APICS) has done much to standardize the terminology in this field and material requirement planning is popularly abbreviated as MRP in the world over [3]. In 1964, Joseph Orlicky as a response to the TOYOTA Manufacturing Program developed Material Requirements Planning (MRP). First company to use MRP was Black & Decker in 1964, with Dick Alban as project leader. In 1983 Oliver Wight developed MRP into manufacturing resource planning (MRP II) [4]. Orlicky's book is entitled *The New Way of Life in Production and Inventory Management* (1975). By 1975, MRP was implemented in 150 companies.

. In the 1980s, Joe Orlicky's MRP evolved into Oliver Wight's manufacturing resource planning (MRP II) which brings master scheduling, rough-cut capacity planning, capacity requirements planning, S&OP in 1983 and other concepts to classical MRP. By 1989, about one third of the software industry was MRP II software sold to American industry (\$1.2 billion worth of software) [5]. MRP is the way of life for many

industries fabricating and assembling products like automobiles and radios. It is generally applicable in situations of multiple items with complex bills of materials and is especially suited to manufacturing settings where the demands of many of the components and subassemblies depend on the demands of items that face external demands. MRP is also suitable when the manufacturing cycle is long for the finished product and lead time for components and raw materials are relatively long. While demands for end items are independent the demands for components used to manufacture end items depend on the demands of the end items. The distinctions between independent and dependent demands are important in classifying inventory items and in developing systems to manage items within each demand classification [6]. The Master Production Schedule (MPS) 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 [7]. The bill of materials (BOM) is a list of the raw materials, sub-assemblies, assemblies, parts and the quantities of each needed to manufacture an end product. Lead time is the time interval between ordering and receiving an item [8]. Sometimes it means the assembly time or processing time to produce an item. A key variable in MRP system design is the selection of lot-sizing rule (how much to order) based on the lead time. The problem of lot sizing is one of satisfying the requirements while trying to minimize holding and setup costs. There are basically two major classes of lot sizing techniques namely Static and Dynamic. A static lot-sizing rule orders the same quantity each time an order is placed and often generating higher average on hand inventory for extra safety stock [9]. Dynamic decision rule changes the order quantity with each order such that each order is just large enough to prevent shortages over a specified time period by tying lot-size to gross requirements. It generally causes instability with lower-level components unable to respond sufficiently fast to changes in requirements [10] [11]. The lot-for-lot (LFL) ordering is the simplest approach and it refers to order the net requirements for a specific period. The LFL approach minimizes the holding cost by producing just-in-time. In lot-size (LS) ordering the order size must be in multiples of the lot size.

MRP does not work well in companies in companies that produce a low number of units annually. Especially for companies producing complex expensive products requiring advanced research and design, experience has shown that lead times tend to be too long and too uncertain, and the product configuration too complex for MRP to handle. Such companies need the control features that network-scheduling techniques offer.

DURATION AND IMPLEMENTATION COST OF MRP

The duration of each step is explained in paragraph 1.4 with related references to the Exhibit 1-4. Cost drivers influencing MRP system development and implementation include:

Driver 1: the number of the end items that are produced:

Driver 2: the complexity of the production procedure of the end items.

Driver 3: the frequency of the orders for end items and components.

All the above cost drivers influence the development and the implementation of the MRP system, because they increase the complexity of the production procedure. MRP must be adjusted to the needs of the production procedure. If there are many variables that affect the production, the necessary time and the cost of the implementation increase.

Based on experience, the implementation of a MRP system usually costs 13000-130000 EURO.

CONDITIONS FOR IMPLEMENTATION

Several requirements have to be met, in order to give an MRP implementation project a chance of success:

- 1) 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.
- 2) 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.
- 3) 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.
- 4) Inventory records should be a precise representation of reality, or else the netting process and the generation of planned orders become meaningless.
- 5) Lead times for all inventory items should be known and given to the MRP system.
- 6) 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.

Organizations Supporting the Implementation of MRP

The importance and the need for Material Requirements Planning in the small and medium enterprises and to bigger companies as well, is great. There are organizations and consulting firms that supports and promote the implementation of MRP.

