A REPORT

ON

COMPUTERIZATION OF

MARKETING AND FINISHED GOODS STORE

BY

Chinthakayala Bharath Kumar	2011A7PS007P
K Harshavardhan Reddy	2011A7PS081P
Siddenki Vikranth	2011A3PS192G
Sachin Paryani	2011B5A7425G

AT

HMT BEARINGS LTD., Hyderabad

A Practice School – I Station of

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

(July, 2013)

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AT

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BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE,

PILANI (RAJASTHAN)

Practice School Division

Station: HMT BEARINGS LTD. **Centre:** Hyderabad

Duration: 22-05-2013 to 13-07-2013(53 days)

Date of Start: 22-05-2013

Date of Submission: 10-07-2013

Title of project: COMPUTERIZATION OF MARKETING AND FINISHED GOODS STORE

ID NOs. /Names of students/ Disciplines of the students:

2011A7PS007P	Chinthakayala Bharat Kumar	Computer Science
2011A7PS081P	K Harshavardhan Reddy	Computer Science
2011A3PS192G	Siddenki Vikranth	Electrical and Electronics
2011B5A7425G	Sachin Paryani	Computer Science

Names and Designations of the Experts:

Mr Md Liakhat Ali Mohiddin, Joint General Manager and Factory Manager.

J. Ramesh, Deputy General Manager.

Name of the PS Faculty: Dr. I Sreedhar

Key Words: Java, jdbc, NetBeans, jdk, SQL queries etc.

Project Areas: Database development and Software design.

Abstract: This project is aimed to extend already established computerized accounting system (PACT) from Finance department to both Marketing and Finished Goods Stores at HMT Bearings. This Project mainly deals with enhancing performance and efficiency by computerizing the records. A Java stand-alone application is being prepared which allows editing and modifying content as well as maintenance from a central interface. This research seeks to determine the extent and direction of computerization of records systems in businesses with identifiable records departments. Computerized records managers are extremely efficient for tracking records. This project helps traditional paper records to be moved to a digital format. The java application is being used to create various forms needed for the company; this data is saved in a database, to achieve efficient cooperation between the records management and data processing. Java is being used to create front end and MySQL for backend. Front and back ends are linked by Java Database Connectivity (JDBC).

Signature of Students **Signature of PS Faculty**

Date:

Date:

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HMT BEARINGS LTD.

1.1 Introduction

HMT Bearings which was previously Indo-Nippon precession bearings was setup in 1964. The company went on stream in August 1970, in technical collaboration with M/s. Koyo Seiko Co., Ltd., Japan, an internationally reputed manufacturer of Bearings. In the year 1981, the company became a wholly owned subsidiary of HMT Limited. The company has designed, manufactured and supplied bearings, for various applications required for the user industries. This is the only company of its kind in the public sector set-up to manufacture Ball & Roller Bearings. Keeping in tune with the times, the main thrust of the company has been development of new and custom built sizes. HMT Bearings adopted an operating philosophy to establish and maintain an environment, which will result in continuous improvement.

1.2 Manufacturing Facilities

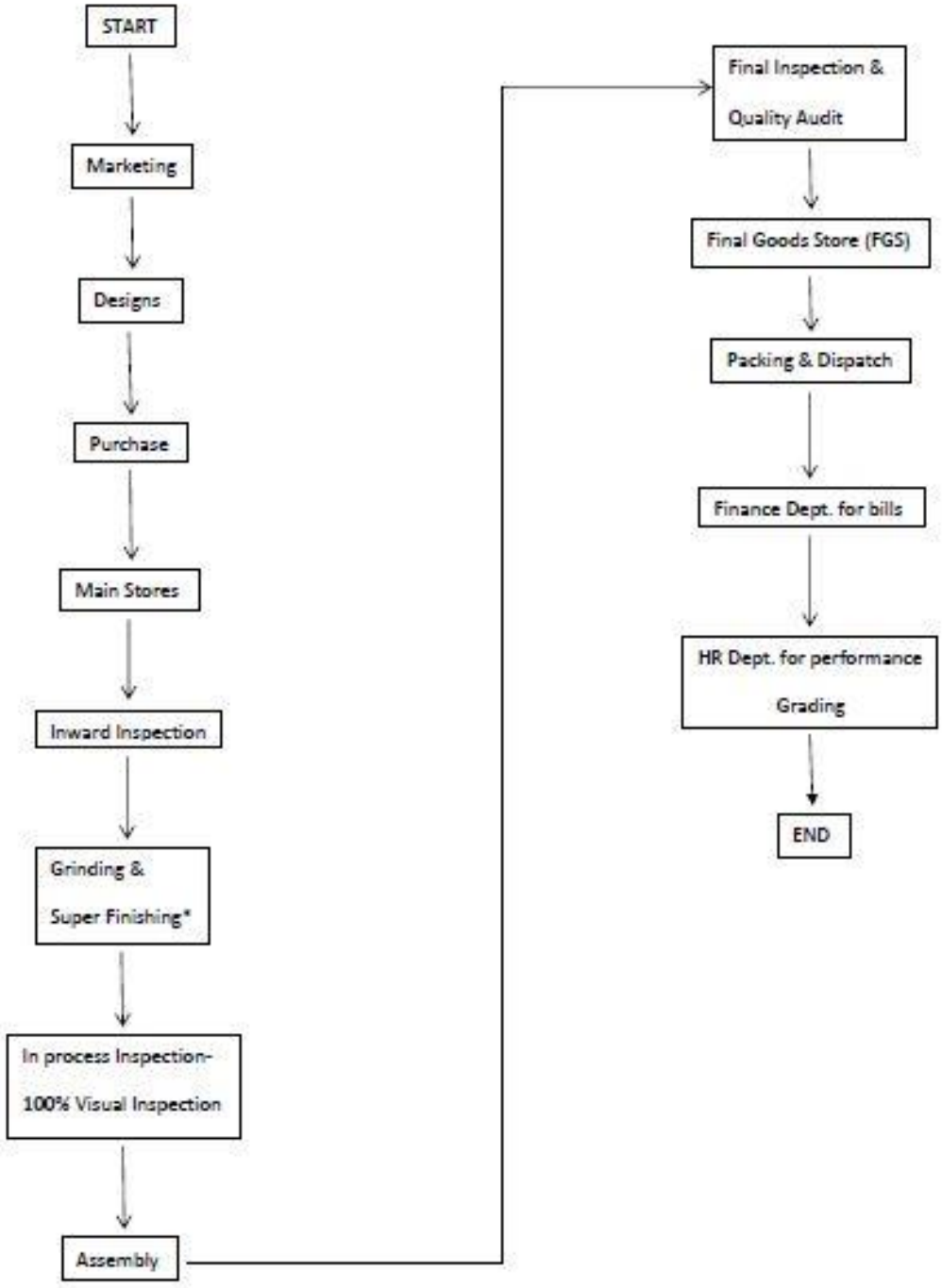
The company manufactures 3 types of bearings. Machines are placed in a line based on its type. The company has following lines:

3 Ball Bearing Lines**,** 2 Cylindrical Roller Bearing Lines, 2 Taper Roller Bearing Lines**,** 2 CNC Versatile Grinding Lines.

The machines in these lines can perform following operations:

- Face Grinding
- OD Grinding
- Raceway and Rib Grinding
- Bore Grinding
- Raceway Super finishing

1.3 PROCESS MAPPING



Grinding & Super Finishing

There are sub processes present in Grinding and Super Finishing which differs from bearing to bearing i.e. for Ball Bearings (BB), Tapered Roller Bearing (TRB) and Cylindrical Roller Bearings (CRB).

For Ball Bearings (BB) the sub process order is:

INNER & OUTER RINGS:

1. Face Grinding
2. OD Grinding
3. Bore Grinding (only for Inner Ring)
4. Raceway Grinding
5. Raceway Super Finishing

For Tapered Roller Bearing (TRB) the sub process order is:

INNER RINGS:

1. Face Grinding
2. Raceway Grinding
3. Rib Grinding
4. Bore Grinding
5. Raceway Super Finishing

OUTER RINGS:

1. Face Grinding
2. OD Grinding
3. Raceway Grinding
4. Raceway Super Finishing

For Cylindrical Roller Bearings (CRB) the sub process order is:

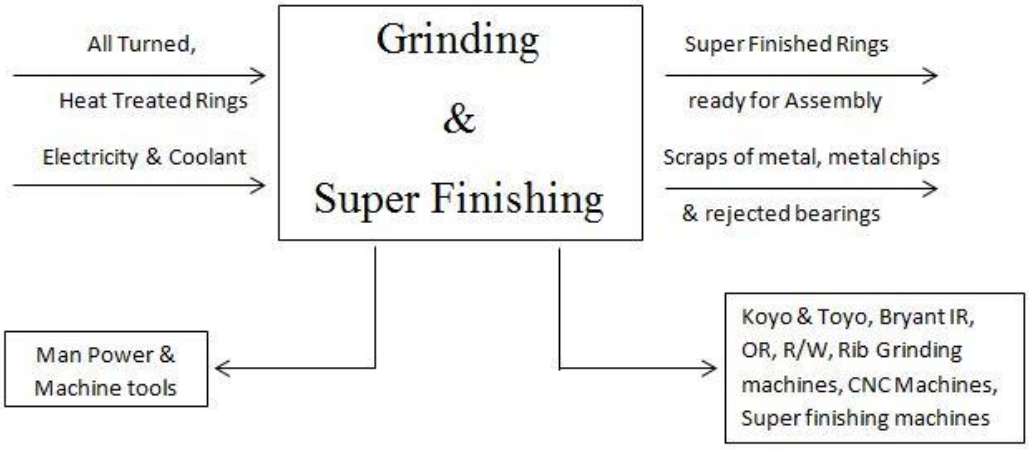
INNER & OUTER RINGS:

