DOWN TIME MANAGEMENT SYSTEM

For

Hyundai Motor India Ltd.

Project Report

Submitted in partial fulfillment of the requirements for the award of the degree of

M.Sc. Applied Science (Software Engineering)
Bharathiar University,
Coimbatore.

Submitted By

M. DHYANESH
Reg. No. 9937S0075

Guided By

Mr. N. Kumar, (External Guide)
Mr. Ganesh Babu MCA., (Internal Guide)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE – 641 006

CERTIFICATE

This is to certify that this project work entitled

"Down Time Management System"

Submitted to

KUMARAGURU COLLEGE OF TECHNOLOGY

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

Of

M.Sc. APPLIED SCIENCE (Software Engineering)

The record work done by

M. DHYANESH
Reg. No. 9937S0075

During his period of study in the Department of Computer Science and Engineering, Kumaraguru College of Technology, Coimbatore – 641 006, under my supervision and guidance and this project work has not formed the basis for the award of any guidance and this project work has not formed the basis for the award of any degree/ Diploma/ Associate ship/ Followed or similar title to any candidate of any university.

Professor and Head

Staff-in-charge

Submitted for University Examinations held on ....29 - 03 - 2004....................

Internal Examiner

External Examiner 29/3/04

DECLARATION

I hereby declare that the project work entitled

Down Time Management System

Done at

Hyundai Motor India Ltd.,

and submitted to

Kumaraguru College of Technology

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

M.Sc. APPLIED SCIENCE (Software Engineering)

Is a report of work done by me during my period of study in Kumaraguru College of Technology, Coimbatore – 641 006

Under the supervision of

Mr. K.R. Baskaran B.E., M.S.,
Assistant Professor, Dept of Computer science & Engineering.
Kumaraguru College of Technology, Coimbatore.

M. Dhyanesh

Place : Coimbatore
Date : 29-03-2004

Signature of the Candidate
(M. Dhyanesh)

Staff-in-charge

Mr. K.R. Baskaran B.E., M.S.,
Assistant Professor, Dept of Computer Science & Engineering,
Kumaraguru College of Technology, Coimbatore.

HYUNDAI

5th March 2004

To Whomsoever it May Concern:

This is to certify that Mr.M.Dhyanesh of Kumaraguru College of Technology, Coimbatore has completed his industrial project with our Organization, as a part of his M.sc (Software engineering) Curriculam.He was involved in a project on “Down Time Management System”.The duration of the project was from 18thDecember to 28th February 2004.He had an opportunity to develop Visual Basic, Crystal reports and Oracle skills.

His contribution was good and we wish him success in all his endeavors.

For **Hyundai Motor India Ltd.,**

KUMAR N,

SENIOR MANAGER.

ACKNOWLEDGEMENT

I express my deep sense of gratitude to **Dr. K.K. Padmanaban, B.Sc (Engg), M.Tech, Ph.D,** Principal, **Kumaraguru College of Technology**, Coimbatore, for giving me the opportunity to carry out this project.

I express my sincere gratitude to **Dr. S. Thangasamy B.E. (Hons),Ph.D** Prof and Head of the Department of Computer Science Engineering, Kumaraguru College of Technology, Bharathiar University , for the immense concern shown during the course of the project.

I express my most profound gratitude to my project guide **Mr. K.R. Baskaran** B.E, M.S., Assistant Professor, Department of Computer Science & Engineering and **Mr. GaneshBabu,** MCA., Lecturer Department of Computer Science & Engineering, Kumaraguru college of Technology, for their valuable comments and suggestions given to me, right from the beginning of the project.

This project work is done in Hyundai Motor India Ltd., Irungattukotai, Sriperumpudur, in partial fulfillment of the award for the degree of Master of Science in Applied Science – Software Engineering of Bharathiar University, Coimbatore. It is a matter of privilege and honor for me to place on record **Mr. Ramesh Babu**, Deputy Manager, and **Mr. Ramakrishnan**, Maintenance Head, Paint Shop for their unstinted co-operation and encouragement at levels to undergo this project work.

I deem it a great pleasure to place on record my deep sense of gratitude and indebtedness to Bharathiar University, for providing me this excellent opportunity to work on this project.

I am also grateful to **Mr. N. Kumar**, Senior Manager, Maintenance Dept, Hyundai Motor India Ltd., Sriperumpudur.

Mr. C.S. Lakshmi Narayanan, Senior Manager, Utilities & Services Dept, Hyundai Motor India Ltd., who had helped me in giving a route to approach the software companies and helping me in getting the project.

I also thank our beloved parents for their moral and financial support without whom the project wouldn't have been completed. We also express our sincere gratitude and thanks to all our intimate friends, well wishers and family members whose good wishes are responsible for crossing an important milestone in my life. Above all, I thank the Almighty for the completion of this endeavor.

Synopsis

Down Time Management System is an Intranet application developed to keep track of the failures in the machinery's used in various department of Hyundai Motor India Ltd., Sriperumpudur. The maintenance department of Hyundai Motor handles this application.

The objective of this project is to computerize the activities done in the "Downtime Management System". This application is used to increase the efficiency of the machine, which plays vital role in any organization, by computerizing all work done to carry out the activities.

The application comprises of four main modules- Master, DBA, Flaw Management and the Report generator. One of the salient features of DTMS is its ability to produce various kinds of reports. The master module deals with the access rights of the various users of the system and the privileges provided to them. The other important sub module of the master module is to get the input from the administrator about all the available machinery's in the various departments and their parts.

The DBA module actually deals with the backend (database) of the system. This process is carried out with the database designing according the system usage. The Flaw Management deals with various downtime entries by the user and other functions such as validation, efficiency calculations, etc. This also deals with the user requirements and delivers the applications according to the privilege of the current user.

Report Generator is used by the users from the different department to generate the reports in various formats according to the data specified by the user. This report generator is implemented in the crystal reports according to the user specification. The application is built on a two-tier architecture with VB as its front end and Oracle as its backend.

CONTENTS

CONTENTS

INTRODUCTION

1.0. Introduction

This document provides comprehensive details about the organization, project and about the details of the authority of the project.

1.1. About the Organization:

Hyundai Motor India Ltd. was established in 1996, and is a subsidiary of the giant South Korean multi national, the Hyundai Motor Company. It is Korea's top automobile manufacturer, with it sales revenue touching 8.24 billion in 1997.

The Company has set up more than 70 dealer workshops that are equipped with the latest technology, machinery, and international quality press, body and paint shops, across the country, thereby providing a one-stop shop for a Hyundai customer.

The company has produced 500,000 cars in a record time of just over 5 years since commencement of commercial production in October 1998. HMIL has set up a fully integrated state-of-the-art manufacturing plant near Chennai that boasts some of the most advanced production, quality and testing capabilities in the country.

The company was recently awarded the benchmark ISO 14001 certification for its sustainable environment management practices.

1.2. About the project:

The Down Time Management System (DTMS) is developed for the maintenance team of the Hyundai Motor India Ltd. The maintenance team comprises of six departments such as engine shop, paint shop, transmission, assembling department, press shop and the body shop. The proposed system is to assist the maintenance department to uphold their activities in the above mentioned departments. The DTMS is used to keep track with the failures of the machinery's in various departments and to generate the reports to measure the efficiency of the actions performed.

BACKGROUND

2.0. Background

2.1. Source of data:

All the data used in DTMS is a primary data. These data are provided by the Maintenance department of Hyundai Motor India Ltd. The primary data provided by the company is highly confidential and cannot be exposed to unauthorized people. Hence we are restricted to publish the data in this document.

2.2. System Requirement

2.2.1. Software Profile:

VISUAL BASIC 6.0:

Visual Basic is a powerful programming system for developing sophisticated graphical applications for Microsoft windows environment. Its productivity has been enhanced by addition of a complete set of tools to simplify rapid application development.

Visual Basic 6.0 introduces us to the new world of active technology, a unique way to harness the Internet. Visual Basic offers many silent features to aid in the development of full-featured applications including.

- Data access functionality allows creation of front-end applications the can work on most of the popular databases systems.
- Active TM technology allows usage of the functionality provided by other applications, such as Microsoft Word, Microsoft Excel, and other Windows applications and their possible development on the web.
- Applications developed using Visual Basic provides a true EXE file that uses a runtime Dynamic-Link Library (DLL) which can be freely distributed.
- Calling powerful API functions available in Visual Basic optimizes application performance.

ACCESSING DATABASES:

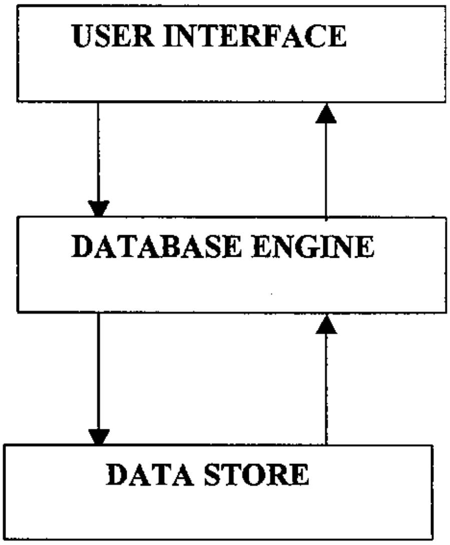
Visual Basic provides a set of tools created and uses structured database systems to manage application data. These tools are Microsoft Jet Database Engine, the Data Control and the Data Access Objects (DAO) programming interface. Visual Basic provides Jet Database, version 3.5 for 32-bit programming. The Data Control and Data Access Objects are the interfaces used to connect to the Jet Database Engine.

ADO (ActiveX Data Objects):

Active x data Objects also called as universal data object .VB 6.0 supports wide range of ADO. Since Objects are ActiveX based, they work across different platforms and programming languages unlike data control works strictly in the VB environment. The most importance of ADO is its capability tom access many kinds of data .Not limited to just relational and non-relational database

WORKING WITH DATABASES:

A Visual Basic database application has three parts such as User Interface, Database Engine and Data store. The Database Engine lies between the program and physical database. The figure below represents the database architecture.