MRP supporting organizations:

- 1) **APICS** (American Production and Inventory Control Society) - *The Educational Society for Resource Management*. URL: <http://www.apics.org>
- 2) **SOLE** (The International Society of Logistics). URL: <http://www.sole.org>
- 3) **The Copley Consulting Group**. URL: <http://www.copleycg.com>
- 4) **BILD, LLC Company**. URL: <http://www.bild.com>
- 5) **NJN Consulting**. URL: <http://www.talon.net/njn/>

IMPLEMENTATION PROCEDURE OF MRP

Steps / Phases of a MRP project

The material requirements planning portion of manufacturing activities interacts with the master schedule, bill of materials file, inventory records file, and the output reports.

INPUTS TO A STANDARD MRP PROGRAM

Demand for Products: 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 interdepartment 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.

MRP COMPUTER PROGRAM

The MRP program works as follows:

- 1) A list of end items needed by time periods is specified by the master production schedule.
- 2) A description of the materials and parts needed to make each item is specified in the bill of materials file.
- 3) The number of units of each item and material currently on hand and on order are contained in the inventory file.
- 4) 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.
- 5) 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.

OUTPUT REPORTS

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.

IV.COMPUTERIZATION

Why Visual Basic?

Visual basic has revolutionized Windows programming and familiarized many thousands of programmers with an object-based, event-driven approach to software design. Visual basic's object-based nature requires a variety of programming perspectives, for instance you may be designing a new application from scratch. Think of it as working from outside in the one starts work on the screen layouts by selecting the appropriate forms, objects and controls needed to communicate with the user. Then programmer can write the basic Statements that make up the "engine" of the program: the code that performs the calculations, format texts or draw images.

COMPONENTS OF VISUAL BASIC

Standard Modules: Standard modules with an extension BAS contain declarations of constants, types and variables as well as procedures and functions. Unlike the form modules, which contain both code and description of all attached controls standard modules contain only code. Module-level declaration and definitions in a standard module are by default public, which means the constants, variables and procedures declared within a standard module are by default accessible by code in other modules and forms.

Form Modules: Form modules with the extension FRM are the foundations of your application's user interface. They contain all of your text fields and controls including any property settings of these controls. Forms can also contain constant and variable declaration, procedures and event procedures for the various form and control events. More complex applications may have several forms. Each with its own form module default to private, which means that constants, variables and procedures in a form module are not available to code outside that form unless you explicitly declare them as public.

Class Modules: Class modules, with an extension CLS are similar to form modules, except they have no visual component. You can use class modules to create your own object. Class modules can include code for methods and properties associated with an object that you define, but they can't include their own events.

Active X Controls: Active X controls with an extension OCX contain information. Visual basic needs to provide new features and controls to your application's toolbar. An Active X control is just another term for an OLE object. You can add or remove Active X Controls from your Toolbox by using the component dialog box. In the components dialog box, controls tab shows within a list box all the variable controls that are registered your system. To remove controls deselect its check box. If the control is in use within your project, which means that the control is placed on a form, you can't remove it from the Toolbox.

THE VB PROGRAMMING ENVIRONMENT

Since its introduction, Visual Basic has made it easier for developers to become more productive by integrating development, debugging and compiling features into one environment Visual Basic like most Windows development environments, seamlessly puts all those component into an

Integrated Development Environment (IDE). As you type the code for your program the editor performs syntax checking to ensure that you are entering the valid code. When you compile your code, the IDE will perform a logic check and if an error arises, an error flag will notify you and place you in the code in which the error is occurred. When it compiles, you are in a "run time" mode. In this mode, your application takes control and you interact with it. If an error occurs, you will notify by a dialog window and you will then be placed in the code that caused the error. Essentially, you can code, test, and debug your application all within one environment.

CREATING USER INTERFACE

The user interface is perhaps the most important part of the application; it is certainly the most visible. To users, the interface is the application, they probably are not aware of the code that is executing behind the scenes. No matter how much time and effort is put into writing and optimizing the code, the usability of the application depends on the interface.