1. Face Grinding
2. OD Grinding (only for Outer Ring)
3. Rib & Raceway Grinding
4. Bore Grinding (only for Inner Ring)
5. Raceway Super Finishing

1.4 ACTIVITY MAPPING

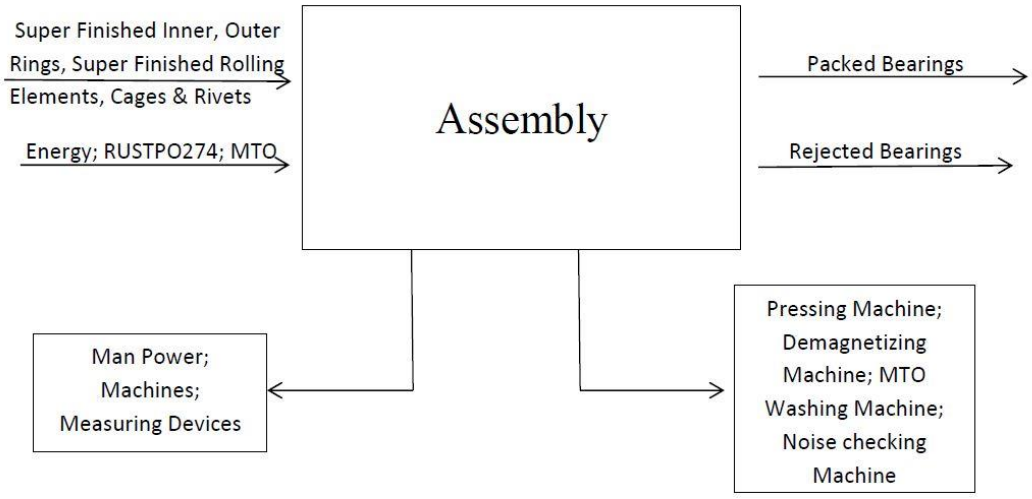
The main activities taking place in the company are grinding, super finishing and assembly.

1.4.1 Activity mapping of Grinding an d Super Finishing



Input	Other inputs	Activity	Resources, Tools & Method	Activity Control	Output	Unintended Outputs
H.T Turned Inner Rings	Electricity & Coolant	Grinding and Super Finishing	Koyo & Toyo, Bryant IR, OR, R/W, Rib Grinding machines, CNC Machines, Super finishing machines; Electricity, Man power; Grinding & Super Finishing	Deviation from the desired value	Super Finished Inner Rings ready for Assembly	Metal Chips & scraps; Rejected Inner Rings
		(i)Face Grinding		(i) +10 to -10 microns		
		(ii)OD Grinding		(ii)-20 to -30 microns		
		(iii)Bore Grinding		(iii) -2 to -11 microns		
		(iv)R/W Grinding		(iv) +20 microns		
		(v) Super Finishing		(v)-10 to +10 microns		
		(vi)Visual Inspection		(vi) ---		
H.T Turned Outer Rings	Electricity & Coolant	Grinding and Super Finishing	Koyo & Toyo, Bryant IR, OR, R/W, Rib Grinding machines, CNC Machines, Super finishing machines; Electricity, Man power; Grinding & Super Finishing	Deviation from the desired value	Super Finished Outer Rings ready for Assembly	Metal chips & scraps; Rejected Outer Rings
		(i)Face Grinding		(i) -40 to -60 microns		
		(ii)OD Grinding		(ii) -2 to -11 microns		
		(iii))R/W Grinding		(iii) -20 microns		
		(iv) Super Finishing		(iv)-10 to +10 microns		
		(v)Visual Inspection		(v) ---		
H.T Rollers & Balls	——	No activity is performed on H.T Balls and Rollers as finished Balls and Rollers are outsourced.Therefore only Visual Inspection is done.	——	——	Super Finished Balls & Rollers ready for Assembly	Rejected Balls & Rollers

1.4.2 Activity mapping of Assembly



Input	Other inputs	Activity	Resources, Tools & Method	Activity Control	Output	Unintended Outputs	Activity Performance
Super Finished Inner & Outer Rings from shop floor	Electricity	Demagnetizing	Demagnetizing Machines & Lubricants	___	Demagnetized Rings	Adulterated Lubricants	___
Inner & Outer Rings from Demagnetizing M/C	Electricity	Washing	Dewatering Oil Machine(MTO)	___	Washed Rings	Adulterated Lubricants	99%
Balls, Rollers, Cage, Rivets	___	Ball & Roller filling in Cage by Pressing using Rivets	Punching Machine, Die, Man Power	___	Bearings	Rejected Bearings	99%
Bearings	Electricity	Quality control		Varies from Bearing to Bearing	Accurate Bearings	Rejected Bearings	99.99%
		(i)Noise Check	Noise Check Machine				
		(ii)Dimension Check	Air & Pressure Gauges				
		(iii)Hardness Check	Brinell Hardness testing M/C				

1.5 Quality System Management

Each new development of a bearing is preceded by advance product quality planning followed with comprehensive control plans. The process is controlled with modified tolerances, to ensure safe conformity of final product. Product quality is monitored through various stages of production and continuously evaluated for improvement. Each bearing undergoes as many as 150 checks before it is supplied to the customer. Quality appraisal equipment includes sophisticated equipment like Profile testing, Waviness testing, Surface texture testing, Circularity testing and Bearing Vibration testing etc., Quality Appraisal equipment are updated from time to time. Company has been certified with ISO - 9001 and TS - 16949 quality systems

2. PROJECT: COMPUTERIZATION OF MARKETING & FGS

2.1 Introduction to the project:

In HMT bearings limited, there is computerization only in finance and accounts department, with the PACT software. In these departments they need not do the work manually they just need to enter the required details in the forms like INVOICE etc. that are there in PACT.

In marketing and finished goods store (FGS), they are doing the work manually, they need to enter the details everything manually. So we are going to computerize both these departments. With this, work load will be reduced, at present in manual work there are many fields that are being repeated in different departments like customer details, etc. This repetition will be reduced by computerization, also we can easily access the monthly sales, monthly or year wise collection register etc. Almost all the manual work will be removed by this computerization in marketing and FGS. There would be reduction errors by computerization as we will be linking both these departments, but in manual work there would be more chances for errors. We will be creating the required database (Appendix) and the user interface for these two departments (marketing and finished goods store (FGS)).

2.2 Forms collected:

Different forms required for preparation of these reports are:

1) Customer details

2) Order form

3) Order acceptance (O.A)

4) Despatch instruction (D.I)

5) Packing sheet (P.S)

6) Invoice

7) Bearing details

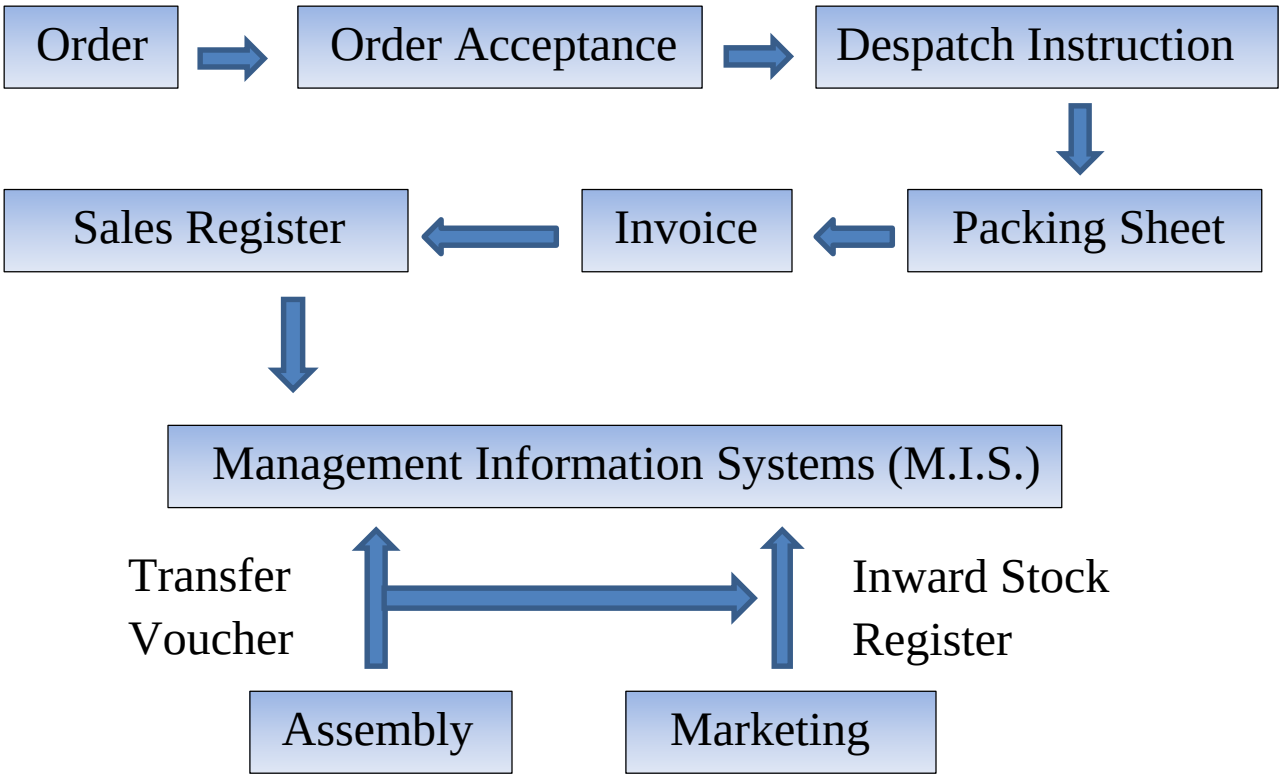
8) Transfer Voucher

9) Inward Stock Register.