- The user interface is what the user sees and interacts with. It contains forms that display the data and enable users to view or update.
- The Database Engine is contained in a set of DLL files that are linked to the Visual database and handles indexing, locking and referential integrity. It also contains query processor that accepts. SQL queries to carryout the desired database operations and a result processor to manage the result returned by queries.
- The data store is the file or files containing the database tables.
- It contains data but does not do anything to or with it.

Crystal Reports:

Crystal reports is a powerful program for creating custom reports, list and form letters using data a from existing databases. Crystal Reports is designed to work with all kinds of data such as numbers, currency, text and Boolean fields. It has a wide range of built-in tools for manipulating data with which it is possible to:

- Make calculations and comparisons of data values,
- Calculate grand total and subtotals of values,
- Test for the presence of specific values,
- Present data only if specific conditions are met,
- Evaluate logical relationship between values,
- Convert data from one type to another,

Calculate group averages; count the records in a group and test for minimum and maximum values.

The data can be placed at the required spot on the report, with special fonts and font sizes. Once a report has been designed it can be used as a template for creating other similar reports, which save a lot of time in creating new reports from scratch.

Databases that work with Reports:

Crystal Reports can build reports with the standard data files generated by Microsoft Access, DBASE, Paradox, Clipper and Bereave. The programs also support SQL Server and Oracle via ODBC.

ORACLE:

Oracle is an Object Relational Database Management System (ORDBMS). It offers capabilities of both relational and object-oriented database systems. In general, objects can be defined as reusable software codes, which are location independent and perform a specific task on any application environment with little or no change to the code.

Oracle products are based on Client/Server Technology. This concept involves segregating the processing of an application between two systems. The Client or front end database application also interacts with the database by requesting and receiving information from the database server.

Oracle uses the Internet File System, which is a Java based application, which enables the database to become an Internet development platform. The data stored in the database can be used for building HTML web pages. Oracle also provides support for building Java application by offering a new version of Jdeveloper. Corba 2.0 complaint Object Request Broker (ORB) that provides users with ability to call in and out of the object sever using Corba's IIOP, which is also integrated with Oracle.

2.2.2. Hardware Profile:

Minimum Requirement:

- 20 GB HDD
- Processor P-II
- 128 MB RAM

SYSTEM DESCRIPTION

3.0. System Description

3.1. System Study & Analysis

3.1.1. Purpose:

The purpose of this document is to understand the modules in DTMS. The modules included in the product have been listed along with a detailed description of functions involved in each module.

3.1.2. Scope:

The Down Time Management System (DTMS) is developed for the maintenance team of the Hyundai Motor India Ltd. The maintenance team comprises of six departments such as engine shop, paint shop, transmission, assembling department, press shop and the body shop. The proposed system is to assist the maintenance department to uphold their activities in the above mentioned departments. The DTMS is used to keep track with the failures of the machinery's in various departments and to generate the reports to measure the efficiency of the actions performed.

4.0. DTMS Modules

4.1. Definition, Acronyms & Abbreviations:

SRS	Software Requirements Specification
DBA	Database Administration
HMIL	Hyundai Motor India Limited
DTMS	Down Time Management System

4.2. Reference:

- Software Engineering – A Practitioner's Approach -Roger.S.Pressman
- www.vbcodes.com
- www.oracle4u.com
- Teach yourself Visual Basic6.0 in 21 Days-Sam Series
- Beginning Visual Basic 6.0

4.3. Overview:

Master Module:

The master module deals with the access rights of the various users of the system and the privileges provided to them. The other important sub module of the master module is to get the input from the administrator about all the available machinery's in the various departments and their parts.

DBA Module:

The DBA module actually deals with the backend (database) of the system. This process is carried out with the database designing according the system usage.

Flaw Management:

The Flaw Management deals with various downtime entries by the user and other functions such as validation, efficiency calculations, etc. This also deals with the user requirements and delivers the applications according to the privilege of the current user.

Report Generator:

This application is used by the users from the different department to generate the reports in various formats according to the data specified by the user. This report generator is implemented in the crystal reports according to the user's specification.

4.4. General Description

Product Perspective

Product Functions

- ➢ Master
  - ⇒ Equipment Master
  - ⇒ Employee Master
  - ⇒ Line Master
  - ⇒ Plan Master
  - ⇒ Incharge Master
- ➢ Transaction
  - ⇒ Down Time Entry
  - ⇒ Response Entry
  - ⇒ Cause Entry
- ➢ Training
  - ⇒ Skill Chart
  - ⇒ Training Entry
- ➢ Reports
  - ⇒ Item
  - ⇒ Trainer
  - ⇒ Section
  - ⇒ Designation
  - ⇒ Type
  - ⇒ Month
  - ⇒ Location
  - ⇒ Total Item
  - ⇒ Total Trainer

- ⇒ Total Section
- ⇒ Total Designation
- ⇒ Total Type
- ⇒ Total Month
- ⇒ Total Location
- ⇒ Total Down Time Analysis Status
- ⇒ Down Time Target Result
- ⇒ Down Time Target Result
- ⇒ Down Time Status – Total
- ⇒ Down Time Analysis – Total
- ⇒ Major Down Time Counter Measure
- ⇒ Down Time Analysis - Equipment
- ⇒ Down Time Analysis – Causewise
- ⇒ Down Time Analysis by Equipmentwise & Causewise
  - ❑ Responsibility
  - ❑ Major Equipment
  - ❑ Reason

4.5. Overview of Modules

Module **4.5.1. Master**

Module Functions

Functions List

The following are the functions provided by this module

- ➢ Equipment Master
- ➢ Employee Master
- ➢ Line Master

- Plan Master
- Incharge Master

Equipment Master

Functional Requirements

This function is used to collect Equipment, Shop and Line information.

Description

The new equipment details and the shop in which they are used with its respective line are provided by the user in this function. These details are added to the database and also can be retrieved whenever needed. The existing equipment details can be modified or deleted based on the equipment id. Equipment id is generated by the system automatically during addition of new equipment.

Inputs

- Equipment name.
- Shop id.
- Line id.

Outputs

- New equipment is added to the database
- Existing equipment is updated.

Process Validations

- Equipment name.
- Shop id.
- Line id.
- Equipment id should be unique.

Employee Master

Functional Requirements

This function is used to collect Employee and Shop information.

Description

The user in this function provides the new employee details and the shop in which he/she is placed. These details are added to the database and also can be retrieved whenever needed. The existing employee details can be modified or deleted based on the employee id. Employee id is generated by the system automatically during addition of new employee.

Inputs

- Employee name.
- Employee designation.
- Shop id.

Outputs

- New employee is added to the database
- Existing employee is updated.

Process Validations

- Employee name and designation.
- Shop id.
- Employee id should be unique.

Line Master

Functional Requirements

This function is used to collect Line and Shop information.

Description

The user in this function provides the new line details and the corresponding shop. These details are added to the database and also can be retrieved whenever needed. The existing line details can be modified or deleted based on the line id. Line id is generated by the system automatically during addition of new employee.

Inputs

- Line name.
- Shop id.

Outputs

- New line is added to the database
- Existing line is updated.

Process Validations

- Line name.
- Shop id.
- Line id should be unique.

Plan Master

Functional Requirements

This function is used to collect Plan and Shop information.

Description

The user in this function provides the new plan details and the corresponding shop. These details are added to the database and also can be retrieved whenever needed. The existing plan details can be modified or deleted based on the plan id. Plan id is generated by the system automatically during addition of new employee.

Inputs

- Plan year.
- Plan month.
- Plan value.
- Total plan value.
- Shop id.

Outputs

- New plan is added to the database
- Existing plan is updated.

Process Validations

- Plan year & month.
- Plan value & total plan value.
- Plan id should be unique.

Incharge Master

Functional Requirements

This function is used to collect Equipment, Employee and Incharge information.

Description

The user in this function provides the new incharge details, employee details and the equipment he/she is incharge for. These details are added to the database and also can be retrieved whenever needed. The existing incharge details can be modified or deleted based on the incharge id. Incharge id is generated by the system automatically during addition of new incharge.

Inputs

- Equipment id.
- Employee id.

Outputs

- New incharge is added to the database
- Existing incharge is updated.

Process Validations

- Equipment & employee id.
- Incharge id should be unique.

Module 4.5.2. Training

Module Functions

Functions List

The following are the functions provided by this module

- Training Entry

Training Entry

Functional Requirements

This function is used to collect Training, Employee information.

Description

The user in this function provides the new training details like trainer, item on which training is done, duration and the employees for training. These details are added to the database and also can be retrieved whenever needed. The existing training details can be modified or deleted based on the training id. Training id is generated by the system automatically during addition of new training details. The training given to the employees can be internal or external. Internal training is one, which takes place within the premises of Organization, and the external training is conducted outside the Organization premises.

Inputs

- Employee id.
- Trainer name & item.
- Location, type.
- Duration in hours and date.

Outputs

- New training details is added to the database
- Existing training details is updated.

Process Validations

- Equipment & employee id.
- Break down time & duration.

- Status and EDC.
- Entry id should be unique.

Module 4.5.3. Reports

Module Functions

Functions List

The following are the functions provided by this module

- Training Reports
  - ⇒ Item Wise
  - ⇒ Trainer Wise
  - ⇒ Section Wise
  - ⇒ Designation Wise
  - ⇒ Type Wise
  - ⇒ Month Wise
  - ⇒ Location Wise
  - ⇒ Total Item Wise
  - ⇒ Total Trainer Wise
  - ⇒ Total Section Wise
  - ⇒ Total Designation Wise
  - ⇒ Total Type Wise
  - ⇒ Total Month Wise
  - ⇒ Total Location Wise
- Other Reports
  - ⇒ Total Down Time Analysis Status
  - ⇒ Down Time Target Result
  - ⇒ Down Time Target Result

⇒ Down Time Status – Total

⇒ Down Time Analysis – Total

⇒ Major Down Time Counter Measure

⇒ Down Time Analysis - Equipment

⇒ Down Time Analysis – Causewise

⇒ Down Time Analysis by Equipmentwise & Causewise

- ❑ Responsibility
- ❑ Major Equipment
- ❑ Reason

Training Reports

Item Wise Report

Functional Requirements

This function is used to collect Training Item information.

Description

The user in this function provides the training item name. The item wise report is generated which contains the trainer's name, designation, shop name, the employees trained, location of the training, training type and the duration.

