Sales and Service System

PROJECT REPORT

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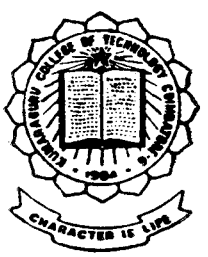
By

J. SENTHIL KUMAR

Reg. No. 9438MO205



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Kumaraguru College of Technology

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CERTIFICATE

This is to certify that this project work entitled.

"SALES & SERVICE "

submitted to Kumaraguru Collage of Technology Coimbatore (affiliated to Bharathiar University) in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications is record of original work done by ***Mr.J.SENTHIL KUMAR Reg No. 9438MO205*** *during his period of study in the department of Computer Science and Engineering, Kumaraguru Collage of Technology, Coimbatore under my supervision and guidance and this project work has not formed the basis for the award of any Degree/Diploma/Associateship/Fellowship or similar title to any candidate of any University.*

Professor and Head

Staff in - charge

submitted for University Examination held on /06/199

Internal Examiner 3/6/97

External Examiner 3/6/97

LAKSHMI MACHINE WORKS LIMITED

LMW

CERTIFICATE

This is to certify that **Mr. Senthil Kumar. J.** Of Kumaraguru College of Technology has done the project titled **SALES AND SERVICE SYSTEM** in our company from December 96 to May 97 in partial fulfillment of the requirements for the degree of Master Of Computer Applications.

Date : 14 - 05 - 1997

For LAKSHMI MACHINE WORKS LIMITED,

(R. PALANISWAMY)
SR. MANAGER OFFICE MANAGEMENT

DECLARATION

I hereby declare that this project work entitled

"SALES AND SERVICE"

submitted to Kumaraguru College of Technology, Coimbatore (affiliated to Bharathiar University) is a record of original work done by me under the supervision and guidance of ***Mrs.Sumathi*** *B.E ,Department of Computer Science and engg, Kumaraguru College of Technology, Coimbatore and that this project work has not formed the basis for the award of any Degree/Diploma/Associateship/ Fellowship/ or similar title to any candidate of any university.*

Signature of the candidate

Place :Coimabtore
Date : 03.06.1997

(Mr.J.SENTHILKUMAR)

Countersigned by

Staff in-charge

Prof.P.SHANMUGAM
M.Sc.(Engg),M.S.(Hawaii),SMIEEE,MISTE.,
Head of the Department,
Department of Computer Science & Engg.
Kumaraguru College of Technology,
Coimbatore.

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SYNOPSIS

Computer Numerical Control machines, popularly known as CNC machines is to many things to many people. The first part of the project deals with the machine details of the CNC machines which are manufactured at LMW.

Sales & service are the important areas of any business concern. The activities of the sales department are maintaining the quatation details of each machine and their spares, studying the scope of supply, acceptance of order, raising of Proforma Invoice and Invoice.

After the machine is despatched, the customer may find fault with the machine. The service department takes care of these machines. There are two types of service available. One is Free replacement and the other is Service Complaint Record.

This project has been developed keeping in mind for requirements of the company Lakshmi Machine Works, Coimbatore.

This project carries out its operation in machine details, sales and service.

This software is a menu driven consisting of machine details, spares details, operations in sales department operations in service department and the reply of customer service department to sales department reports and exit options which is easy for the users to select and operate.

This software has been developed in CA-open Ingres and Embedded 'C'

INTRODUCTION

1.1 ORGANISATION PROFILE.

LMW today is many things to many people a Multiproduct Company, LMW represents the actualization of a dream shares by the founding fathers of the group. A dream inspired no doubt by their pre-occupation with cotton as a cash crop. And the basis of an Industry that literally clothes the word.

LMW Manufactures the entire range of Cotton Spinning Machinery, meeting the demands of mills in India and around the world. Infact, LMW meets 60% of the demand generated in India alone.

Cavalier Dr.G.K.Devarajulu was a legend in his own lifetime. Entrepreneur, Industrialist, Visionary, Diplomat and Philanthropist, GKD as he was affectionately called, was a colossus who strode a period of history when Indian industry was at a fledgling stage and lived to see it firmly entrenched on the industrial map of the world.

In fact it is widely believed that the emergence of Coimbatore as an industrial city is largely on account of his efforts. LMW, is his legacy for all of us, even as our lives continue to be touched by it's far reaching influence - every day.

An agreement of collaboration between LMW and Rieter Machine Works Ltd. signed at Winterthur, Switzerland on 27th April 1962, set in motion Cavalier Dr.G.K.Devarajulu's plans to make India truly self - reliant in textile machinery.

FOUNDRY

A modern, mechanised foundry designed and executed jointly by **FRIED KRUPP** and Rieter Machine Works, provided a basic requirement - castings to international quality standards.

LTE

LMW set up Lakshmi Textile Exporters Limited (L T E) to offer consultancy/project engineering service to execute turn key project and expand global trading activities.

LRT

With the collaboration of M/s. Walter Bracker of Switzerland, Lakshmi Ring Travelers (Coimbatore) was set up at Hosur, to cater to the demand of spinning mills for quality and high speed ring travelers.

EXPORTS

In 1977 LMW introduced the world to Initial excellence in engineering. The year ended with exports totalling Rs.2.3 crores.

The figure today continues to spiral, thanks to export revenues from Indonesia, Thailand, Tanzannia, Kenya, Sudan, Egypt and Sri Lanka.

It was the proudest moment yet-when LMW dispatched a machine to be installed in Switzerland, home of its collaborator Rieter Machine Works Ltd.

LPT

LMW absorbed a dedicated tool making unit at Madras and shifted it to Arasur, a suburb of Coimbatore. Lakshmi Precision Tools Lts., supports the manufacturing programme with quality tools and fixtures. Tool Holders are manufactured in collaboration with SANDVIKAB of Sweden.

UNIT II

LMW's second manufacturing complex commenced operations at Kaniyur near Coimbatore.

The modern plant boasts the latest machines and a high degree of automation.

LECS

Electrical controls are critical components in a textile machine. LMW collaborated with Sprecher + Schuh of Swtizerland to manufacture compact, precision controls at a dedicated facility.

MTD

LMW's Machine Tool Division is a showcase for state-of-the-art manufacturing facilities in India.

The first major diversification, the Machine Tool Division, was set up in collaboration with world leaders Mori Seiki Company Ltd, of Japan to usher in CNC Machine Tools.

ADMINISTRATIVE OFFICE

The administrative office was established at Perianaickenpalayam. This two storeyed edifice functions as the nerve centre of the Group. The factory complex at Unit I, where it all started, is complemented by the modern architecture of the administrative office. Surrounded by manicured lawns, the building set over an area of 10,000sq.ft.houses the offices of the Managing Director, Executive Director and Commercial, Administration and Information Departments.

CNC SYSTEMS

Advanced CNC Control Systems are manufactured in collaboration with NUOVA - OSAI, an affilate of Allen Bradley, USA, at a dedicated facility at LECS, marking a significant entry into the sphere of electronics.

NEW FOUNDRY

A most modern, computerised foundry - with a capacity of 12,000 tonnes per annum, meets domestic and international needs for machine tool, automobile and other engineering industries.

TRAINING CENTRE

Opened in 1993 the R & D cum Training Centre provides a solid foundation for LMW customers.

1.2 SALES AND SERVICE

Sales and Service are the important stages of the business concern. If the sales increases, the productivity increases and and the profit margin touches the desired amount.

Customer satisfaction is the most important one because, if the customer is satisfied with the machine he bought from the company he will approach the company

once again for more business. The service department is specially meant for increasing customer satisfaction.

The operations done in the sales department of the company are:

Maintenance of Machine details

Maintenance of Customer details

Maintenance of Quotation details

Studying the Scope of Supply

Accepting the Order

Raising Proforma Invoice

Raising Invoice

Maintenance of Dispatch details.

Currently Machine Tool Division of LMW manufactures seven types of CNC machines .If the Machine Code or Product Code and the Bed Number is given, the details about the machine arrives. The Customer Code and the customer details are maintained seperately. A link is formed between Customer Code and Machine Code.

The machine rate and their spare details along with their rates are maintained in a form called Quotation.

The details about the Accessories, Tool holders, CNC System details, Special features required, Customers supplied product and the try out requirement comes under scope of supply.

Based on the scope of supply the acceptance of order takes place. The customer details, despatch detail,delivery schedule,particulars and the total rate are maintained here.

Based on the total particulars and the total rate with taxes Proforma Invoice is prepared.One the Proforma Invoice is prepared by calculating the total cost and verifying with the balance amount if any to be paid.If the balance amount is present that amount will be added with the current invoice.

Two types of service are done in service department,they are:

Free Replacement (FR)

Service Complaint Record(SCR)

If any spare is damaged automatically that spare is replaced freely.This type is called Free Replacement type service.

If any spare is damaged by the customer or any problem occured in the operation of the machine,service complaint is raised.This type is called Service Complaint Record type service.

1.3 NEED FOR COMPUTERSISATION.

The benifits of computerisation over the manual system is manyfolds.The benefits can be stated as below:

* SPEED - Computers enable us to do arithmetical calculations with fantastic speed and ease.It is possible to do things which so far no one could think of attempting, in a manual system.Takes involving large voluminous data processing are thus done with much accuracy and speed by the computers than by the manual system.

* ACCURACY - One of the greatest benefits which computers can give us is that of accuract.Practical experience has already shown that these machines are capable of achieving the degree of accuracy which hitherto has been unattainable in certain accounting processes into which the human brain enters at so many stages of the complete cycle of operations.

*FLEXIBILITY - flexibility in use is another important advantage of Computers. Output can be obtained almost in whatever form it is suitable.

*MISCELLANEOUS - These include economies resulting from better managerial control, saving in labour because it is fully automatic.

In the Sales and Service system, the computerisation speedens up the entry of the transactions into the respective files.Moreover,all the operations are done upto date.This ensures that important reports can be generated at any moment of time,thereby helping the management to make quick decisions.overall,the computerisation of the manual system results in better maintenance and increase the profitability of the system using it.

1.4 HARDWARE ENVIRONMENT

CONFIGURATION OF THE MACHINE USED IN THE PROJECT.

Hardware	:	Intel Pentium Processor
CPU Memory	:	64 MB RAM
Cache Memory	:	1 MB
Clock Speed	:	100 MHz
Operating System	:	SLO Open Server Release 3.2 - Version 5.00
Disk Drives	:	1 x 2 GB 1 x 1 GB - 4 GB Hard Disk
Floppy Disk Drives	:	1 x 1.2 MB Floppy Disk
Drive Capacity(Cartridge)	:	1 x Double Speed CD Drive 1x150 MB CT Drive
Printer	:	600 LPM Lipi
Terminal Connected	:	30
Ports	:	Network (Ethernet Card)

1.5 SOFTWARE ENVIRONMENT

What is a database ?

* a collection of related information

* a common bank of data

What is a Database Management System ?

* a software system for managing information resources

* a way of organizing data that models information in the real world

* 4 function of DBMS

  - accept data and instructions from users

  - update the database

  - retrieve information from the database

  - format and output data to users

SOME OF THE PLUS POINTS OF DATABASES :

Database redundancy :

This is the problem of storing duplicate data within a DBMS. This comes about due to bad systems design. Careful thought should be given to the design of the central database so as to avoid the storage of duplicate data.

Sharing of data :

A multi user database must allow multiple users to access the database at the same time.

The DBMS must include concurrence control to ensure that when several users are attempting to update data in a central database it is done in a controllers manner and that the updates do not bring about chaos in the data held in the database. For example, in a flight ticketing DBMS, no one who uses the system, must be allowed to sell the same seat on the aircraft to more than one person.

Restricting Unauthorized access :

The DBMS should be able to automatically enforce a security and authorization sub-system which has been designed by the DBA and coded by the programmers.

Providing Multiple Interface :

Since there are many types of users of DBMS the DBMS must have several types of interfaces to provide access to the data held within the database. These will include query languages for the casual user, programming languages for the application programmers, menu driven interfaces for the naive users and natural languages interfaces.

Complex relationships among Data :

A database may have a wide variety of data held in it. This data an also be related to data held in other database files. Hence a DBMS must have the capability to represent a variety of complex relationships among files as well as retrieve and update data in such files based on these complies inter file relationships.

Data Integrity in the Database :

All DBMS have to enforce some level of data integrity on the data being saved in the database. The most rudimentary level of data integrity enforcement is at the time the database structure is being defined.

All DBMS gives the user the facility to define what data type each cell can hold. Hence in accordance with this information the DBMS will not allow a user to insert an alphanumeric value in a cell marked for holding numeric data type or a data data type.

There are more complex types of data integrity checks. One common types that occurs frequently is that entered and saved in one database is to be checked against data held in another database.

Backing up and recovery of Data :

In case of either a soft ware or hardware failure at the time that a complex update of data was taking place in the database, the DBMS must have an in-built backup and recovery system that makes sure that there is no question about the integrity of the data held in the database.

This automatic recovery sub-system must bring the database back to its original state before the complex update was being executed or restart the program executing from exactly the same point where it stopped so that the entire update, commenced before the failure, is felt in the database.

INGRES is actually an acronym, standing for Interactive Graphics and Retrieval system.

It is an RDBMS that allows any number of users to access any number of relational databases using the SQL "Structured Query Language " or QUEL "Query Languages"embidded in INGRES.

The INGRES prototype was built at the University of Berkeley. The University INGRES prototype, was converted to INGRES, the commercial product by a company called Relational Technology Incorporated.

Relational Technology Incorporated was actually formed, to refine the University prototype into a commercial product, and the founders of R.T.I. included some of the original designers and the developers of the prototype. R.T.I was founded in 1980, and Ingres was first developed for the DEC VAX, VMS platform.

AN INGRES DATABASE :

An Ingres database is a collection of tables and objects that you can use with the tables. In Ingres you work with one database at a time. Whatever you need, to perform a task, on the data within the database is stores together in the database.

You can have one or any tables stored within a database, normally the tables in the database are related. The various objects that are used with the data held within a database are view definitions, reports, forms, indexes, QBF objects, graphs etc.

A view definitions is user defined choice of seeing data held within a table. A table may store data quite differently from the the way in which a user may want to see it, a view definition therefore is an Ingres tool which enables users to define the manner in which they wish to see the data stored in the table.

Views are database objects, especially helpful when the DBA wants to restrict the data that the user of an Ingres table can actually see. Views can also be used for selecting the data that can had in a report.

A report is a database object that displays the data from a table or a view in a user defined format. You can produce an Ingres report on the monitor or in file or on a printer.

A form is the Ingre's method of giving the user of the system a familiar media to use ie. a paper form. Some forms are created automatically others are user defined to fit the columns of an Ingres table.

Although you may be able to set up your own databases, most of these are set up your own database, most of these are set up by the DataBase Administrator, is responsible of the DBA to determine what is stored in the database, how this data is organized, and who in the company is allowed to see which blocks of data, also who in the company is allowed to update which blocks of data.

THE BASIC ARCHITECTURE IF INGRES :

Ingres is divided into the following sections :

The user interface

The terminal monitor

Ingres toolset

Customized Application programs.

Query language

4GL and SQL

The Data Manager

The INGRES database

Ingres Data Manager

The data manager accepts query language instructions and performs the specified operation on the data within the database. All the basic tasks such as data updates, retrievals etc are performed directly by the data manager. The user NEVER communicates directly with the data manager but must give instructions to the Ingres data manager via one of the Ingres tools.

The query language :

It is the medium of instruction that the user has to adopt, to communicate with the Ingres Data Manager so as to be able to manipulate data held in an Ingres database table. All communications with the DBA is via the Ingres query language called SQL. This language is the IBM, ANSI standard SQL. The user talks to the Ingres DBA via an Ingres tool called the terminal monitor.

The user interface :

A user interface is a set of programs via which individuals can manipulate, at will, the data held within an Ingres table. The interface accepts instructions from users, con verts these instructions to SQL statements and forwards them to the DM. After the operations required by the SQL statements are performed on the table the user interface displays the results to the end user.

The concept of DISTRIBUTED databases :

The greatest advantage that Ingres has over other RDBMS is that Ingres allows a system to be distributed across a network.

Distributed Access :

This means that users at any site can obtain access to data from an Ingres tables as if it were on their own computers.

Distributed Storage :

Data stored at different networks sites can be shared rather then duplicated at each site.

Distributed processing :

Data from any site can be processed anywhere in the network and stored any site required.

Interoperability :

Ingres provides a consistent interface to the user. If you have an application that operates on one machine, it will operates on one machine, it will operate in the same way on when transferred, without modification, to another machine.

The products available in Ingres to facilitate this are INGRES/NET, INGRES Gateways and INGRES/STAR to create a true distributed database environment.

Ingres net :

Runs on top of network software to connect any number of sites using Ingres Database,including mainframes, minis and micros work station and personal computers.

An Ingres user interface at one site can communicate with the data manager at another site. This means that users anywhere in the world using different computers can all share the same database and the data held in its tables.

Ingres Gateways :

This Ingres product enables access of data that is not stored in an Ingres database. Using Ingres gateway you can access non-Ingres data as if it were stored in an Ingres Database.

Ingres Star :

Allows the user to access several databases at the same time by creating a distributed database. This product enables the user to combine data held in different databases stored at different sites, in single database. Thus data is always available to those who require it, and data duplication is avoided.

With these products you can access a single Ingres database at a remote site, A number of Ingres database at a local & remote site. By using Ingres Gateway & Ingres Star you can access non-Ingres databases from local and remote sited simultaneously as though they were Ingers databases.