2.3 Process Flow:

Based on the **Order** given by the customer, **Order Acceptance** sheet is prepared specifying the payment terms, despatch mode etc. A copy of the order acceptance is sent to the customer and the Finance Department. After the preparation of the order acceptance sheet, a **Despatch Instruction** sheet is prepared specifying the destination, due date for the delivery. The prepared despatch instruction sheet is sent to the **Finished Goods Store** (**FGS**) where the **Packing Sheet** is prepared specifying the order, no. of cases, weight of the consignment and other details. The despatch instruction sheet and packing sheet are sent to the finance department for the preparation of the **Invoice.** After the invoice is prepared the bearings ordered, their quantity, the customer name, invoice no. are added to the **Sales Register**. Based on the sales register a **Collection Advice** is prepared for collecting the money and is then added to the **Collection Register**. An **Outward Stock Register** is maintained in the FGS where the dispatches made are noted according to the bearing no. An **Inward Stock Register** is maintained by the marketing department which gives the details of stock available for various bearings. The inward stock register gets its input from the **Transfer Voucher** prepared in the assembly.

The preparation of **Operating Results** and **Performance Report** in **Management Information System** involves collection of data from various sources. These include transfer voucher from assembly, sales register and inward stock register from the marketing department.

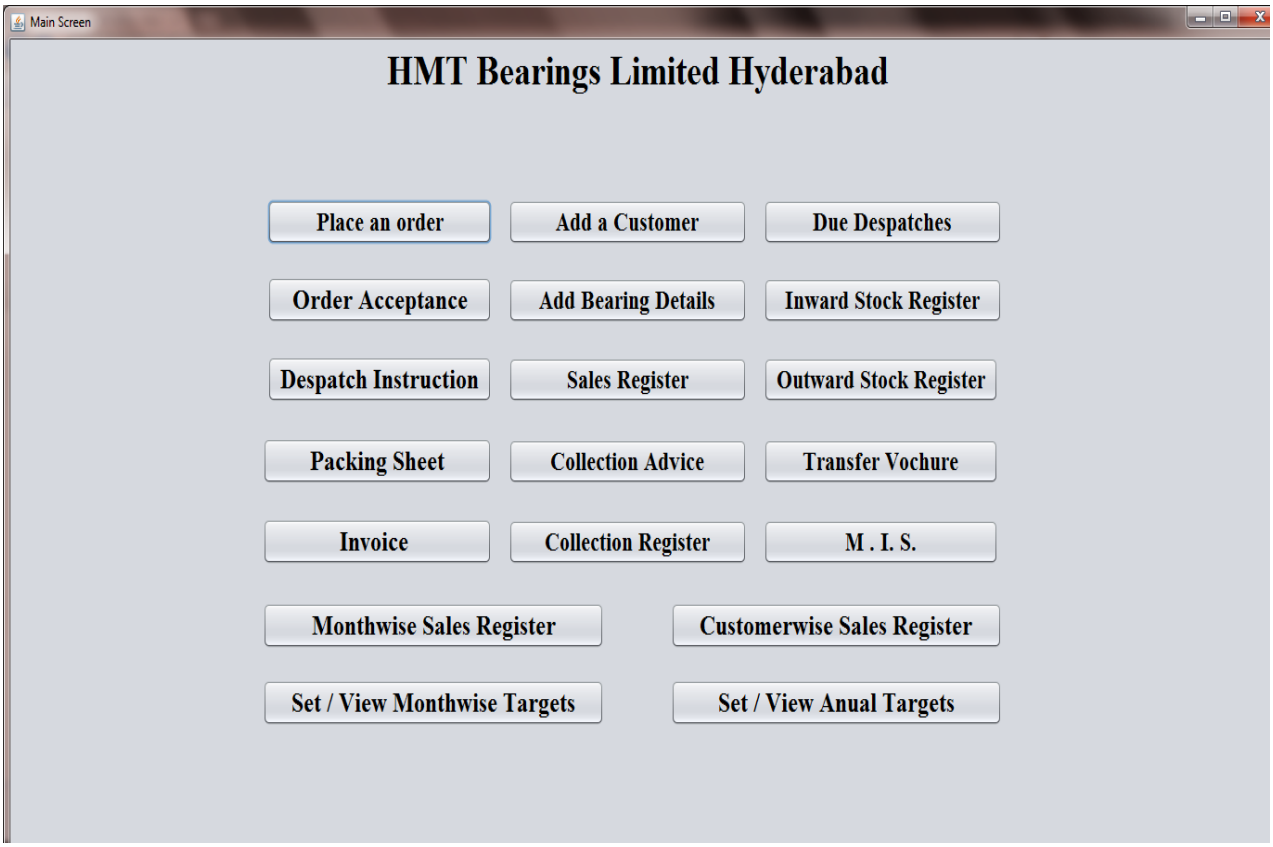


2.4 Description of the user interface

The following gives a brief description of the user interface.

2.4.1 Home Screen:

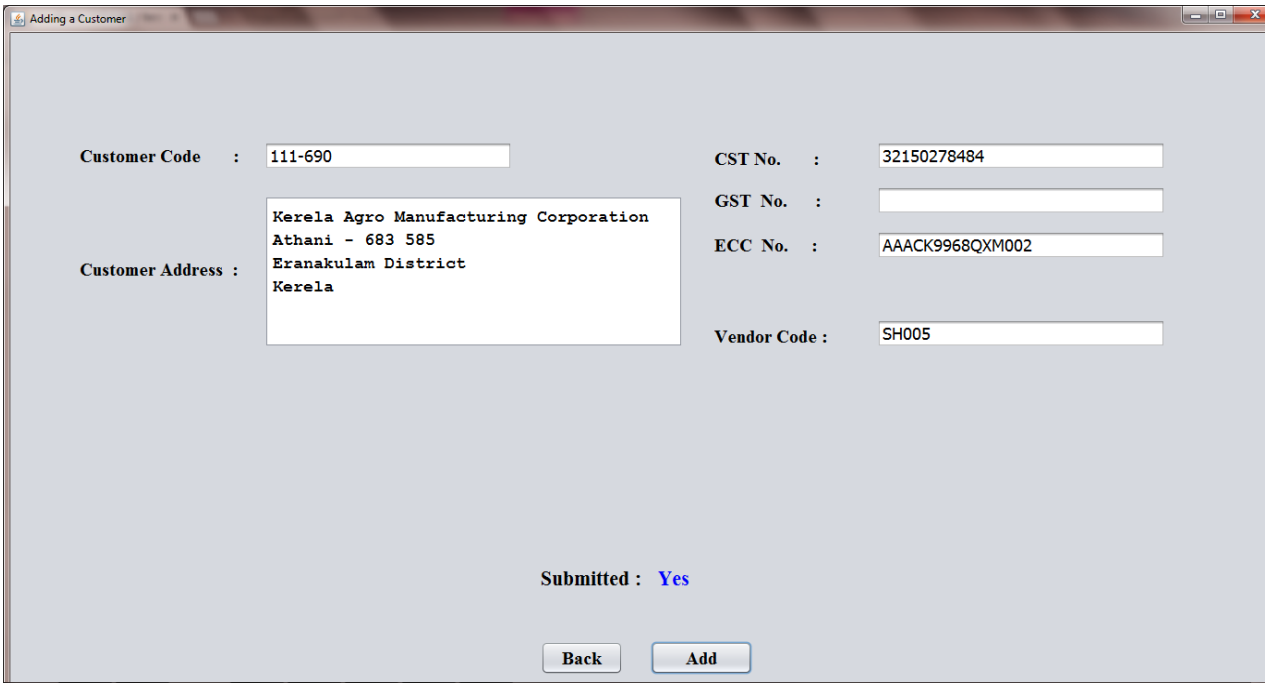
This is the main screen of the user interface which provides the user with various options.



The following description shows the forms generated when each of the button is clicked.

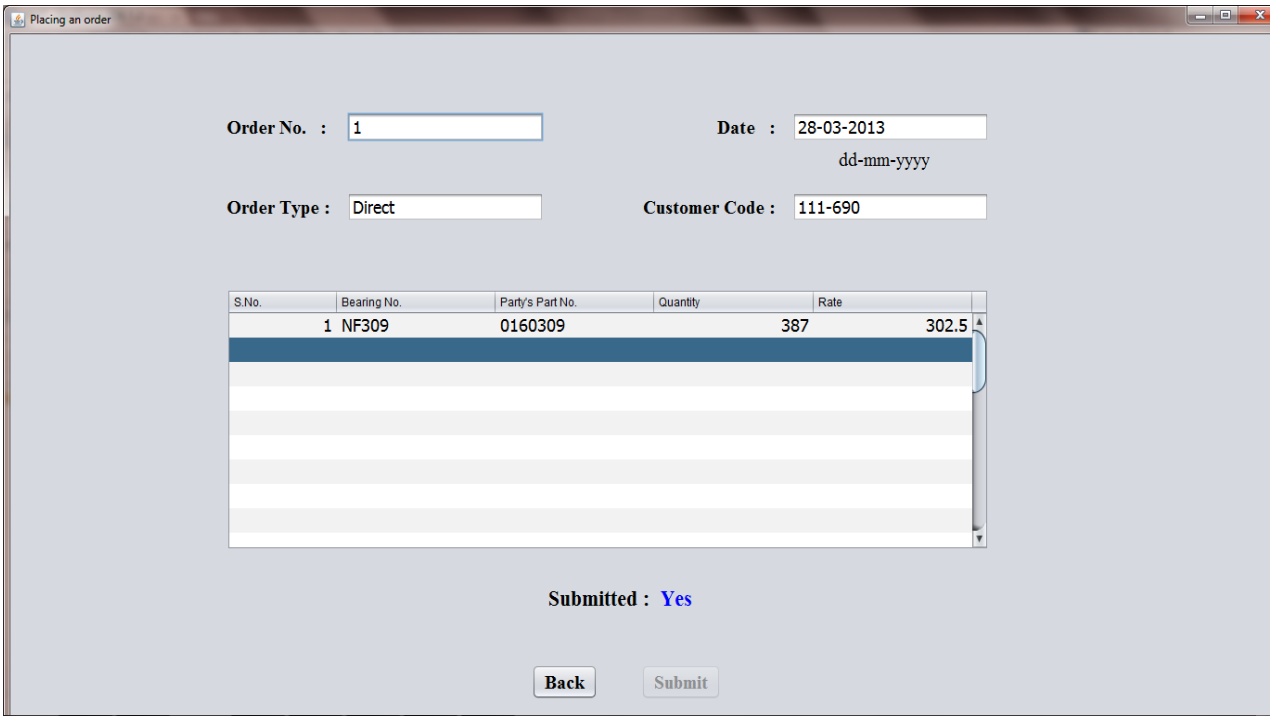
2.4.2 Add a Customer:

Customer details are entered in this form and stored in the database.