Inputs

➢ Training item.

Outputs

➢ Item wise report is produced.

Process Validations

➢ Training item.

Trainer Wise Report

Functional Requirements

This function is used to collect Trainer information.

Description

The user in this function provides the trainer's name. The trainer wise report is generated which contains the trainer's name, designation, shop name, location of the training, training type and the duration.

Inputs

- ➢ Trainer's name.

Outputs

- ➢ Trainer wise report is produced.

Process Validations

- ➢ Trainer's name.

Section Wise Report

Functional Requirements

This function is used to collect Section information.

Description

The user in this function provides the section type. The section wise report is generated which contains the trainer's name, designation, employee's name, shop name, location of the training, training type and the duration.

Inputs

- Section type.

Outputs

- Section wise report is produced.

Process Validations

- Section type.

Designation Wise Report

Functional Requirements

This function is used to collect Designation information.

Description

The user in this function provides the designation type. The designation wise report is generated which contains the trainer's name, employee's name and designation, shop name, location of the training, training type and the duration.

Inputs

- Designation type.

Outputs

- Designation wise report is produced.

Process Validations

- Designation type.

Type Wise Report

Functional Requirements

This function is used to collect Training type information.

Description

The user in this function provides the training type. The type wise report is generated which contains the trainer's name, employee's name and designation, shop name, location of the training, training type and the duration.

Inputs

- Training type.

Outputs

- Training type wise report is produced.

Process Validations

- Training type.

Month Wise Report

Functional Requirements

This function is used to collect Month & Year information.

Description

The user in this function provides the month name and year. The month wise report is generated which contains the trainer's name, employee's name and designation, shop name, location of the training, training type and the duration for the corresponding year.

Inputs

- Month name.
- Year.

Outputs

- Month wise report is produced.

Process Validations

- Month name.
- Year.

Location Wise Report

Functional Requirements

This function is used to collect Location information.

Description

The user in this function provides the training location. The location wise report is generated which contains the trainer's name, employee's name and designation, shop name, location of the training, training type and the duration.

Inputs

- Training location.

Outputs

- Location wise report is produced.

Process Validations

- Training Location.

Total Item Wise Report

Functional Requirements

This function is used to collect Training Item information.

Description

The total item wise report is generated which contains the trainer's name, designation, shop name, the employees trained, location of the training, training type and the duration.

Outputs

- Total item wise report is produced.

Total Trainer Wise Report

Functional Requirements

This function is used to collect Trainer information.

Description

The trainer wise report is generated which contains the trainer's name, designation, shop name, location of the training, training type and the duration.

Outputs

- Total trainer wise report is produced.

Total Section Wise Report

Functional Requirements

This function is used to collect Section information.

Description

The total section wise report is generated which contains the trainer's name, designation, employee's name, shop name, location of the training, training type and the duration.

Outputs

- Total section wise report is produced.

Total Designation Wise Report

Functional Requirements

This function is used to collect Designation information.

Description

The total designation wise report is generated which contains the trainer's name, employee's name and designation, shop name, location of the training, training type and the duration.

Outputs

- Designation wise report is produced.

Total Type Wise Report

Functional Requirements

This function is used to collect Training type information.

Description

The total type wise report is generated which contains the trainer's name, employee's name and designation, shop name, location of the training, training type and the duration.

Outputs

- Total training type wise report is produced.

Total Month Wise Report

Functional Requirements

This function is used to collect Month & Year information.

Description

The total month wise report is generated which contains the trainer's name, employee's name and designation, shop name, location of the training, training type and the duration.

Outputs

- Total month wise report is produced.

Total Location Wise Report

Functional Requirements

This function is used to collect Location information.

Description

The total location wise report is generated which contains the trainer's name, employee's name and designation, shop name, location of the training, training type and the duration.

Outputs

➢ Total location wise report is produced.

Other Reports

Downtime Analysis Status Report

Functional Requirements

This function is used to collect Month and Year information.

Description

The user in this function provides the month and the corresponding year. The report is generated which contains the given month's total down time analysis status. The report is in a form of a bar graph, which shows the plan and action taken in each shop in the corresponding month. The average plan and the actual average plan are compared for each shop and their total is computed.

Inputs

➢ Month & Year.

Outputs

- Down time analysis status report is produced.

Process Validations

- Month & Year.

Downtime Target Result Report

Functional Requirements

This function is used to collect Year information.

Description

The user in this function provides the year. The report is generated which contains the given year's downtime target result. The report is in a form of a bar graph, which shows the plan and action taken in each shop in each month. The average plan and the actual average plan for each month are compared and their total is computed.

Inputs

- Year.

Outputs

- Downtime target result report is produced.

Process Validations

- Year.

Downtime Target Result Report (ENG, T/M)

Functional Requirements

This function is used to collect Year information.

Description

The user in this function provides the year. The report is generated which contains the given year's downtime target result. The report is in a form of a bar graph, which shows the plan and action taken in each Engine, T/M (Transmission) in each month. The average plan and the actual average plan for each month are compared and their total is computed.

Inputs

- Year.

Outputs

- Downtime target result report is produced.

Process Validations

- Year.

Downtime Status Total Report

Functional Requirements

This function is used to collect Month and Year information.

Description

The user in this function provides the month and the corresponding year. The report is generated which contains the given month's downtime total status. Four reports are generated for the corresponding month. They are cause & responsibility report for assembly and cause & responsibility report for Engine, T/M.The cause report is in the form of pie chart, which depicts the cause for the downtime and the responsibility report similar to the cause report depicts each department's responsibility for the down time cause. The cause & responsibilities are shown in percentages.

Inputs

- Month & Year.

Outputs

- Downtime status total report is produced.

Process Validations

- Month & Year.

Downtime Analysis Total Report (Shopwise, Causewise)

Functional Requirements

This function is used to collect Month and Year information.

Description

The user in this function provides the month and the corresponding year. The report is generated which contains the given month's downtime analysis total. Two parts of report are generated for the corresponding month. They are cause & responsibility report for assembly maintenance and cause & responsibility report for Engine, T/M maintenance.

The report shows each shop and its corresponding department's downtime causes and responsibilities in minutes.

Inputs

- Month & Year.

Outputs

- Downtime analysis total report is produced.

Process Validations

- Month & Year.

Major Downtime Counter Measure Report

Functional Requirements

This function is used to collect Month and Year information.

Description

The user in this function provides the month and the corresponding year. The report is generated which contains the given month's downtime counter measure. The report shows the shop, line, problem, downtime, reason, action, counter measure, EDC and the status.

Inputs

- Month & Year.

Outputs

- Major downtime counter measure report is produced.

Process Validations

- Month & Year.

Downtime Analysis by Equipmentwise & Causewise Report

Functional Requirements

This function is used to collect Month, Year and shop information.

Description

The user in this function provides the month, its corresponding year and the shop name. The report is differentiated as responsibility, major equipment and reason. The responsibility report shows each department's part responsibility for downtime in percentage. The next one shows the major equipment for the downtime and the last shows the reason for the downtime.

Inputs

- Month & Year.
- Shop.

Outputs

- Downtime analysis by equipmentwise and causewise report is produced.

Process Validations

- Month & Year.
- Shop.

Downtime Analysis – Equipment Report

Functional Requirements

This function is used to collect Month, Year and shop information.

Description

The user in this function provides the month, its corresponding year and the shop name. The report shows the equipment, problem, downtime, reason, action, counter measure, EDC and the person incharge for that problem.

Inputs

- ➢ Month & Year.
- ➢ Shop.

Outputs

- ➢ Downtime analysis – equipment report is produced.

Process Validations

- ➢ Month & Year.
- ➢ Shop.

Downtime Analysis – Cause Report

Functional Requirements

This function is used to collect Month, Year and shop information.

Description

The user in this function provides the month, its corresponding year and the shop name. The report shows the problem, reason, action, counter measure, EDC and the person incharge for that problem.

Inputs

- ➢ Month & Year.
- ➢ Shop.

Outputs

- ➢ Downtime analysis – cause report is produced.

