Inventory Control System for Crushing Spare Parts

By

Ms. Warunee Tra-Ngarnruang

Final Report of the Three - Credit Course
CS 6998 System Development Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer Information Systems
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Project Title	:	Inventory Control System for Crushing Spare Parts
Name	:	Ms.Warunee Tra-ngarnruang
Project Advisor	:	Dr.Boonyarit Pokrud
Academic Year	:	1998

The Graduate School of Assumption University had approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

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ABSTRACT

The project is concerned with analysis and design of an Inventory Control System for a crusher trading company. Inventory control of crusher spare parts is considered as the first priority means to help the company minimize the operation costs. The existing manual system is first studied and analyzed to locate the problems and to find possible areas for improvements. The current problems include spare parts shortage, spare parts excess, costly inventory operations, time-consuming and inefficient daily operations, and inaccurate information for management.

A computerized inventory control system, developed using systems analysis and design techniques, is proposed to replace the existing manual system. The new system helps to eliminate unnecessary paper work, speed up inventory data recording or reporting, and provide accurate and up-to-date information for management. The cost and benefit analysis is carried out and the results obtained indicate that the proposed system is worth an investment.

ACKNOWLEDGEMENTS

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The writer would like to appreciate the staff of the Maschinenfabrik Lizen (Thailand) Co., Ltd. for giving her the information of the company.

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I. INTRODUCTION

1.1 Background of the Project

Maschinenfabrik Lizen (Thailand) Co., Ltd. is a trading company which sells various types of crushing machines and around 400 spare parts items to customers. The company has found that current manual system causes many problems especially on spare parts inventory system. The spare parts information obtained is always inaccurate. The spare parts in stock often do not meet the customer orders. The spare parts delivery sometimes causes delays. The staff have to file a lot of documents which are difficult to trace. Also, it is very difficult to manually check the number of spare parts and items daily.

The company has decided to develop an inventory control system as it is a major operation of the company which should have been more effective. Moreover, with the growing number of customers and increasing demand for crushing spare parts in Thailand, the company needs to develop a computerized Inventory System to control the spare parts in stock to meet all the expectations and requirements of the manager for better decision-making and better service for the customers. The computerized system serves to be a competitive strategy to assist the stock keeper in performing services by automatically checking the stock and informing about the unsold items. This computerized system will retrieve the spare parts inventory information from a database accurately and faster than the manual system. The computerized system can create not only ad hoc reports but also strategic reports to assist the decision- making of the manager to prepare sufficient purchase of spare parts to meet the economic cost. This would help the company not to stock more spare parts than the future demand.

1.2 Objectives of the Project

The objectives of the project are as follows :

1. To study the existing manual system of Maschinenfabrik Lizen (Thailand) Co., Ltd.

2. To analyze the existing system problems.

3. To design a computer information system to handle the status of inventory and process of inventory control system with effectiveness.

4. To develop a software package for Inventory Control System for Crushing Spare Parts to achieve the following goals :

   - Minimization of tied capital.
   - Constant ability to meet orders.
   - Keeping the right quantity of spare parts at the right time at the right place.
   - Minimization of carrying costs.
   - Fast and efficient searching of spare parts items.
   - Capability to issue necessary reports and ad-hoc queries to management.

1.3 Scope of the Project

The project scope covers major parts of Crushing Spare Parts Inventory operations, which includes the following :

1. Create all information files of spare parts, reorders, receipts, issuances and spare parts' movement.

2. Calculate correct stock balance.

3. Update inventory information.

4. Generate reports as below :

   - Spare Parts List Report
   - Inventory Reserve Report
   - Inventory Reorder Report
   - Inventory Receipt Report
   - Reserve Receipt Report
   - Inventory Issue Report
   - Inventory Return Report
   - Inventory Quantity Balance Report
   - Inventory Cost Report
   - Stock Take Difference Report
   - ABC Analysis Report
   - Minimum Planning Report
   - Maximum Planning Report

II. EXISTING SYSTEM

2.1 Background of the Organization

Maschinenfabrik Lizen (Thailand) Co., Ltd. (MFL), a subsidiary of Maschinenfabrik Liezen Und Giesserei GES.M.B.H. in Austria, was founded in late 1995. The company imports many types of crushing machines; cone crusher, jaw crusher, horizontal crusher, recycling-impact crusher, impact crusher, as well as their spare parts to sell to crushing plants in Thailand. MFL is located at Viphavadeerangsit Road and is the only distributor of MFL crusher in Thailand. The organization chart of the company is shown in Figure 2.1.

Organization Chart of Maschinenfabrik Lizen (Thailand) Co., Ltd.

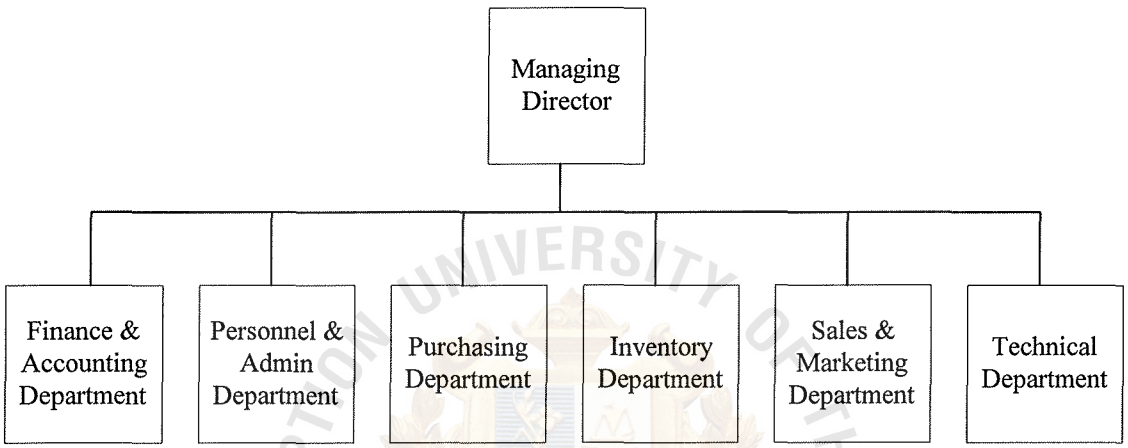

Figure 2.1. Organization Chart

2.2 Existing Business Functions

The existing business functions of spare parts inventory system involves :

1. Check Availability Procedure

   When the Inventory staff receives an item requisition list from Sales & Marketing Department, he will check the availability of spare parts by counting all items on the shelf manually.

2. Reorder Procedure

   When the spare parts are unavailable on the shelf, the Inventory staff will prepare a purchase requisition to Purchasing Department.

3. Receive Item Procedure

   When the Inventory staff receives the spare parts from the manufacturer, he manually records the quantity of the spare parts on the item receipt book and keeps the items on the shelf.

4. Issue Item Procedure

   When the requested spare parts are available, the Inventory staff will issue the items to the Sales & Marketing Department together with the spare part transfer list.

5. Return Item Procedure

   When there are spare parts returned from the Sales & Marketing Department, the Inventory staff will keep the returned items for claiming against the manufacturer if they are damaged, or keep the items back on the shelf if they are wrong models.

6. Reports Procedure

   The inventory staff send to management the inventory quantity balance report and the inventory cost report which are calculated and written down on the papers manually. The reports are always not accurate due to the wrong information.

The above operations are shown in the context diagram in Figure 2.2.

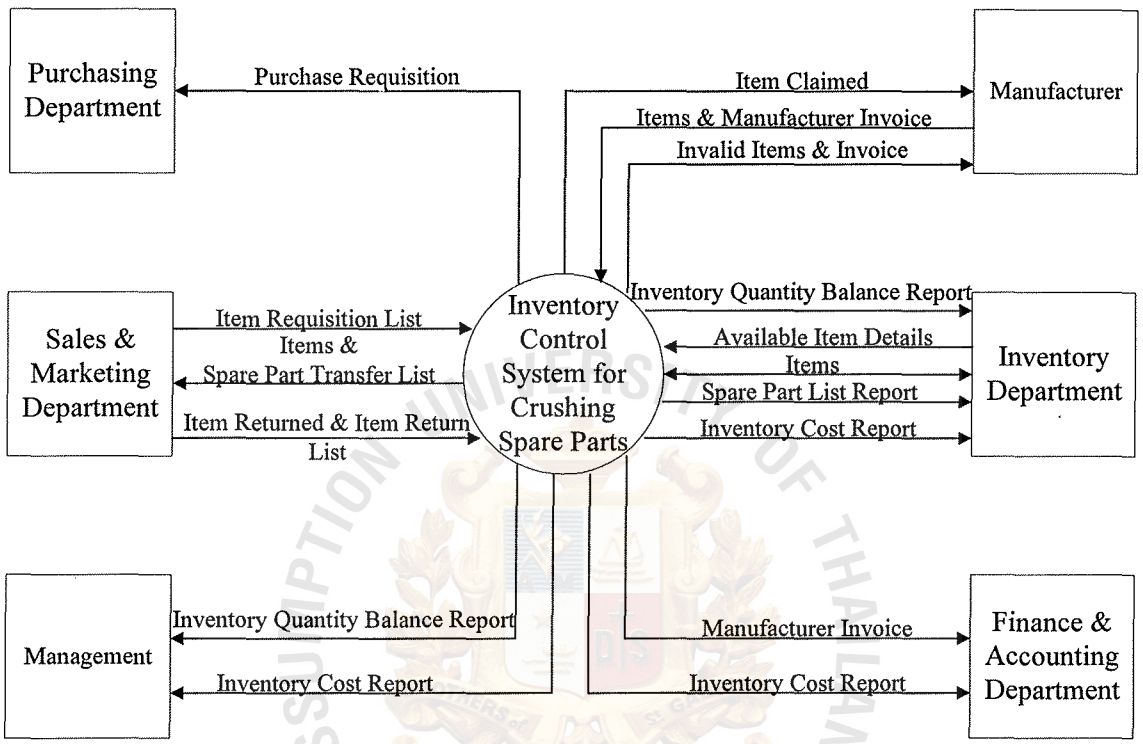

Figure 2.2. Context Diagram of Existing System

2.3 Current Problems and Areas for Improvements

The existing manual system causes many problems :