2. SYSTEM ANALYSIS

The system is titled as Sales and Service System. This system deals with the transactions related with marketing arena.

The main purpose of the system "Sales and Service" is to computerise all the works done in two major departments of the company.

To develop the system,we should study the following points:

CNC Machines

Machine details

Sales

Service

2.1 CNC MACHINES Conventional Numerical Control:

Definition:

Numerical control can be defined as a programmable automation in which the process is controlled by numbers,letters and symbols.The numbers from a program of instructions designed for a particular job.

Basic Components of an Numerical Control System:

1. Program of Instructions
2. Controller unit or machine control unit (MCU)
3. Machine tool or other controlled process.

The program of Instructions serves as an input to the controller unit, which in turn commands the machine tool or other process to be controlled.The relationship between the three components is illustrated in the following figures.

(1) Program of Instruction :

The program of Instruction is the step-by-step set of directions which instruct the machine tool process the job. It is coded in numerical or symbolic form on the input devices (eg.punched cards) that can be interpreted by the controller unit.

There are two methods of Input to the Numerical Control system. They are,

(1) Manual data Input (MDI)

(2) Direct numeric Control (DNC)

The first method is by manual entry of instructional data to the controller unit which is used only for simple jobs.

The second method of Input is by direct link with the computer.

The program of instructions is prepared by part programmers. The programmer's job is to provide a set of detailed instructions by which the sequence of processing steps is to be performed.

(2) Controller Unit:

This consists of the electronics and hardware that read and Interpret the program of instruction and convert it into mechanical actions of the machine tool. The controller unit consists of a (1) tape reader, (2) a data buffer (3) signal output

channels to the machine tool (4) feedback channel from the machine tool and the (5) sequence of controls to co-ordinate the overall operation of the elements.Modern Numerical Control systems include a micro computer as the controller unit. This type of Numerical Control is called Computer Numerical Control.(CNC)

(1) Tape reader :

The tape reader is an electromechanical device for winding and reading the punched tape containing the program of instructions.

(2) Data buffer :

The data container in the tape are read into the data buffer. The purpose of this device is to store the input instructions in logical blocks of information. block of information represents one complete step in the sequence of processing elements.

(3) Signal Output channels :

Through these channels, the instructions are sent to the Machine tool from the controller unit.

(4) Feed back channels :

The feedback data are sent back to the controller in order to make certain that the instructions have been properly executed by the machine.

(5) Sequence controls :

The sequence controls co-ordinate the activities of the other elements of the controller unit. The tape reader is actuated to read data into the from the tape and signals are not to and from the machine tool.

Control panel :

The control panel or control console contains the dials and switches by which the machine operator runs the Numerical Control systems.

(3) Machine tool or other Controlled process :

The machine tool for performing machining operations contains a worktable and spindle and motors and controls tools. and auxiliary equipment, needed in the machining operation.

Machining Centre :

This is a multifunction machine which incorporated several features into a single automated productions equipment.

Features of Machining Centres :

(1) The machine centre is capable of performing various operations seen as drilling, tapping, milling and boring.

(2) It has the capacity to change tools automatically by the use of a command. A variety of machining operations means that a variety of cutting tools are required. The tools are kept in a tool drum. When the tape calls a particular tool, the drive rotates to position the tool and places it into the spindle chuck.

(3) The third capability of the Numerical Control machining centre is (product) workpiece positioning. The machine table can orient the jobs so that it can be machined on several surfaces.

(4) The fourth feature is the presence of two tables or pallets on which, the workpiece can be fixed. While the machining sequence is being performed on one workpart, the operator can be unloading the previously completed piece, and loading the next one. This improves the machine tool utilization because the machine does not have to be idle during loading and unloading of the work parts.

The Numeric Control procedures :

The following steps should be accomplished in order to utilize the Numerical Control in manufacturing.

(1) Process Planning :

The engineering drawing of the workpart (product) must be interpreted in terms of the manufacturing process to be used. This steps is reffered as process planning and it is concerned with the preparation of a route sheet. The route sheet is a listing of the sequence of operation which must be performed on the workpart (product). It is called a route sheet because it also lists the machines through which the part must be routed in order to accomplish the sequence of operations.

(2) Part programming :

There are two ways (methods) to programm for NC. They are,

(1) Manual part programming.

(2) Computer-assisted part programing.

In manual part programming , the machining instructions are prepared on a form called a part program manuscript. The manuscript is a listing of the positions of the part. The computer - assisted part programming os appropriate for complex jobs with many machining steps.

(3) Tape preparation :

A punched tape is prepared from the part programmer's NC process plan. In manual part programming , the punched tape is prepared from the part program manuscript on a device equipped with tape punching capability.

(4) Tape Verification :

The method of checking the accuracy of the tape after the punched tape has been prepared is called Tape Verification. The tape is checked by running it through a computer program which plots the various tool movements on paper.

(5) Production :

This involves ordering the raw workparts (product), specifying and preparing the tools and setting the NC machine tool for the job. The machine tool operator's function during production is to load the raw workpart (product) in the machine and establish the starting position of the tool relative to the workpiece.

Advantages and Disadvantages of NC.

Advantages :

(1) Reduced non productive time :

The NC has no effect on the basic metal cutting process. The NC can increase the proportion of time the machine is engaged in the actual process. It accomplishes this by means of reduced product handling time, automatic tool changes on some machines.

(2) Reduced fixturing :

NC requires fixtured which are less costly and simpler to fabricate because the positioning is done by the NC tape rather than manual process.

(3) Reduced manufacturing lead time :

Since the jobs can be done quickly with NC, the lead time to deliver a job to the customer is reduced.

(4) Greater manufacturing flexibility :

With NC, it is less difficult to adapt to engineering design changes, alterations of the production shedule.

(5) Improved Quality Control :

NC is ideal for complicated products where the chances of human mistakes are more. NC produces parts with greater accuracy, and lower inspection requirements.

(6) Reduced Inventory :

Since we have shorter lead times with NC, the amount of Inventory by the company is reduced.

(7) Reduced floor space requirements :

Since one NC machine centre can accomplish the production of several conventional machines, the amount of floor space required in an NC shop is less than in conventional shop.

Disadvantages of NC :

(1) Higher Investment Cost :

The Numerical Control machine tools represent a complex technology and this costs more than ordinary control machines. The higher cost requires the manufacturing management's to use these machines more.

(2) Higher maintenance Cost :

Since the NC machines are a complex technology the maintenance cost of these machines are more.

NC part programming :

Introduction :

The NC part programming is the procedure by which the sequency of processing steps to be performed on the NC machine is planned and documented. These involves the preparation of an Input medium such as punched tape used to transmit the processing instructions to the machine tool.

The Punched Tape in NC :

The part program is converted into a sequence of machine tool actions by means of the Input medium, which contains the program, and the controller unit, which interprets the Input medium. Coding of the punched tape is concerned with the basic symbols used to communicate a complex set of instructions to the NC machine tool.

There are two methods of preparing the punched tape. The first method uses manual part programming and involves the use of a device similar to a type writer. This produces a typed copy of the program and also the punched tape. The second

method is used with computer assisted part programming. In this method, the tape is prepared directly by the computer using a device called a tape punch.

Working of the punched tape :

During the production of on a conventional NC machine, the tape is fed through the tape reader once for each workplace. It is advanced through the tape reader one instruction at a time while the machine tool is performing one instruction, the next instruction is read into the controller unit's data buffer. After the last instruction has been read into the controller, the tape is rewound back to the start of the program to be ready for the next workpiece.

Tape Coding and Format :

There are three concept which explains Tape coding and Format. They are,

(1) NC tape coding.

(2) Instruction forming.

(3) NC words.

(1) NC tape coding :

There are eight column of holes running in the lengthwise direction of the tape.

There is also a ninth column of holes between the third and fourth regular columns. The ninth hole is used as sprocket holes for punching the tape. The following figure explains the punched tape.

The coding of the tape is provided by either the presence or absence of a hole in a various positions of the tape. This coding system is called as binary code system because there are two possible conditions (i.e..), either the presence or absence of a hole.

(2) Instruction forming :

The binary digit is called a bit and it has the value 0 or 1 depending on the presence of a hole in the certain row and column position on the tape.

A character is a combination of bits, which is a collection of characters used to form a part of an instruction. The collected of words is called the block. A block of words s a NC instruction, For eg. In a drilling operation, a block may contain information on the x and y coordinates of the hole location, the speed at which the cutting of the product should take place and also the specification of the cutting tool.

NC words :

The NC words is the collection of characters used to form part of an instruction.

The collection of words is called as block. The following is a list of different types of words in the formation of a block. The words in the block are given in the following sequence and they differ between machines.

(1) Sequence Number : Used to identify the block.

(2) Preparatory word : used to prepare the controller for the instructions that are to follow. The preparatory word is needed so that the controller can interpret the data that follow it in the block. eg. The word go2 is used to prepare the NC controller unit for circular interpolation along an arc in the clockwise direction.

(3) Co - ordinates : used to give the co-ordinates positions of the tools.

(4) Feed rate : This specifies the punching speed in the machine operation.

(5) Cutting speed : Specifies the cutting speed of the process.

(6) Tool Selection : Specifies which tool is to be used in the operation. For eg. to5 denotes a 1/2 inch drill bit.

(7) Miscellaneous Function : used to specify certain miscellaneous or auxiliar functions which is available on the machine tool. eg:mo3 to start the spindle rotation.

Manual Part programming :

The part programmer writes the machining operations on a special form called a part programming manuscript inorder to prepare a part program. The fig below depicts a part programming manuscript.

In the above figure, the first line shows x and y co-ordinates at zeropoint. The machine operator would insert the tape and read the first block into the system. A block of instruction corresponds to one line on the manuscript form. The next line on the manuscript is RWS (Rewind Stop). The symbol stops the tape after it has been rewounded.

The third column gives the feed rate (i.e.) the punching rate into the machine. The fourth column gives the speed at which the machine operation is done in rpm. The fifth column gives the miscellaneaous functions. M13 denotes the turn on the drill change and m30 cause the tape to be rewound at the end of the machining cycle.

NC programming languages :

An NC part programming languages consists of a software package and special rules, conventions for using that software. Its purpose is to make it conventions for a part programmer to communicate the necessary part geometry and the tool motion information to the computer so that the desired part program can be prepared. Most of the languages were developed to meet particular needs. Some of the NC programming languages are as follows.

(1) APT (Automatic programmed tools.) :

This language was first introduced for contouring, but modern versions of APT can be used for positioning and continuous path programming upto 5 axes versions of APT for particular processes include APTURN (For turining Operations).APTMIL (For milling Operations) and APTPIONT (For point to point operations.)

(2) ADAPT - (Adaptation of APT) :

This is intended to provide many featured of APT, but to utilize a smaller computer. The ADAPT is not as powerful as APT, but it can be used to program for both positioning and contouring jobs.

(3) EXAPT - (Extended subset of APT) -

The important feature of EXAPT is that it attempts to compute optimum feeds and speeds automatically. There are three versions in EXAPT,EXAPT - I - designed for positioning, EXAPT - II Which is designed for turning and EXAPT - III which is designed for contouring Operations.

UNIAPT - (United APT) :

The UNIAPT package represents another attempts to adapt the APT language to use on smaller Computers.

(5) SPLIT - (Sundstrand Processing Languages Internally Translated.)

One of the feature of SPLIT is that the post processor is built into the program. Each machine tool uses its own SPLIT package, thus not needing a special post processor.

It can handle upto five axis positioning and possesses contouring capability.

(6) PROMPT :

This is designed for use with a variety of machines tools such as machining centres, punch presses, etc.

(7) CINTURN II :

This facilities programming of turning operations.

The APT language :

APT is a computer program that performs the calculations to generate cutter positions based on the APT statements. There are 4 types of statements in the APT languages.

They are,

(1) Geometry statements :

This defines the geometric elements that comprises the workpart. They are also called as definition statements.

(2) Motion statements :

This is used to describe the path taken by the cutting tool.

(3) Post processor statements :

This apply to the specific machine tool and control system. They are used to specify the speeds and to actuate other features of the machine.

(4) Auxiliary statements :

These are miscellaneous statements used to identify the part, tool, tolerance and so on.

(1) Geometry Statements:

The geometry of the product in APT. The tool is directed to move to the various locations and along the surfaces of the product which have been defined by these geometry statements.

P1 = POINT/ 5.0, 4.0, 0.0.

The above statement is made of three sections.

(1) The first is the symbol used to identify the geometric element. A symbol can be any combination of six or fewer alphabetic and numeric characters. Atleast one of the six must be an alphabetic character.

(2) The second section of the geometric statements is an APT vocabulary word that identifies the type of geometric element. POINT is a APT vocabulary word in the eg.LINE,PLANE and CIRCLE are other APT vocabulary words.

(3) The third section of the geometry statement comprises the descriptive data that define the element precisely and completely. These data may include quantitative

dimensional and positional data, previously defined geometry elements and other APT words.

The punctuation's used in the above eg.is that the statements is written as an equation, the symbol being equated to the geometry type. A slash separates the geometry types from the descriptive data. Commas are used to separate the words and numbers in the descriptive data.

egs : L3 = LINE/ P3,P4

The two points P3 and P4 are the two points through which the line passes.

A circle can be specified by its centre and its radius.

C1 = CIRCLE/CENTRE P1, RADIUS, 5.0

Rules for formulating an APT geometry statements :

There are four rules that must be followed in formulating an APT geometry statement. They are,

(1) The co-ordinate data must be specified in the order x,y,z for eg., the statement. P1 = POINT / 5.0, 4.0, 0.0 is interpreted by the APT program to denote X = 5.0, Y =4.0 and Z = 0.0.

(2) The symbols used as descriptive data must be previouly defined. For eg. P2 = POINT / L1, L2 In the eg, the two lines L1 and L2 must have been previously defined

(3) A symbol can be used to define only one geometry element . The same symbol cannot be used to define two different elements. For eg. the following statements are incorrect.

P1 = POINT / 1.0, 1.0, 1.0

P1 = POINT / 2.0, 3.0, 4.0.

(4) Only one symbol can be used to define any given element . For eg, the following two statements in the same program will be incorrect.

P1 = POINT / 1.0, 1.0,1.0

P2 = POINT / 1.0, 1.0, 1.0

Motion Statements :

The APT motion statements have a general format, given by motion command / descriptive data.

For eg : GOTO / PI

The Statement consists of two sections separated by a slash.

1. The first section is the motion command, which tells the tool what to do.

2. The second section is comprised of descriptive data, which tell the tool where to go. In the above eg, the tool is commanded to go to point P1, which must have been defined previously.

Starting-point Motion statement :

The tool must be given a starting point at the beginning of the statement. This point is the target point, the location where the operator has positioned the tool at the start of the job. The starting - point motion statement is given by FROM/TARG

The FROM in the above statement is an APT word and this denoted the initial point from which others will be reference TARG is the symbol given to the starting point.

eg. FROM / 0.0

Point - to - Point motion statements :

There are two Point- to - point motion statements

(1) GOTO

(2) GODLTA

The GOTO statements instructs the tool to go to a particular point location specified in the descriptive data. For eg: GOTO /P2

In the eg, P2 is the destination of the tool point.

The GODLTA command specifies an incremental move for the tool. For eg. GODLTA/2.0, 3.0 , 4.0.

The above eg. instructs the tool to move from its present position to 2 inches in the X direction, 3.0 inches in the Y direction and 4 inches in the Z direction.

Contouring motion statements :

The contouring commands controls the tool position throughout the movement of the tool. The tool is directed along three surfaces to accomplish the control of tool position.

(1) Drive surface - This is the surface that guides the side of the cutter.

(2) Part surface - This is the surface on which the cutting tool moves.

(3) Check surface -This is the surface that stops the movement of the tool in its current direction.

There are several ways in which the check surface can be used. This is determined by the APT modifier words within the descriptive data of the motion statement. The three modifier words are TO, ON and PAST. To moves the tool into initial contact with the check surface. ON

The APT contour motion statement commands the cutting tool to move along the drive and part surfaces and the movements ends when the tool is at the check surface. There are six motion command words.

(1) GOLFT - Go left

(2) GOFWD - Go forward

(3) GOUP - Go up

(4) GORGT - Go right

(5) GOBACK - Go back

(6) GODOWN - Go down

Post processor statement :

Statement which control the speed & operation of spindle, and other features of the machine tool are called as post processor statements.

Auxiliary statement :

These statement are used for the part identification, cutting tool size specification and so on.

The MACRO statements in APT :

The MACRO statement in APT is similar to a subroutine statements in high level languages. It would be used where certain sequences would be repeated several times within a program. The purpose of the MACRO statement is to reduce the total number of statements required in the APT program. The general format of the MACRO statement is Symbol = MACRO / parameter definition.

The above statement will be the first statement in the MACRO subroutine. It would be followed by a set of APT statements that comprise the subroutine. The last statement of the subroutine is TERMAC which signifies the termination of MACRO.

In order to active the MACRO subroutines, within an APT program, the following CALL statement would be used.

CALL / symbol, parameter specification.

The symbol would be the name of the MACRO that is to be called. The parameters specification identifies the particular values of the parameter that are to be used in the execution of the MACRO subroutine.

eg. MILL = MACRO / PX

CALL / MILL, PX = 5.0

Function of CNC :

There are a number of function which CNC is designed to perform. The principle functions of CNC are

(1) Machine tool control.