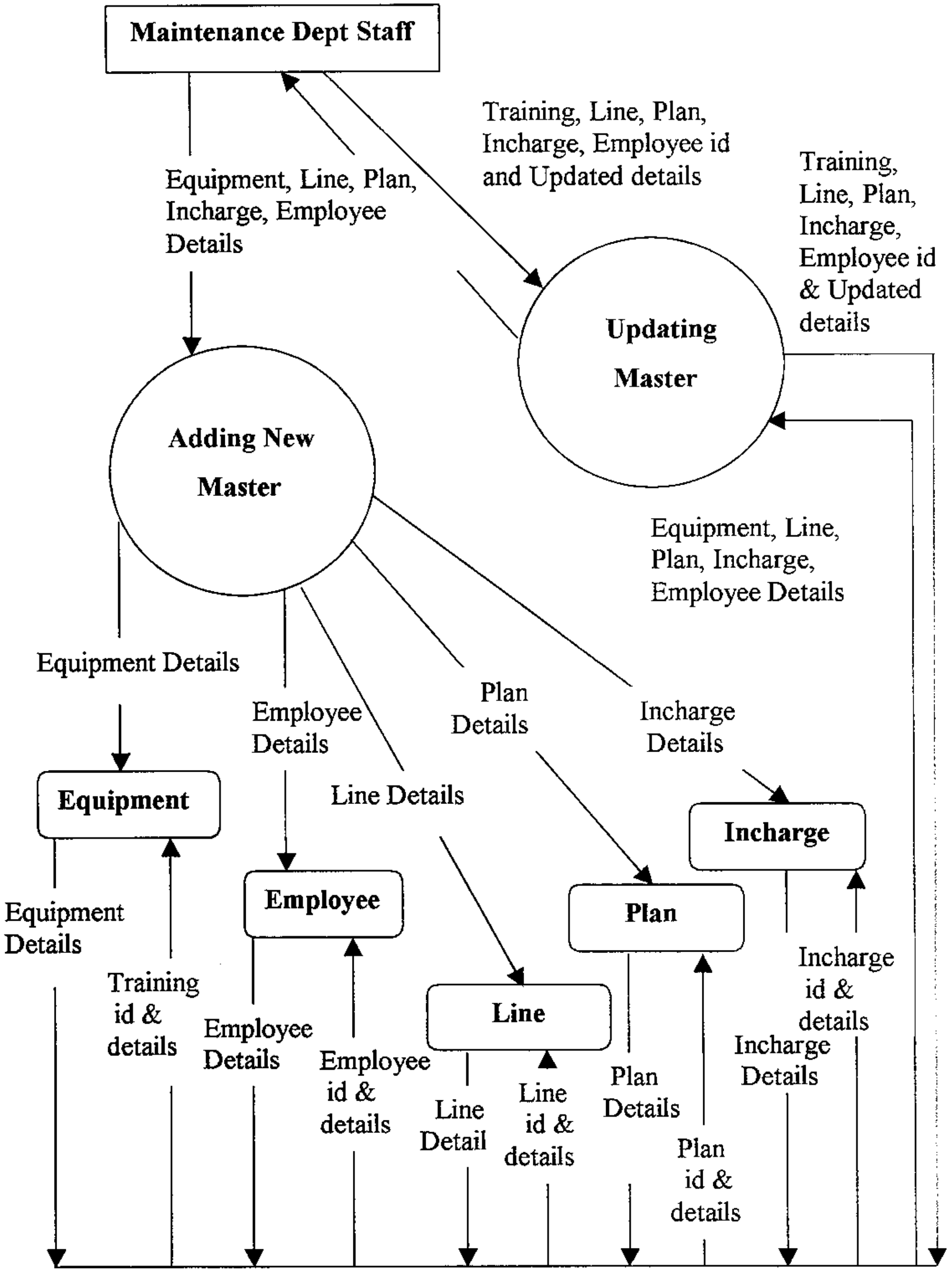
Process Validations

- ➢ Month & Year.
- ➢ Shop.

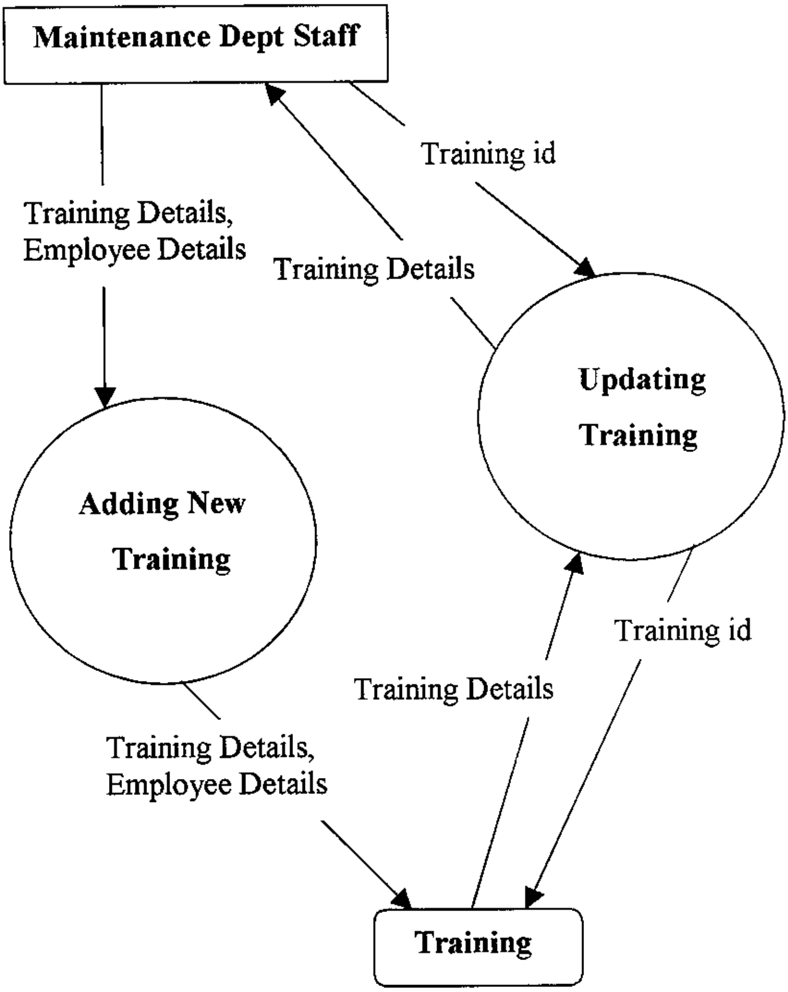
DATA FLOW DIAGRAM

5.0. Data Flow Diagram

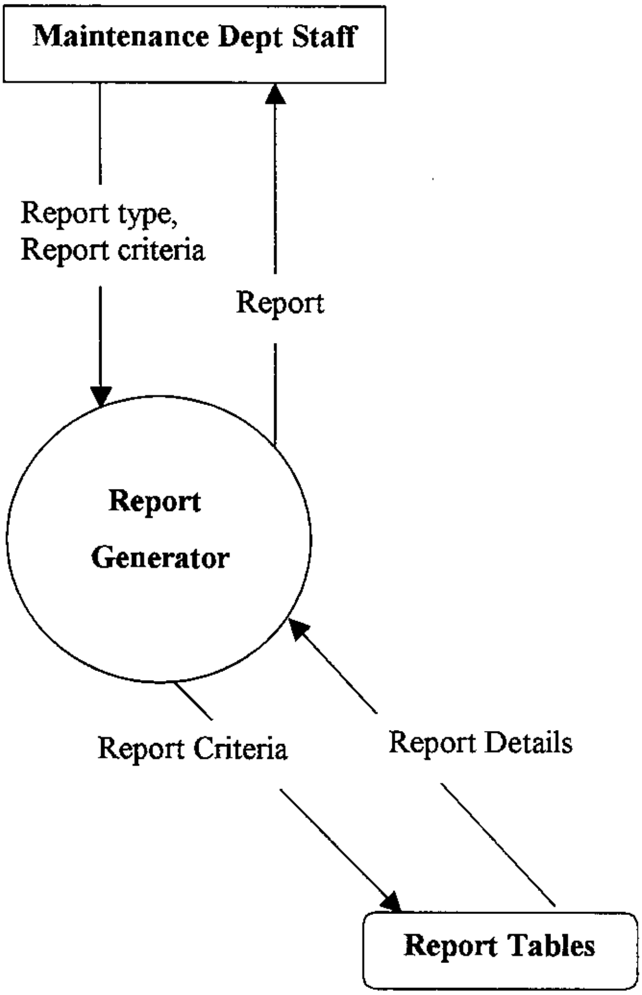
5.1. Master:



5.2. Training:


Maintenance Dept Staff
Training id
Training Details,
Employee Details
Training Details
Updating
Training
Adding New
Training
Training id
Training Details
Training Details,
Employee Details
Training

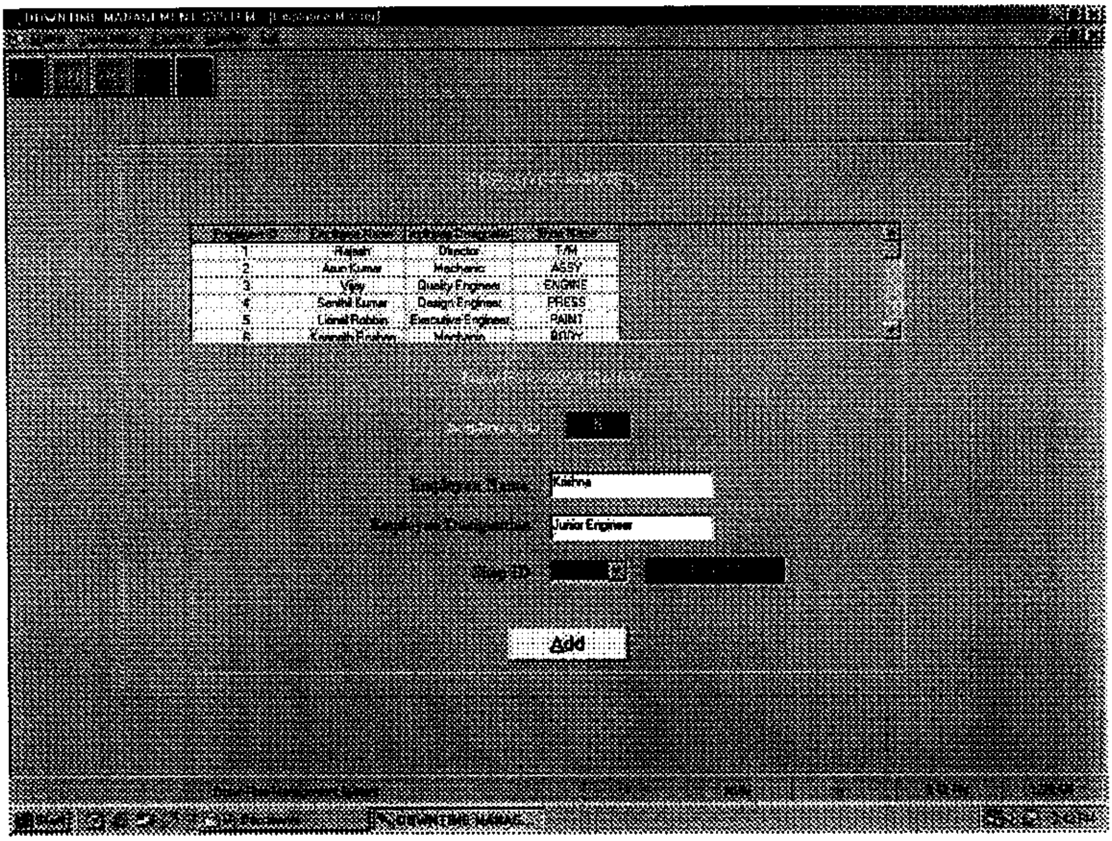
5.3. Reports:


Maintenance Dept Staff
Report type,
Report criteria
Report
Report
Generator
Report Criteria
Report Details
Report Tables

SAMPLE FORMS

6.0. Sample Forms

6.1. Employee Master:



Employee ID	Employee Name	Employee Designation	Shop Name
1	Rajesh	Director	T/M
2	Arun Kumar	Mechanic	ASSY
3	Vijay	Quality Engineer	ENGINE
4	Senthil Kumar	Design Engineer	PRESS
5	Lionel Robbin	Executive Engineer	PAINT
6	Kennath Fishan	Mechanic	BODY