1. The information of spare parts and stock balance are not correctly recorded.

2. The company cannot rely on the correctness of transactions.

3. The employees are confused to check the availability of spare parts quantity after receiving customer order.

4. Spare parts ordered by customers are out of stock due to inaccurate inventory records.

5. Some items are over-stocked due to the inability to estimate demands by management to order the suitable quantity of each item.

6. The carrying cost of inventory is uncontrollable.

7. The management cannot plan the purchase schedule, forecast the budget and determine the market trend for each year due to insufficient information.

II. PROPOSED SYSTEM

3.1 User Requirements

The user requirements on the proposed system can be summarized as follows :

1) The system should provide accurate information to control the inventory effectively.

2) The system should provide accurate information and reports to management for decision-making, forecasting and budget preparation and planning.

3) To have the right spare parts at the right quantity at the right time.

4) To reduce employees' workload.

5) To reduce the carrying cost.

3.2 System Design

3.2.1 System Processes

The proposed system is designed to control major activities of spare parts system consisting of the following processes :

Process 1 : Check Availability

The check availability process will check first the requested items details indicated in the item requisition list with the spare part master file to find out whether the items are available. If the items are not available or there are not enough items for requisition, the details of unavailable items will be recorded in a reserve transaction file and a spare part master file. Then, the reorder process will be activated.

Process 2 : Reorder

When there are insufficient quantity of any items to meet the requisition or there are some stock out spare parts, this process will calculate the inventory turnover of those items and the quantity to order by reading details from the spare parts master file and reserve transaction file. The reorder quantity will be automatically saved in the spare parts master file and reorder details will be saved in the reorder transaction file. The process will print a purchase requisition to the Purchasing department.

Process 3 : Received Items

This process will receive items and an invoice from the manufacturer as well as the reorder information from the reorder transaction file to compare the item quantity and details of the reorder with the invoice. If any of the items are invalid, they will be rejected from the company. If they are valid, they are assigned the location number and calculated the amount from Austrian Shillings into Thai Baht. It also automatically checks the spare part code in the stock. If the item is a new one, it is added as a new record in the spare parts master file and the receipt transaction file. If the item has the spare parts code, the received item quantity is added in the spare parts master file and the item details are recorded in the receipt transaction file. This process also calculates the average cost of items and checks reserved items to find out whether the received

item is a reserved item. If so, the inventory staff will send a reserve receipt report to the Sales & Marketing department to inform that the reserved item has been received in stock.

Process 4 : Issue Items

If the items are available, this process will decrease the item quantity in the spare parts master file and record the issue information in the issue transaction file. This process will also print the spare parts transfer list to be sent together with the items received from the Inventory department to the Sales & Marketing department.

Process 5 : Returned Items

When there are items returned from Sales & Marketing department, this process will receive the items returned together with the item return list and check the reason for spare parts return. This process will keep the return transaction in the system and update the item and quantity in the spare parts master file. It also claims against the manufacturer in case of damaged returned items.

Process 6 : Check Physical Inventory

A physical inventory checking process must be carried out for all spare parts at least once a fiscal year. The actual count data is input and post any difference with the stock balance in the file.

Process 7 : Reports

This process will read item information from the spare parts master file and the issue transaction file to print reports for the Management, the Inventory department and the Finance & Accounting department for planning and forecasting.

The Context Diagram of the proposed system is shown in Figure A.1 (Appendix A). The Data Flow Diagrams for all processes above are shown in Figure B.1 - B.8 (Appendix B).

3.2.2 Proposed Database

A proposed database system for the Inventory Control System for Crushing Spare Parts provides several benefits as follows :

- increasing data accessibility for users to extract needed information from the data resources.
- improving data quality by reducing data duplication and redundancy.
- improving data control with more consistency in data descriptions.
- improving data security by preventing unauthorized access to data.

Database design of the proposed system is carried out and the file specifications are given in Appendix C.

3.2.3 Process Specification

Process specification provides further description of elementary-level processes. This is shown in Appendix D.

3.2.4 Structure Chart

A structure chart is a graphical tool that allows the analyst to break a system process down into finer components. It focuses on the processes themselves. It proposes a very small set of programming constructs for developing code. This is shown in Appendix E.

3.2.5 Data Dictionary

Data Dictionary defines the meaning and components of terminator, data stored and data flow. This is shown in Appendix F.

3.2.6 Graphic User Interface Design

The graphic user interface designs are the designs of input screens and the outcomes of the input for the system. This is shown in Appendix G.

3.3 Hardware and Software Requirements

The proposed system requires the following hardware components (Figure 3.1) :

1) File Server 1 set

- CPU Intel Pentium II 266 MHz
- 64 MB. RAM / 6.5 GB.HDD.
- 1.44 MB. Floppy Disk Drive
- 2 Serial (UART 16550, 1 Parallel (EEP,ECP))
- 32X Speed CD ROM Drive
- 17" SVGA Color
- Keyboard and Mouse

2) PC Client 3 sets

- CPU Pentium 200 MHz
- 32 MB. RAM / 3.2 GB. HHD.
- 1.44 MB. Floppy Disk Drive
- 16X CD-ROM/33.6 KBPS
- 14" SVGA Color
- Keyboard and Mouse

3) Laser Printer 1 set

- HP Laser Jet 6P

4) Dot Metrix Printer 1 set

- Epson LQ-300

5) UPS 500 VA 1 set

6) Ethernet LAN Card 4 sets

- Brand name Intel
- PCI Interface (32 bits)
- Built in tranceiver
- 10/100 MBs
- Full Duplex

7) Ethernet Hub (8 ports) 1 set

8) UTP

The Software components of the proposed system are as the follows :

1) MS Windows NT
2) MS Windows 95
3) MS Access Version 7.0

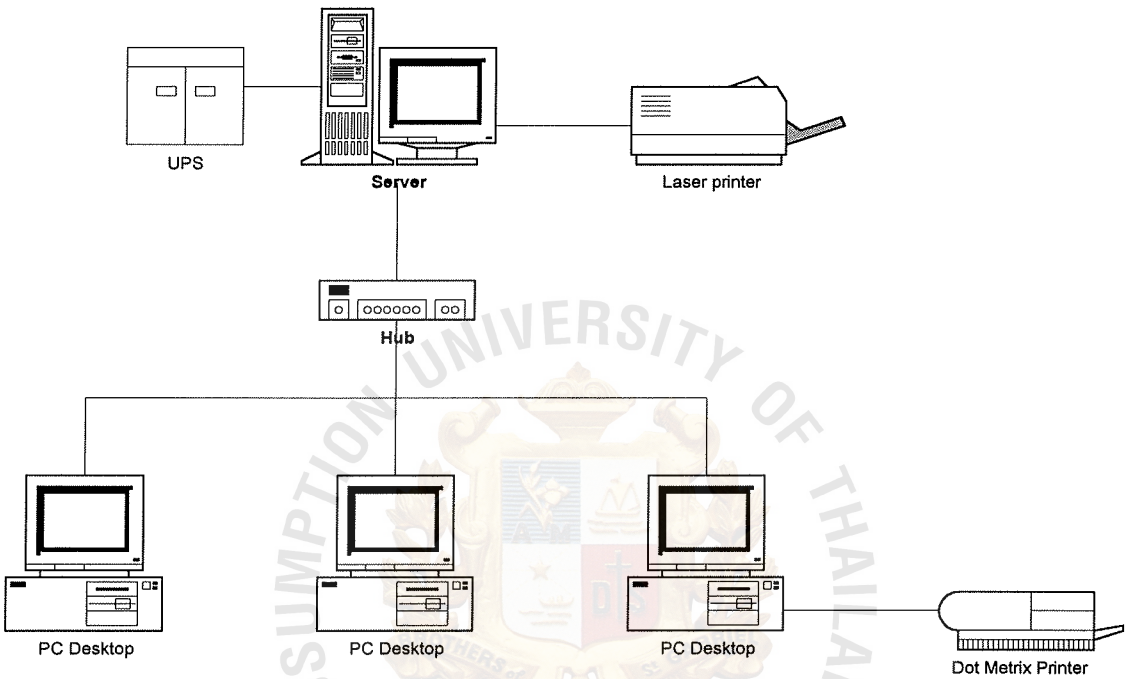

Figure 3.1. Hardware Configuration of the Proposed System

3.4 Security and Control

User Access Control (Authentication)

Using ID / Password system. Every user in the network system will be given an ID, name, and password for accessing the system and programs. The system checks the ID and password. When the user access into the system, the user will be asked for the user's log-in and password. Only the authorized users can access the system. This is the network security. After the user has accessed the system, the computer will ask the user again for the user's ID if he or she would like to access the Crushing Spare Parts Inventory Control System.