When designing an application, a number of decisions need to be made regarding the interface. Should the single - document or multiple - document style be used? How many different forms are needed? What comments will the menu's will include? What about the dialog boxes to interact with the users? How much assistance is needed?

Before designing the user interface, it is needed to think about the purpose of the application. The design for the primary application that will be in constitutes should be different from one that is only used occasionally for short periods of time. An application with the primary purpose of displaying information has different requirements than one used to gather information.

The intended audience should also influence the design. An application aimed at beginning user may be more complex. Other application used by the target audience may be influence their expectations for application behavior.

Designing a user interface is best approach as an interactive process.

USING VB STANDARD CONTROLS

The use of controls is to get user input and display output. Some of controls used in the application include text boxes, command buttons, and list boxes. Other controls let to access other application and process data as if the remote application was part of the code. Each control has its own set of properties, methods and events.

INTRODUCTION TO VISUAL BASIC CONTROLS

Using Command Button Control: Use the command button control to design, interrupt, or end a process. When clicked, it invokes the command written into its Click event procedure.

Using the Common Dialog Control: Use the common dialog control to provide a standard set of dialog boxes for operation such as opening and saving files, setting print options and selecting colors and fonts.

Using the Frame Control: Use the frame control to provide an identifiable grouping for other controls.

Using the Image Control: Use the image control to display the graphics in the following formats: bitmap, icon, metafile, enhanced metafile, JPEG or GIF files.

Using the Label Control: Use the label control to display the text that cannot be edited by the user or to provide a description what a certain control will do if checked.

Using the List Box Control: Use the list Box control to display a list of items from which a user can select one or more.

Using the Microsoft Flex Grid Control: Use the Microsoft Flex Grid control to add advanced features such as individual cell formatting, sorting cell - grouping, data binding, extra storage capacity and extensive customization options to the application.

Using the Picture Box Control: Use the picture box control to display the graphics, to act as a container for other control, and to display output from the graphics method.

Using the text box control: Use the text box control to display information entered by the user at run time, or assigned to the text property of the control at the design or at run time.

Using the Status Bar Control: A status bar control is frame that can consist of several panels, which inform the user, the status of an application. The control can hold up to sixteen frames. Additionally, the control has simple style (set within the style property), which switches from the multi Is to single panel for special messages.

Using DB Grid Control: Displays and enables data manipulation of a series of rows and columns representing records set object.

Using the Progress Bar Control: A progress bar control allows to graphically representing the progress of a transaction. The control consists of a frame that is filled as the transaction occurs. The value property determines how much of the control has been filled the minimum and maximum properties set the limits of the control.

RESPONDING TO MOUSE AND KEYBOARD EVENT

The Visual Basic applications can respond to a variety of mouse events and keyboard events. For example, forms, picture boxes, and image controls can detect the position of the mouse pointer, can determine whether a left or right mouse button is being pressed and SHIFT, CTRL, or ALT keys. Using the key events, controls and forms can be programmed to respond to various key actions or interpret and process ASCII characters.

DEBUGGING CODE AND HANDLING ERRORS

No matter how carefully crafted the code, errors can (and probable occur. Ideally, Visual Basic procedures would not need error handling code at all. Unfortunately, sometimes files are mistakenly deleted, disk drives run out of space, or network drives disconnect unexpectedly. Such probabilities can call run time errors in the code. To handle these errors, it is needed to add error-handling code to the procedures. Some time's error can also occur within the code, this type of error is commonly referred to as a bug, minor bugs - for ex, a cursor

that does not behave as expected - can frustrating or inconvenient. More sever bugs can cause an application to atop responding to commands; possibly requiring the user to restart the application, and loosing whatever work has not been saved.

Designing for Performance and Compatibility

In an ideal world, every user of the applications would have a computer with the fastest possible processor plenty of money, unlimited drive space and a blazingly fast network connection. Reality dictates that for most users, the actual performance of an application will be constrained by one more of the above factors. As larger and more sophisticated applications are created, the amount of memory the Applications consume and the speed with they execute become more significant. One may decide to need to optimize the application by making it smaller and by speeding calculations and displays. As the application designed and coded, there are various techniques that can be used optimize the performance. Some techniques can help to make the application faster, other help to make smaller.