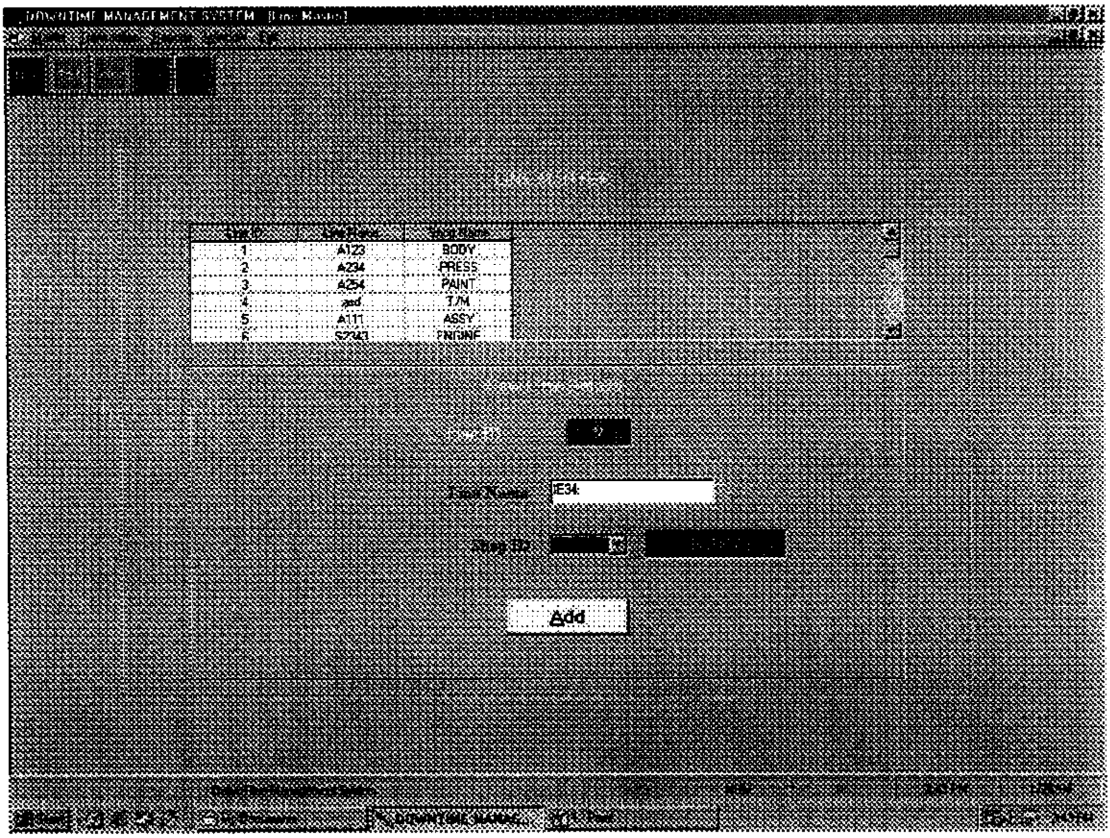
Employee ID: 8

Employee Name: Krishna

Employee Designation: Junior Engineer

Shop ID:

6.2. Line Master:



DOWNTIME MANAGEMENT SYSTEM - [Line Master]

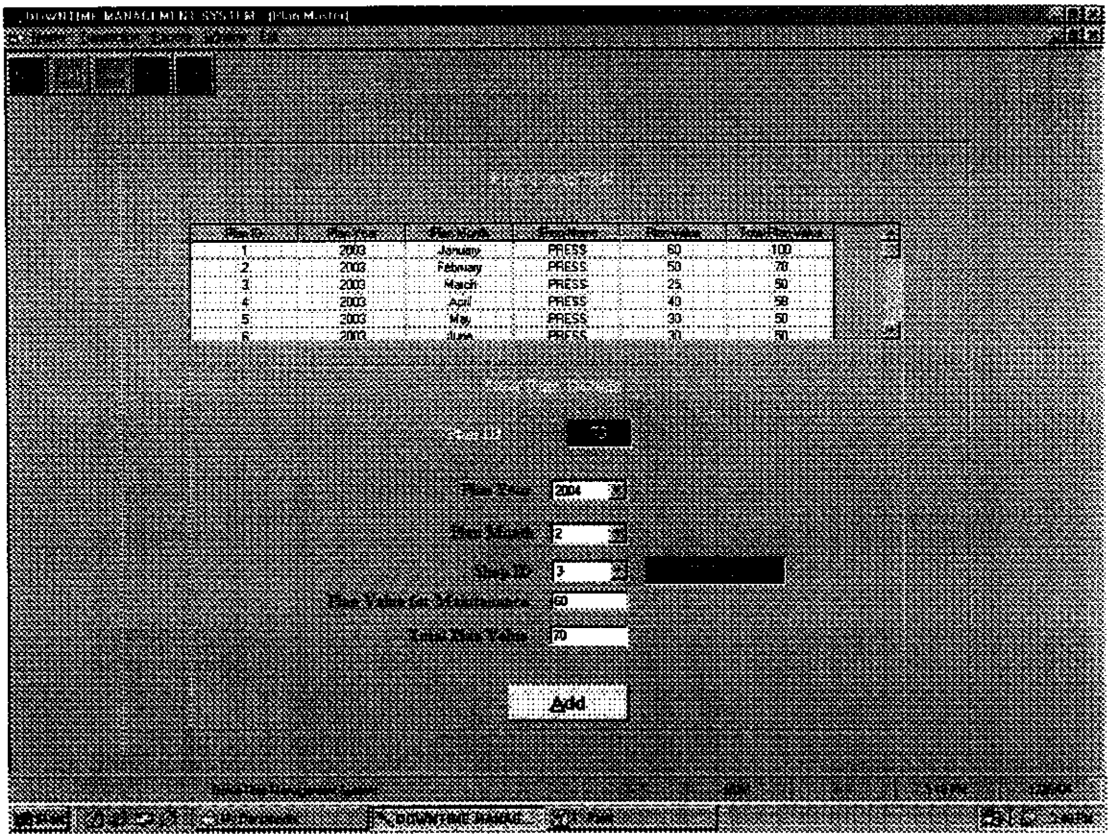
Line ID	Line Name	Shop Name
1	A123	BODY
2	A234	PRESS
3	A254	PAINT
4	asd	T/M
5	A111	ASSY
6	S2343	ENGINE

Line ID: 7

Line Name: E34

Shop ID:

6.3. Plan Master:



Plan ID	Plan Year	Plan Month	Shop Name	Plan Value	Total Plan Value
1	2003	January	PRESS	60	100
2	2003	February	PRESS	50	70
3	2003	March	PRESS	25	50
4	2003	April	PRESS	40	58
5	2003	May	PRESS	30	50
6	2003	June	PRESS	30	50

Plan Year: 2004

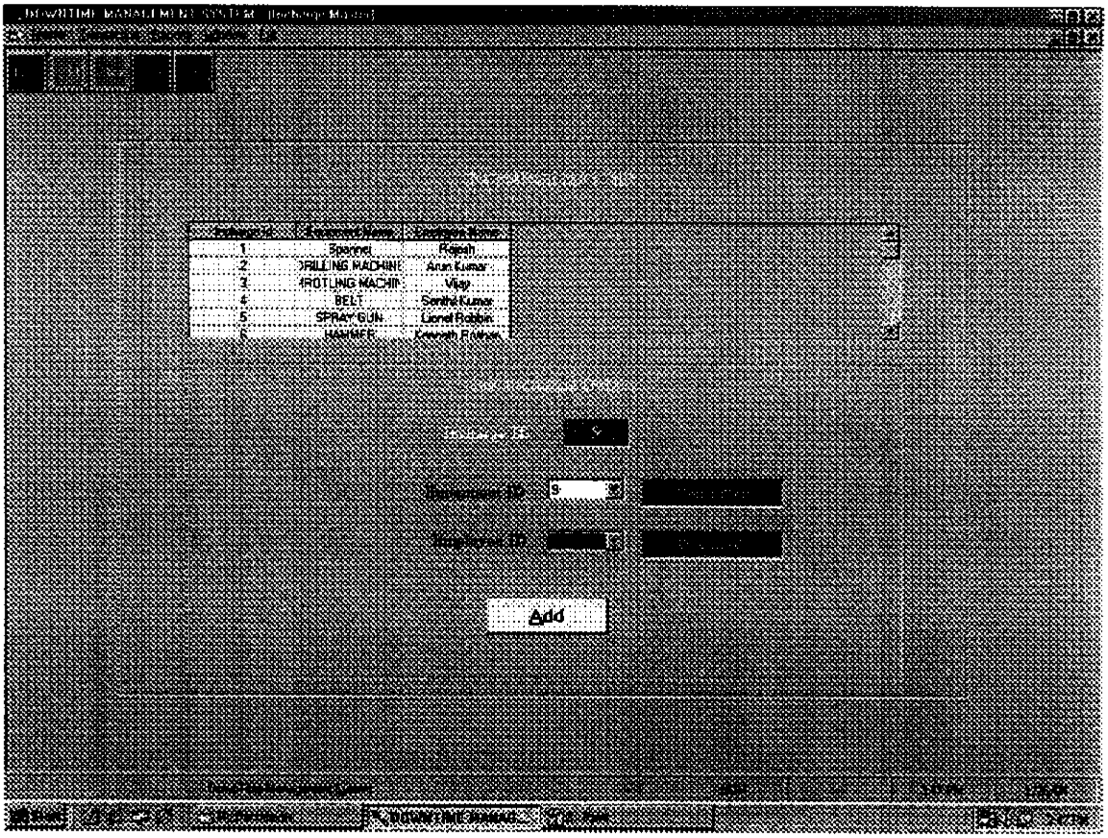
Plan Month: 2

Shop ID: 3

Plan Value for Maintenance: 60

Total Plan Value: 70

6.4. Incharge Master:



DOWNTIME MANAGEMENT SYSTEM - [Incharge Master]