The authorized users are required to change their password every four months.

Data Access Control

All the data can be updated or modified by authorized users who are allowed to log-in to the system and programs. But the users should not be allowed to update the structure of the file. For the maintenance part, some persons have the authorization to edit the information. This is the data security control policy.

Back up and Recovery

Back up all files when the database are updated or modified. The back up should be done within that day and keep all files separately in the safe places.

File Server Security Control

The file server security control will emphasize on both hardware and software. For the hardware, the file server of the proposed system will be kept in the locking room with a thick wall which is not easily damaged by fire. Only authorized persons who can enter the room, has authorized cards.

Other Control

The computers will be kept in an air-conditioned room.

Ensure that the users receive adequate training on the use of the computer.

3.5 Cost and Benefit Analysis

3.5.1 Cost Analysis

1) Investment Cost

- Hardware Cost

1 set of File Server	130,000 Baht
3 sets of Work Station	90,000 Baht
1 set of Laser Printer	28,500 Baht
1 set of Dot Metrix Printer	10,500 Baht
1 set of UPS	20,000 Baht
4 set of Ethernet LAN Cards	6,000 Baht
1 set of HUB	10,000 Baht
UTP Cable	5,000 Baht
Total Hardware Cost	**300,000 Baht**

- Software Cost

MS Windows NT	30,000 Baht
MS Windows 97	20,000 Baht
MS Access	5,000 Baht
Total Software Cost	**55,000 Baht**

- Development Cost

Software Development & Training Cost	70,000 Baht
Total Development Cost	**70,000 Baht**

Total Investment Cost (300,000+55,000+70,000) = 425,000 Baht

2) Annual Operating Cost

	Baht per year
• Diskettes (High Density 3.5", 4 boxes @ 300.00)	1,200 Baht
• Removable Hard Disk (for back up)	20,000 Baht
• Ribbon	1,000 Baht
• Toner	5,000 Baht
• Paper	8,500 Baht
• Maintenance Cost	12,000 Baht
Total Annual Operating Cost	**46,500 Baht**

3.5.2 Benefit Analysis

The proposed system provides both tangible and intangible benefits as follows :

Tangible Benefit

- Reducing Overtime Expenses 90,000 Baht

  For manual inventory system, the company normally pays overtime wage for one person about 7,500 Baht per month.

  The computerized Inventory Information System will reduce the overtime expense around 90,000 Baht per year.

- Saving salary of inventory employee 180,000 Baht

  Due to the reduction from 6 inventory employees to 4 inventory employees, the yearly salary cost saving is around Baht 180,000. (Baht 7,500 x 2 x 12)

- Reducing massive equipment 150,000 Baht

Total Saving **420,000 Baht**

Intangible Benefits

- Provide accurate information and faster access to it for managing decision.
- Provide accurate information for forecasting, budgeting and planning.
- Improve the efficiency of operation.
- Better control of inventory.
- More accurate quantity of spare part reorder.
- To improve quality of the process
- To achieve customer satisfaction
- Provide information about location of each spare part where to keep the stocks and reduce the time to find.
- More satisfied employees.

3.5.3 Calculations of Payback Period

$$\text{Payback Period} = \frac{I}{(1 - T)R}$$

I = Investment Cost

R = Average annual return on the investment (tangible benefit subtracted by operating cost)

T = Corporate tax rate in percentage (30%)

$$\text{Payback Period} = \frac{425{,}000}{(1 - 0.3)(420{,}000 - 46{,}500)}$$

= 1.62 years

Payback period (after tax) for the proposed system is 1.62 years.

3.5.4 Calculation of Break Even Year

- **Break Even Analysis**

It is reasonable to apply the concept of break-even analysis to compare between the current system and the proposed system. In this case the cost of the new system is compared to the cost of the current system to determine the point at which the new system costs the same as the old one.

The figure 3.2 shows such a break-even analysis, in which the cost of the new system initially would be higher than the current system. In 2 years, the new system would have reached the break-even point and thereafter becomes more economical to operate than the current system.

- **Cost of the Manual System**

The pricing of manual system is summarized as the table below :

Table 3.1. Cost of the Manual System

Cost of the Manual System (Baht)					
Item	**1st Year**	**2nd Year**	**3rd Year**	**4th Year**	**5th Year**
1. Manpower					
- 4 Staff (18,000x4)	864,000	950,400	1,045,440	1,149,984	1,264,982
- 2 Staff (7,500x2)	180,000	198,000	217,800	239,580	263,538
- O.T. Payment 12 months x 50 hours/month x 150 Baht/hour (10% Increasing/year)	90,000	99,000	108,900	119,790	131,769
2. Supplies(Paper,etc.) (10% Increasing/year)	40,000	44,000	48,400	53,240	58,564
3. Space Rental (10% Increasing/year)	100,000	110,000	121,000	133,100	146,410
4. Utility (10% Increasing/year)	10,000	11,000	12,100	13,310	14,641
Total	**1,284,000**	**1,412,400**	**1,553,640**	**1,709,004**	**1,879,904**
Accumulative Cost	**1,284,000**	**2,696,400**	**4,250,040**	**5,959,044**	**7,838,948**

- **Cost of the Computerized System**

The pricing for a new computerized system is summarized as follows :

Table 3.2. Cost of the Computerized System

Cost of the Computerized System (Baht)					
Item	**1st Year**	**2nd Year**	**3rd Year**	**4th Year**	**5th Year**
1. Investment Cost	425,000	-	-	-	-
2. Manpower 4 Staff (18,000x4) (10% Increasing/year)	864,000	950,400	1,045,440	1,149,984	1,264,982
3. Supplies(Paper,etc.) (10% Increasing/year)	34,500	37,950	41,745	45,920	50,512
4. Maintenance (10% Increasing/year)	12,000	13,200	14,520	15,972	17,569
5. Space Rental (10% Increasing/year)	150,000	165,000	181,500	199,650	219,615
6. Utility (10% Increasing/year)	30,000	33,000	36,300	39,930	43,923
Total	**1,515,500**	**1,199,550**	**1,319,505**	**1,451,456**	**1,596,601**
Accumulative Cost	**1,515,500**	**2,715,050**	**4,034,555**	**5,486,011**	**7,082,612**

- **Comparison between Cost of the Manual System & Cost of the Computerized System**