DISTRIBUTING APPLICATION

Once a Visual Basic application is created, one may want to distribute it to others. One can freely distribute any application created with Visual Basic to any one who Microsoft Windows. If one is going to distribute any application, there will be I to write or use a set of program that installs any application on to a user's machine.

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DATA ACCESS IN VISUAL BASIC

Visual Basic provides two methods of interfacing with the Jet database the data control and data access object. While data control gives a limited ability to existing databases without programming, the DAO model is a complete programming interface that gives a total control of a database. These two methods are not mutually exclusive there are many situations where one wants to use both of them together. [12]

The DAO model is a collection of object classes that model of the structure of a relational database system. They provide properties and methods that allow to accomplish all the Operations necessary to manage such a system, including facilities for creating databases, defining tables, fields and indexes, establishing relations between that table, navigating and querying that databases and so on.

The jet database engine translate these operations on data access objects into physical operation on the database files themselves, handling all the machines of interfacing with the different supported databases.

Database program in visual basic consist of creating data access objects, such as , database table of, field and index objects, that correspond to the various parts of physical the database one want to access. One uses the properties and methods of these to object to perform operations on the database. One can display the result of these operations and accept input from the user on visual basic forms, using both bound and unbound controls.

This approach simplifies the code one need to write and insulates one from the underling structure and machines of retrieving and updating data. It gives one a great flexibility, because one can use the same objects, properties and methods to work with a variety of supported database formats. Also, if one change from one database t to another (for ex., porting a local Microsoft Access databases to a SQL server database on a network), it is needed to make a few changes in the code to accommodate change. One can even create the applications that join tables from two or more different databases in a single query or report.

There are three categories of databases that visual basic recognizes DAO and jet engine.

Visual Basic databases Also called native databases, these databases files use the same format as Microsoft Access. These databases are created and manipulated directly by the jet engine and provide maximum flexibility and speed.

External databases These are indexed sequential access method (ISAM) databases in several popular formats, including Btrieve, dBase III, dBase IV, Microsoft FoxPro versions 2.0 and 2.5, and paradox versions 3x and 4.0 One can create or manipulate all these database formats in visual basic. One can also access text file database and Microsoft Excel or Lotus 1-2-3 work sheets.

ODBC databases These include client - server databases that confirm to the ODBC standard, such as Microsoft SQL server. To create true client - server application in visual basic, one can use ODBC, direct to pass commands directly to the external server for processing.

There are other methods of data access supported by visual basic, which do not use Jet database engine. The ODBC direct mode of data access objects allows one to access ODBC data directly, using the same object and model and syntax but by passing the Jet engine. In addition, the Remote Data Objects (RDO) library and Remote Data control (RDC) are included in the enterprise edition, and allow direct access to ODBC Data. Finally, there are ODBC libraries, which allow one to call the ODBC applications programming interface (API) directly and the visual basic SQL libraries (VBSQL), which provide a direct link to the Microsoft SQL server API. The tool kits for these libraries are available as separate products.

What is relational database system?

Database is a collection of data designed to be used by different programmers. It's a collection of interrelated data stored together with controlled redundancy to serve one or more application in an optional fashion. Database management system is nothing but a computer based record keeping system. That is a system whose overall purpose is to record and maintain information.

A database management system has four components.

1. Data 2. Hardware 3. Software 4. User

Data: Database is a repository for stored data. It is self-describing collection of integrated and shared files.

A collection of records is a file and database is a collection of integrated files or collection of files and relationship among records in those files.

By "Integrated" one means that the database may be thought of as a unification of several otherwise distinct files with any redundancy among those files partially or wholly eliminated. By "Shared" we mean that individual pieces of data in the database may be shared among different users, in the sense that each of these users may have access to the same pieces of data and may use for several different purposes.

Hardware: Hardware consists of main memory, secondary memory, volume disk, tapes etc. on which the database resides together with the associated devices control units, channels and so forth.

Database applications require more main memory, faster CPU and more direct access storage.

