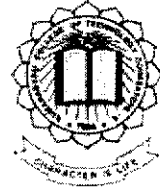




P-1935



**PRODUCTION MANAGEMENT IN ERP**

By

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**KUMARAGURU COLLEGE OF TECHNOLOGY**  
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(Affiliated to Anna University)

**A PROJECT REPORT**

Submitted to the

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In partial fulfillment of the requirements  
for the award of the degree  
Of

**MASTER OF COMPUTER APPLICATIONS**

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P-1935

**BONAFIDE CERTIFICATE**

Certified that this project report titled **PRODUCTION MANAGEMENT IN ERP** is the bonafide work of **Mr.P.VIJAYAKUMAR (Reg.No: 71204621059)** who carried out the research under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

*N. Jayakumaran*

**PROJECT GUIDE**



**HEAD OF THE DEPARTMENT**

Submitted for the University Examination held on 03.07.2007



**INTERNAL EXAMINER**



**EXTERNAL EXAMINER**

## CERTIFICATE

This is to certify that the project titled "**Production management in ERP**" is submitted to Adroit Solutions in fulfillment of the requirement for the final semester degree of MCA to be awarded by Anna University.

This project is a bonafide record at work carried out by **Mr.P.Vijayakumar** (Reg No: 71204621059) under the supervision and guidance of **Ms. S.Lalitha** , Project Leader, Adroit Solutions, Banglore between a period of **December 2006 to June 2007**.

We are happy to recommend that **Mr.P.Vijayakumar** who has completed the project successfully be an asset to any organization that he is going to serve in future.

Source code of the project developed by the trainee at Adroit Solutions, Banglore is not given to the trainee, as per the policy of the Company.

Thanking You

For Adroit Solutions

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## ABSTRACT

Enterprise resource planning for automobile companies is to maintain reports of order details, production details, scheduled orders based on capacity requirements planning and materials requirements planning and also to track the products.

When the order is placed, it immediately generates bill of materials and production route reports. Then production schedule is generated using backward scheduling. This scheduling is based on the capacity of the company, plant calendar and material requirements.

In materials requirement planning, it checks availability of materials and based on that it intimates the purchase department. It also generates material requirements for each and every process in a particular date.

It reserves the materials for the committed or scheduled orders. When the stock level goes below the reorder level it immediately intimates the purchase department. It also allows to, enter the new product details and new machinery details.

This ERP also allows tracking the products in different stages. Thus this ERP reduces time consumption and reduces cost. This project **Production Management In ERP** is designed to meet the requirements of Adroit Solutions, Bangalore.

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**TABLE OF CONTENTS**

	<b>PAGE NO</b>
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
1. INTRODUCTION	
1.1 OVERVIEW OF THE PROJECT	1
1.2 ORGANIZATION PROFILE	2
2. SYSTEM STUDY AND ANALYSIS	
2.1 EXISTING SYSTEM	3
2.2 PROPOSED SYSTEM	4
2.3 FEASIBILITY ANALYSIS	5
3. SYSTEM REQUIREMENT SPECIFICATION	
3.1 HARDWARE REQUIREMENTS	7
3.2 SOFTWARE REQUIREMENTS	7
3.3 SOFTWARE OVERVIEW	8
4. SYSTEM DESIGN AND DEVELOPMENT	
4.1 ELEMENTS OF DESIGN	12
4.1.1 MODULAR DESIGN	12
4.1.2 INPUT DESIGN	15
4.1.3 OUTPUT DESIGN	16
4.1.4 DATABASE DESIGN	17
4.2 TABLE STRUCTURE	18

	<b>PAGE NO</b>
<b>5. SYSTEM FLOW DIAGRAM</b>	
5.1 DATA FLOW DIAGRAM	24
<b>6. SYSTEM TESTING AND IMPLEMENTATION</b>	
6.1 TESTING	27
6.1.1 UNIT TESTING	28
6.1.2 INTEGRATION TESTING	28
6.1.3 SYSTEM TESTING	29
6.1.4 USER ACCEPTANCE TESTING	30
6.2 SYSTEM IMPLEMENTATION	30
<b>7. CONCLUSION AND FUTURE ENHANCEMENT</b>	31
<b>APPENDIX</b>	33
<b>REFERENCES</b>	54

**LIST OF TABLES**

<b>TABLE NO</b>	<b>TABLE DESCRIPTION</b>	<b>PAGE NO</b>
Table 4.1	Machine_Category	18
Table 4.2	Machine_Schedule	18
Table 4.3	Material_Master	19
Table 4.4	Operation_Master	19
Table 4.5	Plant_Calendar	20
Table 4.6	Plant_Master	20
Table 4.7	Process_Master	21
Table 4.8	Product_Master	21
Table 4.9	Product_Materials_Required	22
Table 4.10	Product_Process_Required	22
Table 4.11	Product_Type	22
Table 4.12	Production_Master	23
Table 4.13	Sales_master	23



**LIST OF FIGURES**

<b>FIGURE NO</b>	<b>FIGURE DESCRIPTION</b>	<b>PAGE NO</b>
Figure 5.1	DFD Level 0	24
Figure 5.2	DFD Level 1	25
Figure 5.3	DFD Level 2	26

## CHAPTER 1

### INTRODUCTION

#### 1.1 OVERVIEW OF THE PROJECT

This project entitled **Production management in ERP** is designed and developed using Active server pages with .Net framework. Microsoft SQL server 2000 is supporting the entire system as a powerful backend.

The main purpose of this project is to provide the user an easy way of planning the resources of ERP that are particular to production department. So the project maintains reports of order details, production details, scheduled order based on capacity requirement planning and material requirement planning and also to track the products that are in the production phase.

The project contains four modules. They are master module, report module, planning and scheduling module, and tracking module.

## 2.1 ORGANISATION PROFILE

Adroit is a Professional designing and Development concern engaged in web media, digital-media and E-commerce services. Adroit manages all aspects of website development and digital-media projects, from conception to final product using the best technology available. Adroit has worked with different clients in the fields of Art, Architecture, Publishing, Media, Health care, Hotel Industry, and Technology in both Domestic and Overseas.