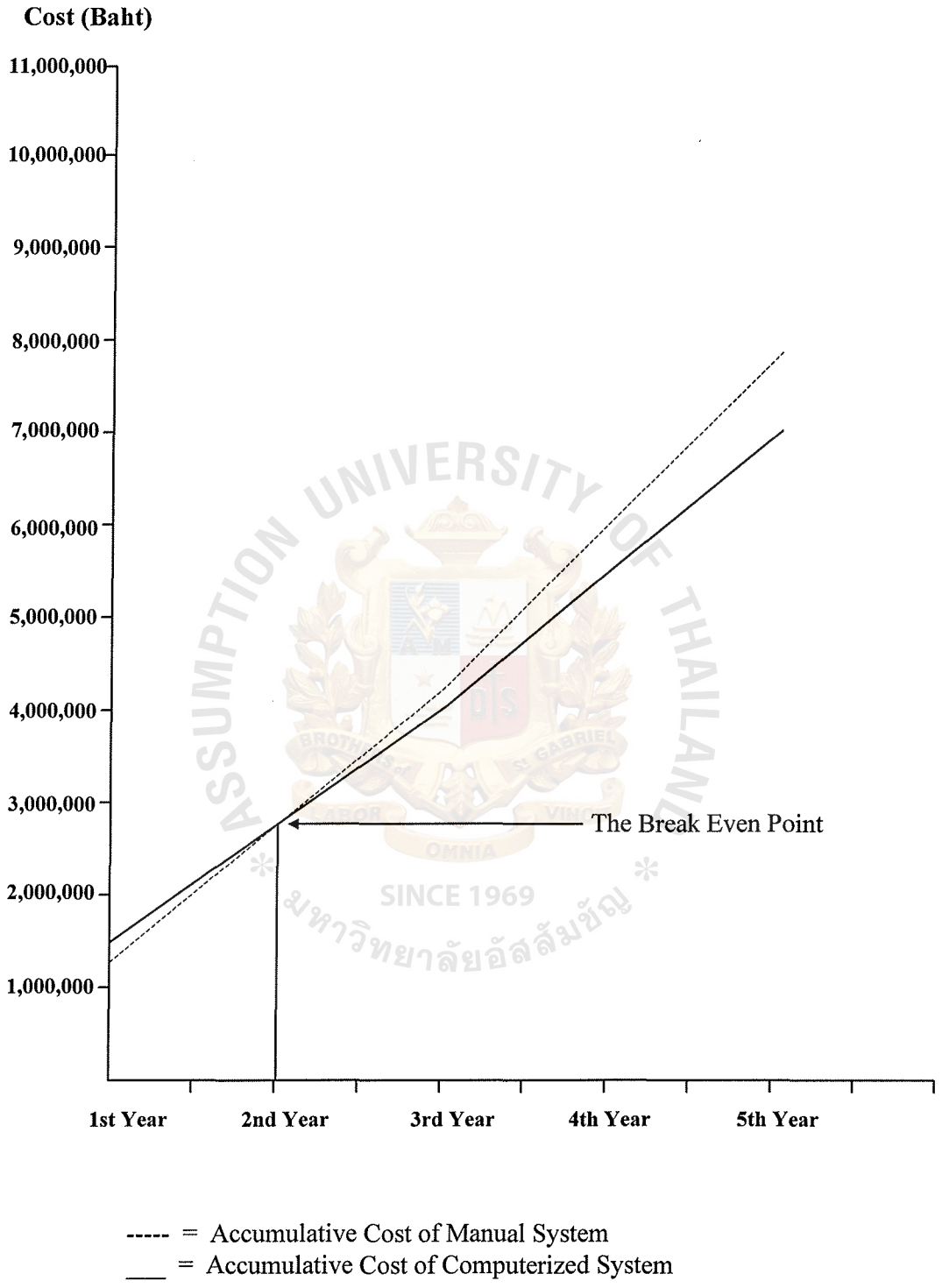

Figure 3.2. Break Even Point of Cost / Benefit between Manual System and Computerized System

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation Schedule

The Implementation process is set up by using the parallel run concept. The new process is designed and programmed based on the routine job of the users who spend a short time for some users to understand the process and make it correctly. The implementation consists of the following stages :

- Programming the system

The first step of the implementation is to program the system, that is to transform the modules to be come run-able system by writing the source code, or the program.

- Installing the system - Data Conversion

Since the existing system is a manual system, there is only a few steps for installing the system. The installation follows the parallel conversion method, that is the users continue to use the current system when the proposed system is started to be operated in parallel, in case, there is some problem or error in processing to the proposed system, the current system is still being used without loss of time.

During the installation period, there are some preparations of the installation plan by making a list of all files that should be installed as well as the documents which are going to be used during the installation.

- Documentation

Documents about system programs of the proposed system and the use are developed.

- Training

After the installation of the proposed system has been finished, the training task is performed. The training method is the In House Training which is to train the operator, users and a manager. The In House Training is used for the reason that if any problems occur to the users during the training, the problems can be immediately solved

and guided. They will be trained in all systems in the program and its flow in one course.

- Testing

  Testing is described in testing plan and result.

Table 4.1. Project Implementation Schedule

Activities	June	July	Aug	Sep	Oct	Nov	Dec
1. Project Planning	XXXX						
2. Design & Analysis		XXXX					
3. Develop Program		XX	XXX				
4. Documentation			XXXX	X			
5. Test & Modify Program			XXXX	XX			
6. Implementation							
6.1 User Training				XX			
6.2 Setup Master File				X	X		
6.3 Input 1st Month T/R					XXXX		
6.4 Close Period & Print Report					X	X	
6.5 Process 2nd Month T/R						XXXX	
6.6 Process 3rd Month T/R							XXXX

4.2 Test Plan and Results

It involves the testing of the program, a full system test and the documentation of the programs. A complete schedule of testing involves the following :

1) Testing Individual Program of Inventory Control System for Crushing Spare Parts.

2) Creating Test Data. Data testing can be done by creating an extensive set of test data to cover all interconnecting program testing.

3) Link/String/Single-Thread Testing

4) System/Multiple-Thread Testing. System testing is carried out by running the whole system to make sure that the whole system programs run properly and meet the original programming specification.

5) Back up and Restart Testing

Testing the program begins after training of the new system functions. The testing of the new system should be done parallel with the existing system. The period of parallel running should be set. Users use the parallel running for 3 months until they confirm that all process and output reports are correct. Start the use of the new system and quit the old one.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In the current condition of Thai economic crisis and fierce business competition, the existing manual system is not efficient in coping with general function and fast information system. The reports from manual processing do not finish on-time for management decision. Also, the reports are not accurate due to the improper collection of the information.

The computerized system has been designed to solve the problems and increase the operation productivity and to also serve every level of employee's requirements. The information can be retrieved easily whenever it is needed as well as updating data can be implemented without data redundancy. The reports can support the management team to achieve the organization's goals as the Inventory information of the computerized system will be more accurate and up-to-date. Moreover, the security of data is controlled therefore data which is accidentally caused by the nature disaster and humans will not be easily damaged or lost. Besides, the major benefit from this computerized system can reduce the carrying cost and control the stock lost. With the computerized system, the company can compute safety stock level of each spare part which is worth for reorder process. The computerized system saves administration costs as well since fewer personnel will be hired to handle the information system of the company. Although costs in investment period is high, in the long run, it is less than using the manual system as shown in break-even analysis. All the benefits which the computerized system provides to the users and management identifies that the system can improve the efficiency of the data management to be in a better condition.

5.2 Recommendations

The proposed system is the first step towards computerization. The computerized system can be modified for further expansion easily or more developed further according to user's requirements.

In the future, the information system of Maschinenfabrik Lizen (Thailand) Co., Ltd. will be implemented in online system. When the other departments in the company install computers and implement computerized systems, the Inventory Control System for Crushing Spare Parts can be online to link with the other departments information system by sending information and reports via the electronic mail or file transfer. This will reduce more cost of paper usage of the company. Moreover, the company will use the bar code, stuck in each spare part, in order to link and transfer the issued spare part code into the Inventory Control System for Crushing Spare Parts by a program interface. The inventory staff will not key in each issued spare part code on the screen during the issue process. This bar code will solve the problem of the mistakes of keying the issued spare part code. It will not only ensure the inventory staff that the issue information is more accurate but also reduce his work time of issue process. Besides, the Inventory Control System for Crushing Spare Parts will indicate the location of each spare part in details such as zone number and shelf number both on the screen and the report upon the receipt process.