Software: Between the physical database itself and the user of the system is a layer of software, usually called DBMS. All requests from users for access to the database is candled by it. In other words the DBMS provides the view of the database that is elevated somewhat above hardware level and support user operations.

User: We have three classes of users; First there is the application programmer, responsible for writing application programs that use the database. These application programs operate on the data in all ways retrieving information creating, deleting or modifying the information. The second class of user is the end user accessing the database administrator.

About MS-Access :

An overview of database objects and methods

User interface

The user interface part of visual basic application is made of standard visual basic forms that display data and provide the user method for traversing and modifying the dispend data. Your code uses request. The DB Engine object with their properties and methods to respond to the user request The DB Engine object is comprised of several dynamic link libraries that are linked to your visual basic program at runtime. Your application control the DB DB Engine through his object classes and their associated properties and methods.

The MRP Software

Objectives :

First of all Cost-quantity Classification was done. Then to develop the MRP software visual Basic 6.0 as the front hand and MS Access as the backhand has been used, as it is easy to develop commercial user friendly applications. The

developed program is menu driven. Different objects like command buttons, text, combo boxes, frames etc have been to give a professional outlook to the software.

This project can give a forecast view for the future demands, receive the customer orders as well as seek for the respective customer information. It also gives the MPS based on the customer order requirements and delivery dates. Based on the information received from the MPS one can issue the purchase order to the particular vendor. Other information about the various transaction that taken place i.e., in house transaction, vendor transaction, vendor transaction, customer transaction, bill of material etc can be obtained from this software. Whenever required, online information regarding part list, vendor information, inventory status etc can be viewed. Stage wise production requirements are also taken care off.

Tables in MS Access:

The following are the tables that have been in incorporated in the database to the used in the front hand.

- Part Master
- Inventory
- Vend Master
- Cust Master
- Forecast
- In-House
- Ven Tran
- MPS
- Cust Tran

PARTMASTER

This stores the detail of the parts. The design of the table is as shown below.

| <u>FIELD NAME</u> | <u>DATA TYPE</u> |
|-------------------|------------------|
| Part code | Number |
| Part Name | Text |
| Unit Ass | Number |
| Category | Text |
| Max stock | Number |
| Lead-time | Text |

Part code is a unique number, which we have given to the parts used in the industry. The part name gives the names of the various parts present in the part list the number of units required for a single assemble is indicated as unites. The ABC/Cost-Quantity classification was done and the category field indicates whether the item is a “A” or “B” or “C” category item. Based on the product lead time of the various parts are know and are displayed in the field lead time. Max stock the maximum stock that can be kept.

INVENTORY

This stores the inventory details like opening stock, current stock, unit cost lead-time safety stock, material value etc. The design of the table is as shown below.

| <u>FIELD NAME</u> | <u>DATA TYPE</u> |
|-------------------|------------------|
| Part code | Number |
| Part Name | Text |

| | |
|--------------|----------|
| Open stock | Number |
| Cur stock | Number |
| Unit cost | Currency |
| Lead time | Number |
| Safety stock | Number |

Part code, part name, lead time already been discussed about in the part Mast. Open stock indicates the number of component in the store at the start of the day/start of the working house. Cur stock stores the current stock balance of the parts. The cost of each part is stored in the unit cost field. Lead-Time stores the lead-time of the various parts. The current stock should never fall below the safety stock and this is indicated in the field safety stock.

VENDMASTER

This gives the detailed information about the vendors.

| <u>FIELD NAME</u> | <u>DATA TYPE</u> |
|-------------------|------------------|
| Vend code | Text |
| Vend name | Text |
| Address | Text |
| Phone, Fax, Email | Text |

The different codes, addresses, phone numbers, fax numbers emails of different vendors in stored in the fields vend code, address phone, fax Email respectively.

CUSTOMASTER

This table gives the detailed information of the firm’s customers.

| <u>FIELD NAME</u> | <u>DATA TYPE</u> |
|-------------------|------------------|
| Cust code | Text |
| Cust Name | Text |
| Address | Text |
| Phone, | Text |
| Fax | Text |
| Email | Text |
| Due date | Date/time |

The different codes, names address, phone numbers, fax numbers, emails of different customers are stored in this database. There is one more option of due dates being incorporated in this table.