The core philosophy of Adroit is to provide cost effective & innovative solutions. Emphasis in the design is to map the user requirements, assurance of system maintainability, reliability and the provision of easy upgradeability. Comprehensive technical documentation is an essential feature of the developed products. Adroit aims at establishing a constructive working relationship with their clients by providing them with a responsive technical support.

Whatever client's solution requirements, Adroit will develop it using a structured project management approach to ensure that the project arrives on time and within budget.

Adroit has a strong technical sales and marketing, customer support and self motive business-intelligence functionality Team. Its mission is to deliver timely, accurate and insightful energy intelligence. It empowers our customers to compete in today's rapidly changing environment. Marketing's comprehensive approach to meeting customer needs leverages the strength of abundant right-cost power products & services and a robust, highly interconnected marketing network system to offer Innovative & Speedy energy solutions.

## CHAPTER 2

### SYSTEM STUDY AND ANALYSIS

#### 2.1 EXISTING SYSTEM

Production Management in the organization is currently performed using MS-Access as both front end and back end. The drawbacks are listed below:

- MS-Access had to be installed in all the systems separately with the product license.
- This led to increase in cost and time.
- If the implementation of one system changes, then all other components should be recompiled.
- Any user can access the system.
- The main drawback in the existing system is security was less and facilities like authentication were absent.
- Data redundancy.
- Data inconsistency.
- Access and retrieval of relevant information requires considerable overhead.

## 2.2 PROPOSED SYSTEM

The proposed system is uses ASP.Net as front end and SQL server as backend. ASP. Net is a server side scripting language which is used to create high performance web server applications which makes the proposed system effective.

The features of the proposed system provide the consolidated way of synchronizing the employees by authentication process for logging in. The employees can then visit the site and view the data. Advantages of the proposed system are

- ASP.Net is easy to create because manual linking and compiling of program is not required.
- ASP files ensure that the page is browser independent.
- Completely integrated into HTML files.
- Sql server is designed using relational database model. That supports working in internet, database window and use customized tools.
- Run block of codes selectively and improves compilation performance.

## **2.3 FEASIBILITY ANALYSIS**

Feasibility analysis is the measure of how beneficial or practical the development of an information system will be to the organization. Once the problem is explained, information is gathered about the system to test whether the system is viable Technically, Financially and Operationally.

### **2.3.1 Feasibility Considerations**

The key considerations involved in the feasibility analysis are

- Economic
- Technical
- Operational

#### **2.3.1.1 Economic Feasibility**

Economic feasibility is the measure of the cost-effectiveness of the proposed system. The investment to be made in the proposed system must prove a good investment to the organization by returning benefits equal to or exceeding the costs incurred in developing the system.

The proposed benefit of the system outweighs the costs to be incurred during system development. Since, the system does not require procurement of additional hardware facilities, it is economically feasible. In addition, capability of the system to incorporate future enhancement will improve the performance to suit the future need of the user and the fact that a single system can be used for a standalone organization as well as a corporate, improves its marketing prospect.

#### **2.3.1.2 Technical Feasibility**

Technical feasibility takes care of the technical issues that are to be tested to see whether the system is feasible. Technical feasibility analysis

makes a comparison between the level of technology available and the technology that is needed for the project. The level of technology is determined by factors such as the software tools available, the machine environment, platform etc. Since, the resources required for the development of the project are already available in the organization, the project is technically feasible.

#### **2.3.1.3 Operational Feasibility**

The resources that are required for implementation are already with the organization. The personnel of the organization already have enough exposure to computers. So the project is operationally feasible.

The proposed system has found encouraging support from the management as it will be of great use to them. The employees of the organization are also committed to have the system operational as it will save time and reduce their workload.

## CHAPTER 3

### SYSTEM REQUIREMENT SPECIFICATION

The Software Requirements Specification is a technical specification of requirements for the software product. The goal of software requirements definition is to completely specify the technical requirements for the software products in a concise and unambiguous manner.

The Software Requirements specification is based on the system definition. High-level requirements specified during initial planning, are elaborated and are more specific in order to characterize the features that the software product will incorporate. The requirement specification is primarily concerned with functional and performance aspect of the software product and emphasis is placed on specifying product characteristics without implying how the product will provide those characteristics.

#### 3.1 HARDWARE SPECIFICATION

PROCESSOR	: PENTIUM IV
RAM	: 128 to 512 MB
HARD DISK	: 40 to 80GB

#### 3.2 SOFTWARE SPECIFICATION

OPERATING SYSTEM	: WINDOWS XP
FRONT END	: ASP .NET USING c#
BACK END	: SQL SERVER
WEB BROWSER	: INTERNET EXPLORER 5.0



## 3.3 SOFTWARE OVERVIEW

### 3.3.1 ASP .NET Using C#

#### 3.3.1.1 ASP .NET

The .NET framework is a cluster of different technologies like:

**The .NET Languages**, which include C# and Visual Basic .NET, the object-oriented and modernized successor to Visual Basic 6.0.

**The Common Language Runtime (CLR)**, the .NET runtime engine that executes all .NET programs, and provides modern services such as automatic memory management, security, optimization, and garbage collection.

**The .NET class library**, which collects thousands of pieces of pre-built functionality that you can snap in to your applications. These are sometimes organized into technology sets, such as ADO .NET (the technology for creating database applications) and Windows Forms (the technology for creating desktop interfaces).

**ASP .NET**, the platform services that allow you to program web applications and Web Services in any .NET language, with almost any feature from the .NET class library.

**Visual Studio .NET**, an optional development tool that contains a rich set of productivity and debugging features.

#### **ASP .NET Features:**

##### **Better language support**

- ASP .NET uses the new ADO .NET.
- ASP .NET supports full Visual Basic, not VBScript.
- ASP .NET supports C# (C sharp) and C++.
- ASP .NET supports JScript.