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APPENDIX A

Context Diagram

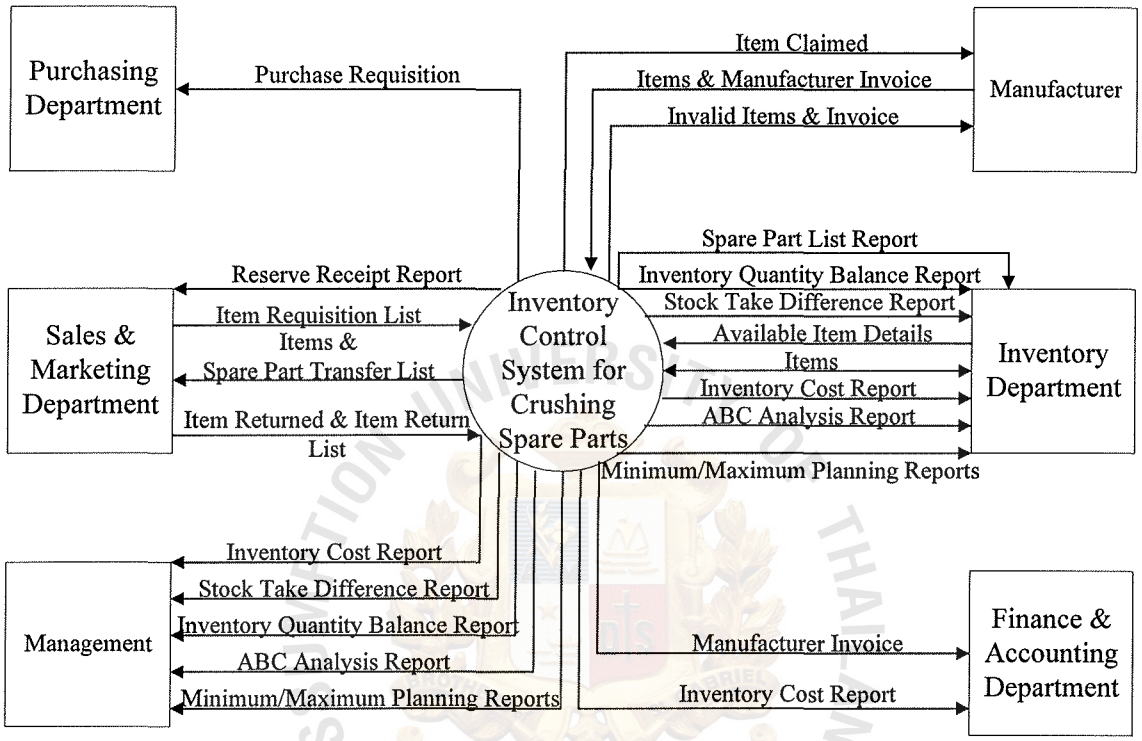

Figure A.1. Context Diagram of Proposed System

APPENDIX B

Data Flow Diagrams

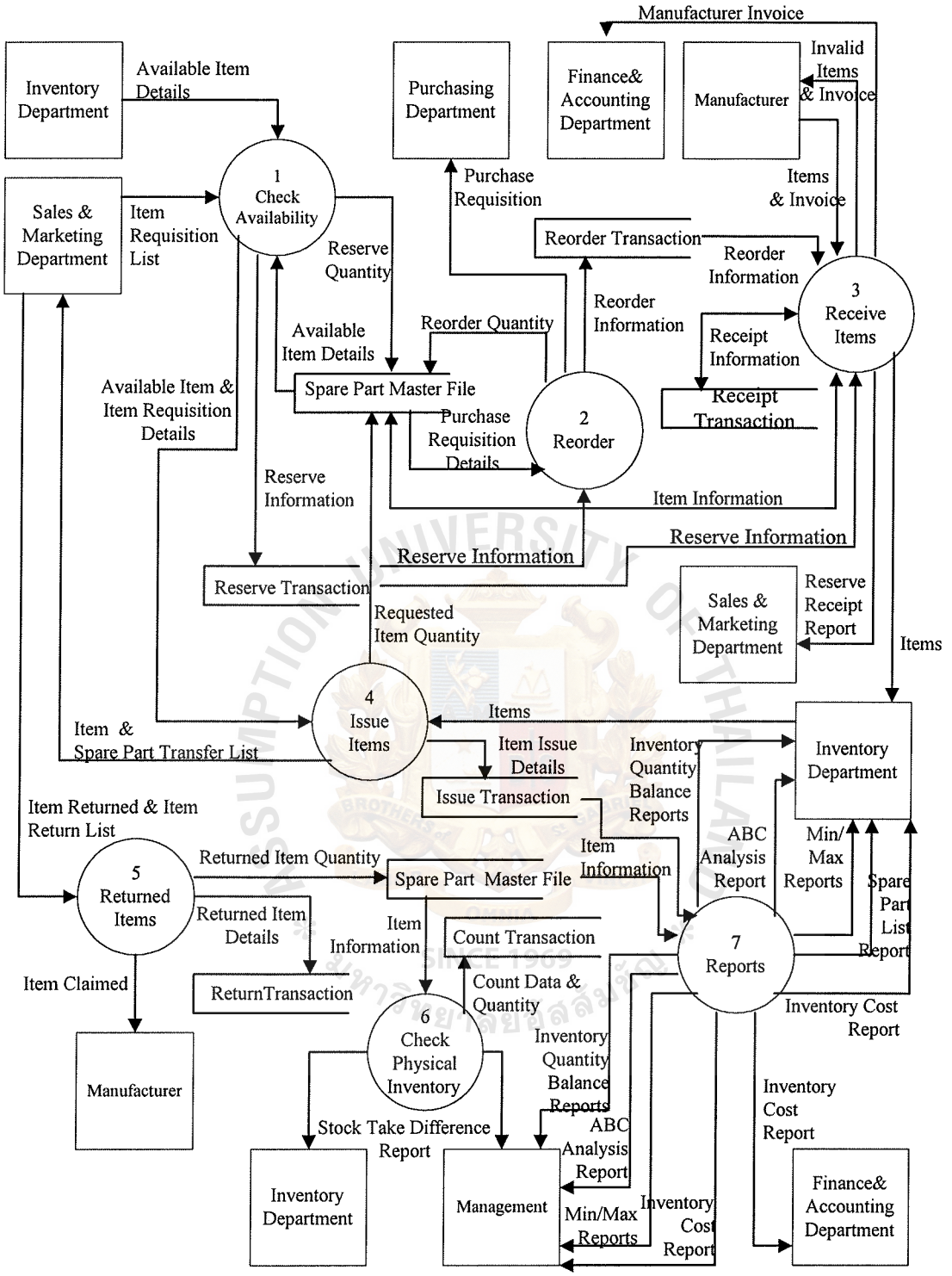

Figure B.1. Data Flow Diagram Level 0 (Proposed System)