(2) In process compensation.

(3) Improved programming and Operating features.

(4) Diagnostics.

Machine tool control :

The main objective of the CNC system is control of the machine tool. This involves a conversion of the part program instruction into machine tool instructions through the computer interface. The capacity to incorporate a variety of control features into the soft-wired controller unit lead to the development of two alternative controller designs in CNC.

(1) Hybrid CNC.

(2) Straight CNC.

(1) Hybrid CNC :

The following figure illustrates the Hybrid CNC.

The controller consists of the softwired computer and a hardware logic circuits.

The hard wired components functions such as circular for interpolations. The computer performs the remaining control functions.

(2) Straight CNC :

The straight CNC system uses a computer to perform all the NC functions. The only hardwired elements are those required to interface the computer with the machine tool and the operator's console. The tool position and all other functions are performed by computer software. The figure below describes the straight CNC.

In - process Compensation :

This involves the correction of the machine tool motions for changes or errors which occur during processing. Some of the options of CNC in process compensation are :

(1) Adjustments for errors sensed in in-process inspection.

(2) Recomputions of position when an inspection is used.

(3) Adjustments for tool radius and length.

Improved programming and Operating Featured.

The flexibility of the controller unit allows an improved programming and Operating features. Some of the features are,

(1) Editing of part programs.

(2) Use of subroutines.

(3) Graphics display.

(4) Storage of more than one program.

Diagnostics :

The CNC machines are equiped with diagnostics capabilty to assists in maintaining and repairing the system. The diagnostics system has several functions.

(1) The system would be able to identify the reasons for the occurrence so that the corrections may be done quickly.

(2) The diagnostics system alerts the user when any component fails.

(3) The diognostics system has the capability to contain redundancy of components which are considered unreliable. When any one of the component fails, then the diagnostics system would automatically disconnect the faculty component and activate the new component.

2.2 MACHINE DETAILS

- CNC LATHE LAL-2
- CNC LATHE LSL-3
- CNC LATHE D-50
- CNC TURNING MACHINE PILATUS 20 SERIES
- Vertical Machining Centre LMV-Junior
- Vertical Machining Centre LMV-55.

Sl.No	**ST DESCRIPTION**
00	One Time Req.Store
01	LSL-3
02	LAL-2
03	LSL-0
05	LAL-22
07	PILATUS
08	D-50
09	AZ-11

VERTICAL MACHINING CENTRE LMV-55
MACHINE SPECIFICATIONS

Traverses X x Y xZ	mm	1050 X 550 X 560
Spindle Nose to Table Top	mm	200 - 760
Spindle Centre to Column Front	mm	600
Table Size	mm	1400 X 550
Table Top to Floor	mm	325 - 875
Spindle Hole Taper	No	50
Spindle Speed	rpm	40-4000
Main Motor Power(Cont./30min)	Kw	7.5/11 AC
Cutting Feed Rate	mm/min	1-5000
Rapid Traverse(X,Y)	mm/min	15,000
Rapid Traverse(z)	mm/min	12,000
Tools in ATC	-Std. -Opt.	No.30 No.40
Tool Shank Configuation	type	Bt50
Max. Tool Weight	Kg	20
Max.Tool Dia/Length	mm	240/350
Coolant Tank Capacity	its	250
Positioning Accuracy	mm	0.010(Full strcke)
Repeatability	mm	(+,- 0.003)
Machine Dimensions (L X B X H)	m	3.4 X 3.6 X 3.3
Machine Weight	Kg	10,000

CNC LATHE LAL-2 MACHINE SPECIFICATIONS

CAPACITY	LAL-2A	LAL-2B
Swing Over Bed,dia	480mm	
Admit Between Centres	550m	
Bar Capacity,dia	34mm	42mm
SPINDLE		
Spindle Nose	A2-5	A2-6
Spind;e Inside Taper	1/20	MT-6
Spindle Speed - std. -M version	200-6000rpm	110-3500rpm 50-6000rpm 40-3500rpm
Spindle Motor Power	Ac 5.5/7.5 Kw (Cont./30min)	
FEED DRIVES		
Cross Slide/Bed inclination	30/0	
Longitudinal Stroke, Z axis	500mm	
Cross-Stroke, X axis	150mm	
Rapid Traverse Rate,Z axis	15000mm/min	
Rapid Travrse Rate, X axis	10000mm/min	
TURRET		
Number of Tool Stations	8	
OD Tool Shank	25mm	
ID / dia,std.	40mm	
TAILSTOCK		
Quil Dia	75mm	
Quil Taper	MT-4	
Quill Stroke, Programmable	100mm	
DIMENSIONS(APPROX)		
Lenght (w/o Chip Conveyor)	2360mm	
Height	1700mm	
Widht	1260mm	
CNC SYSTEM	LAKSHMI NUMBERIC 8605 T/HI HUMERIC 2000 T/ EQUIVALENT.	

MACHINE SPECIFICATIONS

Traverses, X x Y x Z	mm	560 X 410 X 460
Table Working Surface	mm	900X410
Max.Load on Table	Kg	300
Spindle Nose to Table Top	mm	150 - 610
Spindle Centre to column Face	mm	680
Spindle Hole Taper	No	40
Spind;e Speed -Std. -Opt. -Opt.	rpm	150 - 6,000 100 -4,000 150 -10,000
Main Motor Power _Std (cont./ 30 Min). -Opt.	Kw	3.7/5.5 5.5/7.5
Cutting Feed Rate (All Axes)	mm/min	1-5,000
Rapid TraverseRate(X,Y)	mm/min	15,000
Rapid Traverse Rate(Z)	mm/min	12,000
Tools in ATC - Std. -Opt.	nos.	20 30
Tool Shank Configuation	type	BT 40
Max. Tool Weight	Kg	8
Largest Tool Dia/Length	mm	125/250
Coolant Tank Capacity1	Its.	85
Positional Accuracy	mm	0.005
Repeatabilty	mm	(+-0.003)
Machine Length X Width X Height (Approx).	mm	2,300 X 2,200 X 2,600
Machine Weight	Kg	3,500

CNC LATHE LSL-3

MACHINE SPECIFICATIONS	3B	3H
Max,.swing, Dia	570mm	
Admit Between Centre-Std. -Opt.	610mm 750mm	
Max.Turing Length-Std. -Opt.	550mm 750mm	
Max.Cross Trvel	160mm	
Max.Maching Dia	260mm	240mm
StandardChuck Dia	250mm	200mm
Spindle Speed Range	30-3000rpm	40-4000rpm
Hole Through Spindle,Dia	60mm	77mm
Spindle Nose	A2-6	
Spindle Inside Taper	MT7	
Repaid Fee Rate -X Axis -Z Axis	6000mm/min 12000mm/min	
Tailstock Quill Dia	85mm	
Tailstock Quil Tapoer	MT3	
Tailstock Quill Stroke	80mm	
Turret Tool Stations	10	12
Standard Cutting Tool Size	25mm sq.	
Carriage/Bed Inclination	45/45	
Main Motor Power (Cont/30min)	11/15kW	
Power Consumption	31kVA	
Floor Space(with Chip Conv.)	3770 X 1740mm	
Machine Weight Approx.	4200Kg.	
CNC System	Lakshmi Numeric 8610 TC/ Hinumerik 3100y/Equivalent.	

10	LSL-3 (NOT IN USE)
19	LSL3-CUSTOMER SPARES
20	LAL-22(NOT IN USE)
21	LMV-Jr
22	LMV-55
23	LMV-Jr(HP)
29	LAL-2 CSTSP (NOT USED)
30	LSL-00 (NOT IN USE)
31	LV325-H
32	LMH40
39	LSL-0 CSTSP (NOT USED)
40	MIK- RON-WF-21D
41	MIKRON-WF-31D
42	MIKRON-WF-32D
43	VME600
50	LMV-Jr (NOT IN USE)
59	LMV-Jr CUSTOMER SP
60	LMV-55 (NOT IN USE)
70	LSL-4T
80	RD-60 (OLD)

81	RD-60
99	COMMON ITEM
A1	SL-3 SPARES
A2	AL-2 SPARES
A3	SL-0 SPARES
E1	MV-Jr SPARES
R1	RD-60

2.3 SALES

SCOPE OF SUPPLY REGISTRATION

Customer has to give his/her order by specifying the required products by browing the product list and he/she should also specify the quantity needed on the products.

SCOPE OF SUPPLY ADDITION

Here scope of supply called SOS NO is generated by the system the customer has to give his/her company address and dispatch address,machine type,configuration,speed range and Bed Number are given as input based on the selection of the customer.

There are four steps of accessories available. They are Accessories,Tool holders,CNC system details and special requirements.For each accessories a number

81	RD-60
99	COMMON ITEM
A1	SL-3 SPARES
A2	AL-2 SPARES
A3	SL-0 SPARES
E1	MV-Jr SPARES
R1	RD-60

2.3 SALES

SCOPE OF SUPPLY REGISTRATION

Customer has to give his/her order by specifying the required products by browing the product list and he/she should also specify the quantity needed on the products.

SCOPE OF SUPPLY ADDITION

Here scope of supply called SOS NO is generated by the system the customer has to give his/her company address and dispatch address.machine type,configuration,speed range and Bed Number are given as input based on the selection of the customer.

There are four steps of accessories available. They are Accessories,Tool holders,CNC system details and special requirements.For each accessories a number

called option number is generated the customer has to give the required quantity also. If the option number is given the description of variant items are fetched from option number master table.There are seperate program in Design and system department to maintain option number details.

Option Number Maintanance in Design Department

Here the items belong to accessory category,tool holders category and special features category.Option numbers are generated from the parts list numbers of the accessories.

Option Number Maintanance in System Department

Here the items are electrical system items.The third digit of the item should be 9.Here the field quantity required is not required.

Option Number for `T- Option Numbers'

Some of the variant items will not have their option numbers .For those items the option numbers are generated by the system starting with `T'.These option numbers are called T - option numbers.

LMV 55 M/c OPTIONAL ACCESSORY CODES

Sl.No	DESCRIPTION OF VARIANT ITEMS	OPTION NOS.	PART LIST Nos
1.	30 TOOLS AUTOMATIC TOOL CHANGER	22 142 10	22 142 100
	40 TOOLS AUTOMATIC TOOL CHANGER	22 672 00	22 672 000 - EXCLUDE 22 142 100 -ASSY
2.	BULLET - IN AC (IMPORTED)	22 235 10	22 235 100
	BULLET - IN AC (INDIGENOUS)	22 135 20	22 235 200
Sl.No.	DESCRIPTION OF OPTIONAL ITEMS	OPTION Nos.	PARTS LIST Nos.
1.	AUTOMATIC PALLET CHANGER	25 507 00	22 507 00 + ADD 22 671 00 - EXCLUDE 22 106 000 ASSY.
2.	220 mm COLOUMN EXTENSION	22 671 00	22 671 000 EXCLUDE 22 106 000 ASSY
3.	CHAIN TYPE CHIT CONVEYORS (LHS and RHS) MARK : MIVEN MAYFRAM	22 577 00	22 577 000 EXCLUDE 22 206 000 ASSY
4.	SCREW CONVEYOR ALONG X - AXIS MARK : MIVEN MAYFRAN	22 578 00	22 578 00 EXCLUDE 22 206 100 ASSY
5.	HIGH PRESSURE COOLANT	22 551 10	22 551 100 EXCLUDE 22 191 100 ASSY
6.	OIL HOLE	22 554 00	22 554 000
7.	OIL SHOT	22 552 00	22 552 000
8.	PROCESS COMPLETION LAMP	22 603 00	22 603 000
9.	TOUCH PROBE - RENISHAW	22 622 05	AT REQUEST
10.	AXIAL INDICATOR ARBOR	22 627 00	22 627 000
11.	Z- AXIS ZERO POINT SETTING TOOL	22 629 00	22 629 000
12.	CENTRAING INDICATOR ARBOR	22 628 00	22 628 000
13.	SUB - TABLE WITH T - SLOT & CROSS SLOT	22 512 00	22 512 000
14.	KITAGAWA ROTARY TABLE TB 320, SCROLL CHUCK JN12T & TAIL STOCK BR 032T	22 510 10	22 510 100
15.	KITAGAWA ROTARY TABLE TB 320, & TAIL STOCK BR 032 T	22 510 11	22 510 100 EXCLUDE 22 510 002 00 & 22 510 004 00
16.	KITAGAWA ROTARY TABLE TB 320, & SCROLL CHUCK JN12T	22 510 12	22 510 100 EXCLUDE 22 510 003 00
17.	KITAGAWA ROTARY TABLE TB320	22 510 13	22 510 100 EXCLUDE 22 510 002 00 , 22 510 004 00 & 22 510 003 00
18.	BASIC TOOLING PACKAGE	22 526 00	22 526 000
19.	PULL STUD, PATH NUMBER 22 526 057 00 (*)	22 526 057	
20.	SPECIAL MACHINE COLOUR (**)	22 012 00	

NOTES : (*) Quality to be mentioned
(**) Colours to be specified

L M W LSL-3 M/C OPTIONAL ACCESSORY CODES 04.11.96 WITH PARTS LIST NUMBERS MTD

SL NO:	DESCRIPTION	DRG NOS.	OPTION NOS.	PARTS LIST NOS.
23	O.D CUTTING TOOL HOLDER With CLAMPING BLOCK and TAPER GIB	01 527 005 0X 01 141 001 0X 01 141 002 0X	01 527 04	01 527 040
24	CLAMPING BLOCK & TAPER GIB	01 141 001 0X	01 527 02	01 527 020
25	TOOL HODER FOR FACEWORK With Gib	01 527 004 0X 01 527 014 0X	01 527 03	01 527 030
26	BORING BAR HOLDER, I.D 32 mm	01 527 006 0X	01 527 33	01 527 330
27	BORING BAR SLEEVE, I.D 8 mm	01 527 032 0X	01 527 41	01 527 410
28	BORING BAR SLEEVE. I.D 10 mm	01 527 024 0X	01 527 42	01 527 420
29	BORING BAR SLEEVE. I.D 12 mm	01 527 025 0X	01 527 43	01 527 430
30	BORING BAR SLEEVE, I.D 16 mm	01 527 023 0X	01 527 24	01 527 440
31	BORING BAR HOLDER, I.D 35 mm	01 527 023 0X	01 527 24	01 527 240
32	BORING BAR HOLDER, I.D 40 mm	01 527 022 0X	01 527 25	01 527 250
33	BORING BAR HOLDER, I.D 45 mm	01 527 022 0X	01 527 26	01 527 260
34	DRILL SOCKET MT-1	01 527 055 0X	01 527 91	01 527 910
35	DRILL SOCKET MT-2	01 527 040 0X	01 527 92	01 527 920
36	DRILL SOCKET MT-3	01 527 031 0X	01 527 93	01 527 930
37	DRILL SOCKET MT-4	01 527 011 0X	01 527 94	01 527 940
38	BORING BAR SLEEVE , I.D 20 mm	01 527 010 0X	01 527 45	01 527 450
39	BORING BAR SLEEVE , I.D 25 mm	01 527 009 0X	01 527 46	01 527 460
40	BORING BAR SLEEVE , I.D 20 mm(EXT)	01 527 026 0X	01 527 61	01 527 610
41	BORING BAR SLEEVE, I.D 25 mm (EXT)	01 527 027 0X	01 527 62	01 527 620
42	U- DRILL SLEEVE, I.D 20 mm	01 527 028 0X	01 527 75	01 527 750
43	U - DRILL SLEEVE, I.D 25 mm	01 527 029 0X	01 527 76	01 527 760
44	U - DRILL SLEEVE, I.D 32 mm	01 527 030 0X	01 527 78	01 527 780
45	BORING BAR HOLDER I.D 50 mm	01 527 038 0X	01 527 27	01 527 270

NOTES : For items 23 to 45 - Quantities to be mentioned
Items 27 to 30 to be ordered only with item 26
Items 34 to 44 to be ordered only with item 33

21	6 NOS. COPPER NOZZLES (3H)	01 562 20	01 562 200
22	SPECIAL MACHINE COLOUR (**)	01 012 00	-----

NOTE : 1

(*) SIZES AND QUANTITES TO BE MENTIONED
(**) COLOURS TO BE SPECIFIED
(***) SEE ANNEXURE - A

NOTE :2

ACCESSORY CODE IS SPECIFIC FOR EACH OTION ASGIVEN ABOVE. IF ANY DEVIATION IN ACCESSORY IS REQUIRED. SALES MUST GIVE FULL DETAILSAND ASSIGN ACCESSORY CODE - 999 TO INDICATED THAT IT IS A SPECIAL ACCESSORY AND DESIGN WILL HAVE TO ISSUE A SPECIAL PARTS LIST.