2.4.3 Place an Order:

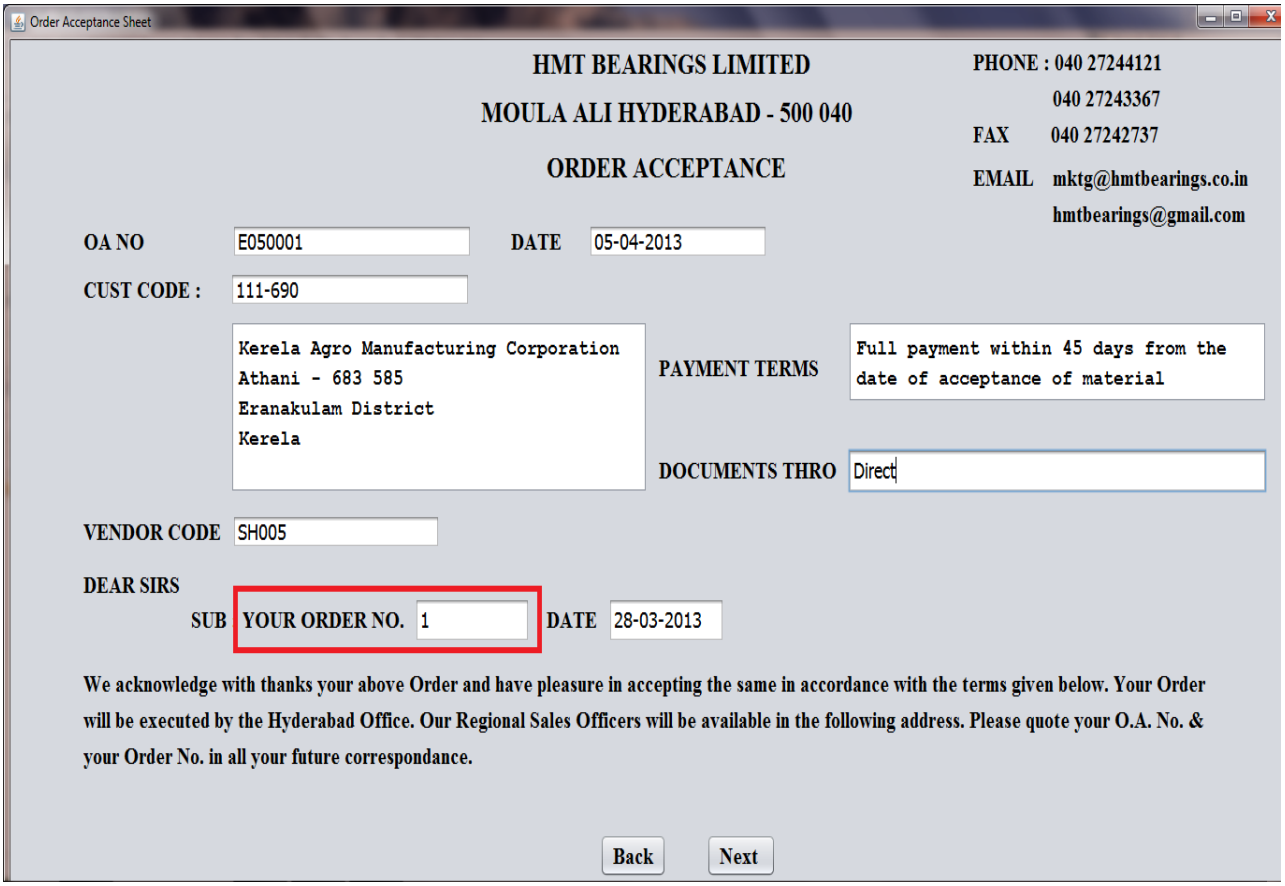
Order details are entered in this form.



2.4.4 Order Acceptance:

Based on the order, Order Acceptance sheet is prepared. The following table shows the required fields to be entered and the fields generated based on the order no.

Key field	Fields generated	Remaining fields to be entered
Order No.	Customer Code, Address, CST No. Vendor Code, Order Date, Ordered bearing details.	OA Date, Payment terms, Documents Thro Mode of dispatch, P & F charges, Insurance, Freight Price, Central tax and State tax.



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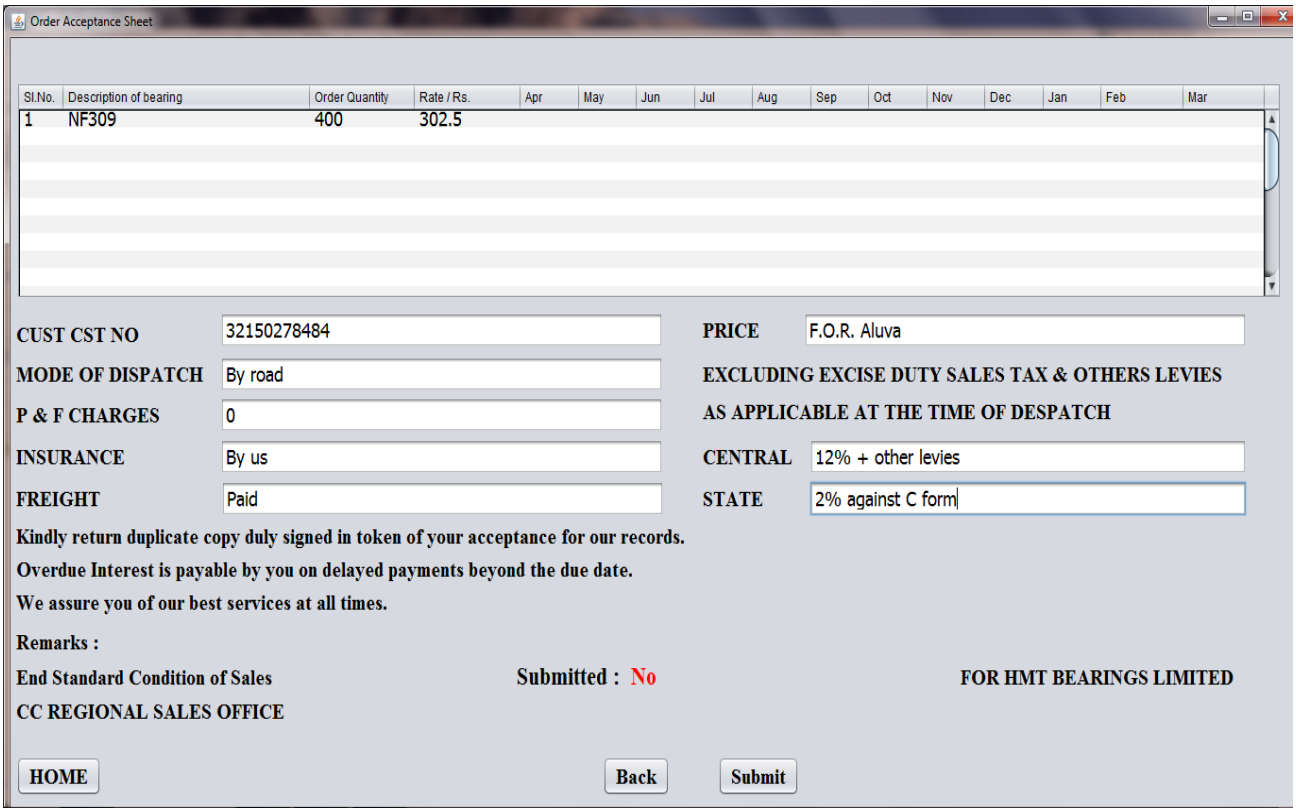
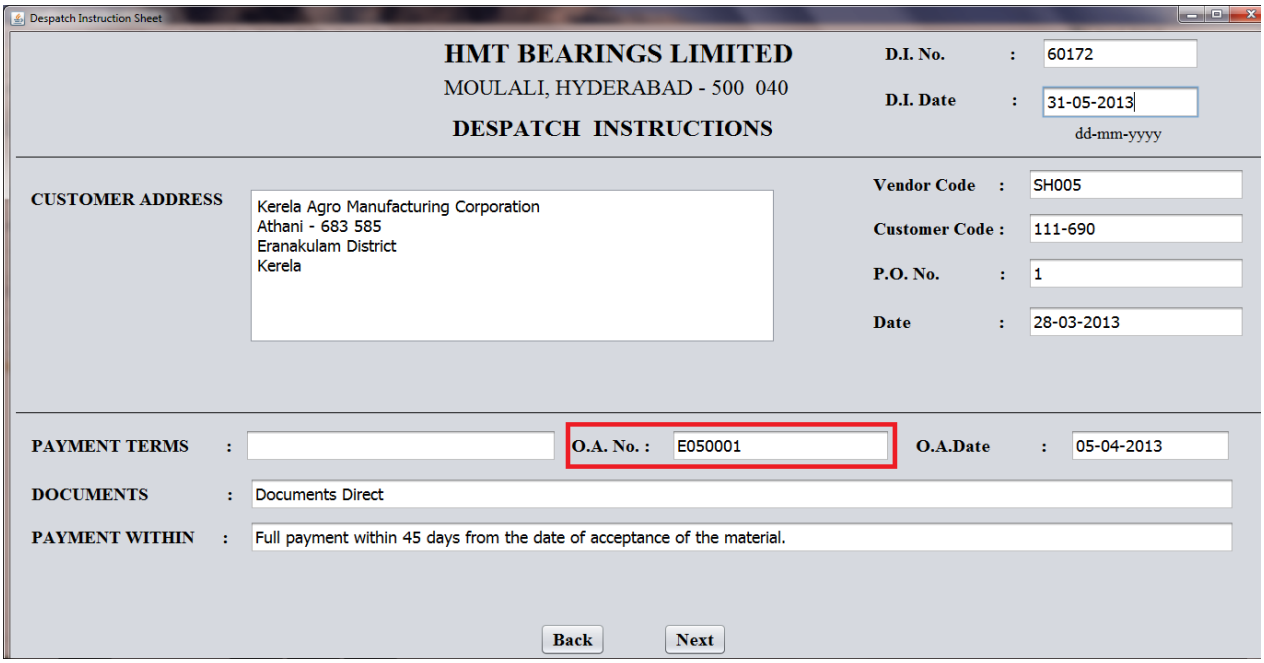
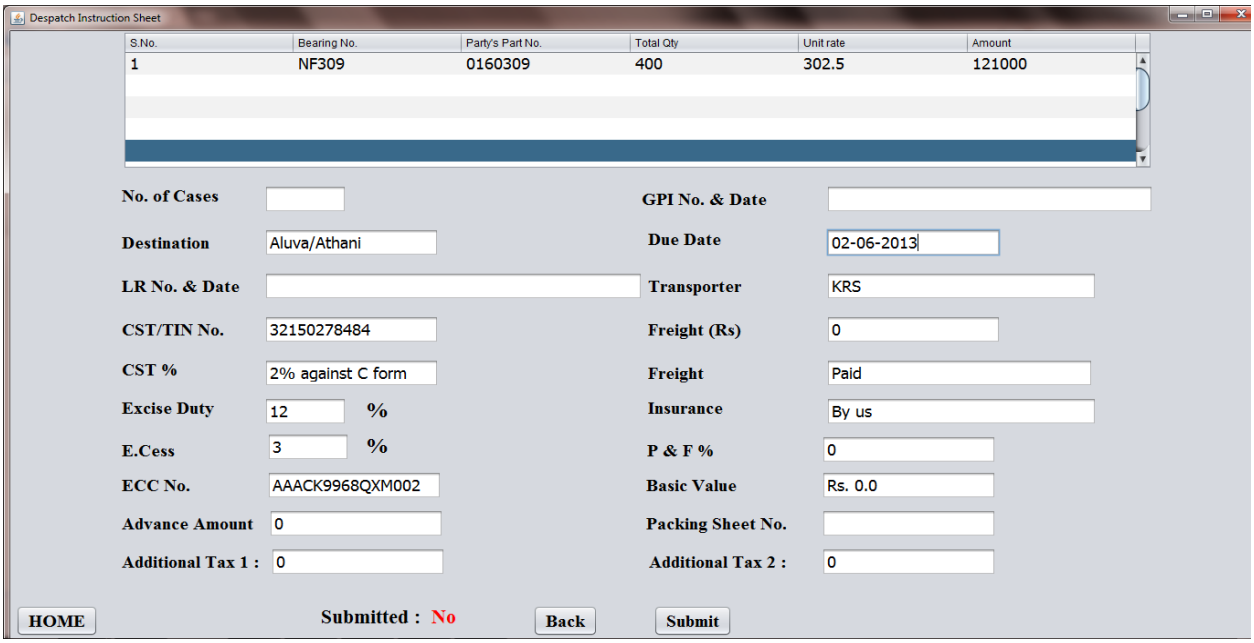