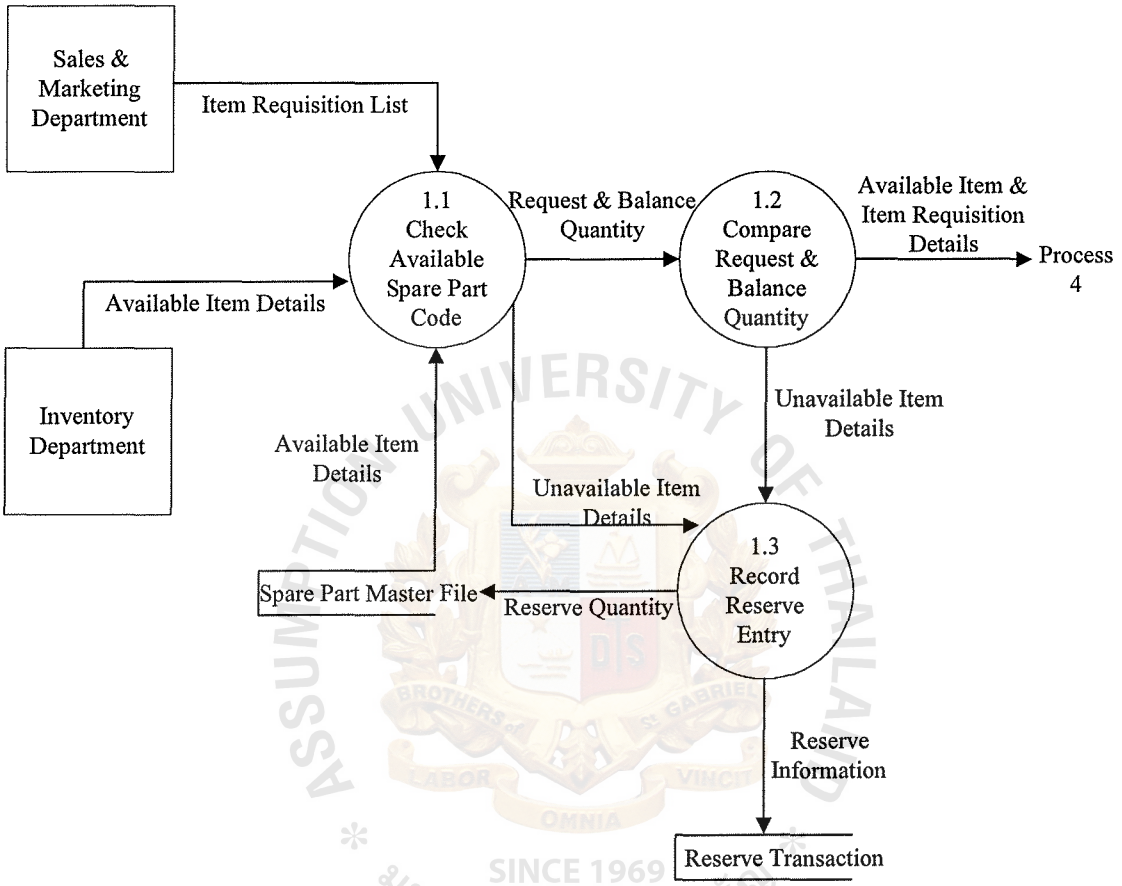

Figure B.2. Data Flow Diagram Level 1 : Process 1 : Check Availability

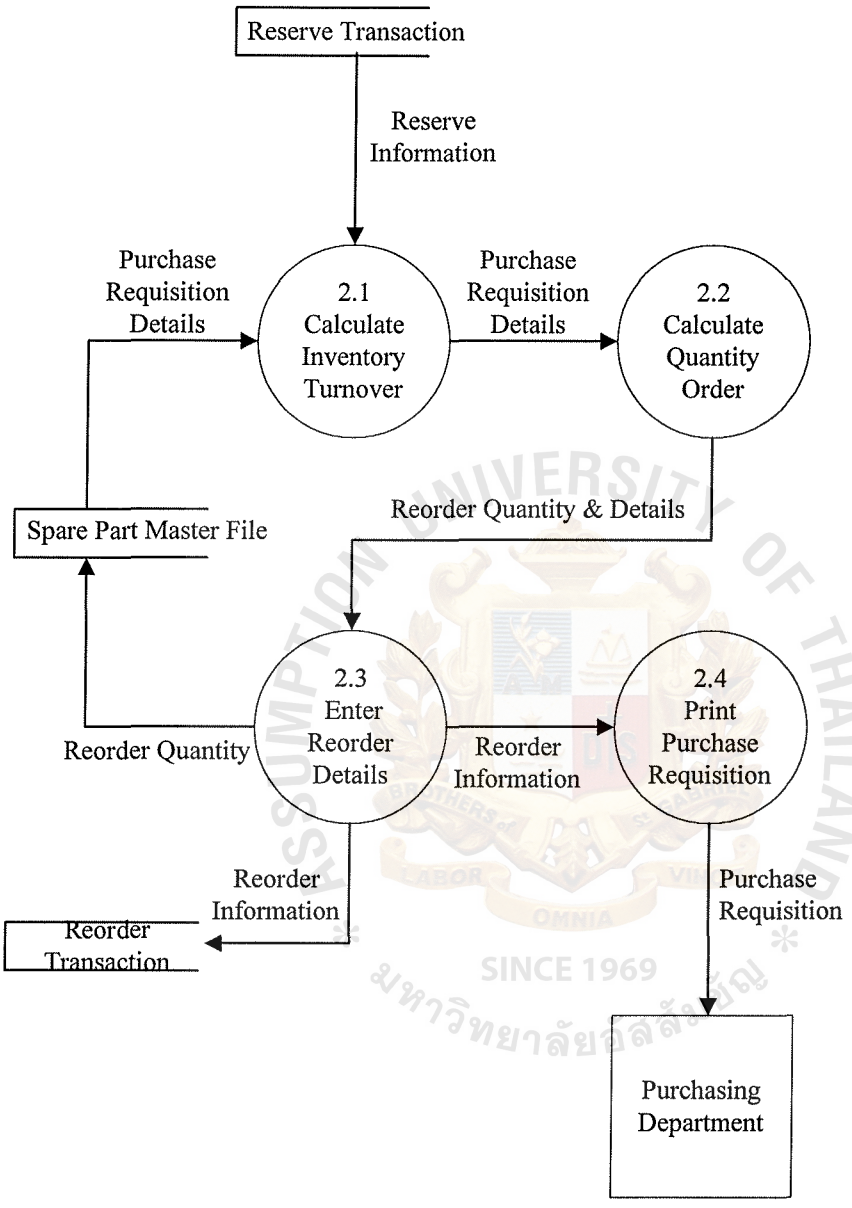

Figure B.3. Data Flow Diagram Level 1 : Process 2 : Reorder

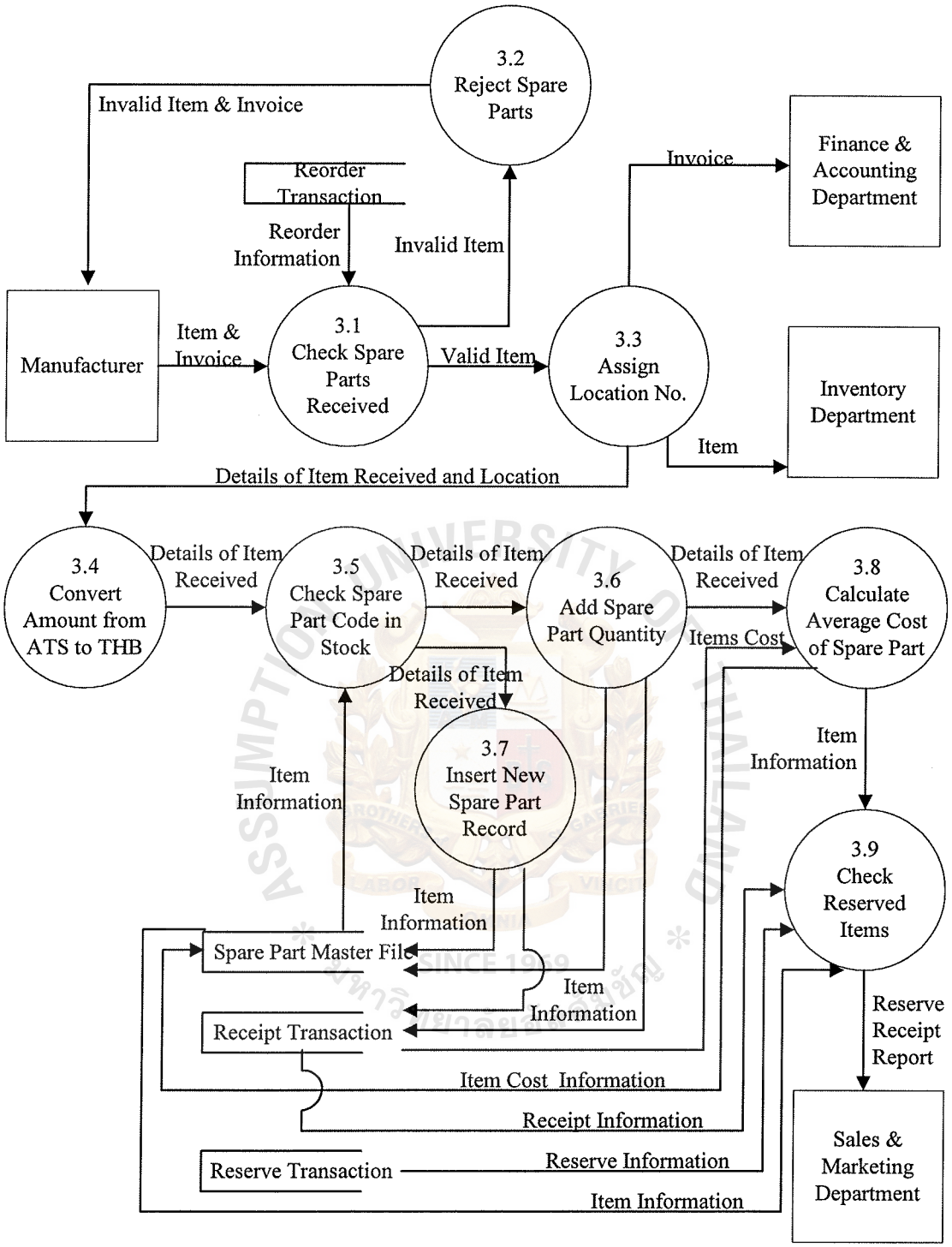

Figure B.4. Data Flow Diagram Level 1 : Process 3 : Receive Items

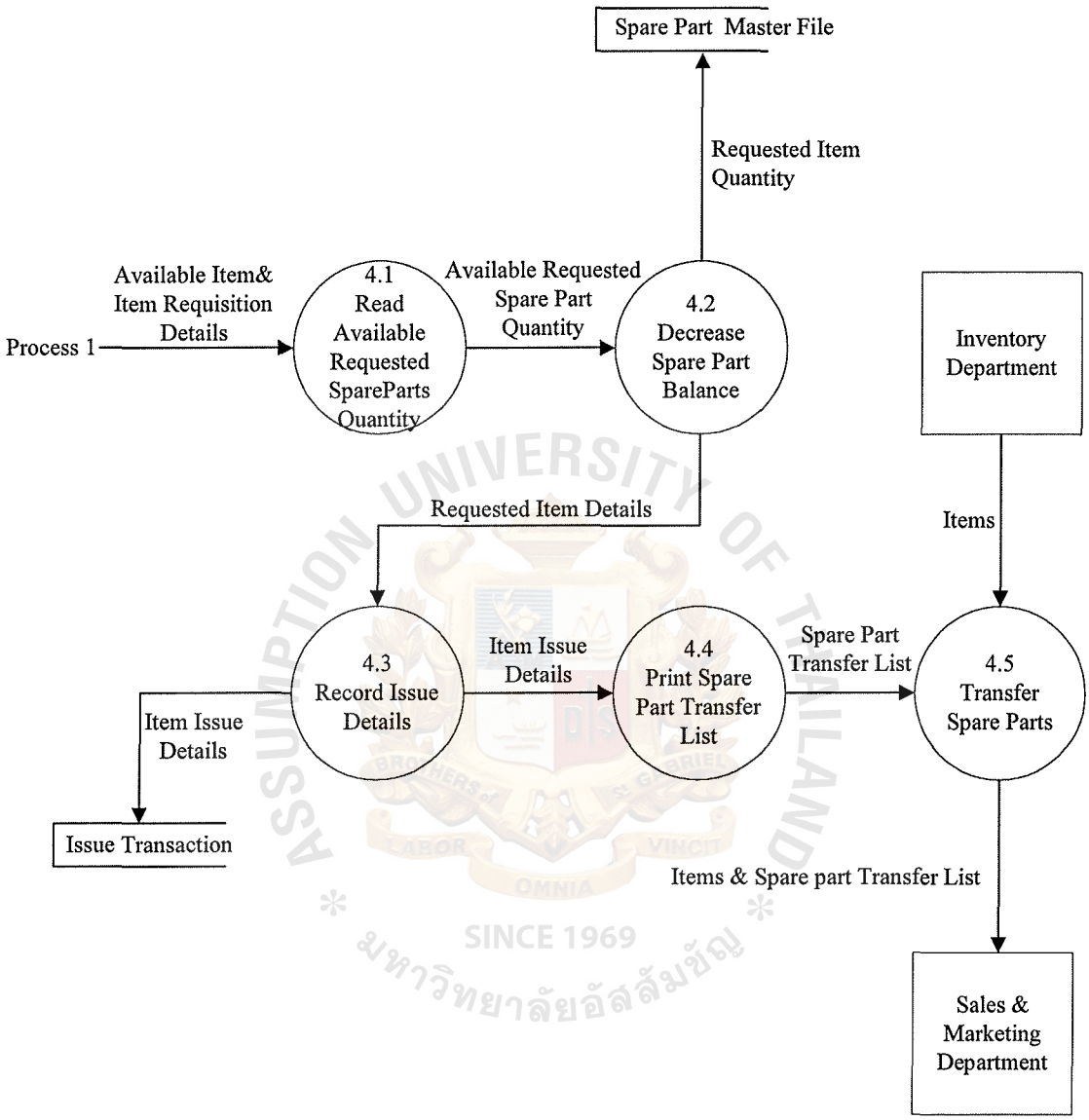

Figure B.5. Data Flow Diagram Level 1 : Process 4 : Issue Items

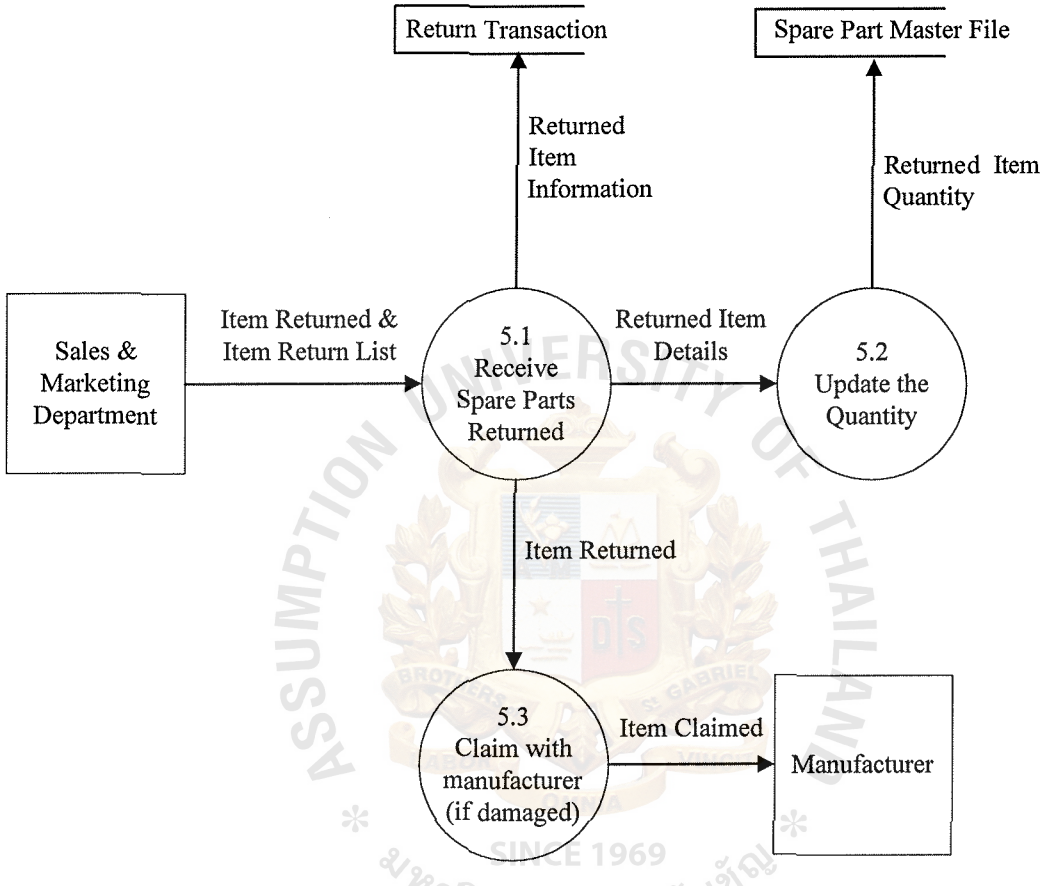

Figure B.6. Data Flow Diagram Level 1 : Process 5 : Returned Items

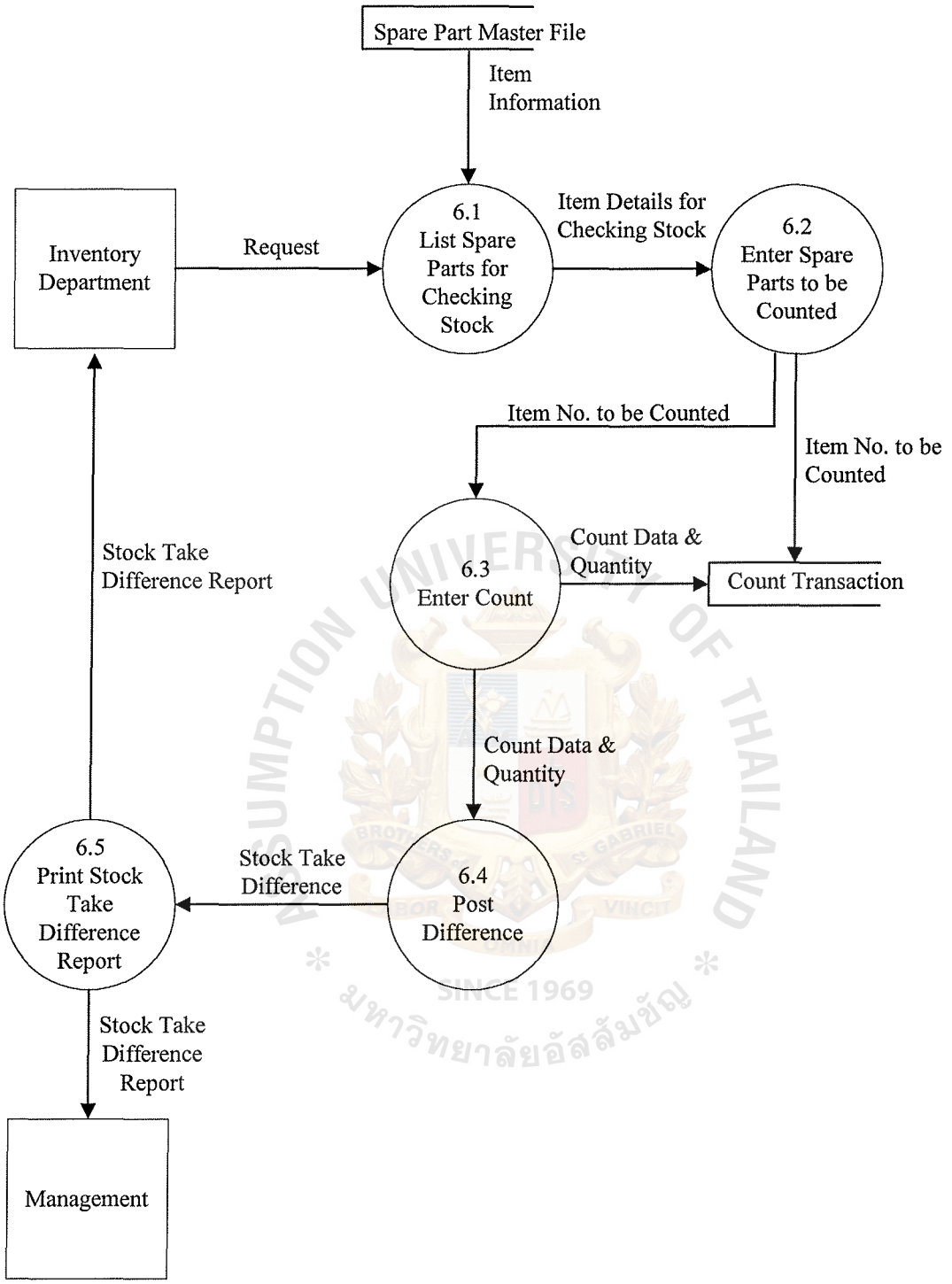

Figure B.7. Data Flow Diagram Level 1 : Process 6 : Check Physical Inventory

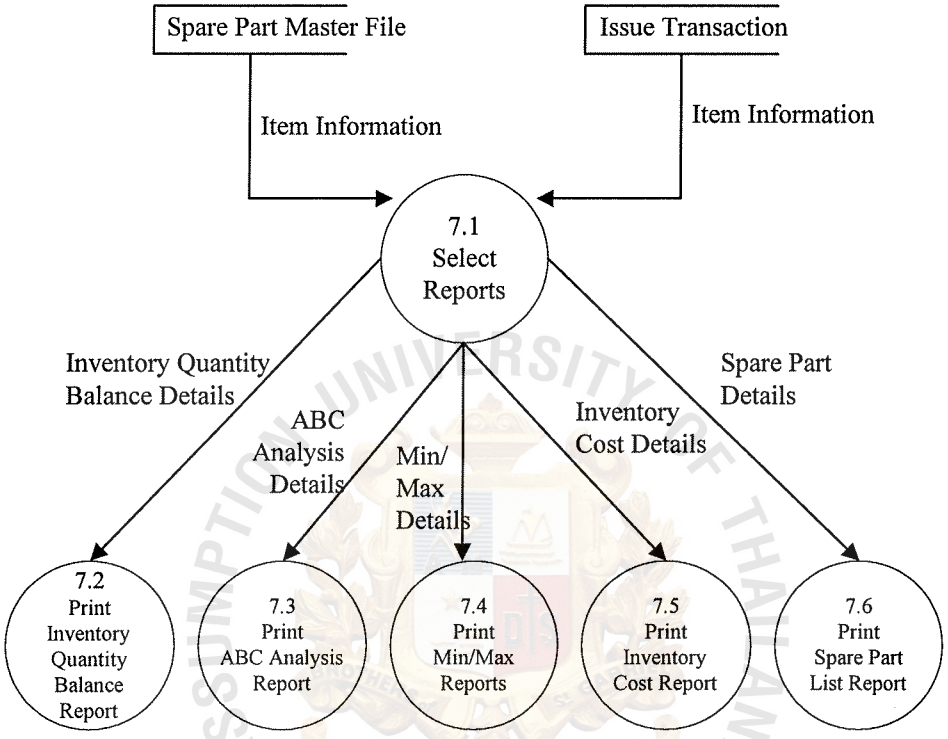

Figure B.8. Data Flow Diagram Level 1 : Process 7 : Reports

APPENDIX C

Database Design

Table C.1. File Name : Spare Part Master File

Field	Field Name	Type	Description	Width	Decimal
1	Spare Part Code	Number	Spare Part Code	15	
2	Creation Date	Date	Creation Date	10	
3	Spare Part Name	Text	Spare Part Name	40	
4	Type	Text	Type of Machine	15	
5	Dimension	Text	Dimension	15	
6	Weight	Text	Weight	10	
7	UOM	Text	Unit of Measure	10	
8	ABC_Code	Text	ABC Code	5	
9	Cost/Unit	Currency	Cost per Unit	15	2
10	Location	Text	Location	15	
11	Min_Qty	Number	Minimum Quantity	15	
12	Max_Qty	Number	Maximum Quantity	15	
13	Reorder Qty	Number	Reorder Quantity	15	
14	Reserve Qty	Number	Reserve Quantity	15	
15	Stock Balance	Number	Stock Balance	15	
16	Available Balance	Number	Available Balance	15	

Table C.2. File Name : Reserve

Field	Field Name	Type	Description	Width	Decimal
1	Reserve Number	Number	Reserve Number	10	
2	IRL Number	Number	Item Requisition List Number	10	
3	Date	Date	Reserve Date	10	
4	Spare Part Code	Number	Spare Part Code	15	
5	Spare Part Name	Text	Spare Part Name	40	
6	QtyOnRequest	Number	Quantity on Request	15	
7	Qty Unavailable	Number	Quantity Unavailable	15	
8	UOM	Text	Unit of Measure	15	
9	Date Required	Date	Date Required	15	

Table C.3. File Name : Reorder

Field	Field Name	Type	Description	Width	Decimal
1	P/R_No.	Number	Purchase Requisition Number	10	
2	Department Name	Text	Department Name	20	
3	P/R_Date	Date	Purchase Requisition Date	15	
4	Date Required	Date	Date Required	15	
5	Item	Number	Item	10	
6	Spare Part Code	Number	Spare Part Code	15	
7	Spare Part Name	Text	Spare Part Name	40	
8	Quantity	Number	Quantity	15	