### **Programmable controls**

- ASP .NET contains a large set of HTML controls. Almost all HTML elements on a page can be defined as ASP .NET control objects that can be controlled by scripts.
- ASP .NET also contains a new set of object oriented input controls, like programmable list boxes and validation controls.
- A new data grid control supports sorting, data paging, and everything you expect from a dataset control.

### **Event-driven programming**

- All ASP .NET objects on a Web page can expose events that can be processed by ASP .NET code.
- Load, Click and Change events handled by code makes coding much simpler and much better organized.

### **XML - based components**

- ASP .NET components are heavily based on XML. Like the new AD Rotator, that uses XML to store advertisement information and configuration.

### **User authentication, with accounts and roles**

- ASP .NET supports forms-based user authentication, including cookie management and automatic redirecting of unauthorized logins. (You can still do your custom login page and custom user checking).

### **Higher scalability**

- ASP .NET allows for user accounts and roles, to give each user (with a given role) access to different server code and executables.

### **Increased performance – Compiled code**

- The first request for an ASP .NET page on the server will compile the ASP .NET code and keep a cached copy in memory. The result of this is greatly increased performance.

### **Easier configuration and deployment**

- Configuration of ASP .NET is done with plain text files.
- Configuration files can be uploaded or changed while the application is running. No need to restart the server.
- No more server restart to deploy or replace compiled code. ASP .NET simply redirects all new requests to the new code.

### **Not fully ASP compatible**

- ASP .NET is not fully compatible with earlier versions of ASP, so most of the old ASP code will need some changes to run under ASP .NET.
- ❖ To overcome this problem, ASP .NET uses a new file extension ".aspx". This will make ASP .NET applications able to run side by side with

#### **3.3.1.2 C#**

The first component-oriented language in the C/C++ family is C#. It is robust and durable software for next generation. Its component concepts include mainly classes and objects. It also includes properties, methods, events, design-time and run-time attributes and integrated documentation using XML.

It can be embedded in web pages. It has no header files. It has improved extensibility and reusability. Pervasive versioning considerations in all aspects of language design. A set of .NET components collectively known as ADO.NET provides efficient access to relational database and variety of data

source. Components are also available to allow access to the file system and to directories.

### 3.3.2 Overview of SQL Server 7.0

SQL Server 7.0 is the 100% ANSI SQL compatible relational database management system. It is available on a wide range of mainframes, mini and microcomputers. It offers both relational database and object oriented facilities. Managing large amount of data could present administrative and performance problem. SQL Server 7.0's data partitioning help to minimize the program. Each of the partition can be managed individually, thereby allowing more efficient management of database. In it all information are stored as simple tables consisting of rows and columns.

There are three categories of tools provided by SQL Server 7.0

- ❖ To perform the administration of database.
- ❖ For controlling access to the data present in the database.
- ❖ To control the manipulation of the data in the database.

#### SQL Server 7.0 Features:

- ❖ SQL compatibility.
- ❖ Portability.
- ❖ Connect ability.



P-1935

## CHAPTER 4

### SYSTEM DESIGN AND DEVELOPMENT

#### 4.1 Elements of Design

System Design is the most creative and challenging phase in the development of a software system. Design implies a description of the final system and the process by which it is developed. The first step is to determine what input data is needed for the system and then to design a database that will meet the requirements of the proposed system. The next step is to determine what outputs are needed from the system and the format of the output to be produced.

During the design of the proposed system some areas where attention is required are:

- What are the inputs required and the outputs produced?
- How should the data be organized?
- What will be the processes involved in the system?
- How should the screen look?

The steps carried out in the design phase are as follows:

- Modular Design
- Input Design
- Output Design
- Database Design

##### 4.1.1 Modular Design

It is always difficult for any System Development team to grasp a system without breaking it into several smaller systems. These smaller systems will be a part of the original system yet they will be independent in the sense that they will

incorporate within them the major functionalities of the proposed system. A software system is always divided into several subsystems which make it easier to develop and perform tests on the whole system. The subsystems are known as the modules and the process of dividing an entire system into subsystems is known as Decomposition.

The modules identified for this project are master module, report module, planning and scheduling module, and tracking module.

**Master module** consists of sub modules such as,

**Login Page:** This page is used to login with id and password for administrator.

**Product master:** It is used to add the product type id and type name the organization is engaged with. And product description, product price and total time taken.

It also includes machine category id, machine category name, and total number of machine available in the category

**Plant master:** It is used to add number of working hours and employees required accordance with particular machine and to add last maintenance date.

**Material master:** It is used to add material id, material description, type and quantity available. These materials are raw materials that are used in production of the product. It checks and notifies the reorder level, and also to notify particular product is made by intended raw material.

**Process master:** It is used to add that particular process done in particular machine. And also one product undergoes many process, so it is used to add the chosen product goes under this much processes.

**Order Master:** It is used to add the order details like order number, customer id and names who placed the order and date in which order was placed and the date in which it has to be completed. It is also used to add required number of products under one order number, because one order may contain many products. Also includes time taken, required quantities, product type and price.

**Plant calendar:** It is a calendar that is used to add the days that are considered as holidays for the organization. So these days are not taken while calculating working days for particular product to be completed.

**Report Module** consists of sub modules such as

**Bill of materials:** It provides what are all materials used for making a chosen product. When given order number and product number it list out the needed material id, material name, material type, measurement type and quantity.

**Product route page:** When product id is given, the page lists out the number of processes and the name of the processes the product has to undergo.

**Order status:** When order id is given in this page, it says whether all the products under this order id is scheduled or not.

**Planning and scheduling module** consists of the following sub modules.

**Scheduling:** This page is an important part of this project. Here we schedule the product. One product undergoes many processes, so each process should be allotted with dates to be worked on. These allotted dates should be calculated and given in considering delivery date. If it is found that the product cannot be completed in required date, then it should give options for increasing the man power to get completed in time. Once a product is scheduled it cannot be scheduled again.

We have to select the order number and product id, it will list out the number and name of the processes the chosen product will have to undergo. It also list out the working days and holidays.

**View scheduling:** It is used to show the scheduled dates of all the products under one order number. It lists out order number, machine name and id, product name and id, process name, indate and outdate.