2.4.5 Despatch Instruction:

After the preparation of order acceptance, despatch instructions are prepared. Any no. of despatch instructions can be prepared for an order depending on the quantity of the bearings ordered. Based on the OA no. entered, the customer details and order details are filled. DI No. is generated based on the previous despatch instruction. Other details have to be filled by the user.

Key field	Fields generated	Remaining fields to be entered
OA No.	Customer Code, Address, CST No., ECC No., Vendor Code, Payments Within, Documents, Order No., Order Date ,OA Date , Freight, Insurance.	DI Date , Destination , CST% Excise duty, E.cess, Advance amount Due date, Transporter, Freight (Rs) P & F %, Additional taxes (if any).

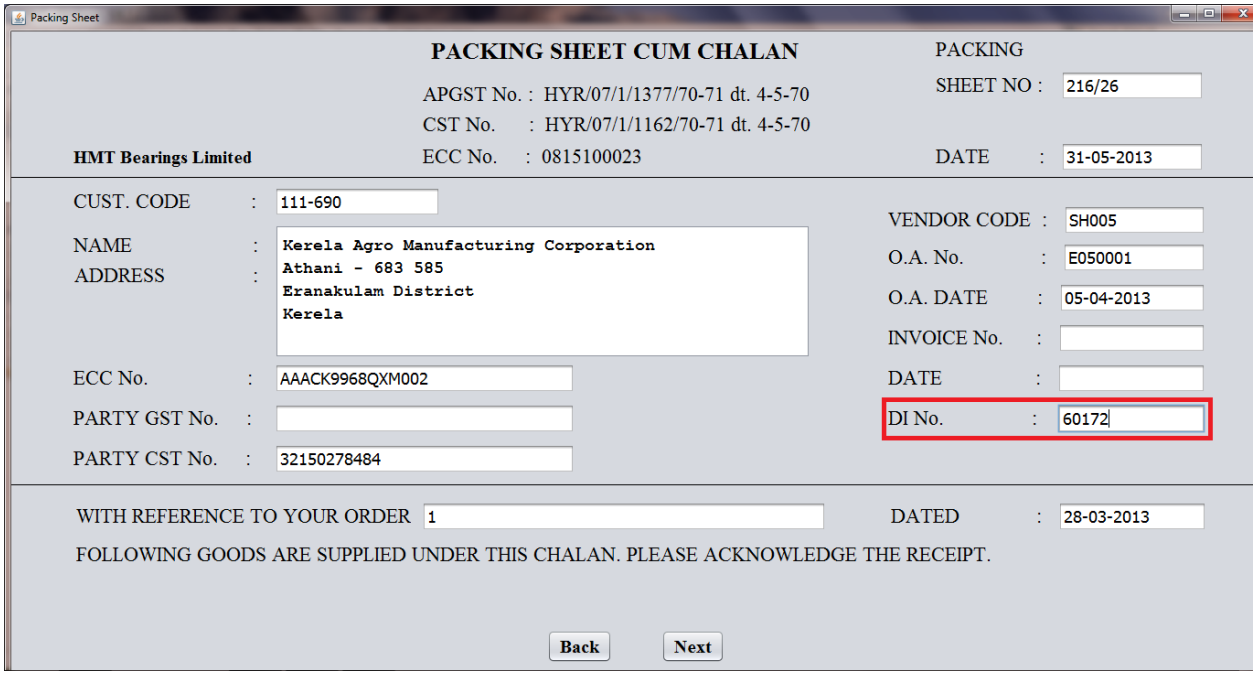


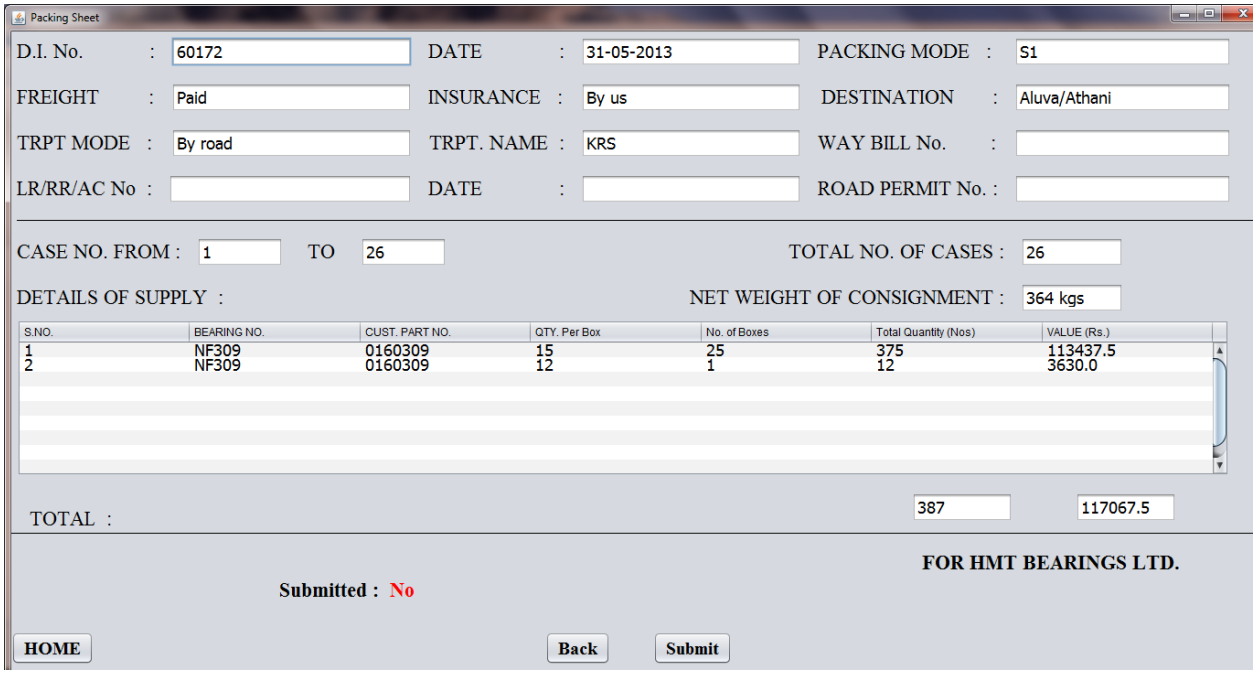


2.4.6 Packing Sheet:

For each despatch instruction sheet, a packing sheet is prepared specifying the no. of boxes and bearings content of boxes being supplied. Packing sheet no. / Chalan no. is generated based on the previous packing sheet. Other details are to be filled by the user.