L.M.W LSL - 3 M/c VARIANT AND OPTIONAL ACCESSORY CODES WITH PARTS LIST NUMBERS

Sl No.	DESCRIPTION OF VARIANT ITEMS	OPTION NOS.	PARTS LIST NOS.
1	BED-610 ABC	01 101 40	01 101 000 + 01 101 400
	BED - 750 ABC	01 101 20	01 101 000 + 01 101 200
2	LSL - 38 HEADSTOCK	01 122 10	01 122 000 + 01 122 100
	LSL - 3H HEADSTOCK	01 122 20	01 122 000 + 01 122 200
3	LSL -3B (10 STATION) TOOL POST	01 141 10	01 141 000 + 01 141 100
	LSL - 3H (12 STATION) TOOL POST	01 141 30	01 141 000 + 01 141 300
4	BUIL - IN AC (IMPORTED)	01 235 10	01 235 100
	BUIL - IN AC (INDIGENOUS)	01 235 20	01 235 200
5	GENERAL PURPOSE TOOL HOLDERS (3B) (***)	01 211 10	01 211 100
	GENERAL PURPOSE TOOL HOLDERS (3H) (***)	01 211 20	01 211 200
Sl.No	DESCRIPTION OF OPTIONAL ITEMS	OPTION NOS.	PARTS LIST NO.
1	CHIP CONVEYOR - Side - Chain Belt - MIVEN	01 578 10	01 578 100
2	CHIP CONVEYOR - Side - Scraper - MIVEN	01 578 20	01 578 200
3	CHIP CONVEYOR - Rear - Chain Belt - MIVEN	01 574 10	01 574 100
4	CHIP CONVEYOR - Rear - Scraper - MIVEN	01 574 20	01 574 200
5	AUTO DOOR (610 - ABC)	01 591 10	01 591 100 + 01 602 000+ 01 602 100 OR 01 602 300
6	AUTO DOOR (750 - ABC)	01 591 20	01 591 200 + 01 602 000+ 01 602 100 OR 01 602 300
7	STEADY REST - SMW - SLK - 087	01 505 20	01 505 200
8	TILT TYPE CHIP BIN	01 575 00	01 575 000
9	PROGRAMMABLE TAILSTOCK(LATCH TYPE)	01 506 10	01 506 100
10	MANUAL BUILT - IN TOOL PRESETTER	01 622 00	01 622 000
11	HYDRAULIC OIL COOLER (REFRIGERATION TYPE) (GEM)	01 556 00	01 556 000
12	PARTS CATCHER	01 514 00	01 514 000 + 01 602 000 + 01 602 200 OR 01 602 300
13	TWO STEP CLAMPING PRESSURE FOR CHECK	01 645 00	01 645 000
14	HIGH PRESSURE COOLANT SYSTEM	01 551 00	01 551 000
15	MACHINE CLEANNING SYSTEM	01 579 00	01 579 000
16	BAR PULLER WITH JAWS-(GMT)(*)	01 502 10	01 502 100
17	BUSHES FOR BAR SUPPORT (*)	01 524 10	01 524 100
18	OVER LOAD SAFETY COUPLING OF X & Z AXES	01 604 00	01 604 000
19	TAILSTOCK INCHING	01 510 00	01 510 000
20	5 NOS. COPPER NOZZLES (3B)	01 562 10	01 562 100

DETAILS OF THE VARIANT AND OPTIONAL AND OPTIONAL ACCESSORY CODES WITH PARTS LIST

NUMBERS

- LSL -3

-LMU Jr

The first two digits of the option number represents the type of the machine which is termed as Machine Code or Product Code.

PRODUCT CODE DETAILS

SCOPE OF SUPPLY CANCELLATION.

If a customer cancels his/her order the details corresponding to the customers scope of supply are cancelled.This is referred as scope of supply cancellation. ISSUE NUMBERWISE AMENDMENTS.

If a customer places an order,the first issue of the scope of supply is raised.After some days,the customer may wish to change his/her requirement details.These are maintained in the next issue of the scope of supply.

ACCEPTANCE OF ORDER

After the study of the scope of supply the acceptance of order takes place.If customer and the company are satisfied with each other the order is accepted.This process is called the acceptance of order.

It contains the details about TNGST no,CST no, customer address,despatch address and other details corresponding to the scope of supply of a particular order.

The AO (Acceptance of Order) number and purchase order number are given as input.It the order is accepted the delivery schedule is fixed.The mode of despatch,Insurance,colour and Inspection details are selected by the customer.

The column "particulars" containing the details of the machine and spare requirements of the customer (taken from the scope of supply) along with the quantity,unit and rate of each item.

Finally the price of the machine is calculated by calculating the rates of individual items of the machine.

PROFORMA INVOICE

Proforma invoice is prepared by sales despatch by studying the "acceptance of order" details.Total payable amount is calculated by adding the price at the machine and all other tax details.This Proforma Invoice is given to Central Exercise department.

INVOICE

One of the Proforma Invoice is prepared by sales department,Invoice is prepared by Central Excercise department by calculating the total cost and verifying with the balance amount if any to be paid.If the balance amount is present that amount will be added with the current Invioce.

In the manual system for preparing the invoice market professional should refer customer details,product details and despatch details.So the preparation of invoice is getting late. In order to produce the computerised system had eliminated the difficulties.

Invoice Cancellation.

If the invoice is cancelled the alloted amount of stock are updated for the products and the order status is changed to cancelled order.

In the manual system for cancelled Invoice, the sales professional should maintain a separate file.But in the computerised system,the system itself will change the status.

2.4 SERVICE

The functions of service are:

1. Free Replacement Type
2. Service Complain Record Type.

Free Replacement (FR)

In this type,FR number is generated by the system.For a particular FRnumber the machine type, bed number and customer code are given as input.The invoice number and reference number are taken from the invoice.For a particular Free Replacement number,the defected parts of the machines are noted.The drawing number of the item,describton of the item,unit,quantity,reason for free replacement are listed here.

FR updation and FR deletion are the amendment operations available here.

Service Complaint Record (SCR)

Here SCR number is generated by the system.For a particular SCR the type of complaint is registered.For a particular complaint, the service engineer will find the actual problem based on his analysis the service process starts.The above process is registered in the columns namely complaint,Service Engineer Observation and further action. In this system the complaint is classified as:

1. Major Complaint
2. Minor Complaint

The above two classes are further divided into three types.They are:

1. Commission Type
2. Warranty Type
3. Non Warranty type

LMW has got six branch offices all over India.The name of the branch office in which the complaint is registered is also included in the SCR.The branch offices are:

1. Chennai Sales Office
2. Pune Sales Office
3. Calcutta Sales Office

4. Delhi Sales Office

5. Bangalore Sales Ofiice

6. Head Office (Coimbatore)

The machine status is identified by the Service Engineer.The Three types of machine status are:

1. Machine Idle

2. Machine Running with Problem

3. Machine Under Observation

Based on the status of the machine the action will be taken by the following departments.

1. Sales

2. Customer Service Department (CSD)

3. System

4. Assembly

5. Head Office

6. Design.

SCR UPDATION

While registering the SCR,the customer may not know all of the problems that is accured in the operation of the machine.

Based on the changing factors,some modifications should occur during the reparation of the SCR.

SCR - VERSIONWISE ADDITION

The above operation is called first version of SCR.After the machine is serviced,some more problems may arise.These problems are entered in the next version of the SCR.

SCR - COMPLETION

After the service is performed,the operation of the machine will be tested by the customer.If the customer is satisfied,the complaint is closed.The complaint status will be four (Complaint closed) Based on the above operations various reports are produced.

2.5 PROPOSAL SYSTEM

The system is developed in CA-open Ingres and embedded C.The operating system is SCO open server release 3.2- version 5.0.The system has relational database techniques and effective file operations.The use of software is restricted only to authorised persons by giving necessary securities.The coding of the system is done by 4GL.This software is an interactive menu oriented software.This software produces the output in a standard format using embedded C.

3.SYSTEM DESIGN

After studying the operations of the sales and service departments, designing process of tables,screens,files and report to be generated take place. The design of the system is completely based on the requisition of the screen. This software is menu driven one which helps the user to select the process according to their wish.

3.1 INPUT DESIGN

During the operation of the system, the inputs will be provided with proper listing of possible values. For example, to select the costmer details, a list of customers and their order details will be displayed. so that the user cannot do mistakes.

Help messages are given at all levels. The user can change the value at any time until the user commits the entry.

The manipulation of multiple records at a time is possible. For example, the user may enter mutiple complaints at a time. We can change or delete any number of records at a time.

3.1.1 MASTER FILE ENTRY DESIGN

WORK WITH CUSTOMER MASTER

To process an order, the customer should be present for any business concern. In this file the customers details are stored as per the requirement of the company. The entry screen is given in this Appendix.

WORK WITH MACHINE MASTER

To start a business, the products are the essential need of the company. This file will contain the machine details present in the company. The entry screen is given in the Appendix.

WORK WITH QUOTATION MASTER

Before buying a machine from the company, the customer should know the details of the machines manufactured in the company and their price details. This quotation file will contain the details of the machines manufactured in the company and the spares associated with that machines. The price details and terms and conditions are also present in this file. The entry screen is given in the Appendix.

WORK WITH SCOPE OF SUPPLY MASTER

After studying the details in the quotations, the customer will choose a CNC machine for his use. He will give the details about his/her selection in a form based on that form the scope of the supply is prepared. This file will contain the machine number, bed number, speed range and colour of the machine, sales tax number and the details of the customer. The entry screen is given in the Appendix.

WORK WITH ORDER ACCEPTANCE MASTER

If the company is satisfied with the scope of the supply, the order will be accepted. This order acceptance file will contain the despatch details, purchase order details and packing details. The entry screen is given in the Appendix

WORK PERFORMA WITH INVOICE MASTER

The proforma invoice is prepared by the sales department. This proferma invoice file will contain the order details, invoice number and total payable amount by the customer to the company. The entry screen is given in the Appendix.

WORK WITH INVOICE MASTER

The invoice is prepared by the central Excercise department. The invoice master file will contain the invoice number, customer details, tax details, total amount to be payed and delivery schedule. The entry screen is given in the appendix.

WORK WITH FR MASTER

The FR master file deals with the free replacement type service details. The FR number, commissioning date of the machine, the place at which the service is performed and the problems that is occured during servicing the machine are the other details contained in the FR master file. The entry screen is given in the Appendix.

WORK WITH SCR MASTER

SCR master file deals with service complaint records. This file contains the details of SCR No, SCR date, machine configuration details, the nature of the complaint,Machine status, branch office, and the name of the department which is responsible for this SCR. The entry screen is given in the Appendix.

3.2.1 TRANSACTION FILE ENTRY DESIGN

WORK WITH ORDER REGISTRATION FILE

When a customer is placing an order for his required products, details are stored in the order registration file. While placing an order, the order number is generated by the system itself.

WORK WITH QUATATION DETAIL FILE

This file will contain the details of the spare parts of the machine, quantity, and rate of each parts, for a particular quatation number.

WORK WITH SCOPE OF SUPPLY DETAIL FILE

This file contains the details of the accessories of a particular SOS number. The parts of CNC machine is divided into four types. They are Accessories, Tool Holders, CNC system details and special featurs. Based on the technical background number called option number is generated for each part of the machine. The scope of supply details file gives the details of parts, option number and the required quantity.

WORK WITH ORDER ITEMS DETAIL FILE

This file will contain the details of parts description quantity and rate of each items.

WORK WITH FR DETAIL FILE

FR detail file contains the details of the items to be replaced. The description of the item, unit, quantity, drawing number , FR code and reasion for free replacement are the contents of FR detail file.

WORK WITH SCR DETAIL FILE

For a single SCR number various complaints are registered. The file will contain the details of the complaint number, complaint detail, service Engineer observation and the details of the actions which are taken top rectify the problem that is occured in the operation of the machine.

3.2 REPORT DESIGN

The report is the all important in a system. This system provides the output to satisfy the requirements of the two departments of LMW. Reports can be viewed in the screen and also be taken a print.

QUOTATION PRINTING

This report gives the details of a machine inculding this spares details. For a particular order the quatation number is generated by the system. The customer will have to choose to product code and bed number.

SCOPE OF SUPPLY PRINTING

This report gives the detail analysis of an order placed by a customer. From the master file scope, the machine details and order details are selected. From the scope transaction file the accessory details are selected. Accessory details, tool holder details, system details and special feature details are selected from the transaction file. Try out requirement and customer supplied product details are also selected according to the selection of customer.

SCOPE OF SUPPLY AMENDMENT DETAIL REPORT

The first version of the scope is called new realse. If the customer wants to change some of his requirements in the latter stage, the amendment details are stored in a separte file called amendment file. This amendment report gives the deleted or updated items of an order.

ORDER ACCEPTACE REPORT

After placing an order, allotment is made based on the customer, market demand of the product, quantity on hand and credit level of the customer. This report will give pending order details of a customer with the details about the products to be alloted and the remaining quantity level. A sample report is given in the Appendix.

PROFORMA INVOICE - PRINTING

In the sales department after an order is shipped for a customer, the sales details of the order are prepared in performa invoice. This should contain the products alloted, number of units alloted, total cost of the products are maintained for the orders made by the customer. A sample report is given in the Appendix.

INVOICE PRINTING

After the proforma invoice is prepared, invoice prepared by Central Excercise deparment. The invoice is prepared by calculating the total cost and verifying with the balance amount if any to be paid. If the balance amount is present that amount will be added with the current invoice.

FREE REPLACMENT - REPORT

For each and every complaint which comes under the category of replacement, the FR number is generated by the system. The FR number begins with letters 'FR' indicating that the number belongs to FR category. The year in which the FR is prepared will be added to the FR number along with a running number. The running number will be incremented, if another FR is registered. If the FR number is given as input, the FR report will be generated. This report consists of customer details and spare details along with despatch details.

SCR - REPORTS

The SCR number is generated by the system. It starts with the year of SCR registration. The next digits contain the running number of SCR.

SERVICE COMPLAINT RECORD

If the complaint is not closed, the complaint is under the category of outstanding complaints. The service complaint record gives the details of the problems occured in the machine, service to be performed and suggestion of the service engineer.

REPORT ON OUTSTANDING COMPLAINTS - PROBLEM WISE

The problem may be one of the following types.

1. Machine Idle
2. Machine running with problem
3. Machine under observation

This report is generated by studying the type of the problem. The user has the provision to see the reports which contains the details of the any one of the problem or all type of problems.

REPORTS ON OUTSTANDING COMPLAINTS - CATEGORY WISE REPORT

The nature of the complaint may be either major or minor. The complaints which are termed as major complaints are generated seperatly. The minor complaints are generated seperatly. The sub- option for category is whether it belongs to any one of the following types.

1. Commissioning
2. Warranty
3. Non-Warranty

REPORT ON OUTSTANDING COMPLAINTS - BRANCH WISE

The complaints are prepared in any of the following branch offices. Banglore salkes office, Delhi sales office, Chennai sales office, Pune sales office, Culcutta sales office or Head office. This report is generated to know the branch office of each SCR.

REPORT ON OUTSTANDING COMPLAINTS - ACTION BY WISE

Based on the nature of the complaints, the action will be taken by six departments. They are sales, customer service department, design, assembly and branch office.

This report contains the details about the action taken by the above six departments along with the SCR numbers.

SERVICE COMPLETION RECORD

If the customer is not satisfied with the performance of the machine, he / she will register the service complain record. Based on this, the service will be performed by the service department. After the service is over, the customer may wish to test the operation of the machine. If he/she satisfied with the functioning of the machine the

SCR will be closed. These type of complaint is called service complaint record. This report will give the closed complaint details. A sample report is given in the Appendix.

There are four types of reports available for servicemcompletion record. They are

* Category wise report
* Problem wise report
* Action by wise report
* Branch wise report

Different formats available for different reports. After the complaint is closed a branch number will be given in the branch office. This reports will give the complaint details, action details, branch complaint number of shifts machine idle and closing date of the complaint. The sample reports are given in the Appendix.

REPORT ON MEAN TIME BETWEEN FAILURE

The time gap between the arrival of first complaints and second complaint gives the time between failure. The average value of time between failure is calculated for a period are product code. This is called the report on mean time between failure. sample report is given in Appendix.

REPORT ON MEAN TIME TO REPAIR

The time gap between the registration date of SCR and closing date of SCR will gives the mean time to repair. The average value of time to repair is calculated for a period or product code. This is calles the report on mean time to repair. A sample report is given in Appendix.

WEEKLY REPORTS

Two types of weekly reports are generated by the system. One is the summary of outstanding complaints and the other is the summary of closed complaints. The service engineer will easily identify the status of the complaints by analysing these reports.

These reports are very useful in the weekly meeting of service department. The sample reports are given in Appendix.

3. DESCRIPTION OF SCREENS USED

The sales and service system is a interactive menu based application. The screens are designed in such a way that any person can use the system. The help messages are available in each filed of the data entry form. This screens include in the

system are developed using the VISUAL FORMS EDITOR (VIFRED). The software contains many screens that can be sub divided as master and transaction screens.

DISPLAY FILES USED

FDEDCUST

This display file is used to enter the details of customers.

FDEDMACHINE

This display file is used to entre the machine details.

This other files and thier uses are

FILE NAME		PURPOSE
FDEDQUOT	-	To enter quotation details
FDEDSCOPE	-	To enter the scope of supply details
FDEDORACCEP	-	To enter the order acceptance details
FDEDPROFERMA	-	To enter the performa invoice details
FDEDINVOICE	-	To enter the invoice details
FDEDFR	-	To enter the free replacement details
FDEDSCR	-	To enter the service complaint
FDEDSCOPEISSUE	-	To enter new issue of scope of supply

3.3 FILE DESIGN

In the sales and service system, there are different files are used. File design is one of the important work that must be carried out before start coding. This system consists of the following files. The files are designed according to the standard normalization rules.