**Material required:** When order number and product id are given, it lists out the material id, name and quantity required for the product to be completed.

**Capacity requirements:** When order number and product id are given, it lists out the machine id, machine name, number of machine required and human resource required.

**Operation master:** When order number and product id are given, it lists out all other details that are pertained to it and it will ask for accepted quantity, rejected quantity and dispatched quantity.

**Tracking modules** consists of following pages:

**Tracking by product:** when product id is given machine name product id and name, process name, in date and outdate.

**Tracking by process:** when process id is given machine name product id and name, process name, material name, in date and outdate.

**Tracking by material:** when material id is given machine name product id and name, process name, in date and outdate.

**Tracking by machine:** when machine id is given machine name product id and name, process name, in date and outdate.

**Tracking by order:** when order id is given machine name product id and name, process name, in date and outdate.

#### 4.1.2 Input Design

Input design is the process of converting user-originated inputs to computer-based format. Input data are collected and organized into groups of similar data. Validations are made for each and every data entered in the screens for data accuracy.

The entire project is implemented using ASP.NET. The information such as User Id and Password are given in the input screen, which is verified for correctness and then all the processes are done. All users are registered initially and then logged in. If the input fails, then the user should retry it.



On each click of the controls used the respective screens are opened. Each screen has Textboxes, Label and Buttons. All the screens are interactive with the user in accepting and displaying data requested by the user.

All the data entered are recorded in the respective database table, specified in the SQL statement and stated in the executing system. Each time the data is entered, verifications are done to ensure no errors are committed and to confirm its accuracy.

The first step in design is to design input within predefined guidelines. Inaccurate input data are the most common cause of errors in data processing. Errors entered by data entry operators can be controlled by input design. The following are some of the constraints that were used in input design for input validation,

- Specifying maximum length of each field.
- Specify the format for the data field, which are entered.
- Listing the values, where necessary.
- Formats of same data in different screen are the same.
- Exception handling is properly provided

#### **4.1.3 Output Design**

Computer output is the most important and direct source of information to the user. Efficient and intelligent output design should improve the system's relationships with the user and help in decision making. A major form of output is a hard copy from the printer.

Printouts should be designed around the output requirements of the user. The output devices are considered depending on factors such as compatibility of the device with the system, response time requirements, expected print quality, and number of copies needed.

The types of output used in the system are internal output, interactive output, turn-around output and data item. The internal outputs are those, whose destination are within the organization and are the user's main interface with the Computer.

The standards for printed output suggest the following:

- Give each output a specific name or title.
- Provide a sample of the output layout, including areas where printing may appear and the location of each field.
- State whether each output field is to include significant zeroes, spaces between fields and alphabetic or any other data.
- Specify the procedure for providing the accuracy of output data.

The output design focuses on to serve the intended purposes, to fit the user, deliver the appropriate quality of output. Based on the need and requirements of the various departments, the outputs were designed with much care and consideration.

#### **4.1.4 Database Design**

A database is a collection of inter-related data stored with minimum redundancy to serve many users quickly and efficiently. The general objective of database design is to make the data access easy, inexpensive and flexible to the user. An elegantly designed database can play a strong foundation for the whole system.

The details about the relevant data for the system are first identified. According to their relationship, tables are designed. The tables are normalized so that they can provide better response time, have data integrity, avoid redundancy and be secure.

The tables for the Internet Banking System have been Normalized up to the Second Normal Form (2NF).

#### 4.2 Table Structure

The various tables used in the system are given from table 4.1 to 4.13

Table Name: Machine\_Category

Primary Key: Machine\_category\_id

Field Name	Data Type	Size	Description
Machine_category_id	Numeric	9	Machine category id
Machine_category_name	Varchar	50	Machine category name
Totalnos	Numeric	3	Total numbers in same quantity

Table 4.1

Table Name: Machine\_Schedule

Foreign Key: Machine\_id

Field Name	Data Type	Size	Description
Machine_id	Numeric	9	Machine id
Timeutilized	Numeric	9	Utilized time

Table 4.2

Table Name: Material\_Master  
 Primary Key: Material\_id

Field Name	Data Type	Size	Description
Material_id	Numeric	9	Material Id
Material_description	Varchar	50	Material Description
Material_type	Varchar	50	Material type
Quantity_available	Numeric	9	Available quantity
Measurement_type	Varchar	50	Measurement type
Scheduled_quantity	Integer	6	Quantity reserved for committed orders
Reorder_level	Numeric	9	Safety stock level

Table 4.3

Table Name: Operation\_Master  
 Foreign Key: Machine\_id, Order\_no

Field Name	Data Type	Size	Description
Operation_no	Numeric	9	Operation number
Operation_desc	Varchar	50	Operation description
Machine_id	Varchar	9	Referred from plantmaster
Order_no	Numeric	9	Referred from salesmaster
Product_id	Numeric	9	Referred from productmaster
Product_process_id	Numeric	9	
Accepted_quantity	Numeric	9	Quantity arrived to that machine
Rejected_quantity	Numeric	9	Quantity rejected
Dispatced_quantity	Numeric	9	Quantity dispatched
In_date	Datetime	8	Product arrival date
Out_date	Datetime	8	Product out date

Table 4.4

Table Name: Plant\_Calendar

Field Name	Data Type	Size	Description
Holidays	Datetime	8	List of holidays
Reason	varchar	50	Reason

Table 4.5

Table Name: Plant\_Master

Primary Key: Machine\_id

Foreign Key: Machine\_category\_id

Field Name	Data Type	Size	Description
Machine_id	Numeric	9	Machine id
Machine_name	Varchar	50	Machine name
Machine_category_id	Varchar	9	Referred from machinecategory
No_of_working_hours	Numeric	9	Number of working hours of a machine in a day
Employee_required	Numeric	9	Total number of employees required to run that machine
Machine_status	Varchar	25	Machine Status
Last_maintedate	Datetime	8	Last Maintenance Date

Table 4.6

Table Name: Process\_Master  
 Primary Key: Process\_id  
 Foreign Key: Machine\_id