9	UOM	Text	Unit of Measure	15	
10	Price/Unit	Currency	Price per Unit	15	2
11	Total Amount	Currency	Total Amount	15	2
12	Remark	Memo	Remark	60	

Table C.4. File Name : Receipt

Field	Field Name	Type	Description	Width	Decimal
1	Receiving No	Number	Receiving Number	10	
2	Receiving Date	Date	Receiving Date	10	
3	P/R No.	Number	Purchase Requisition Number	10	
4	Spare Part Code	Number	Spare Part Code	15	
5	Spare Part Name	Text	Spare Part Name	40	
6	Location	Text	Location	5	
7	Quantity	Number	Quantity	15	
8	UOM	Text	Unit of Measure	15	
9	Cost/Unit(ATS)	Currency	Cost per Unit (ATS)	15	2
10	Exchg_Rate	Currency	Exchange Rate	8	2
11	Cost/Unit(THB)	Currency	Cost per Unit (THB)	15	2
12	Total Amount	Currency	Total Amount	15	2
13	Remark	Memo	Remark	80	

Table C.5. File Name : Issue

Field	Field Name	Type	Description	Width	Decimal
1	STL Number	Number	Spare Part Transfer List Number	10	
2	STL Date	Date	Spare Part Transfer Date	10	
3	Item	Number	Item	10	
4	Spare Part Code	Number	Spare Part Code	15	
5	Spare Part Name	Text	Spare Part Name	40	
6	Quantity	Number	Quantity	15	
7	UOM	Text	Unit of Measure	15	
8	IRL Number	Number	Item Requisition List Number	10	
9	Remark	Memo	Remark	40	
10	Transfer by	Text	Transfer by	40	
11	Transfer To	Text	Transfer To	40	

Table C.6. File Name : Return

Field	Field Name	Type	Description	Width	Decimal
1	Item Return List No.	Number	Item Return List Number	10	
2	Date Returned	Date	Date Returned	10	
3	Item	Number	Item	10	
4	Spare Part Code	Number	Spare Part Code	15	
5	Spare Part Name	Text	Spare Part Name	40	
6	Quantity	Number	Quantity	15	
7	UOM	Text	Unit of Measure	15	
8	Reason	Memo	Reason	50	

Table C.7. File Name : Count

Field	Field Name	Type	Description	Width	Decimal
1	Document No.	Number	Document Number	10	
2	Document Date	Date	Document Date	10	
3	Reference No.	Number	Reference Number	10	
4	Remark	Memo	Remark	60	
5	Item	Number	Item	10	
6	Spare Part Code	Number	Spare Part Code	15	
7	Spare Part Name	Text	Spare Part Name	40	
8	Location	Text	Location	15	
9	Count Qty	Number	Count Quantity	15	
10	UOM	Text	Unit of Measure	15	

APPENDIX D

Process Specifications

Process Number	:	Level 1.1
Process Name	:	Check Available Spare Part Code
Purpose	:	To check spare parts in stock that available for sales requisition
Input	:	Item Requisition List and Available Item Details