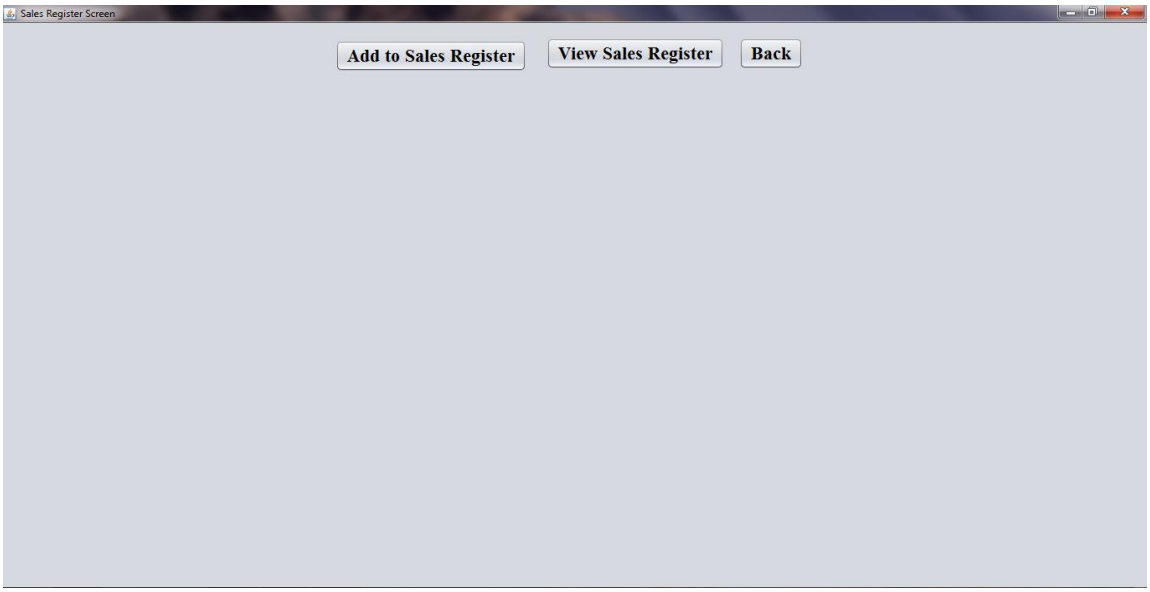
Key field	Fields generated	Remaining fields to be entered
DI No	Customer Code, Address, CST No., ECC No., Vendor Code, GST No., Order No., Order Date, OA No., OA Date , DI Date, Freight, Insurance, Transportation mode, Transporter name , Destination.	Packing Sheet Date, Packing Mode, Way Bill No., Road permit no Case No., Weight of Consignment, Supply Details.





2.4.7 Sales Register:

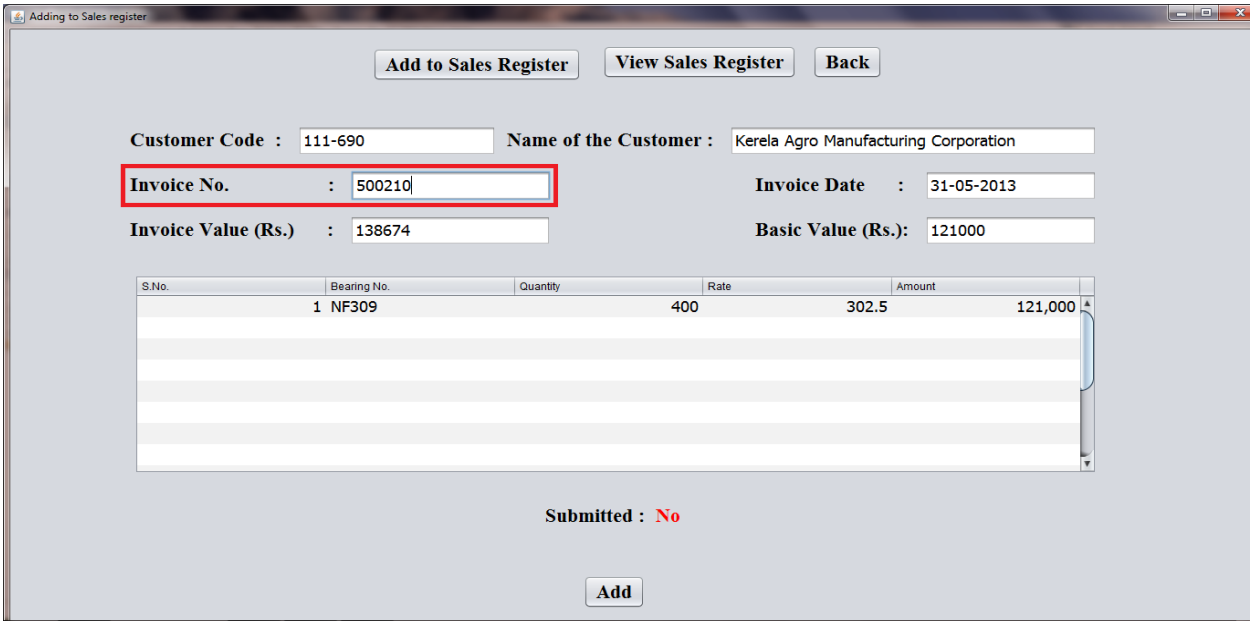
This screen provides the option to add records to sales register and to view sales records.



2.4.8 Add to Sales Register:

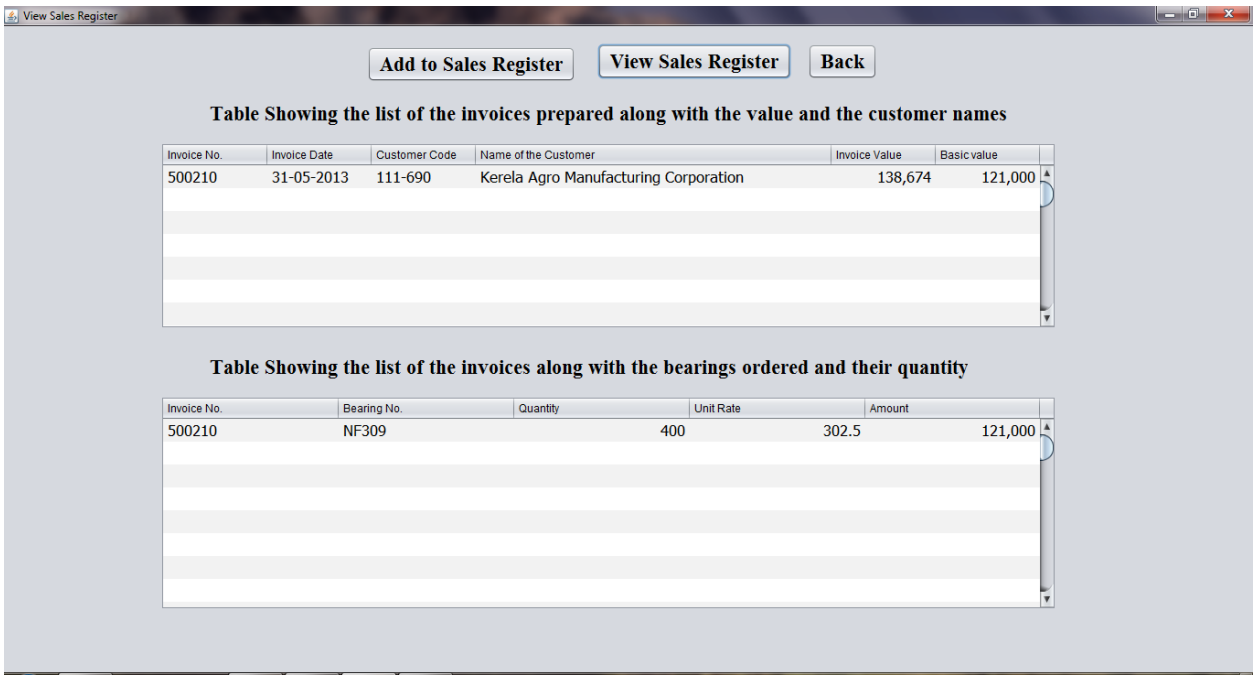
After an invoice is prepared, it is added to the sales register. The invoice no. is entered and remaining fields are generated.

Field to be entered	Fields generated
Invoice no	Customer Code ,Name ,Invoice Date ,Basic Value ,Invoice Value ,Bearing details.