Field Name	Data Type	Size	Description
Process_id	Numeric	9	Referred from processmaster
Process_name	Varchar	25	Process name
Machine_id	Numeric	9	Referred from plantmaster

Table 4.7

Table Name: Product\_Master  
 Primary Key: Producti\_d

Field Name	Data Type	Size	Description
Product_id	Numeric	9	Product id
Product_desc	Varchar	50	Product description
Product_type	Varchar	50	Product type
Product_price	Numeric	9	Product price
Totaltimetaken	Numeric	9	Total time taken to complete the manufacturing
No_of_employee	Numeric	9	Number of employees required

Table 4.8

Table Name: Product\_Materials\_Required  
Foreign Key: Product\_id, Material\_id

Field Name	Data Type	Size	Description
Product_material_id	Numeric	9	Product material id
Product_id	Numeric	9	Referred from productmaster
Product_material_type	Varchar	50	Product material type
Material_id	Numeric	9	Referred from materialmaster
Material_quantity	Numeric	9	Quantity required

Table 4.2.9

Table Name: Product\_Process\_Required  
Foreign Key: Product\_id, Process\_id

Field Name	Data Type	Size	Description
Product_process_id	Numeric	9	Product process id
Product_id	Numeric	9	Referred from productmaster
Process_order_id	Numeric	9	Process order id
Process_id	Numeric	9	Referred from processmaster
Time_taken	Numeric	9	Timetaken to do a particular process to a particular component

Table 4.10

Table Name: Product\_Type

Field Name	Data Type	Size	Description
Product_type_id	Numeric	9	Product type id
Product_type_name	Varchar	50	Product type name

Table 4.11

Table Name: Production\_Master  
 Primary Key: Production\_id  
 Foreign Key: Order\_no, Product\_id

Field Name	Data Type	Size	Description
Production_id	Numeric	9	Production id
Order_no	Numeric	9	Referred from salesmaster
Product_id	Numeric	9	Referred from product master
Product_quantity	Numeric	9	Quantity of the product
Product_Price	Numeric	9	Product price
Totallimetaken	Numeric	9	Total time taken
Order_status	Char	25	Status of the order

Table 4.12

Table Name: Sales\_master  
 Primary Key: Order\_no  
 Foreign Key: Customer\_id

Field Name	Data Type	Size	Description
Order_no	Numeric	9	Order no
Customer_id	Numeric	9	Customer id
Order_date	Datetime	8	Date the order placed
Requied_date	Datetime	8	Required date
Order_status	Numeric	9	Status of the order

Table 4.13



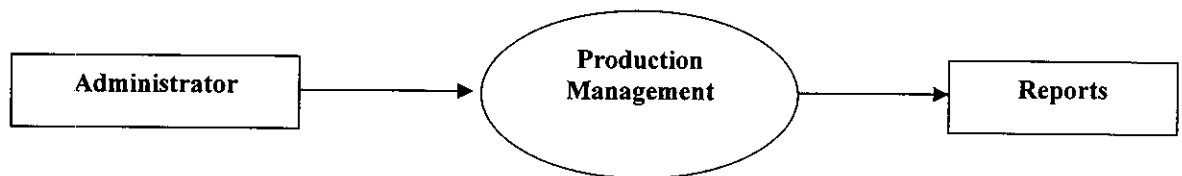
## CHAPTER 5

### SYSTEM FLOW DIAGRAM

#### 5.1 DATA FLOW DIAGRAM

Data flow diagrams are graphical representation depicting information regarding the flow of control and the transformation of data from input to output. The DFD may be used to represent the system or software at any level of abstraction. In fact, DFD can be partitioned into levels. A Level 0 DFD called Context Level Diagram represents the entire software system as a single bubble with its interactions.