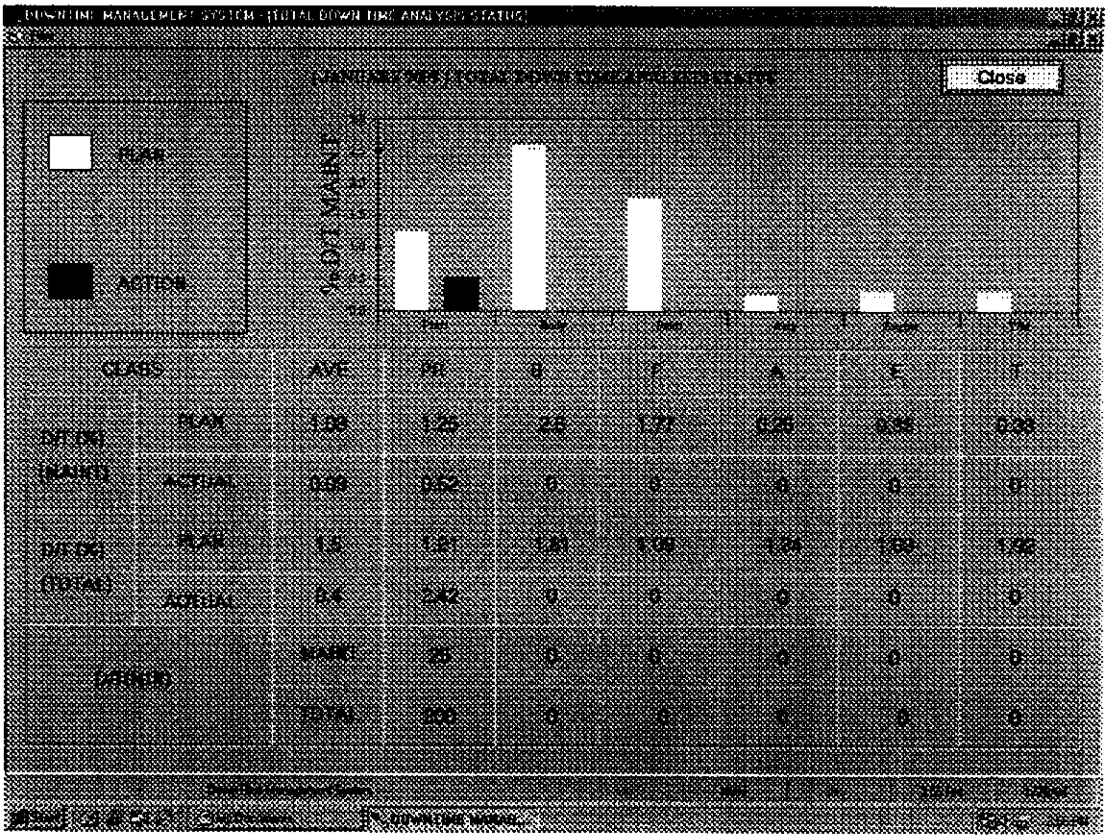
Incharge Id	Equipment Name	Employee Name
1	Spanner	Rajesh
2	DRILLING MACHINE	Arun Kumar
3	ROTLING MACHIN	Vijay
4	BELT	Senthil Kumar
5	SPRAY GUN	Lionel Robbin
6	HAMMER	Kenneth [illegible]

Incharge ID: 9

Equipment ID: 9

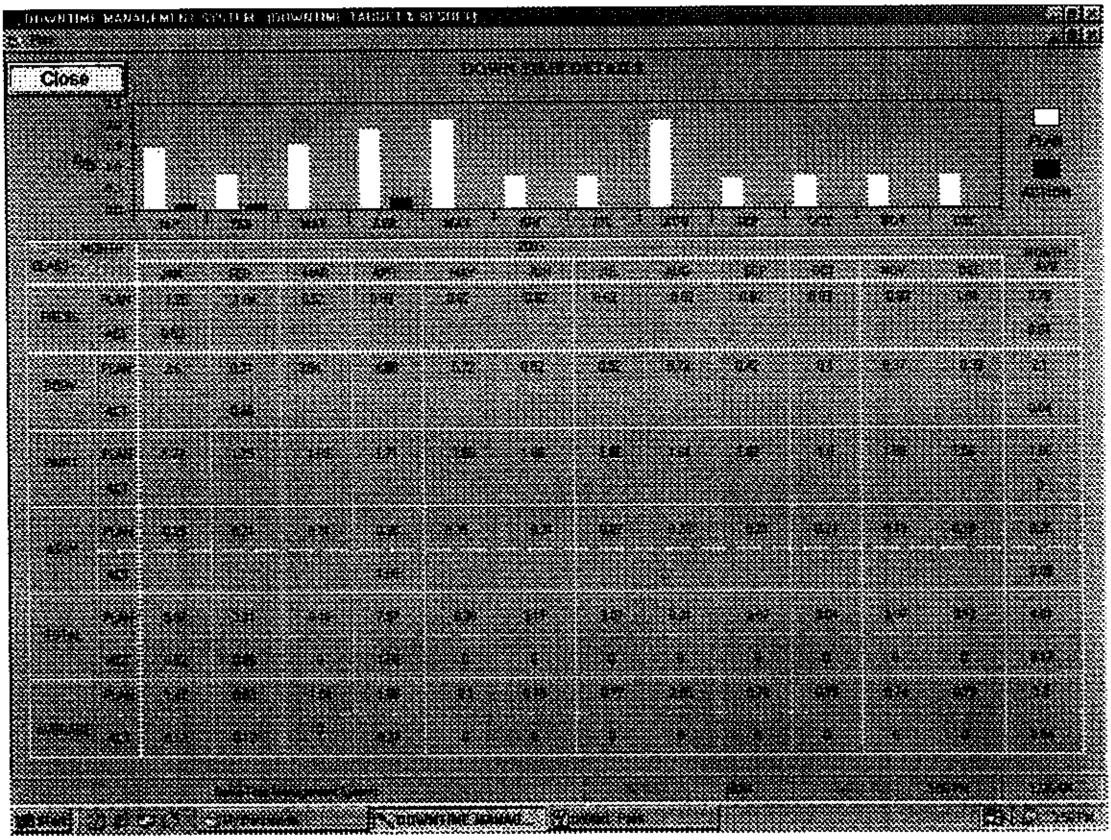
Employee ID:

6.5. Total Down Time Analysis Status:


DOWNTIME MANAGEMENT SYSTEM - [TOTAL DOWN TIME ANALYSIS STATUS]
Close
PLAN
ACTION
% D/T MAINT
0.0
0.5
1.0
1.5
2.0
2.5
3.0

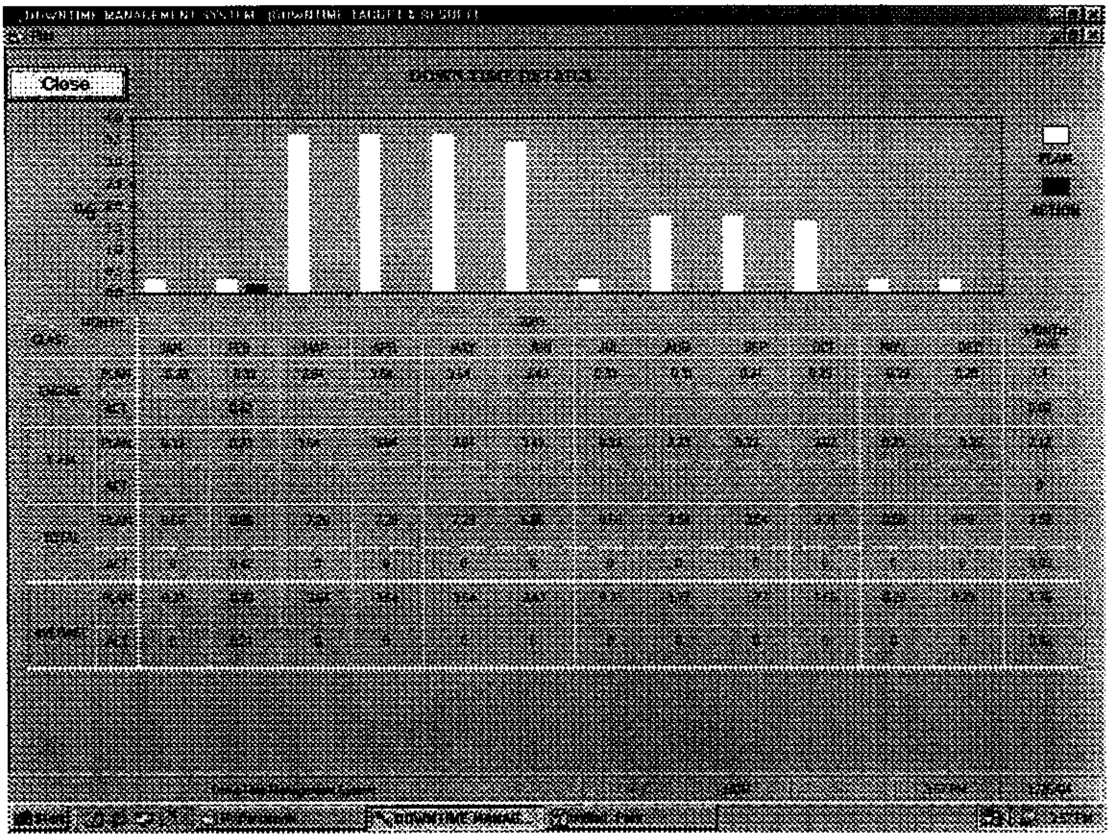
CLASS		AVE.	PR	B	F	A	E	T
D/T (%) (MAINT)	PLAN	1.08	1.25	2.5	1.77	0.25	0.35	0.33
	ACTUAL	0.09	0.52	0	0	0	0	0
D/T (%) (TOTAL)	PLAN	1.5	1.21	1.81	1.09	1.24	1.69	1.92
	ACTUAL	8.4	2.42	0	0	0	0	0
D/T(HR)		MAINT	25	0	0	0	0	0
		TOTAL	200	0	0	0	0	0