The due date gives the exact delivery dates as per the requirement of the customer and the MPS calculate on is based on this date. Any new information regarding the regular customer or any new customer is updated in this fields.

IN-HOUSE

| <u>FIELD NAME</u> | <u>DATA TYPE</u> |
|-------------------|------------------|
| Date | Date/time |
| Part code | Number |
| Emp name | Text |
| Iss Qty. | Number |
| Rec Qty. | Number |
| Email | Text |
| Due date | Date/time |

The date field stores the current system date for day-to-day transaction. During the days transaction various parts from the store issued to different employees. The part code of the part issued and the employee to whom the parts where issue are stored in the fields part Code and emp Name. The quantity of the parts issued is stored in the IssQty field and the quantity of the final product received is stored in the Rec Qty field.

| FIELD NAME | DATA TYPE |
|-------------------|------------------|
| Vend Code | Text |
| Part Code | Number |
| Part name | Text |
| Ord. Qty. | Number |

CUSTTRAN

The Various transaction that take place between the customers and the firm are stored in this table the design of the table is as follows

| FIELD NAME | DATA TYPE |
|-------------------|------------------|
| Cust code | Text |
| Qty. | Number |
| Unit cost | Currency |
| Del date | Date/Time |
| Bill No. | Number |
| Bill date | Date/time |

The customer code is a unique code and is stored in the field CustCode. The number of end product sent to the customer by the firm is stored in the field. Qty. the cost of a single final product as conceived by the firm is stored in the field Unit Cost. Del Date is the date on which the customer expects his demand to be met. Bill No. and Bill Date are the fields, which store the bill numbers of the bills issued to the customer and date of issue respectively.

VENDTRAN

The various transactions that take place between the firm and it's vendors is stored in this table. The design of the table is as shown below.

| FIELD NAME | DATA TYPE |
|-------------------|------------------|
| Vend Code | Text |
| Qty. Req | Number |
| Qty. Rec | Number |
| Rec Date | Date/Time |
| Part Name | Text |
| Bal Qty. | Number |

The vendor code is unique code and is stored in the field vendcode. The QtyReq field stores the quantity required by the firm for future assembly or manufacturing. The QtyReq field stores the quantity received from the vendors. The date on which the parts are received from the vendors is stored in the RecDate. The name of the part supplied by the vendor is stored in the field part name. If any balance quantity is remaining with the vendor then this information is stored in the BalQty field.

FORECAST

Forecasting is the art and science of predicting the future events. It is a very important tool in the planning department. In this project the time series method of forecasting is used. The design of the table is as follows.

| FIELD NAME | DATA TYPE |
|-------------------|------------------|
| Year | Text |
| Q1 | Number |
| Q2 | Number |
| Q3 | Number |
| Q4 | Number |
| X | Number |
| Y | Number |

The year field indicates the previous year from which the demand is taken Q1, Q2, Q3, Q4 are the four quarters of the year, each consisting of three months. The total demand of three months is summed up in these fields. The values of X and Y are stored in their respective fields.

V.CONCLUSION

The A-B-C Analysis considering will help the management to have better control over the critical item in the inventory. The stock of items, contributing maximum to capital investment in the inventory can be kept as low as possible. Proper information regarding materials is observed through VB Forms, stores record are proper and easy to update.

The software package developed will help to save a lot of time and data entry and modification, thus eliminating clerical errors associated with it.

The various reports such as BOM, Inventory status, customer reports, vendor details, etc. are generated which will show the necessary information regarding the status of items which will help in decision making regarding certain parameters.

VI.REFERENCES

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Master Production Schedule (MPS)

MPS basically gives the input such as the quantity required (Demand) of the customer for a particular period) and date of requirement (Delivery Date). The Production schedule and purchase orders are usually prepared by taking into account the information form the Master Production Schedule (MPS). The Design of the Particular table is as shown below.

- 7) Jeffery O.Ullman(1998): “Principles of Database Systems”, Galgotia Publications, Pvt Ltd.
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