The DFD's for the system are given from Figure 5.1 to 5.3



**Figure 5.1 DFD Level 0**

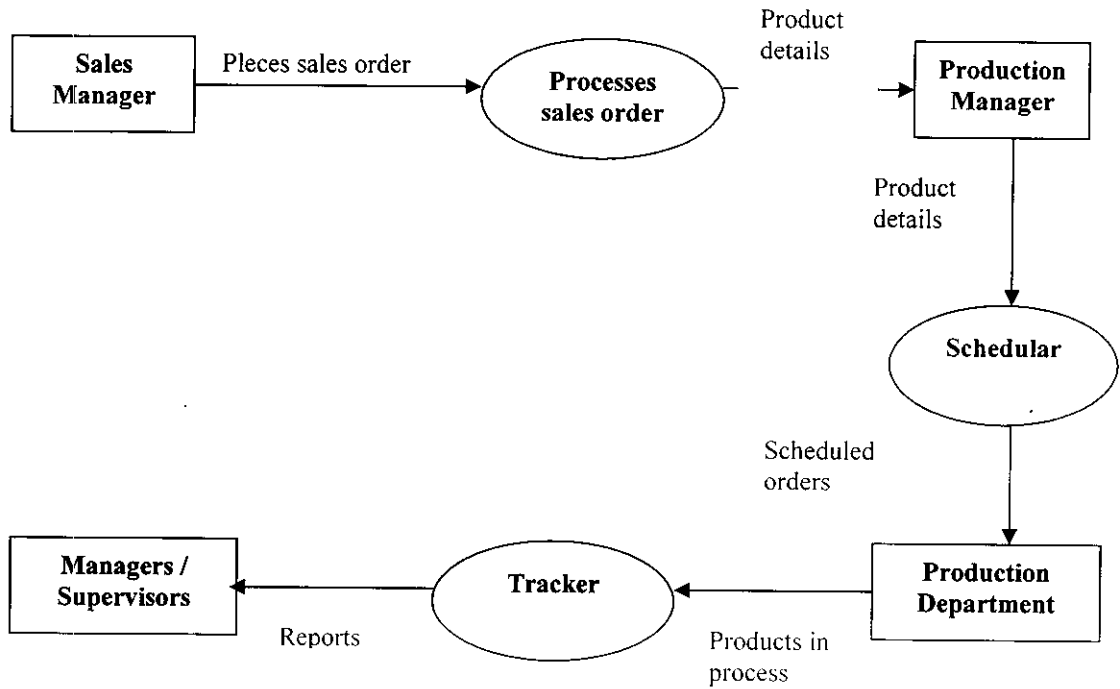
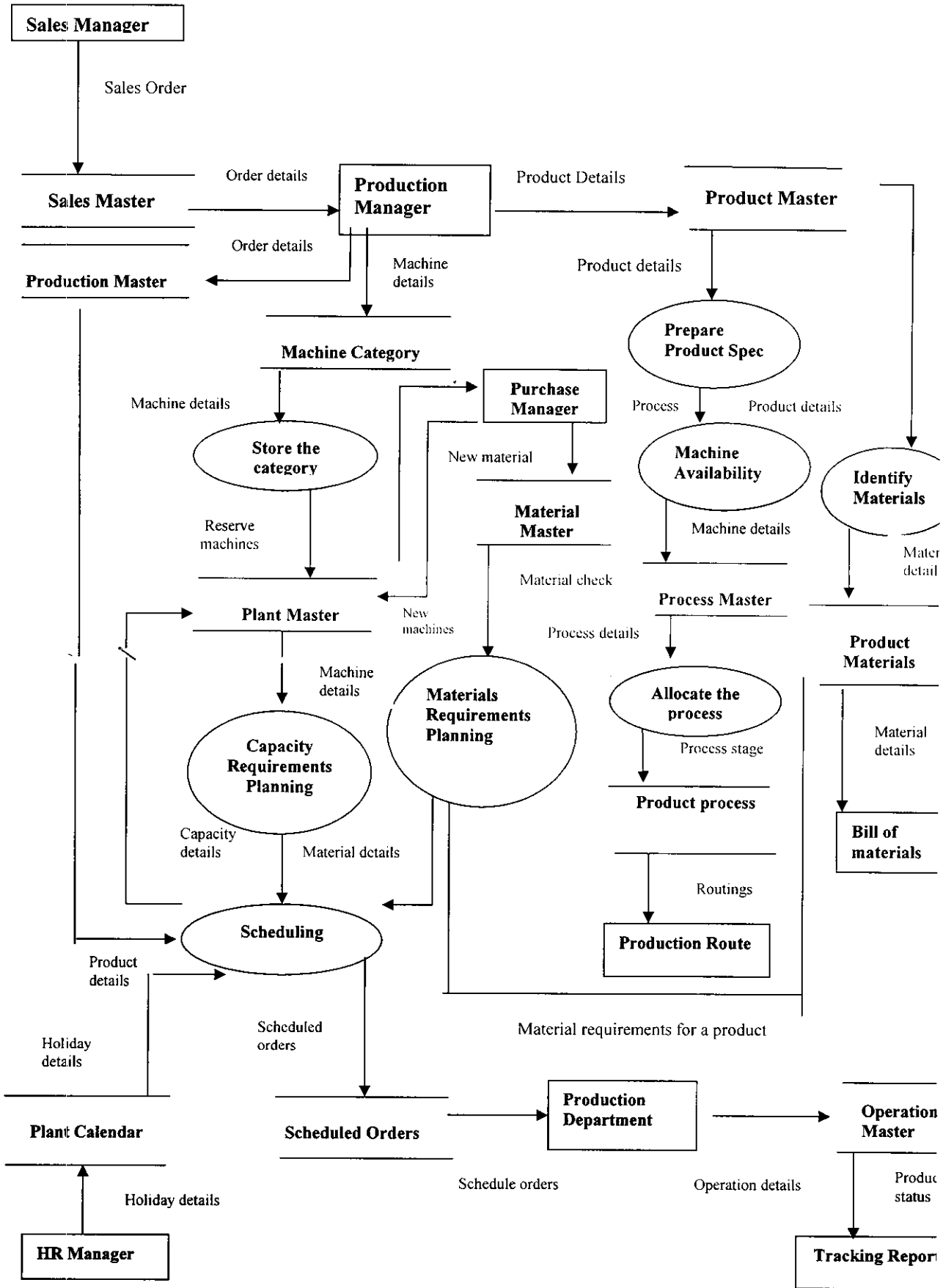


Figure 5.2 DFD Level 1



CHAPTER 5

Figure 5.3 DFD Level 2

## SYSTEM TESTING AND IMPLEMENTATION

### 6.1 TESTING

Testing is a critical element of software quality and assurance and represents the ultimate review of specification design and coding. It is a vital activity that has to be enforced in the development of any system. This could be done in parallel during all the phases of system development. The feedback received from these tests can be used for further enhancement of the system under consideration. The testing phase conducts test using the Software Requirement Specification as a reference and with the goal to see whether the system satisfies the specified requirements.

Standard procedures have been followed in testing. Test cases are generated for each screen. These test cases will cover every possibility which could result in both positive and negative results. These test plans are maintained for any further testing done on the system. The test plan stores information such as, the test script/input, expected output, actual output, comments and the name of the tester. This plan will be followed for all types of testing done in the system.

Testing Objectives are,

1. Testing is a process of executing a program with the intent of finding an error.
2. A successful test is one that uncovers an as yet undiscovered error.
3. A good test case is one that has a high probability of finding an as yet undiscovered error.

The main types of tests carried out on Internet Banking System are:

- Unit Test

- Integration Test
- System Test

### **6.1.1 Unit Testing**

Module or Unit Testing is the process of testing all the program units that make up a system. Unit testing focuses on an individual module thus allowing one to uncover all the errors made logically and while coding in the module.

Each page is tested separately as a unit. Initially the flow of control and data through that page is checked. When considering a module as a unit, the flow of data and control through the whole module is tested. The result is stored in the test plan. In a page, each control is further tested in unit testing. The process is done in all the pages of the system. Once the errors are rectified, the testing procedure is repeated with same test cases to ensure this hasn't produced new errors. Hence this is a continuous process.

Test cases were generated to test the control flow of each unit or module. Almost all cases needed for testing control flows have been generated.