TDEMSOPT : Option Number Master File

COLUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Option_No	Char	7	1	Option Number
Option_Desc1	Char	50		Option Description1
Option_Desc2	Char	25		Option Description2
Option_Flag	Char	1		Option Flag
Qty_Flag	Char	1		Quantity Flag
Qty_Req	Float	4		Quantity Required
User_Id	Char	6		User Name
Sys_Date	Date	8		System Date

TDEDTOPT : OPTION NUMBER DETAIL FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Option_No	Char	7	1	Option Number
Option_Seq	Integer	1		Option Sequence
Pr_Cd	Char	2		Product Code
As_Gp	Char	3		Assembly Group
Co_Vr	Char	3		Common Variant

TDEMSCOPE : SCOPE OF SUPPLY MASTER FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Sos_No	Char	6	1	Scope Supply Number
Sos_Dt	Date	8		Sos Date
Issue_No	Integer	1	2	Issue Number
Pr_Cd	Char	2		Product Code
Ref_No	Char	5		Reference Number
Cust_Nm	Char	10		Customer Name
Cust_Add1	Char	30		Customer Address1
Cust_Add2	Char	30		Customer Address2
Cust_Add3	Char	30		Customer Address3
City	Char	20		City
Pin_Cd	Char	7		Pin Code
Desp_Mon	Char	2		Despatch Month
Desp_Yr	Char	4		Despatch Year
Transporter	Char	30		Transporter
Agents	Char	30		Agents
Colour	Char	20		Colour
Fspeed_Range	Integer	2		From speed range
Tspeed_Range	Integer	2		To speed range
St_No	Char	10		ST Number
Cst_No	Char	10		CST Number
Ecc_No	Char	10		ECC Number
Amand_Fly	Char	1		Amendment Flag
User_Id	Char	6		User Name
Sys_Dt	Date			System Date

TDEDTSCOPE : SCOPE OF SUPPLY DETAIL FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Sos_No	Char	6	1	Sos Number
Option_No	Char	7	2	Option Number
Qty_Req	Float	7		Quantity Required

TDETRCOPE : SCOPE OF SUPPLY TRANSATION FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Sos_No	Char	6	1	Sos Number
Obj_Id	Char	1	2	Object identifier
Seg_No	Integer	2	3	Sequence Number
Descr1	Char	50		Description

TDEMSAO : ORDER ACCEPTANCE MASTER FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Ao_No	Char	15	1	Order Acceptancy Number
Ao_Dt	Date	8		Order Accepatancy Date
Desp_Nm	Char	30		Despatch Name
Desp_Add1	Char	30		Despatch Address1
Desp_Add2	Char	30		Despatch Address2
Desp_Add3	Char	30		Despatch Address3
Desp_City	Char	30		Despatch City
Desp_Pin	Char	10		Despatch Pincode
Po_No	Char	20		Purchase Order Number
Sp_No	Char	10		Sales Tax Number
Desp_Shal	Char	20		Despatch Schedule
Desp_Mod	Char	25		Despatch Mode
Insurance	Char	25		Insurance
Colour	Char	20		Colour
Inspection	Char	30		Inspection
Enclose	Char	30		Enclosers

TDEDTAO : ORDER ACCEPATANCY DETAIL FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Ao_No	Char	20	1	Order Acceptancy Number
Ao_Particular	Char	50		Particulars
Qty	Float	7.2		Quantity
Unit	Float	7.2		Unit
Rate	Money			Rate
Ex_Work	Money			Extra Work

TDEMSTI : PERFORMA INVOICE MASTER FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Inv_No	Char	20	1	Invoice Number
Inv_Date	Date			Invoice Date
Mc_No	Char	5		Machine Number
Cl_code	Char	10		Client Code
Desp_Name	Char	30		Despatch Name
Desp_Add1	Char	30		Despatch Address1
Desp_Add2	Char	30		Despatch Address2
Desp_Add3	Char	30		Despatch Address3
Desp_City	Char	20		Despatch City
Desp_Pin	Char	7		Despatch Pincode
Order_No	Char	15		Order Number
Pi_Date	Date			Performa Date
Payment	Char	50		Payment
Desp_By	Char	25		Despatched By
Desp_To	Char	25		Despatched To
Ex_Work				Extra Work
Bed	Float			Basic Excise Duty
Sed	Float			Sales Excise Duty
Csd	Float			Central Excise Duty
Sur_charge	Float			Sur Charge
Bal_Amt				Balance Amount

TDECTCOMM : COMMISION IN CONTROL FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Pr_Cd	Char	2	1	Product Code
Bal_No	Char	5	2	Bed Number
Comm_Date	Date			Commissioning Date

TDECTDESP : DESPATCH DETAIL CONTROL FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Desp_Id	Char	2	1	Despatch Identifier
Desp_Yr	Char	2		Despatch Year
Desp_SlNo	Integer	4		Despatch Serial Number
Desp_Desc	Varchar	25		Despatch Description

IDECTREUSON : FR REASON FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Fr_Cd	Char	2	1	Free replacement Code
Fr_Reu_Cd	Char	3		Fr reason Code
Fr_Reu_desc	Varchar	25		Fr Reason description

TDEMSCOM : COMMISIONING MASTER DETAIL FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Pr_Cd	Char	2	1	Product Code
Bed_No	Char	5	2	Bed Number
Mc_type	Char	3		Machine Type
Config	Char	8		Configuration
Cust_Cd	Char	6		Customer Code
Cust_Lo	Char	2		Customer Location
Cust_Nm	Varchar	30		Customer Name
Cust_Add1	Varchar	30		Customer Address1
Cust_Add2	Varchar	30		Customer Address2
Cust_Add3	Varchar	30		Customer Address3
Branch	Char	4		Branch
City	Varchar	20		City
Pin_Cd	Varchar	7		Pincode
File_Ref_No	Varchar	7		File Reference Number
Desp_Dt	Date			Despatch Date
Comm_Date	Date			Commisioning Date

TDEMSDESP : DESPATCH MASTER FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Desp_Id	Char	2	1	Despatch Identifier
Desp_Yr	Char	2	2	Despatch Year
Desp_No	Integer	2	3	Despatch Number
Desp_Dt	Date			Despatch Date
SCR_Id	Char	3		Scr Identifier
SCR_No	Integer	2		SCR Number
SCR_Dt	Date			SCR Date
Cust_Lo	Char	2		Customer Location
Cust_Cd	Char	6		Customer Code
Ord_No	Varchar	15		Order Number
Ref_No	Varchar	15		Reference Number

TDEDTDEST : FR DETAIL TABLE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
Resp_Id	Char	2	1	Despatch Identifier
Resp_Yr	Char	2	2	Despatch Year
Desp_No	Integer	2	3	Despatch Number
Item_No	Integer	2		Item Number
Brg_No	Char	13	4	Drawing Number
Drg_Desc1	Varchar	25		Drawing Description
Drg_Desc2	Varchar	25		Drawing Description
Qty_Req	Float	8		Quantity Required
Bed	Float	4		Bed Number
Qty Slip	Float	4		Quantity Slip
Unit	Varchar	2		Unit
Rate	Float	8		Rate
Amount	Float	8		Amount
Fr_Cd	Char	2		FR Code
Fr_reo_Cd	Char	3		FR Reason Code
Reason	VarChar	90		Reason
Remarks	Varchar	30		Remarks

TDEMSSCR : SERVICE COMPLAINT RECORD MASTER FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
SCR_NO	Integer	4	1	SCR Number
SCR_Dt	Date			SCR Date
Pr_Cd	Char	2		Product Code
Bed_NO	Char	5		Bed Number
Ref_No	Char	8		Reference Number
Mac_Stat	Char	1		Machine Status
Eng_Att	Char	25		Enginnerr Attended
SCR_By	Char	25		SCR Raised By
CSD_Ref_No	Char	11		CSD Reference Number
Spares	Char	1		Spares
User_Id	Char	8		User Identifier
Sys_Dt	Date			System Date
Rec_Status	Char	1		Record Status
Fr_Flg	Char	1		FR Flag
Rep_Fly	Char	1		Replay Flag

Rep_Dt	Date			Reply Date
Comp_Natr	Char	1		Complaint Nature
Com_W_Nw	Char	1		Catogory
Brch_Office	Char	2		Branch Office
Actn_By	Char	2		Action By
Comp_DT	Date			Complaint Date
Comp_Finis_Dt	Date			Complaint Finished Date
Shift_Idle	Integer	1		Shift Idle
Brch_Comp_No	Char	6		Branch Complaint Number
Dt_Receipt	Date			Date of Receipt
SCR_Report_NO	Char	10		Service Report Number
Complision_Flg	Char	1		Complesion Flag
Ver_No	Integer	2		Version Number

TDEDTSCRC : SCR DETAIL FILE

COLOUMN NAME	TYPE	LENGTH	KEY SEQ	DESCRIPTION
SCR_No	Integer	4	1	SCR Number
Obg_Id	Char	1	4	Object Identifier
Scq_No	Integer	1	5	Sequencial Number
Descri	Varchar	50		Description
Comp_No	Integer	1	3	Complaint Number
Ver_No	Integer	2	2	Version Number

FDEDOPT - To enter option number details

FDEDSCRVER - To enter new version of service

COMPLIANT RECORD

These file are used to perform file operations like insertion, updation, deletion and displaying of a record or multiple records. The entries made in this screens are entered in the corresponding files.

4. IMPLEMENTATION

During implemention phase, the system should be fully operational. This involves programmers, users and operational management.It includes the final distinct of complete system to users satisfaction and supervision of operation of the new system.

Selection of staff and proper training to them is essential to achieve the objectives and benefitsexpected from computer based system. Training gives the staff to know about how the system works. Education gives the staff to know the background of the system.

System testing is the style of implementation, which is aimed at ensuring that the system works at all levels and effective before live operation starts. The

system test in implementation should be a definite confirmation that al. is correct and an opportunity to show the users that the system works.

4.1 TESTING

Any system that has been coded must pass all sorts of testing before it can be implemented. Only if the system is successfully tested it can be implemented. Further it gives an opportunity to know the behavior of the system in extreme condition. More over it gives a chance to change some parts of the system so that it achieves the specified objective.

As the sales & service system is a live system, which will be used by the two departments of the India's largest textile manufacturing company lakshmi machine works, all the physical files of the system are properly tested. For example, during a file operation instead machine code its name was entered the message 'INVALID MACHINE CODE' is displayed. the error message is displayed because all product codes are checked with the file before its operations.

Also the system requires the user to enter the date in the given format. i.e DD-MM-YY (for eg. 02-05-97) when the user try to enter either the date is any other format or invalid such as 03- 30-97 it will display error message as 'INVALID DATE'.

CONCLUSION

Sales & Service is an integral part of a business concern. It forms the essential backbone for the marketing system with maximum efficiency. The efficient functioning of the company or the marketing department can be credited to a computerised Sales & Distribution system.

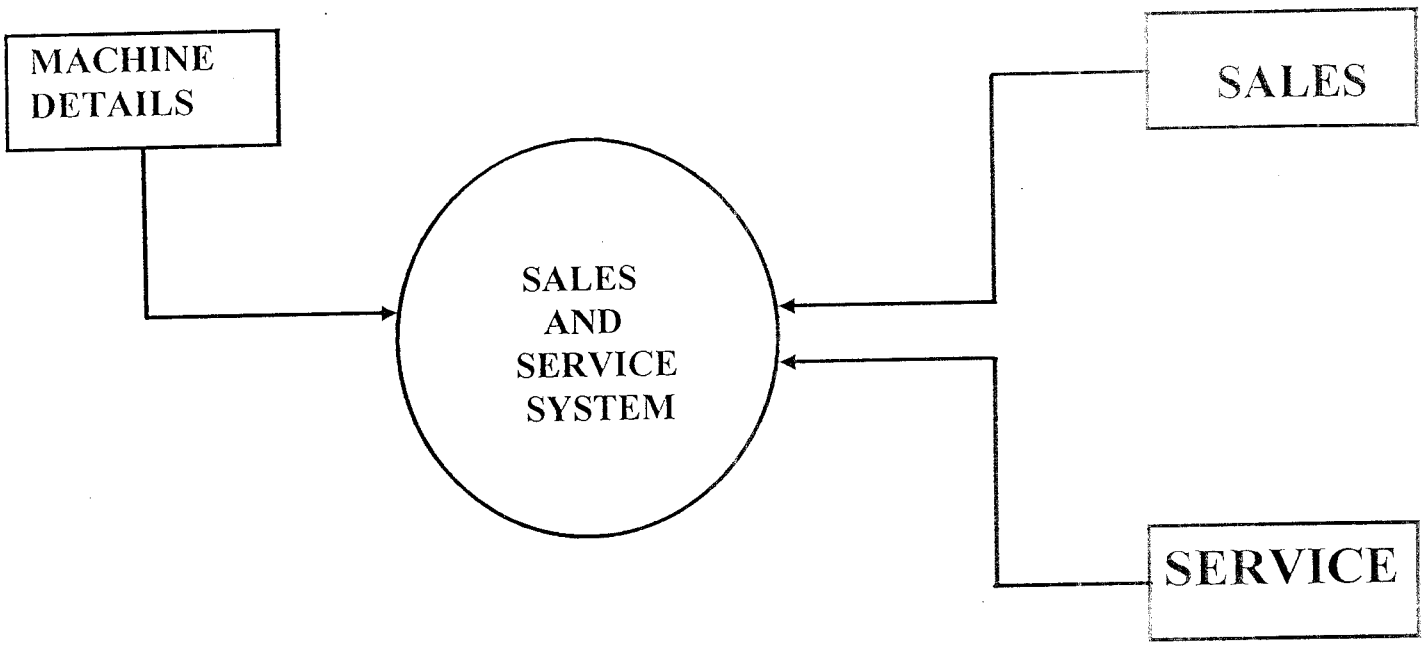
The Sales & Service system has been succesfully carried out in order to meet the requirements of company.

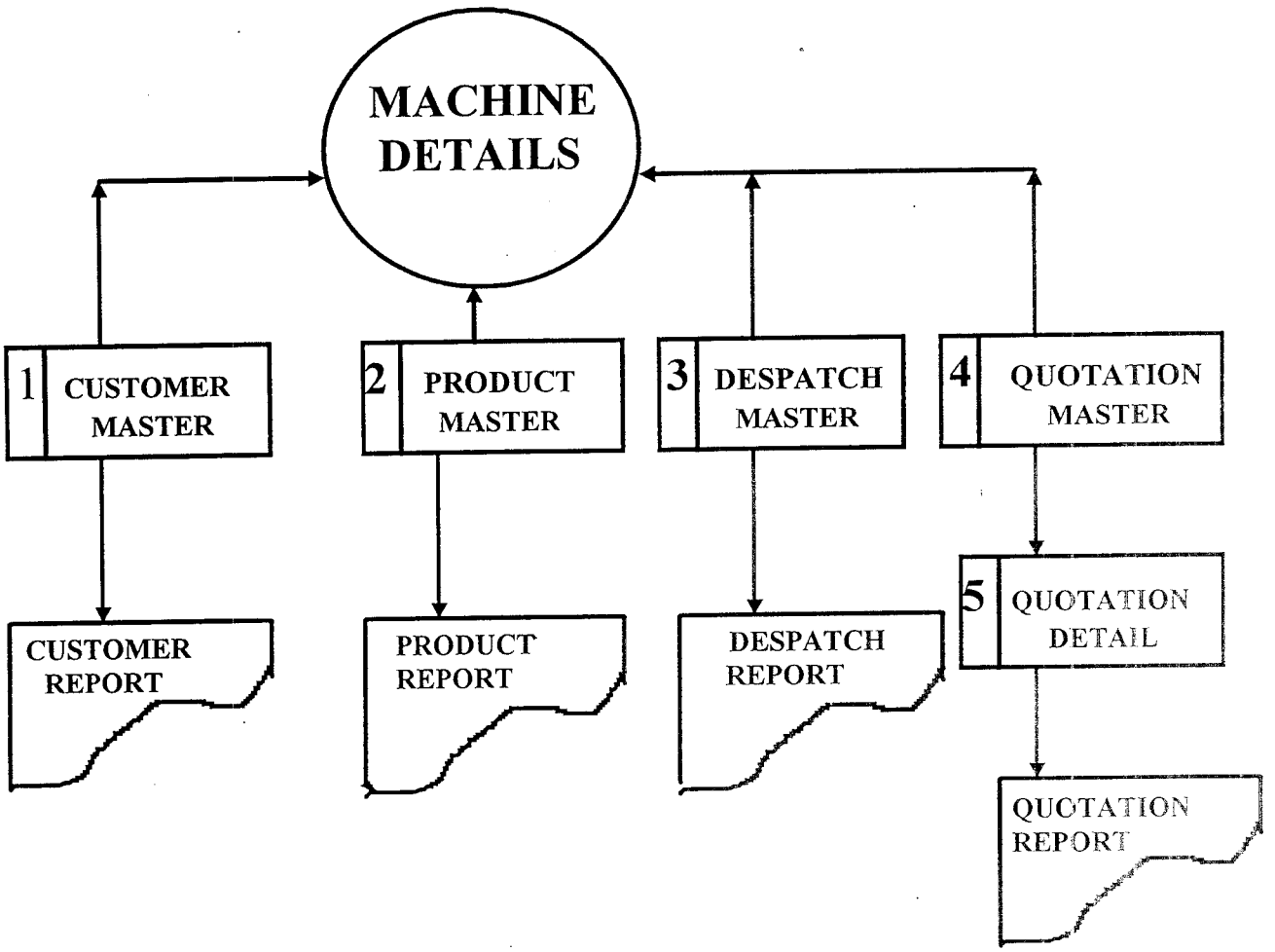
The system has been endeavoured throughout this software to provide the user with a competent, easy to use and sophisticated package for the sound functioning of the organization.