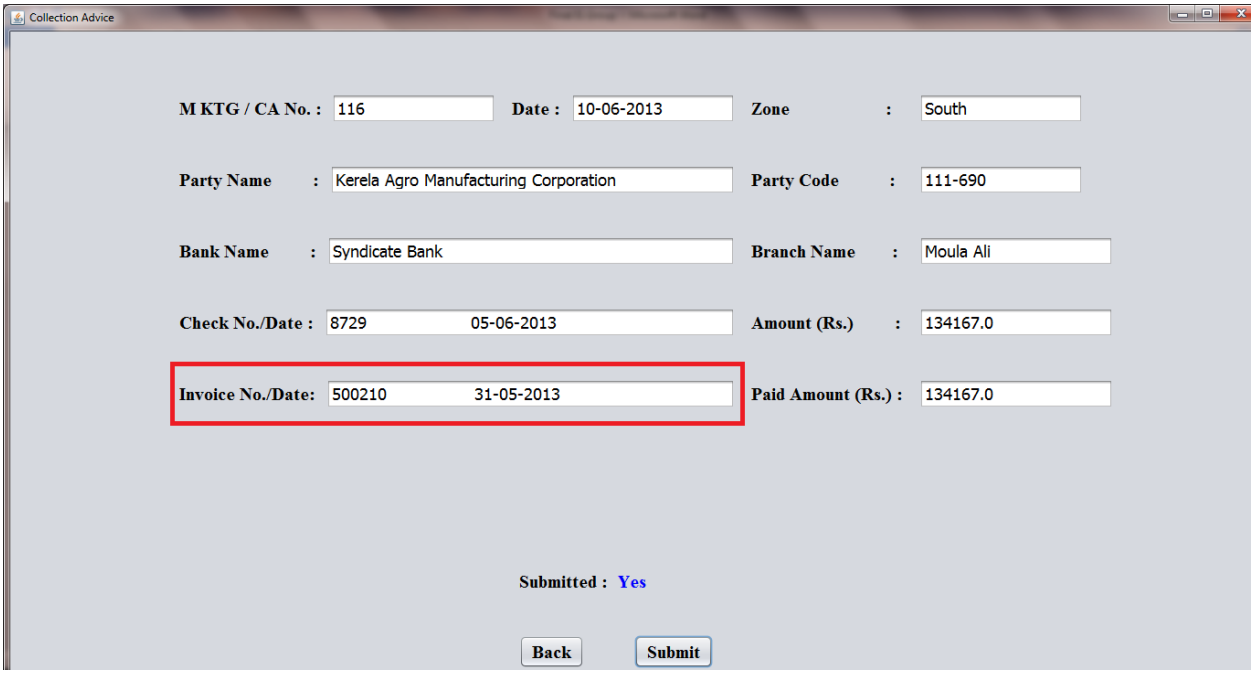
2.4.9 View Sales Register:

Two tables are created, one showing the invoice no., customer details, invoice value and basic value and other showing the invoice no. and the details of the bearings supplied.

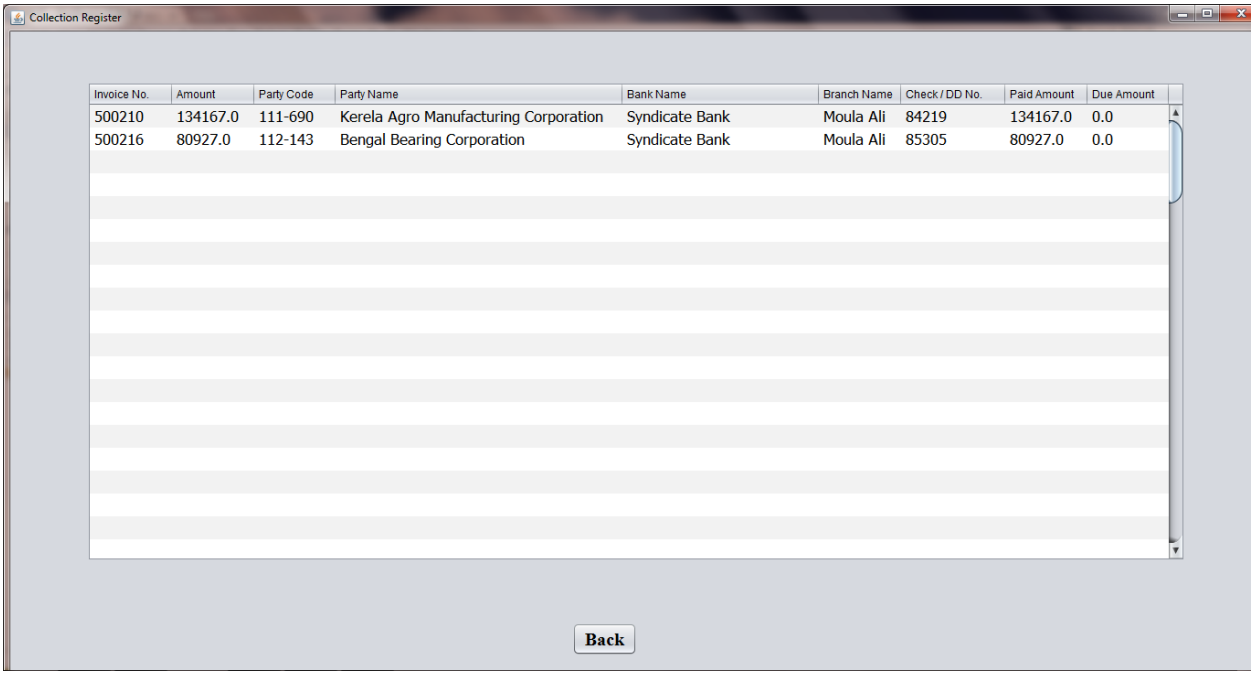


2.4.10 Collection Advice:

Key Field	Fields Generated	Remaining Fields to be filled
Invoice No.	Invoice Date, Party Code, Name, Amount	Date, Zone, Bank Name, Branch Name, Check No., Paid Amount

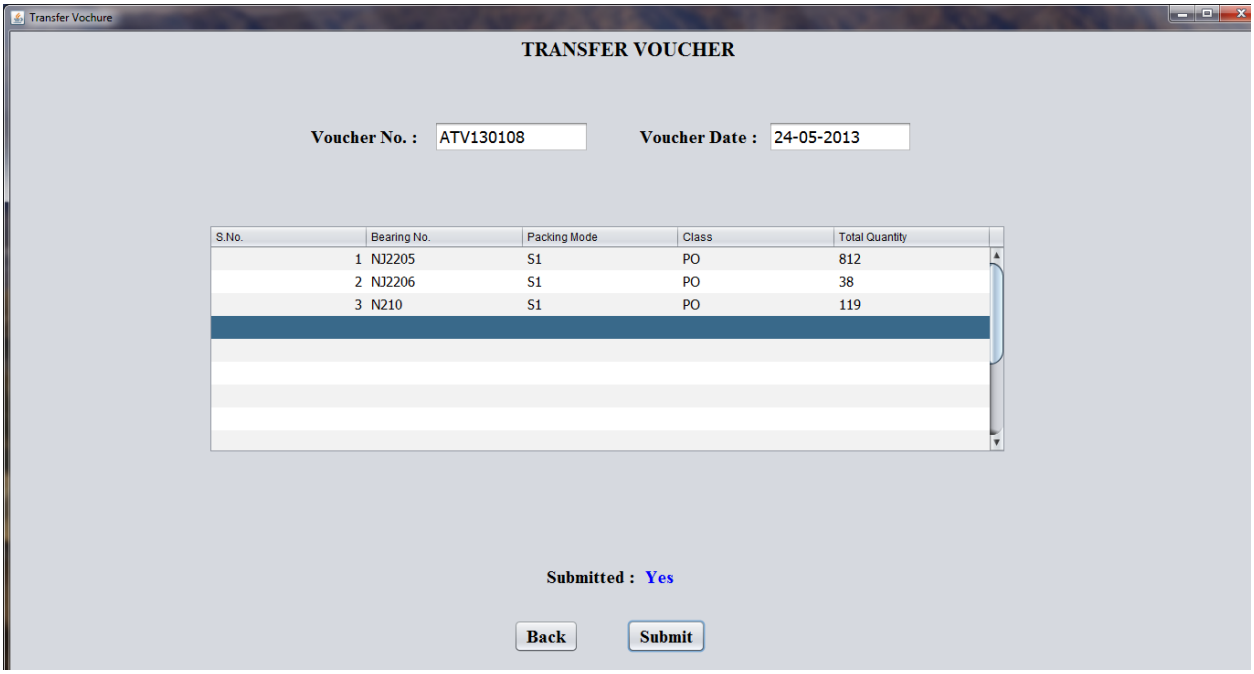


2.4.11 Collection Register:



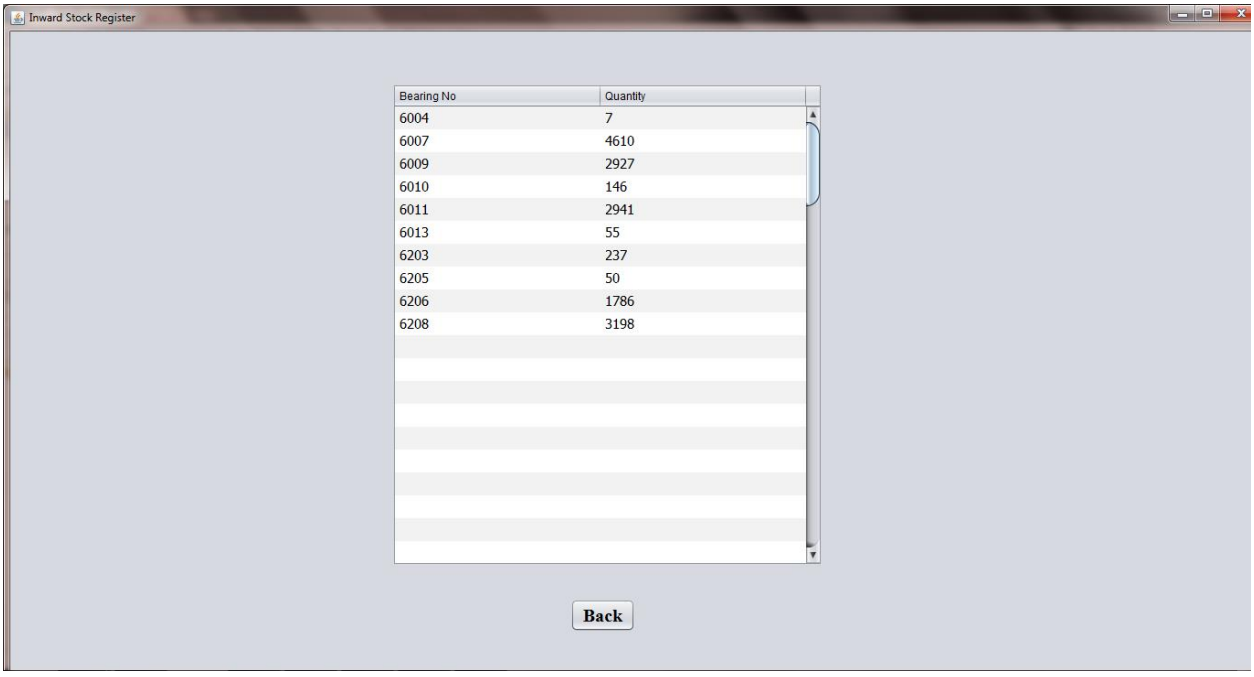
2.4.12 Transfer Voucher:

Transfer voucher is prepared in the assembly based on the inputs from the shop floor and sent to the FGS. The inward stock register gets its input from the transfer voucher.