### **6.1.2 Integration Testing**

Integration testing tests the process of integrating the various modules to form the completed system. Integration starts with a set of units each individually tested in isolation and ends when the entire application has been built. Integration testing verifies that the combined units function together correctly. It facilitates in finding problem that occur at interface or communication between the individual parts.

In this project top-down integration testing is followed. Modules were linked to the main menu in a sequence as required in the real time operating mode of the system. Menu items were created as and when required for the integration. The same procedure is followed in other modules in the same level

at first. Then the upper level is taken into action. The flow of data through the whole module in the upper level is taken and executed. A change of data made in one screen should have reflected in all other screens.

This process is continued from the page level to module level, finally to the system level. In the final stage, the whole system is taken together and tested for integration. A change in one place should be reflected through out the system. Regression testing is done after each change made into the software. This tests if the change has affected any part negatively after the change was made. The whole set of test cases need to be run again to do the regression testing. Data can be lost across the interfaces; one module may have adverse effect on other. Thus integration testing is a systematic testing for constructing tests to uncover errors within the interface.

In this project each and every module are combined and the program is tested as the whole. Integration testing is for testing the design and construction of the software architecture.

### **6.1.3 System Testing**

System testing is actually a serious of different tests, whose primary purpose is to fully exercise the computer-based system. This helps in verifying that all the system elements have been properly integrated and perform the allocated functions. It verifies the entire product after having integrated all software and hardware components, and validates it according to the original project requirement. The system testing takes into consideration the hardware, and the software. It should be able to be run on the specified hardware for variety of cases. The project is tested against recovery from errors.

Security testing is important in system testing. The system in no way shall be accessible to unauthorized users. Testing is done to ensure that a user with respective rights can only view the various forms and reports presented by the system. If users try to perform something beyond his assigned rights corresponding messages should be displayed. In such cases it redirects the user back to the previous page.

Another security issue involves the sensitive data in the system. The system is highly secure with authentication fixed at various levels of the hierarchy. One more level of security is concerned with user rights. Each user is applied rights module wise. The menus can be configured to roles. Users can also be configured to roles. Menu items are assigned to users dynamically based on the roles assigned to menu items as well as users. A match is done before displaying the menu to the user.

#### **6.1.4 User Acceptance Testing**

User acceptance of the system is the key factor of success. The system under consideration is tested for user acceptance by constantly, keeping in touch with the prospective system users at time of developing and making changes whatever required. The input output screen design, online messages to guide the user, menu driven system format of reports are tested.

### **6.2 SYSTEM IMPLEMENTATION**

System Implementation is the part of the software engineering life cycle, where, the design artifacts are converted to a working application. Coding is done in this stage using ASP.NET framework and programming language, which would solve the specific problem the best way. Once the design is coded into a working application, it has to be verified, validated and tested in detail. The tested product if successful is deployed in the user environment. After successful implementation, the change over phase from the existing system to the new system takes place.

## CHAPTER 7

### CONCLUSION AND FUTURE ENHANCEMENT

#### 7.1 CONCLUSION

Production Management is designed to help the administrator and employees of the organization in accessing and viewing the process being performed. This helps the organization to a great extent since it enables to view the operations that are done.

The administrator is the sole controller of the project. The administrator can perform the desired operations and he has the authority to assign privileges to the employees.

The system is tested with sample data and was found to be working efficiently. Sample data are tested for invalid Login and the updating of records. The developed system is flexible and changes can be made easily as and when required. The system is efficient so as to facilitate the interactions of customers.



## 7.2 FUTURE OUTLOOK

This newly developed system is able to meet the requirement of the company. Their requirements may change in the near future. Here are some of the ideas for future enhancements,

- The system can be linked with the internal mail of the organization so that alert messages like re-order level can be mailed to the respective users or employees.
- RFID systems can be linked with the system to import data into the system.
- The system is now designed to fit in the local area network of the organization, in future it could be transferred to internet.

## APPENDIX

## SCREEN LAYOUTS

## Adding Details to the Master Module(Sample 1)

The screenshot shows a Microsoft Internet Explorer browser window with the title 'VS Foundaries - Microsoft Internet Explorer'. The address bar contains the URL: `http://localhost:1042/Enterprise%20Resource%20Planning10_5_2007/Add%20Product%20Details.aspx`. The main content area displays the 'EPMS' logo at the top, followed by a navigation bar with several icons. Below this is the 'Add Product' form, which includes the following fields and controls:

Product Id	<input type="text"/>
Product Description	<input type="text" value="scylencer"/>
Product Type	<input type="text" value="steel"/>
Product Price	<input type="text" value="190"/>
	<input type="button" value="Submit"/>

The browser's status bar at the bottom indicates 'Local Intranet'.

## Adding Details to the Master Module(Sample 2)

YS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Home Search Favorites Media

Address [http://localhost:1042/Enterprise%20Resource%20Planning10\\_5\\_2007/Add%20OrderDetails.aspx](http://localhost:1042/Enterprise%20Resource%20Planning10_5_2007/Add%20OrderDetails.aspx) Go Links

### EPMS

(Enterprise Production Management System)

Master	Report	Planning	Operation Master	Track Reports
--------	--------	----------	------------------	---------------

Order Details

Order No

Customer Id

Customer Name

Order Date

Required Date

Done Local intranet

## Bill of Material

YS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address [http://localhost:1042/Enterprise%20Resource%20Planning10\\_5\\_2007/Bill%20Of%20Material.aspx](http://localhost:1042/Enterprise%20Resource%20Planning10_5_2007/Bill%20Of%20Material.aspx) Go Link

### EPMS

(Enterprise Production Management System)

Master	Report	Planning	Operation Master	Track Reports
	<a href="#">Bill Of Material</a> <a href="#">Product Route</a>			

Bill Of Material

Order No

Product No

Product Name

Material Id	Material Name	Material type	Measurement type	Quantity
2	Plastice sheet	consumable	in kg	8
2	Plastice sheet	consumable	in kg	12
2	Plastice sheet	Consumable	in kg	18