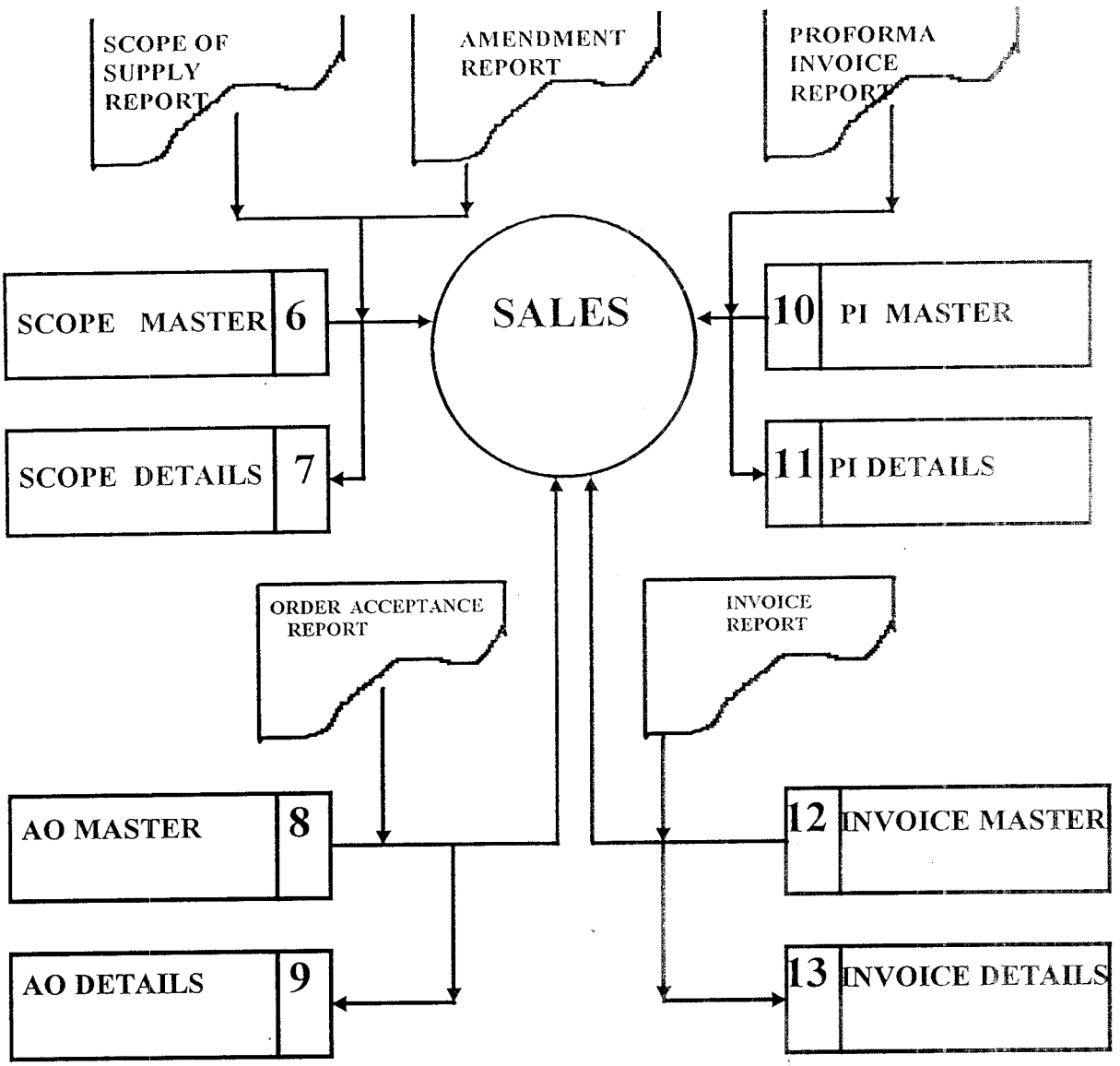
The system is tried to smoothen all possible rags in the system and this software is tested with volumes of input data of all possible condition and results have been found to be excellent. The future expansion of this package can be extended to Sales and Analysis.

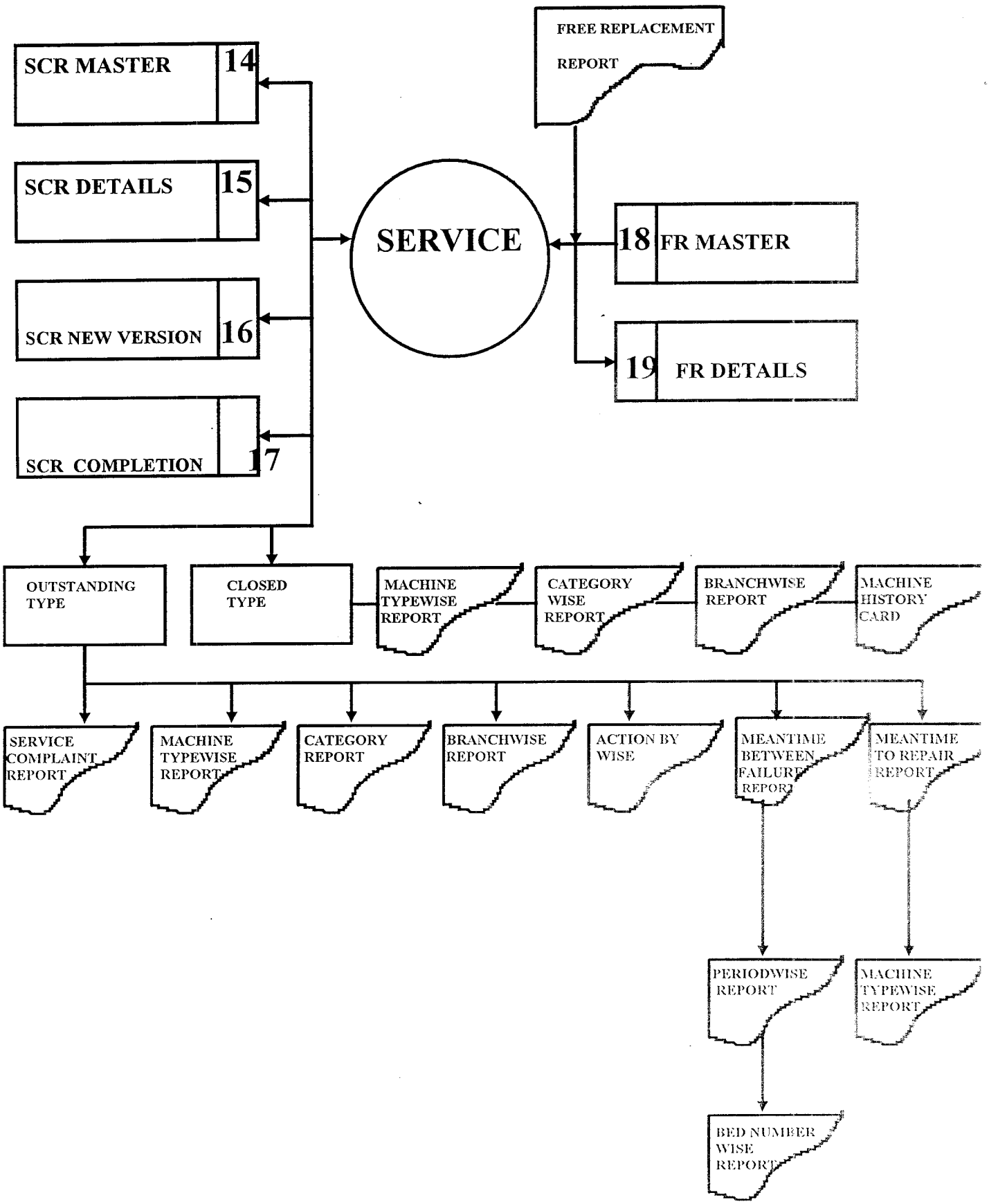
Data Flow Diagrams

DATA FLOW DIAGRAM

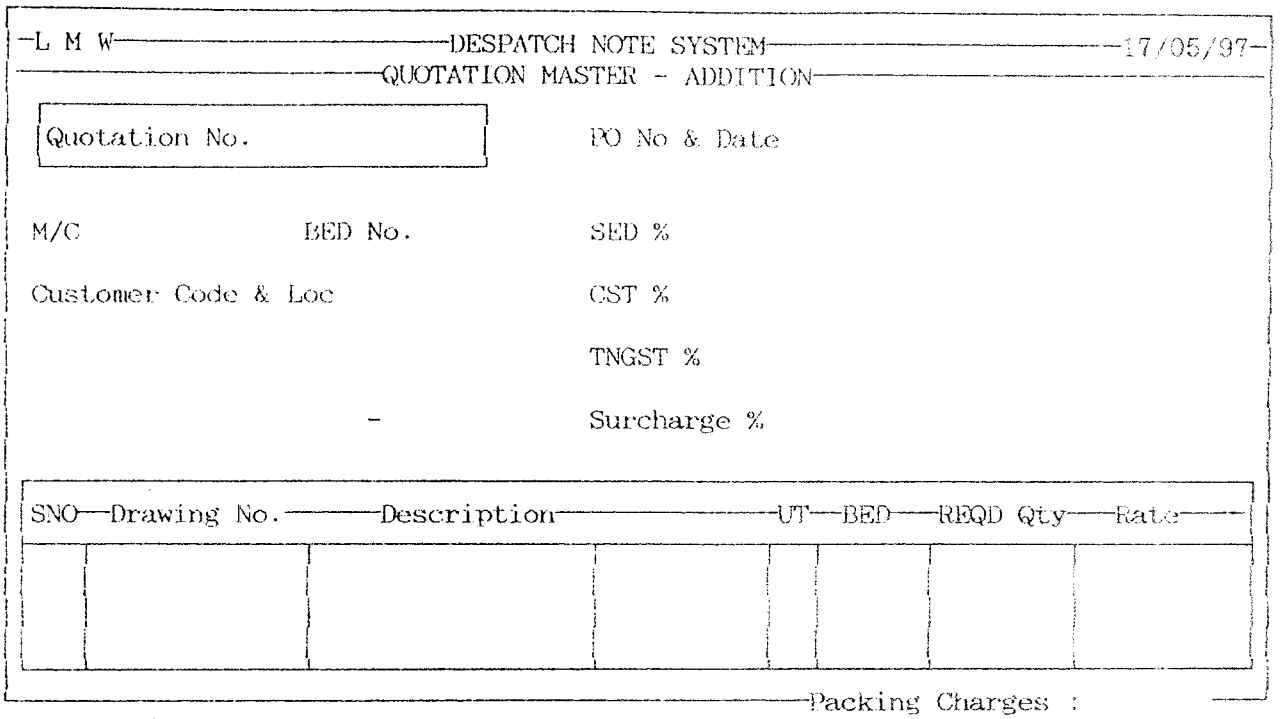


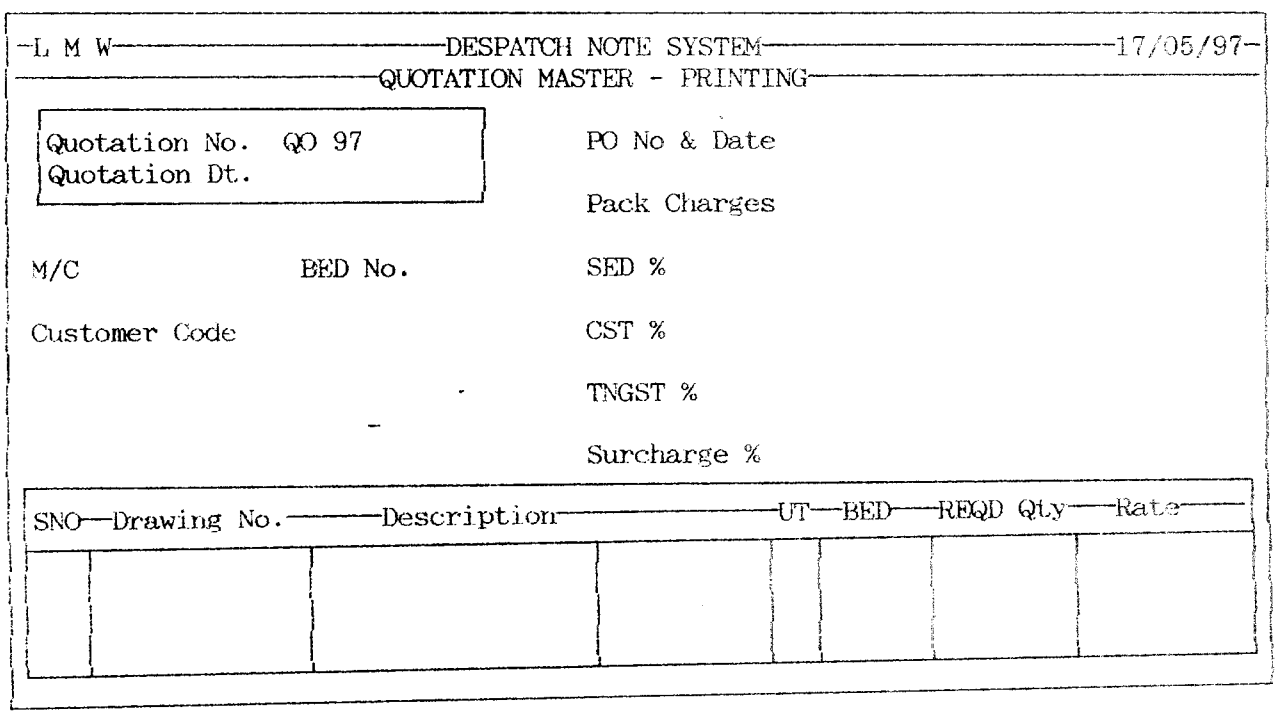

MACHINE DETAILS
1 CUSTOMER MASTER
2 PRODUCT MASTER
3 DESPATCH MASTER
4 QUOTATION MASTER
5 QUOTATION DETAIL
CUSTOMER REPORT
PRODUCT REPORT
DESPATCH REPORT
QUOTATION REPORT


SCOPE OF SUPPLY REPORT
AMENDMENT REPORT
PROFORMA INVOICE REPORT
SCOPE MASTER
6
SALES
10
PI MASTER
SCOPE DETAILS
7
11
PI DETAILS
ORDER ACCEPTANCE REPORT
INVOICE REPORT
AO MASTER
8
12
INVOICE MASTER
AO DETAILS
9
13
INVOICE DETAILS


SCR MASTER
14
SCR DETAILS
15
SCR NEW VERSION
16
SCR COMPLETION
17
SERVICE
FREE REPLACEMENT REPORT
18
FR MASTER
19
FR DETAILS
OUTSTANDING TYPE
CLOSED TYPE
MACHINE TYPEWISE REPORT
CATEGORY WISE REPORT
BRANCHWISE REPORT
MACHINE HISTORY CARD
SERVICE COMPLAINT REPORT
MACHINE TYPEWISE REPORT
CATEGORY REPORT
BRANCHWISE REPORT
ACTION BY WISE
MEANTIME BETWEEN FAILURE REPORT
MEANTIME TO REPAIR REPORT
PERIODWISE REPORT
MACHINE TYPEWISE REPORT
BED NUMBER WISE REPORT

Screen Outputs


L M W
DESPATCH NOTE SYSTEM
17/05/97
QUOTATION MASTER - ADDITION
Quotation No.
PO No & Date
M/C
BED No.
SED %
Customer Code & Loc
CST %
TNGST %
Surcharge %
SNO
Drawing No.
Description
UT
BED
REQD Qty
Rate
Packing Charges :
Help(F4) Quo_to_Quo(End) Pro_to_Quo(F7) Del_Row(F5) >


L M W
DESPATCH NOTE SYSTEM
17/05/97
QUOTATION MASTER - PRINTING
Quotation No. QO 97
Quotation Dt.
PO No & Date
Pack Charges
M/C
BED No.
SED %
Customer Code
CST %
TNGST %
Surcharge %
SNO
Drawing No.
Description
UT
BED
REQD Qty
Rate
Blank(^F) Exit(F9)

LMW — SCOPE OF SUPPLY — 17/05/97

MTD — OPTION NUMBER -ADDITION

Option Number :

Option Description :

Accessory Code :

Quantity Required :

Part List Details:

Product Code	Assembly Group	Comman Variant

Save(Home) Insert Row(F3) Delete Row(F5) Clear(End) >

LMW — SCOPE OF SUPPLY — 17/05/97

MTD — OPTION NUMBER -UPDATION

T - Option Number :

Option Number :

Option Description :

Accessory Code :

Quantity Required :

Part List Details:

Product Code	Assembly Group	Comman Variant

LMW-MTD — SCOPE OF SUPPLY-ADDITION — 17/05/97

SOS No. Date
Reference Number
Despatch Month Year
Agents:
Customer Details:
Name
Address
Transporter:
ST No CST No
City Pin
ECC No

Machine Details: Prod.Code Bed No. Speed Range: From To
Colour Note

Accessory Details:

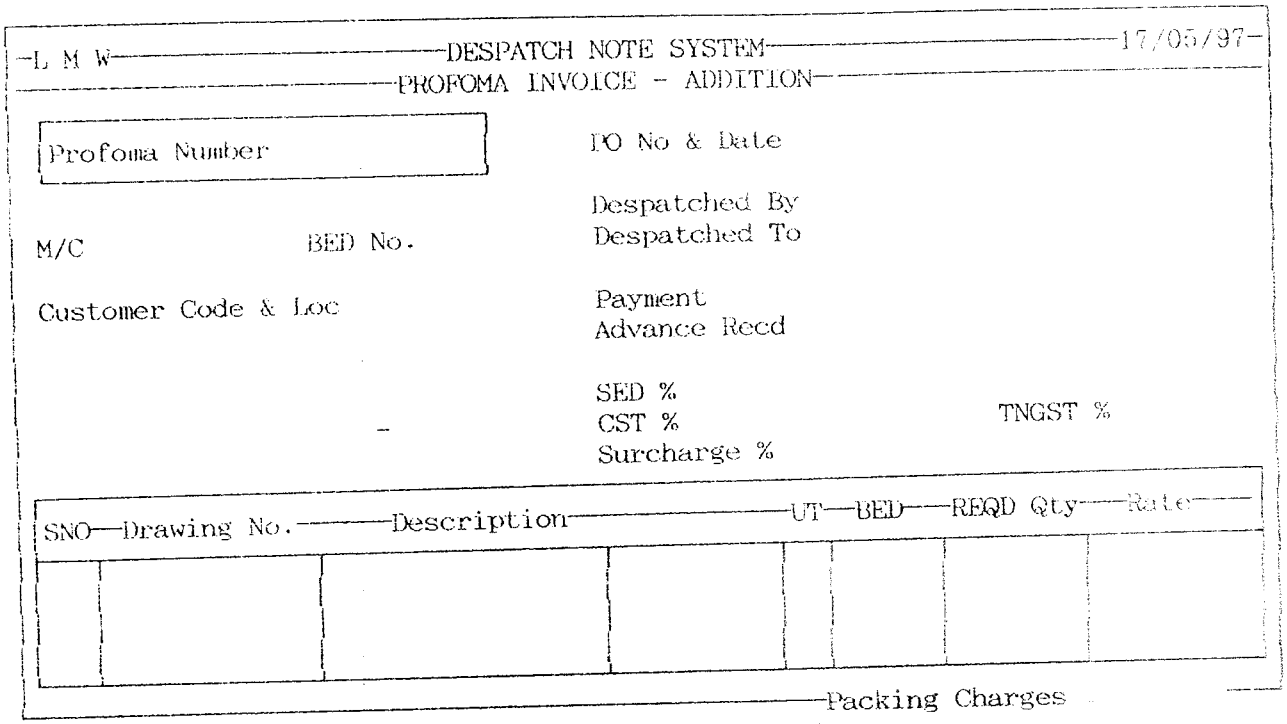
Id	Option No	Description	Qty.Req

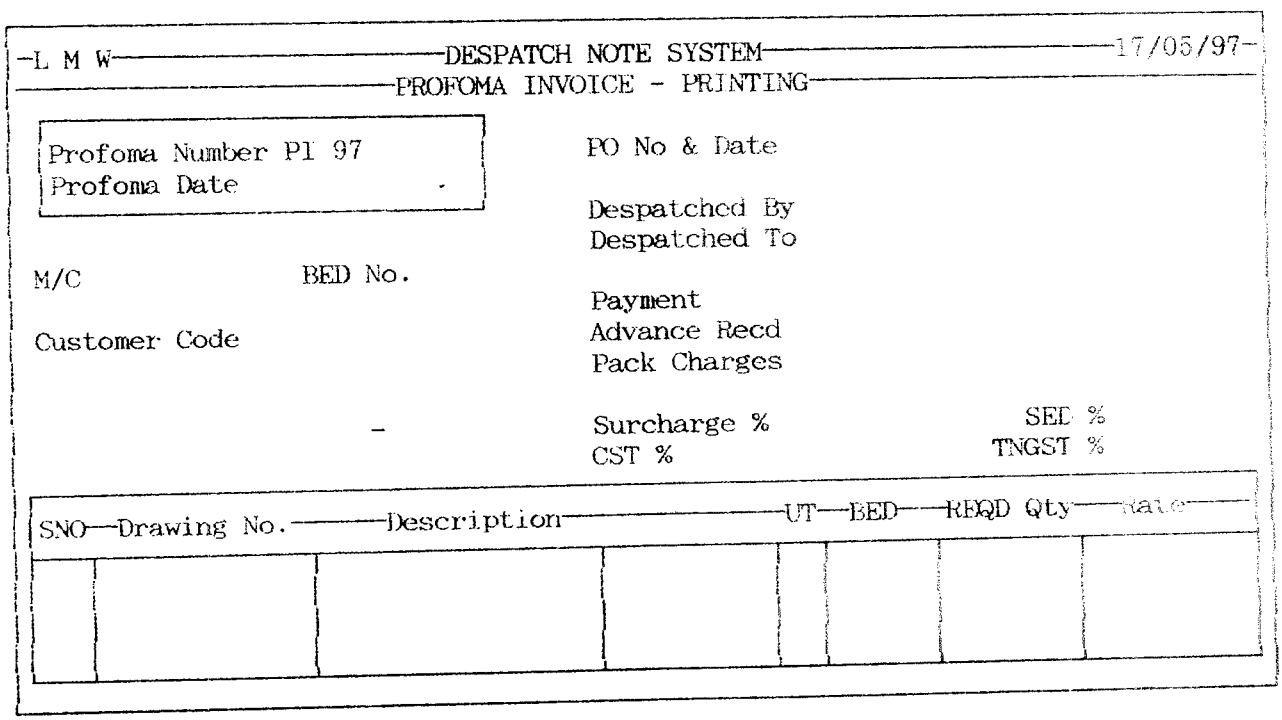
More Details

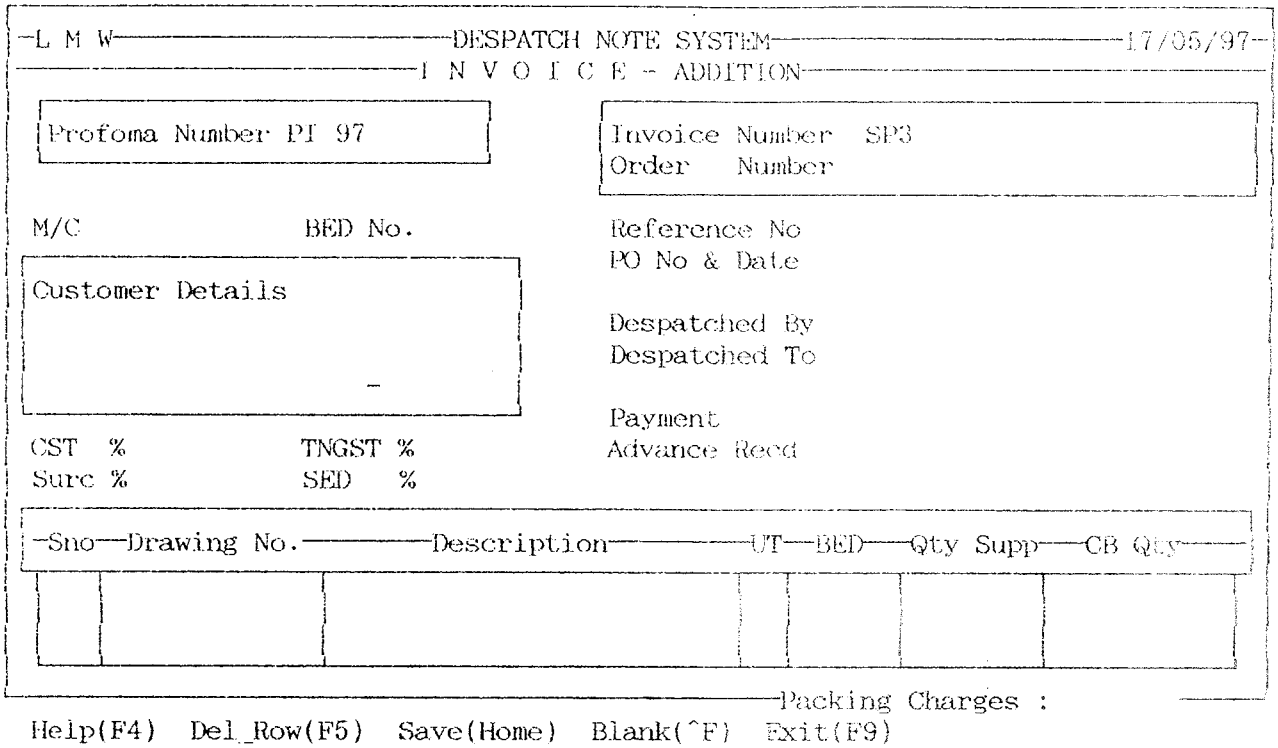
Help(F4) Save(Home) Insert Row(F3) Delete Row(F5) >

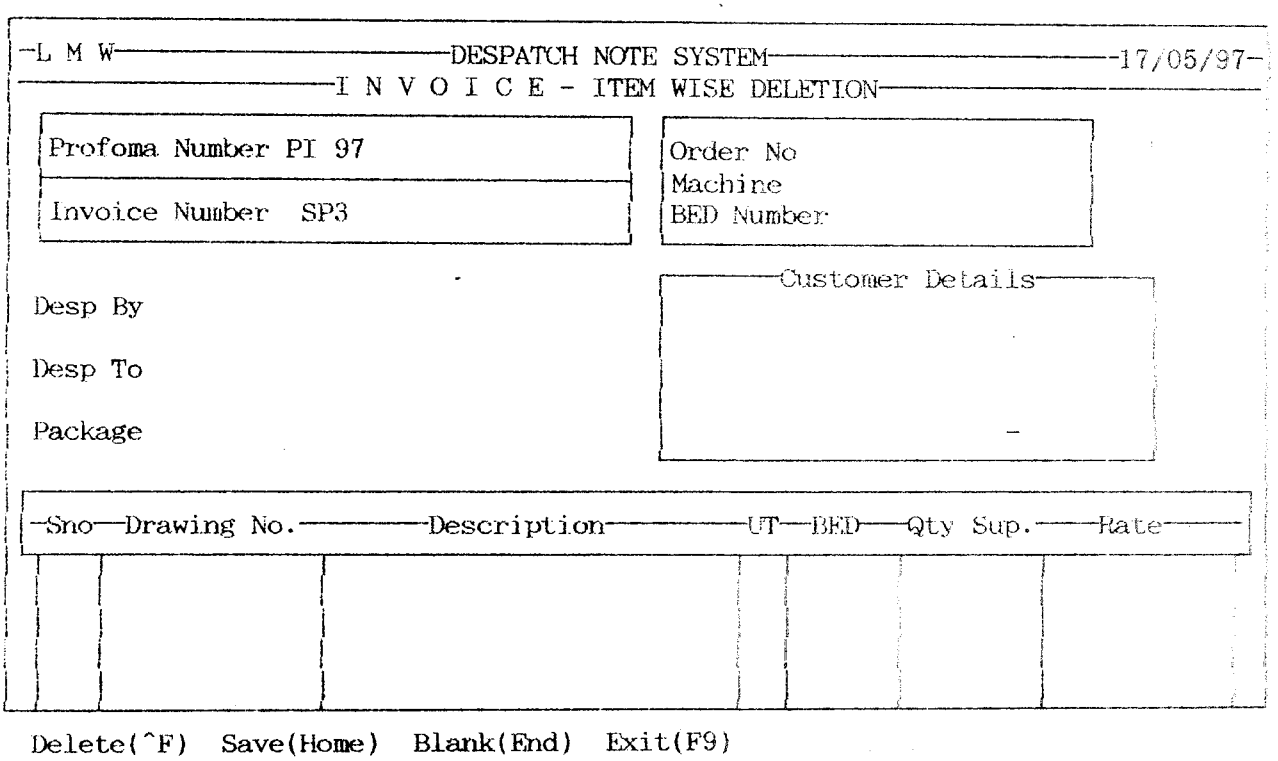
TRYOUT REQUIREMENT:

CUSTOMER SUPPLIED PRODUCT:


-L M W-
DESPATCH NOTE SYSTEM
17/05/97
PROFOMA INVOICE - ADDITION
Profoma Number
PO No & Date
Despatched By
Despatched To
M/C
BED No.
Customer Code & Loc
Payment
Advance Recd
SED %
CST %
TNGST %
Surcharge %
SNO
Drawing No.
Description
UT
BED
REQD Qty
Rate
Packing Charges
Help(F4) Del_Row(F5) Save(Home) Pro_to_Pro(F7) >


-L M W-
DESPATCH NOTE SYSTEM
17/05/97
PROFOMA INVOICE - PRINTING
Profoma Number PI 97
Profoma Date
PO No & Date
Despatched By
Despatched To
M/C
BED No.
Payment
Customer Code
Advance Recd
Pack Charges
Surcharge %
SED %
CST %
TNGST %
SNO
Drawing No.
Description
UT
BED
REQD Qty
Rate
Blank(^F) Exit(F9)


L M W
DESPATCH NOTE SYSTEM
17/05/97
I N V O I C E - ADDITION
Profoma Number PI 97
Invoice Number SP3
Order Number
M/C
BED No.
Reference No
PO No & Date
Customer Details
Despatched By
Despatched To
Payment
Advance Recd
CST %
TNGST %
Surc %
SED %
Sno
Drawing No.
Description
UT
BED
Qty Supp
CB Qty
Packing Charges :
Help(F4) Del_Row(F5) Save(Home) Blank(^F) Exit(F9)


L M W
DESPATCH NOTE SYSTEM
17/05/97
I N V O I C E - ITEM WISE DELETION
Profoma Number PI 97
Invoice Number SP3
Order No
Machine
BED Number
Customer Details
Desp By
Desp To
Package
Sno
Drawing No.
Description
UT
BED
Qty Sup.
Rate
Delete(^F) Save(Home) Blank(End) Exit(F9)

-L M W- DESPATCH NOTE SYSTEM -17/05/97-

Free Replacement - Addition

FR No. & Date FR

SCR No. & Date :

M/C BED No.

Order Number
Invoice Number
Reference Number

Customer Code & Loc

Despatch Mode
Comm. Date

SNO	Drawing No.	Description	UT	Quantity	Rate	BED %	Reason	FR

DESC Reason

Help(F4) Del_Row(F5) Save(Home) Blank(^F) Exit(F9)

-L M W- DESPATCH NOTE SYSTEM -17/05/97-

Free Replacement - Printing

FR No. & Date FR

Customer Code & Loc

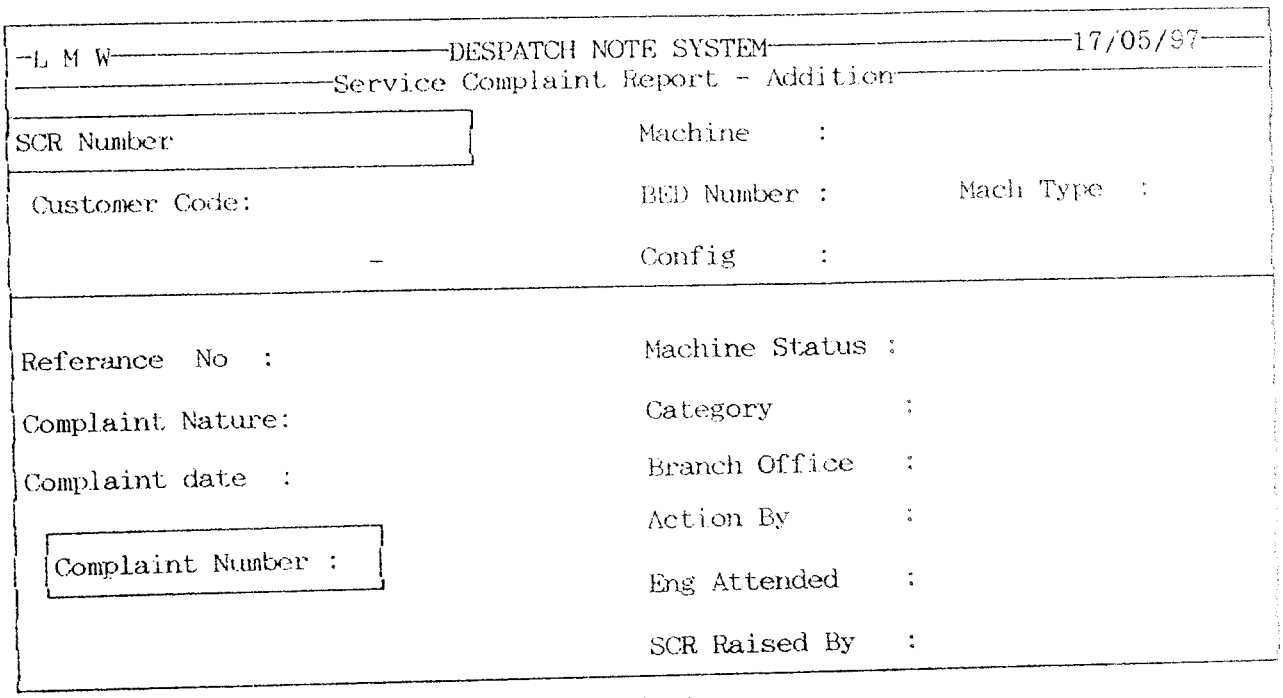
Order Number
Invoice Number
Reference Number