2.4.13 Inward Stock Register:

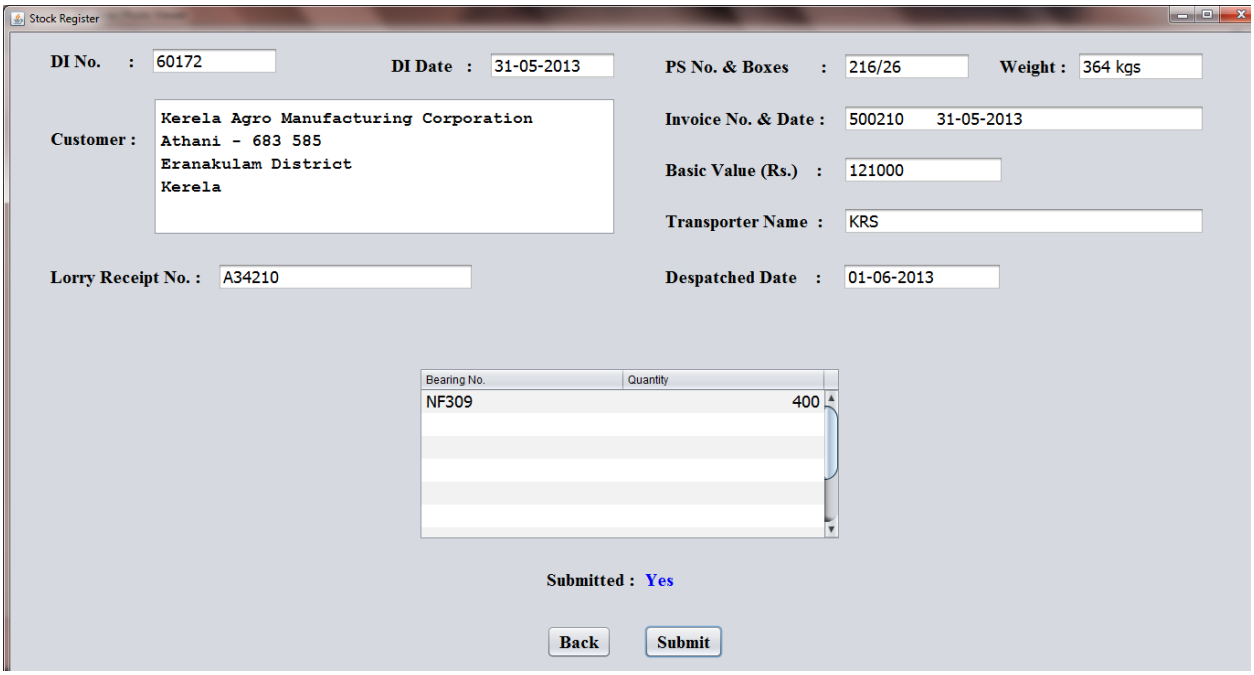
The inward stock register shows the list of the bearings and their quantity available.



2.4.14 Outward Stock Register:

After the invoice is prepared and the shipment is ready to be dispatched, the bearing details are entered in the outward stock register in FGS. DI no., lorry receipt no. and dispatched date are entered. Remaining fields are generated from the DI no. The quantity of these bearings is subtracted from the inward stock register.

Field to be entered	Fields generated	Remaining fields to be entered
DI No	DI date, PS No. & Boxes Weight, Customer Address Invoice No & Date, Basic value Transporter name	Lorry Receipt No. , Despatched Date

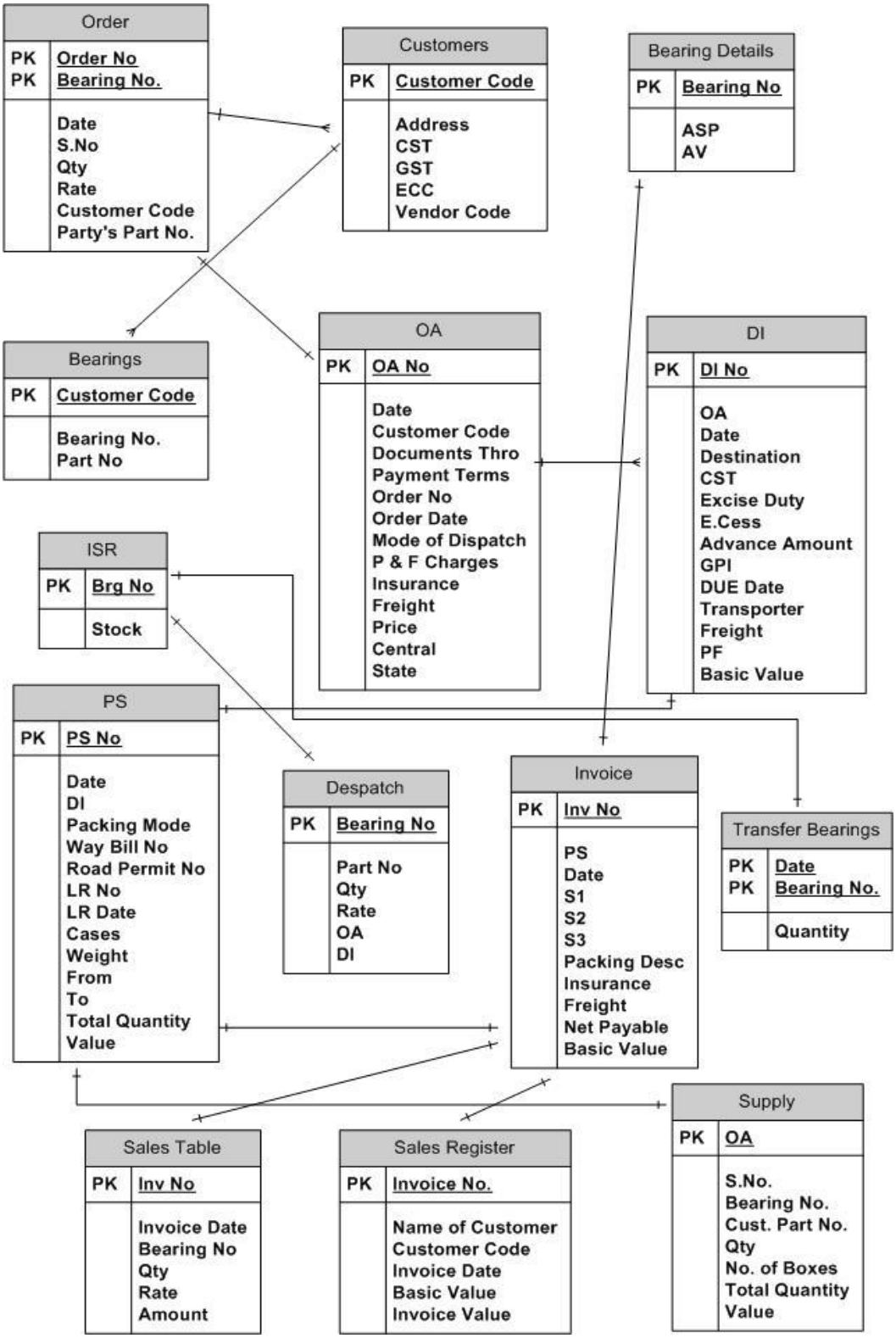


3. CONCLUSION

The project is being integrated with the existing PACT system and implemented. It reduces the redundancy of data, time requirement for preparing the records, improves precision and saves a lot of paper work.

4. APPENDIX

4.1 ER Diagram



4.2 Relational Data Model

Customers

Customer Code	Address	CST	GST	ECC	Vendor Code

Order

Order No	Bearing No.	Date	S.No	Qty	Rate	Customer Code	Party's Part No.

Bearings

Customer Code	Bearing No.	Part No

OA

OA No	Date	Customer Code	Documents Thro	Payment Terms	Order No	Order Date
Mode of Dispatch	P & F Charges	Insurance	Freight	Price	Central	State

DI

DI No	OA	Date	Destination	CST	Excise Duty	E.Cess
Advance Amount	GPI	DUE Date	Transporter	Freight	Basic Value	PF

PS

PS No	Date	DI	Packing Mode	Way Bill No	Road Permit No	LR No
LR Date	Cases	Weight	From	To	Total Quantity	Value

Supply

OA	S.No.	Bearing No.	Cust. Part No.	Qty	No. of Boxes	Total Quantity	Value

Transfer Bearings

Date	Bearing No.	Quantity

ISR Despatch

Brg No	Stock	Bearing No	Part No	Qty	Rate	OA	DI

Invoice

Inv No	PS	Date	S1	S2	S3	Packing Desc	Insurance
Insurance	Freight	Net Payable	Basic Value				

Bearing Details

Bearing No	ASP	AV

Sales Table

Inv No	Invoice Date	Bearing No	Qty	Rate	Amount

Sales Register

Invoice No.	Name of Customer	Customer Code	Invoice Date	Basic Value	Invoice Value

5. REFERENCES

JAVA How to Program Sixth Edition by H.M. Deitel, P.J. Deitel.

Stack Overflow (www.stackoverflow.com)

6.GLOSSARY

Despatch Instruction

Finished Goods Store

Invoice

Inward Stock Register

Management Information Systems (M.I.S.)

Operating Results

Order

Order Acceptance

Outward Stock Register

Packing Sheet

Performance Report

Sales Register

Transfer Voucher