6.6. Down Time Details:



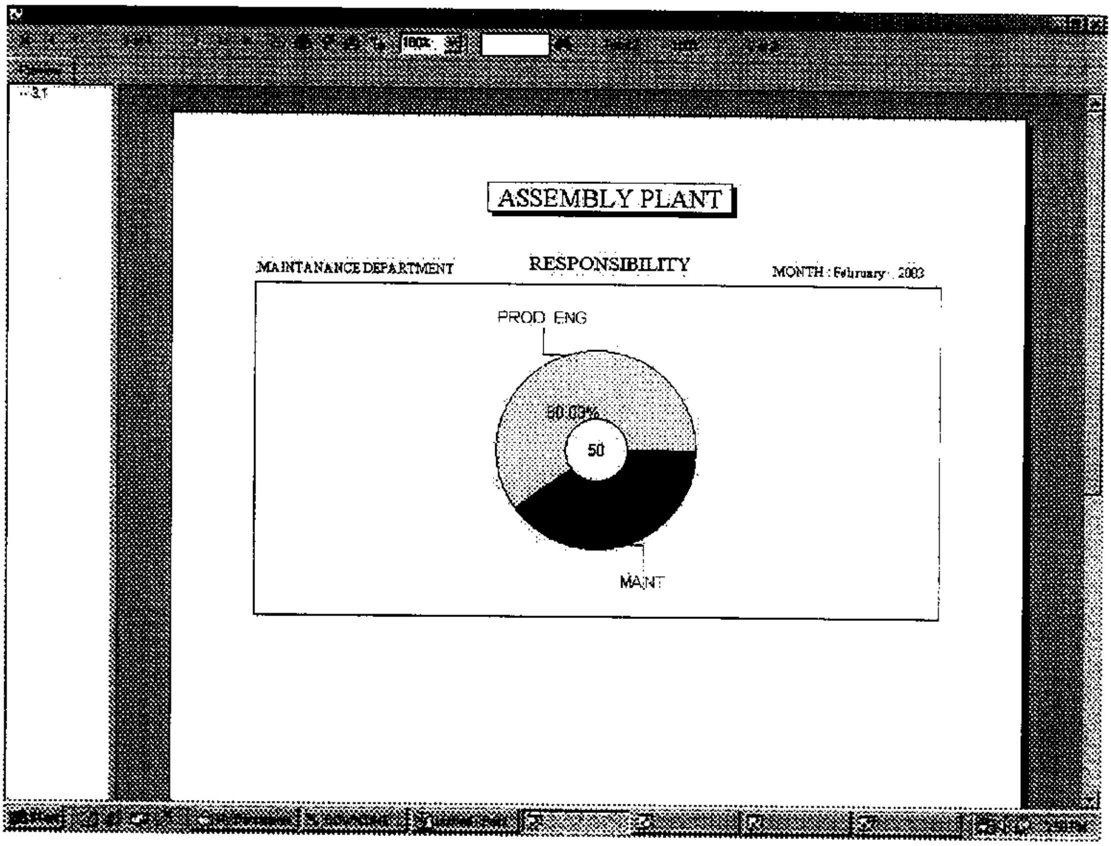
CLASS	MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MONTH AVG
[illegible]	PLAN	1.25	1.06	0.52	0.92	0.82	0.82	0.82	0.82	0.82	0.83	0.82	1.46	0.76
	ACT	0.62												0.05
[illegible]	PLAN	25	0.21	3.06	4.80	0.72	0.82	0.52	0.74	0.42	0.3	0.37	0.39	2.1
	ACT		0.44											0.04
[illegible]	PLAN	0.72	0.25	1.46	1.71	1.85	1.46	1.46	1.44	1.82	1.4	2.38	1.56	1.46
	ACT													0
[illegible]	PLAN	0.25	0.21	0.25	0.26	0.25	0.24	0.27	0.25	0.25	0.21	0.19	0.28	0.25
	ACT				1.00									0.08
TOTAL	PLAN	4.46	3.31	4.49	7.87	3.34	3.17	3.10	3.24	3.02	3.04	3.7	3.52	4.0
	ACT	0.62	0.44	0	1.00	0	0	0	0	0	0	0	0	0.17
AVERAGE	PLAN	1.35	0.83	1.12	1.96	1.1	0.79	0.77	0.81	0.76	0.76	0.74	0.88	1.0
	ACT	0.15	0.11	0	0.25	0	0	0	0	0	0	0	0	0.04

6.7. Down Time Target & Result:



CLASS	MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MONTH AVG
ENGINE	PLAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	ACT		[illegible]											[illegible]
[illegible]	PLAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	ACT													0
TOTAL	PLAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	ACT	0	[illegible]	0	0	0	0	0	0	0	0	0	0	[illegible]
AVERAGE	PLAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	ACT	0	[illegible]	0	0	0	0	0	0	0	0	0	0	[illegible]

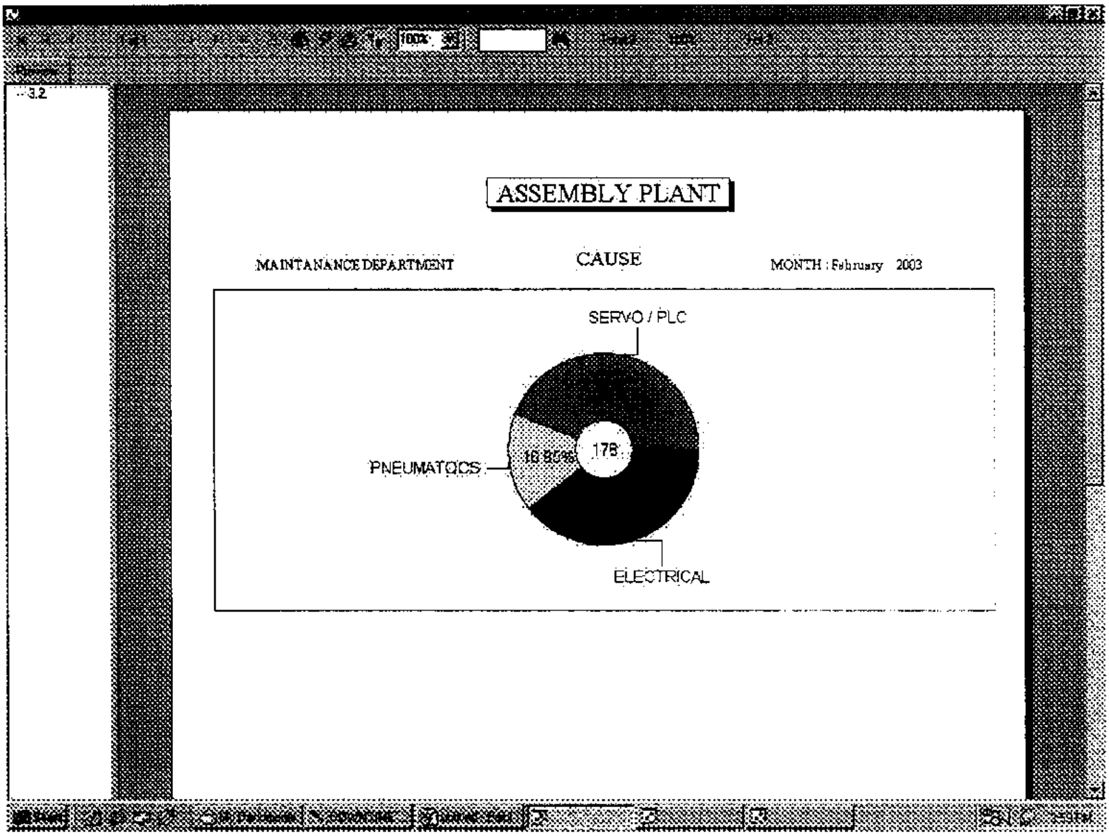
6.8. Assembly Plant:



ASSEMBLY PLANT

MAINTANANCE DEPARTMENT RESPONSIBILITY MONTH : February . 2003

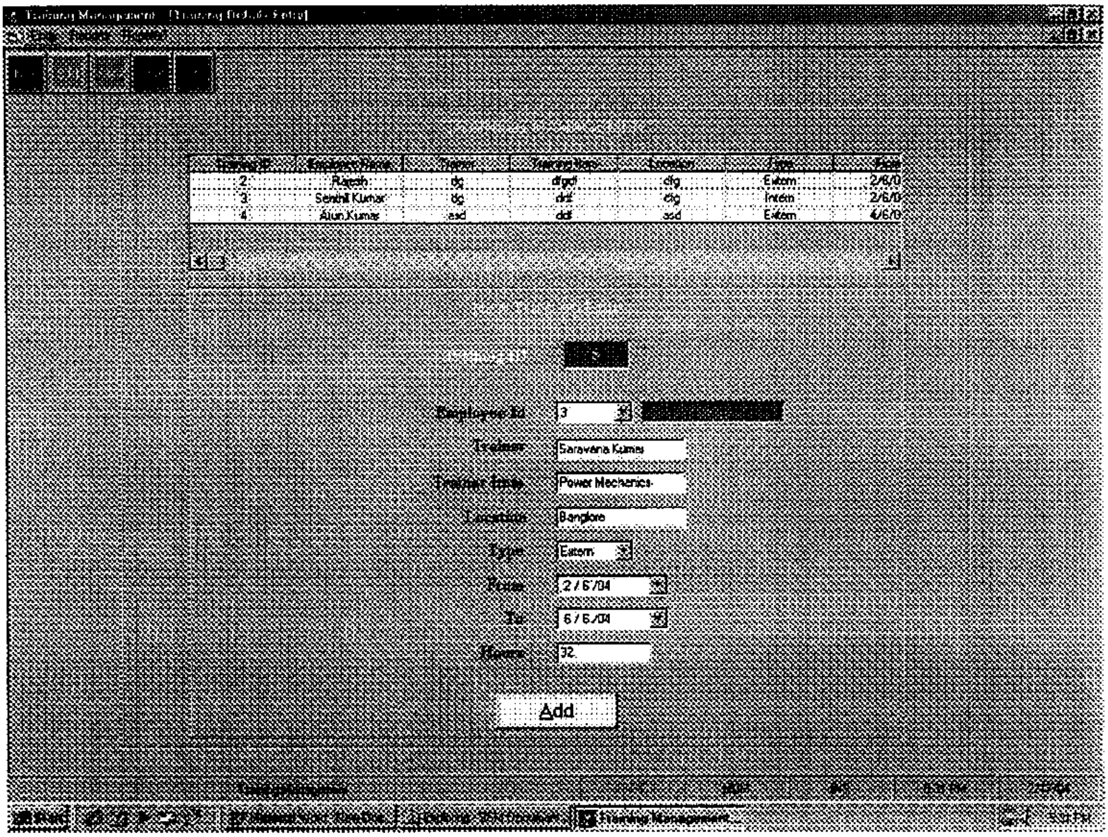
6.9. Assembly Plant - Cause:



ASSEMBLY PLANT

MAINTANANCE DEPARTMENT CAUSE MONTH : February 2003

6.10. Training:



Training ID	Employee Name	Trainer	Training Name	Location	Type	From
2	Rajesh	dg	dfgdf	dfg	Extern	2/6/0
3	Senthil Kumar	dg	drf	dfg	Intern	2/6/0
4	Arun Kumar	asd	ddf	asd	Extern	4/6/0

Employee Id: 3

Trainer: Saravana Kumar

Trainer Title: Power Mechanics-

Location: Banglore

Type: Extern

From: 2 / 6 /04

To: 6 / 6 /04

Hours: 32

TABLE STRUCTURE AND DESCRIPTION

7.0 Table Structure and Description:

Master Tables: -

Equipment Master

Name: dt_equipment

Name	Null	Type	Description
EQ_ID	NOT NULL	VARCHAR2(10)	Equipment ID
EQ_NAME		VARCHAR2(20)	Equipment Name
EQ_LINE _ID		VARCHAR2(3)	(Foreign key)Line ID
EQ_SHOP_ID		VARCHAR2(3)	(Foreign key)Shop ID

Shop Master

Name: dt_shop

Name	Null	Type	Description
SHOP_NAME		VARCHAR2(20)	Shop Name
SHOP_ID	NOT NULL	VARCHAR2(3)	Shop ID
SHOP_CATEGORY		VARCHAR2(1)	Shop Category whether 1 or 2

Line Master

Name: dt_line

Name	Null	Type	Description
LINE_ID	NOT NULL	VARCHAR2(3)	Line ID
LINE_NAME		VARCHAR2(20)	Line Name
LINE_SHOP_ID		VARCHAR2(3)	(Foreign key) Shop ID

Employee Master

Name: dt_employee

Name	Null	Type	Description
EMPL_ID	NOT NULL	VARCHAR2(10)	Employee ID
EMPL_NAME		VARCHAR2(30)	Employee Name
EMPL_SHOP_ID		VARCHAR2(3)	(Foreign key) Shop ID in which the Employee works
EMPL_DESG		VARCHAR2(30)	Designation of the Employee
EMPL_DOJ		DATE	Date of joining of the Employee

Response Master

Name: dt_response

Name	Null	Type	Description
RESP_ID	NOT NULL	VARCHAR2(3)	Responsibilities ID
RESP_NAME		VARCHAR2(30)	Responsibilities Name

Cause Master

Name: dt_cause

Name	Null	Type	Description
CAUSE_ID	NOT NULL	VARCHAR2(3)	Cause ID
CAUSE_NAME		VARCHAR2(20)	Cause Description
CAUSE_SHOP_ID		VARCHAR2(3)	(Foreign key) Shop ID to which the cause belongs to.

Plan Master

Name: dt_plan

Name	Null	Type	Description
PLAN_YEAR		VARCHAR2(4)	Year of the plan
PLAN_MONTH		VARCHAR2(2)	Month of the plan
PLAN_VALUE		VARCHAR2(10)	Plans value
PLAN_LINE_ID		VARCHAR2(10)	(Foreign key) Line ID to which the plan is given

Incharge Master

Name: dt_incharge

Name	Null	Type	Description
INCH_ID		VARCHAR2(10)	(Foreign key) Employee ID
INCH_EQP_ID		VARCHAR2(3)	(Foreign key) Equipment ID

Response Entry

Name: dt_ent_resp

Name	Null	Type	Description
ENT_ID		VARCHAR2(10)	(Foreign key) Entry ID
ENT_RSP_ID		VARCHAR2(3)	(Foreign key) Responsibility ID
ENT_RSP_VAL		NUMBER(6,4)	Responsibility value
ENT_RSP_SHOP_ID		VARCHAR2(3)	(Foreign key) Shop ID of the response

Transaction Entry Tables

Downtime Entry

Name: dt_entry

Name	Null	Type	Description
ENT_ID	NOT NULL	VARCHAR2(10)	Downtime entry ID
ENT_BD_FROM		DATE	Breakdown time from date
ENT_BD_TO		DATE	Breakdown time to date
ENT_BD_T1		VARCHAR2(10)	Breakdown time from
ENT_BD_T2		VARCHAR2(10)	Breakdown time to
ENT_BD		NUMBER(5)	Total Breakdowntime in minutes
ENT_DT		NUMBER(5)	Total Downtime in minutes
ENT_EQ_ID		VARCHAR2(10)	(Foreign key) Equipment ID for which the down time is entered
ENT_PHEN0		VARCHAR2(300)	Phenomena for the downtime
ENT_REASON		VARCHAR2(300)	Reason for the downtime
ENT_ACTION		VARCHAR2(300)	Action taken to rectify
ENT_CMEAS		VARCHR2(300)	Countermeasure for the Equipment
ENT_INC_ID		VARCHAR2(3)	(Foreign key) Incharge ID for the equipment
ENT_EDC		DATE	Expected date of completion for the countermeasure
ENT_STATS		VARCHAR2(20)	The current status of the entry

Cause Entry

Name:dt_ent_cause

Name	Null	Type	Description
ENT_ID		VARCHAR2(10)	(Foreign key) Entry ID
ENT_CAS_ID		VARCHAR2(3)	(Foreign key) Cause ID
ENT_CAS_VAL		NUMBER(6,4)	Cause value
ENT_CAS_SHOP_ID		VARCHAR2(3)	(Foreign key) Shop ID of the Cause

TESTING AND IMPLEMENTATION

8.0 System Testing And Implementation

8.1. Testing

Testing is an important phase in development in software development and application development in the world wide web. Testing will lead the error free application to the client.For this Automating Resources Time Scheduling there is a need of six types of testing.

They are

- Unit Testing
- Validation Testing
- Integration Testing
- Output Testing
- Acceptance Testing
- User Acceptance Testing

81.1. Unit Testing:

Unit testing comprises the set of tests performed by an individual programmer prior to the integration of the unit into the large system. A program unit is usually small enough that the programmer who developed the unit can test it. Then the unit is integrated into the large part of the system. Unit testing is always white-box oriented and the step can be conducted in parallel for modules.

8.1.2. Validation Testing:

Software testing and validation is achieved through a series of black box tests that demonstrate conformity with the requirement. A test plan outlines the classes to test to be conducted and a test procedure defines specific test cases that will be used to demonstrate conformity with the requirements.

Both, the planned the procedures are designed to ensure that all functional requirements are achieved, documentation is correct and other requirements are met. After each validation test case has been conducted, one of the two possible conditions exists.They are the function or performance characteristics conform to the specification and are accepted.

A deviation from specification is uncovered and a deficiency list is created.This project is validated under different test conditions. The requirements as per the specification are met.

8.1.3. Integration Testing:

Bottom-up integration is the traditional strategy to integrate the components of the software system into the functional unit. Bottom-up integration consists of unit testing of the entire system.

Modules are tested in isolation from one another in an artificial environment, known as a **"test hareness"**,which consist of the driver programs and data necessary to exercise the modules.

Moreover Integration testing addresses the issues associated with the dual problem of verification and program construction. After the appplication has been integrated a set of high-order tests were conducted.

8.1.4. Output Testing:

The outputs are thoroughly tested by giving sample data, for which results are known.The outputs from the system are matched with that of the known values and the results are found to be accurate.

8.1.5. Acceptance Testing:

Acceptance testing involves planning and execution of functional tests,performance tests, and stress tests in order to demonstrate that the implemented system satisfies its requirtements.

In addition to the functional performance tests, stress tests are performed to determine the limitations of the system. Tools of special importance during acceptance testing include a test coversge analyzer, a timing analyzer and a coding standard checker.Testing is the process of executing test cases with the intension of exposing the errors.

8.2 System Implementation:

Implementation is the stage where the thoeratical design is converted into working system. It consist of

- Testing and Debugging
- Error Correction
- Training the user
- Change over

Implementation includes equipments installation and user training. For the system to begin operation, a sufficient number of users have been trained to the system. Several hours were sheduled for a number of users so that they were able to fully understand the new system and had an opportunity to familarize themselves with the various input screens and the generation of output.

The change over is another important aspect of the implementation process and had to be handled carefully.

The existing system is changed to the new system and the system is found to meet its objectives. Data from the previous system, static contend, is ported to the new system and the result produced are compared with that of the previous system. The new system is found to satisfy the user needs.

It allows the result to the new system to be compared with the old system before acceptance by the user, there by promoting the user confidence.

CONCLUSION

Conclusion

I thank the almighty, parents, friends for their support and advices for helping us to cross over one of the milestones in our life. I also thank Hyundai Motor India Ltd., for providing us this wonderfull oppurtunity to be a part of their organisation for the past 2 months.

I thank Mr.N.Kumar Senior manager Maintainance Dept, for his extended support and help during some problems that we faced in attaining this milestone. I also thank all my Colleagues of Hyundai Motor India Ltd., without whom this project wouldn't have been completed in the prescribed time.I thank Mr.C.S.Lakshmi Narayanan, Senior Manager U&S Dept., Hyundai Motor India Ltd.,.

I thank Mr.Ramesh Babu & Mr.Ramakrishnan, Project guides who took efforts in clearing all my initial doubts that I faced during the project. I also thank Mr.S.Baskaran and Mr.Ganeshbabu for giving guidance throughout my project.

REFERENCES

References

- Software Engineering – A Practitioner's Approach -**Roger.S.Pressman**
- www.vbcodes.com
- www.oracle4u.com
- Teach yourself Visual Basic6.0 in 21 Days-**Sam Series**
- Beginning Visual Basic 6.0