[http://localhost:1042/Enterprise Resource Planning10\\_5\\_2007/Bill Of Material.aspx](http://localhost:1042/Enterprise Resource Planning10_5_2007/Bill Of Material.aspx) Local intranet

## Production Route

YS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Home Search Favorites Media

Address [http://localhost:1042/Enterprise%20Resource%20Planning10\\_5\\_2007/Product%20Route.aspx](http://localhost:1042/Enterprise%20Resource%20Planning10_5_2007/Product%20Route.aspx) Go Links

**EPMS**  
(Enterprise Production Management System)

Master Report Planning Operation Master Track Reports

Production Route

Product Id

ProductID	Product Name	Process Step	ProcessId	Process Name
3	brake	1	1	Moulding
3	brake	2	2	folding
3	brake	3	1	Moulding

Done Local intranet

## Order Status

VS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address [http://localhost:1042/Enterprise%20Resource%20Planning10\\_5\\_2007/SHedule%20Order.aspx](http://localhost:1042/Enterprise%20Resource%20Planning10_5_2007/SHedule%20Order.aspx) Go Links

### EPMS (Enterprise Production Management System)

Master Report **Planning** Operation Master Track Reports

#### Order Status

Order Id

Product ID	Name	Order Status	Order Given Date	Required Date
1	silencer	Scheduled	03/11/2007	04/19/2007
2	brake pedal	Scheduled	03/11/2007	04/19/2007

Done Local intranet

## Scheduling The Product

VS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media

Address http://localhost:1042/Enterprise%20Resource%20Planning10\_5\_2007/Backward%20Scheduling.aspx

### EPMS

(Enterprise Production Management System)

Master
Report
Planning
Operation Master
Track Reports

#### Scheduling

Order No

Product Id

Holidays

Working Days

6/27/2007	▲
6/26/2007	▼
6/25/2007	▼

Process Id	Process Name	Time Taken	Product Quantity	Total Time Taken	Machine Used	No. Of Machines Available
1	Moulding	1	5	5	moulding machine	2
1	Moulding	3	5	15	moulding machine	2
2	folding	2	5	10	folding machine	5

Process Id

Machine Id

Machine Name  Man Power

Time Taken  Allot Date

From  To

Schedule Added Successfully

Done

Local intranet

## Viewing The Schedule

VS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address [http://localhost:1042/Enterprise%20Resource%20Planning10\\_5\\_2007/View%20Schedule.aspx](http://localhost:1042/Enterprise%20Resource%20Planning10_5_2007/View%20Schedule.aspx) Go Links

**EPMS**  
(Enterprise Production Management System)

Master Report Planning Operation Master Track Reports

View Schedule

Order No

Order No	Machine Id	Machine Name	Product Id	Product Name	Process Name	In Date	Out Date
1	1	folding machine	1	silencer	Moulding	04/18/2007	04/18/2007
1	1	folding machine	2	brake pedal	Moulding	04/18/2007	04/16/2007
1	2	moulding machine	1	silencer	folding	04/18/2007	04/18/2007
1	2	moulding machine	2	brake pedal	folding	04/16/2007	04/13/2007

Local intranet



## Material Requirement Planning

VS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media

Address http://localhost:1042/Enterprise%20Resource%20Planning10\_5\_2007/MPR.aspx Go Links

### EPMS

(Enterprise Production Management System)

Master
Report
Planning
Operation Master
Track Reports

#### Material Requirement Planning

Order Id

Product Id

Product Name

Material Id	Material Name	Material type	Measurement type	Quantity	Process Id	Process name	Date Of Requirement
2	Plastice sheet	consumable	in kg	6	1	Moulding	04/18/2007
2	Plastice sheet	Consumable	in kg	9	2	folding	04/18/2007

Done Local intranet

# Capacity Requirement Planning

**EPMS**  
(Enterprise Production Management System)

Master | Report | **Planning** | Operation Master | Track Reports

Capacity Requirement Planning

Order Id: 1  
Product Id: 1  
Product Name: silencer

Process Id	Process Name	Machine Id	Machine Name	Human Resource Required	From	To
1	folding	1	folding machine	1	04/18/2007	04/18/2007
2	Moulding	2	moulding machine	1	04/18/2007	04/18/2007

Done Local intranet

## Operation Master

VS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address [http://localhost:1042/Enterprise%20Resource%20Planning10\\_5\\_2007/OperationMaster.aspx](http://localhost:1042/Enterprise%20Resource%20Planning10_5_2007/OperationMaster.aspx) Go Links

# EPMS

(Enterprise Production Management System)

Master
Report
Planning
Operation Master
Track Reports

### OperationMaster

Operation Number	<input type="text" value="4"/>	Product Process Name	<input type="text" value="moulding"/>
OperationDescription	<input type="text" value="molding started"/>	Machine ID	<input type="text" value="1"/>
OrderNumber	<input type="text" value="1"/>	Machine Name	<input type="text" value="molding machine"/>
Ordered Date	<input type="text" value="09/06/2007"/>	In-Date	<input type="text" value="10/06/2007"/>
Order Required Date	<input type="text" value="11/06/2007"/>	Out-Date	<input type="text" value="10/06/2007"/>
Product Id	<input type="text" value="2"/>	Accepted Quantity	<input type="text" value="2"/>
Product Name	<input type="text" value="silencer"/>	Rejected Quantity	<input type="text" value="2"/>
Quantity	<input type="text" value="3"/>	Despatched Quantity	<input type="text" value="0"/>
Product Process Id	<input type="text" value="2"/>	<input type="button" value="Submit"/>	

Operation Started

Done Local intranet

## Tracking Reports

VS Foundaries - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media Print

Address http://localhost:1042/Enterprise%20Resource%20Planning10\_5\_2007/Track%20By%20product.aspx Go Links

**EPMS**  
(Enterprise Production Management System)

Master Report Planning Operation Master Track Reports

Track by Product

Product Id

Order No	Machine Name	Product id	Product Name	Process Name	In Date	Out Date
1	moulding machine	1	silencer	folding	07/04/2007	07/09/2007

Done Local intranet

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