Despatch Mode
Despatched Thru
Package

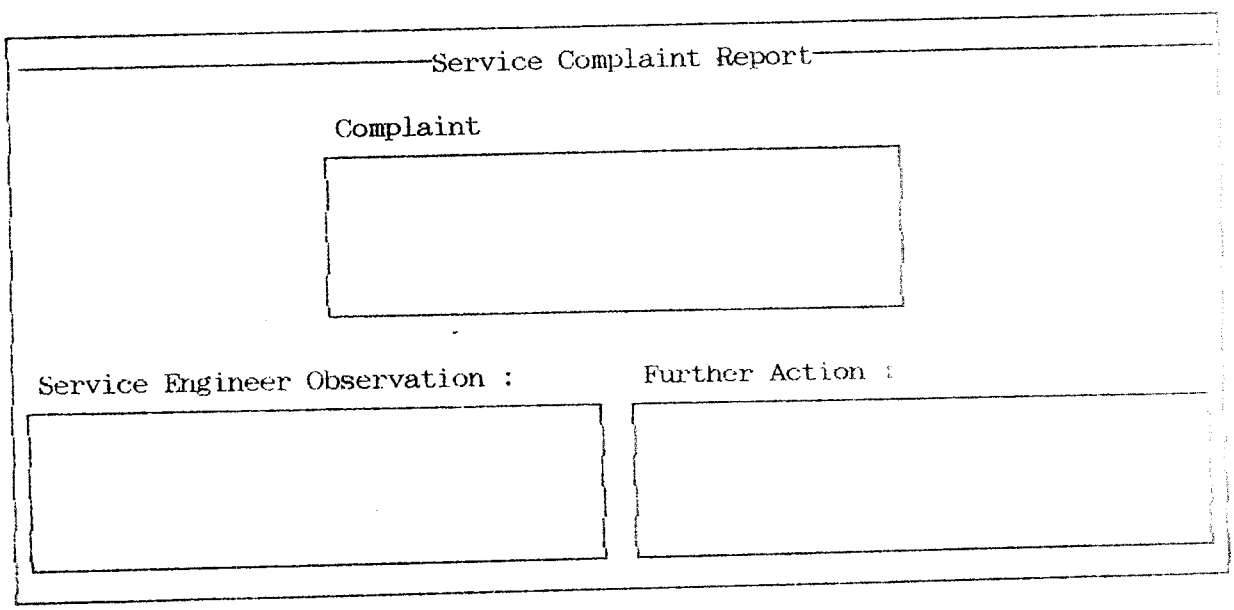
BED No. M/C

SNO	Drawing No.	Description	UT	Quantity	Rate	BED %	Remarks	FR

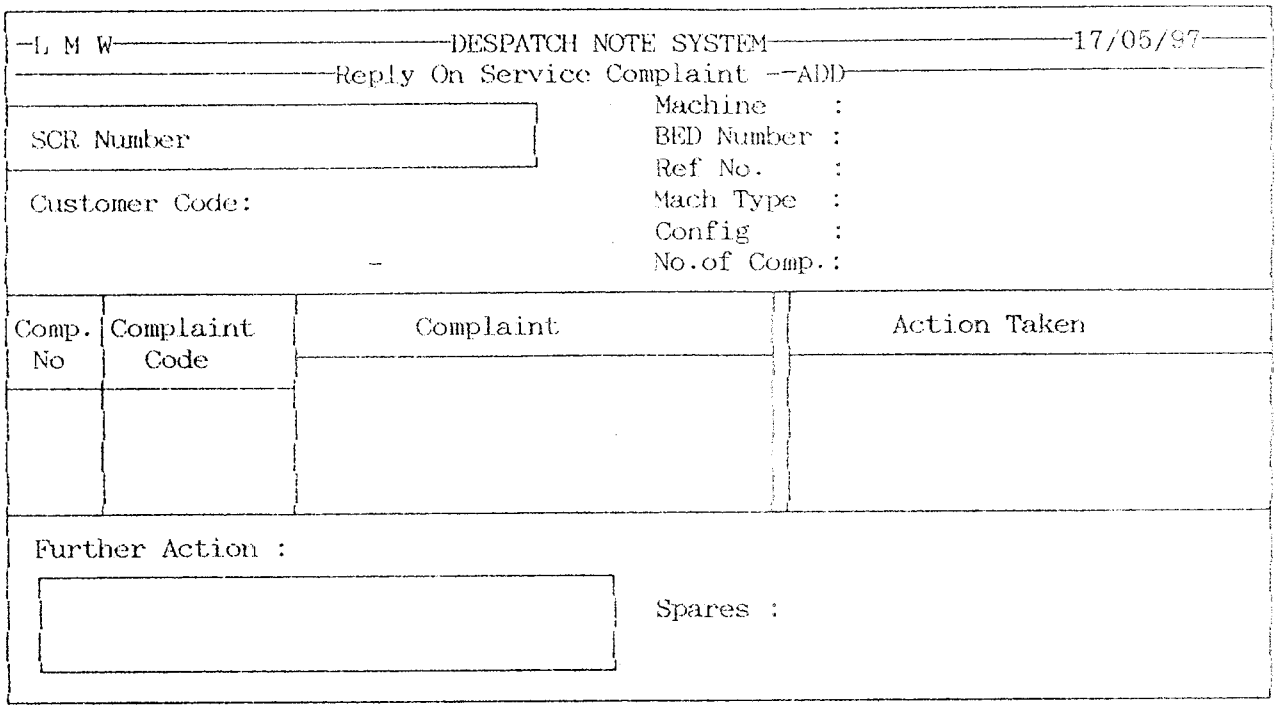
Blank(^F) Exit(F9)



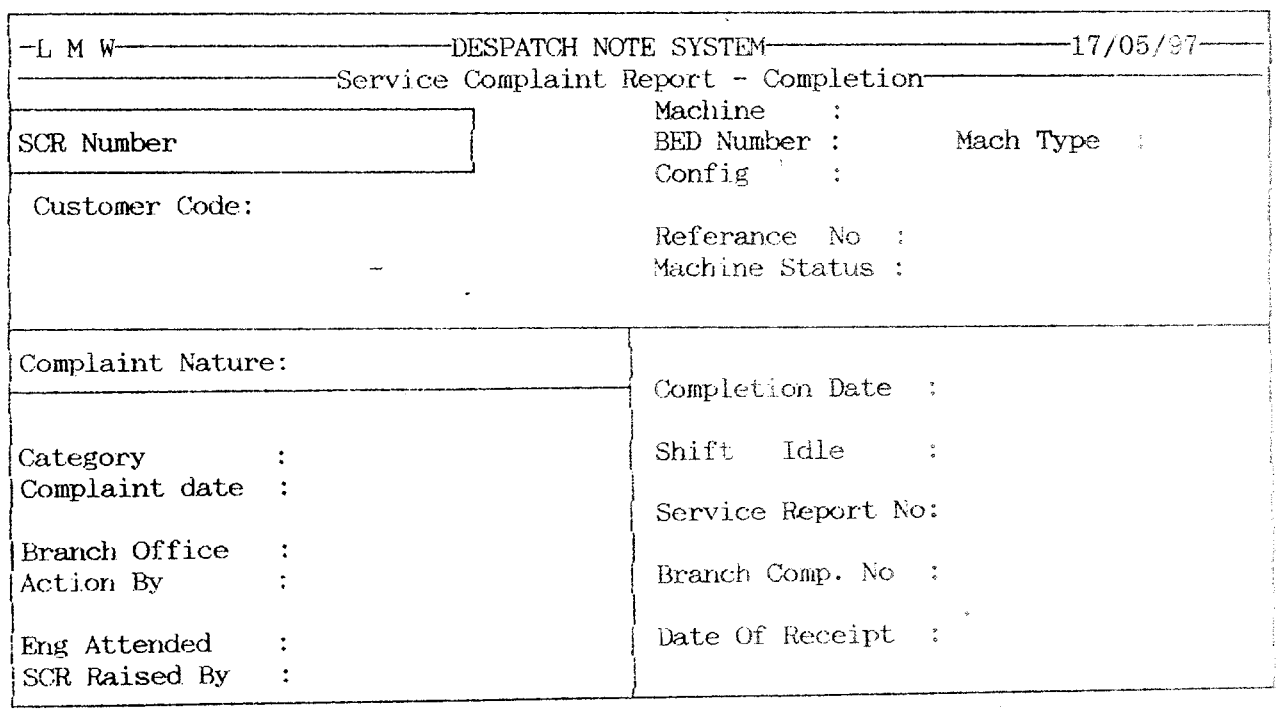
Help(F4) Save(Home) Clear(^F) Exit(F9)



Delete Row(F5) Exit(F9)



Save(Home) Insert Row(F3) Delete Row(F5) Delete(F7) >



Save(Home) Clear(^F) Exit(F9)

Reports

SCOPE OF SUPPLY

REF : 8010567
DATE : 17.03.1997

CUSTOMER DETAILS

DESPATCH ADDRESS
M/S RANE POWER STEERING LTD,
38TH KM STONE,
GST ROAD, (NH45),
VALLANCHERY VILLAGE,
GUDUVANCHERY - 603202

MACHINE DETAILS: 01 - [illegible]

SPEED RANGE : 1234 - 4566 RPM

No	ACCESSORIES	[illegible]
1	CASTER WHEEL MOUNTING	
2	BASE FOR FPC MAIN FRAME	
3	SIDE COVER FOR MAIN FRAME	

No	TOOL HOLDERS	[illegible]
1	SOCKET RP 1/4"	
2	PENDENT PIPE COVER	

No	CNC SYSTEM DETAILS	[illegible]

SCOPE OF SUPPLY

RE : 8010567 [illegible]
DATE : 17.05.1997

No	CNC SYSTEM DETAILS	OPTION NO
1	VOLTAGE STABILIZER	
2	SPECIAL PURPOSE PROGRAMMING TOOL	

No	OTHER FEATURES REQUIRED / SPECIAL REQUIREMENT	OPTION NO/QTY
1	TERMINAL BLOCK MOUNTING PLATE	
2	CYLINDER MOUNTING PLATE	

CUSTOMER SUPPLIED PRODUCT :

50 MATERIALS TO BE TESTED.

TRYOUT REQUIREMENT

NIL.

NOTE: Incase of any doubt, please [illegible]

PREP. CHECKED

TO: AGM, ASSEMBLY, DESIGN, SYSTEMS, [illegible]
QA-TESTING, CSD, COST ACCOUNTS, [illegible]

LAKSHMI MACHINE WORKS LIMITED
MACHINE TOOL DIVISION

TNGST No:322750 DT 25-5-72
CST No : 577250 DT. 25.5.72

ACCEPTANCE OF ORDER

No: 10438/LAL2/96-96 ISD
Date: 31.10.96

To

Dispatch Address
INDIA PISTONS LIMITED,
HUZUR GARDENS
SEMBIAM
CHENNAI 600 011.

Your P.O. No.	Date:	Your ST No.	TNGST NO.

Delivery Schedule : NOV 1995 **Mode of Dispatch :**

Sl No:	PARTICULARS	Qty	Unit	Rate (Rs.)	Value Ex-orks(Rs.)
1	AL-2B-CNE LATHE WITH STANDARD FEAT ESD ACCESSORIES GENRALLY AS PER CAT ALOGUE EQUIPPED WITH SOS SYSTEM INCLUDI NG THE FOLLOWING: SPINDLE ORIENTATION MANUAL PULSE GENERATOR CHIP CONVEYOR BULIT-IN AC FOR CNC SYSTEM SOLID HYDRAULIC CYLINDER INCLUDING RAW BAR AND CYLINDER ADAPOTOR VOLTAGE STABLIZER -25 KVA -RUN TIME DISPLAY -COPY AND RENAME FACILITY -MACHINE DATA IN FLOPPY -MODIFIED COLLANT TANK PRICE FOR MACHINE AS ABOVE FULLY PACKED		NO.		

Payment Terms : RECEIVED Rs. /- AS ADVANCE BALANCE AGAINST PROFORMA

Packing : Full

Inspection :

Color : RAL 6011 / BED NO : 123

We thankfully acknowledge receipt of your order and are pleased to confirm our acceprance as per general conditions of sale (Ref 781/1589) attached herewith.

Enclosures : TERMS AND CONDITIONS ISD

FOR **LAKSHMI MACHINE WORKS LIMITED**

LAKSHMI MACHINE WORKS LIMITED
MACHINE TOOL DIVISION
ARASUR COIMBATORE - 641 407 .

PHONES:
GRAMS:
TELEX:

TO

PROFORMA INVOICE

INV NO: 10438 ISD
DATE : 31.10.95 ISD

TNGST No .322750 dt 25/5/72
CST No. 577250 dt.25.5.72

M/C No: LAL -28 24

YOUR ORDER No.
DATE:
PAYMENT:
DESP BY:

M/C No:

NAME OF THE EXCISABLE GOODS:

DESCRIPTION	Qty	Rate (Rs.)	Value Ex-Works(Rs.)
LAL -2B-CNE LATHE WITH STANDARD FEAT ES AND ACCESSORIES GENRALLY AS PER CAT ALOGUE EQUIPPED WITH SOS SYSTEM INCLUDI NG THE FOLLOWING: - SPINDLE ORIENTATION -MANUAL PULSE GENERATOR -CHIP CONVEYOR -BULIT-IN AC FOR CNC SYSTEM -SOLID HYDRAULIC CYLINDER INCLUDING DRAW BAR AND CYLINDER ADAPOTOR -VOLTAGE STABLIZER -25 KVA -RUN TIME DISPLAY -COPY AND RENAME FACILITY -MACHINE DATA IN FLOPPY -MODIFIED COLLANT TANK			
PRICE FOR MACHINE AS ABOVE FULLY PACKED	1 No	25,75,000.00	

EX. WORKS :
BED :
CST/TNGST :
SURCHARGE :

GROSS TOTAL :
LESS ADVANCE :

BALANCE PAYABLE:

For LAKSHMI MACHINE WORKS LTD.,

TOTAL PAYABLE

Rs. 25,78,090.00

LAKSHMI MACHINE WORKS LIMITED

MACHINE TOOL DIVISION

INVOICE

PHONES:
GRAMS:
TELEX:

CONSIGNEE:

Tariff no.

Exemption Notification

INV. NO.

DATE:

CLIENT'S CODE NO. :
RC. NO. :
R.C.DATE :

YOUR ORDER No.
DATE:
PAYMENT:
DESP BY:

M/C No:

NAME OF THE EXCISABLE GOODS:

DESCRIPTION	Qty	Rate (Rs.)	Value Ex-orks(Rs.)

PACKING DETAILS
DATE AND TIME OF PREPARATION:
DATE AND TIME OF REMOVAL:

EX. WORKS :
BED :
CST/TNGST :
SURCHARGE :

GROSS TOTAL :
LESS ADVANCE :

BALANCE PAYABLE:

MACHINE TOOL DIVISION

LMW

L M W

FREE ORDER NUMBER : FR 435 / 96

Date : 07.01.199

M T D | From : Sales | COMM. DATE : 26.06.1996 | To : CSO | Page : 1

Customer Code :

Reference No. : 8010567

Mode of Despatch : BY COURIER TO LMW MSO

Customer Name & Address : M/S RANE POWER STEERING LTD,
38TH KM STONE,
GST ROAD, (NH45)
VALLANCHERY VILLAGE
GUDUVANCHERY - 603 202

Sl_no	Drawing Number	Description	Req. Qty	Rate	Amount	Bed	Machine	Reason	Remarks
1	4/99 407 002 09	WIRE BRAIDED LUB. HOSE WI H SPRING GUARD 4X 400	1.00	118.00	118.00	25%	LAL-2 - 150	FAILURED.	PS

SERVICE COMPLETION RECORD

Date : 10.05.1997 Ref : 8010556

From : SALES Thru : Sr. Manager Sales / TD To : CSD

Complaint No. : 977072 /1 Customer : 491456 M/S NUMERITECH ENGINEERS (I

M/c Type : 07-PILATUS Bed No. : 06 Config : F/F/F

Comm. Date : 04.04.1997 FR No.& Date : 0/

M/c Status : Complaint Closed. Complaint Nature : MAJOR

Category : WARRANTY Branch Office : DSC

Action By : BRANCH OFFICE Completion Date : 29.04.1997

Shift Idle : 0 Date of Receipt : 17.04.1997

Service Report No. : UP/416 Branch Comp.No. : 974068

Complaint :

1 409 Servo alarm.
2 Alarm - 57 in SDM & Alarm -8 in thePAM.

Service Engineer Observation :

1 Checked and found drive power supply module was faulty.The same has been replaced by new one suppliedby Fanuc-Delhi.
2 .

Further Action :

1 .
2 .

Engineer Attended : U.PERIASAMY

FR Raised By : S.KUMARAN (Sales)

Signature

FL 02-0996

SERVICE COMPLAINT RECORD

Date : 06.05.1997

From : SALES Thru : Sr. Manager Sales / TC

Complaint No. : 977043 /1 Customer : 491045 BRAKES INDIA LTD.

M/c Type : 08-D-50 Bed No. : 04

Comm. Date : 19.04.1995

M/c Status : M/c Idle.

Category : NON WARRANTY

Action By : SALES

Complaint :

1 1.Door solenoid supply shorted &resulted failure of
swithches.

2 2.After replacing the switches it
moving .

ervice Engineer Observation :

1 All proximity switches were replaced

2 Suspected I/O board may be failure.

rther Action :

1 .

2 One no. of I/O. PCB. sent on returnable basis.

ineer Attended : N/KIRUBASHANKAR

Raised By : M.MARIAPPAN

02-09%