Output	:	Request & Balance Quantity and Unavailable Item Details

Begin

Do while there are more requested items in item requisition list

Find spare part in spare part master file with spare part code = spare part code in item requisition list

If record cannot be found

Check availability response = Quantity Unavailable

Display Quantity in Stock and Quantity Unavailable

Exit

End If

End Do

End

Process Number	:	Level 1.2
Process Name	:	Compare Request and Balance Quantity
Purpose	:	To compare requested quantity from item requisition list with balance quantity in stock
Input	:	Request and Balance Quantity
Output	:	Available Item & Item Requisition Details and Unavailable Item Details

```
Begin
    Do while there are more requested items in item requisition list
        Find spare part in spare part master file with spare part code = spare part
        code in item requisition list
        Get requested quantity
        Get balance quantity
        If requested quantity > balance quantity Then
            Check availability response = Quantity Unavailable
            Display Quantity in Stock and Quantity Unavailable
            Exit
        End If
    End Do
End
```

Process Number	:	Level 1.3
Process Name	:	Record Reserve Entry
Purpose	:	To update reserve transaction file with unavailable spare part details and reserve quantity in spare part master file
Input	:	Unavailable item details
Output	:	Reserve quantity and information

Begin

Do While there are more unavailable item details in check available spare part code and in compare request & balance quantity

Get unavailable item details and date required

Add reserve quantity in spare part master file

Update reserve transaction file

End Do

End

Process Number	:	Level 2.1
Process Name	:	Calculate Inventory Turnover
Purpose	:	To calculate inventory turnover for reorder
Input	:	Purchase requisition details and Reserve information
Output	:	Purchase requisition details

Begin

Read spare part master file and reserve transaction file

Get spare part code, Beginning spare part master file, Ending spare part master file, Quantity issue and Cost per unit

Inventory Turnover by spare part code =

(Quantity issue * Cost per unit) / (Beginning spare part master file + Ending spare part master file / 2)

Print Inventory turnover by spare part code

End

Process Number	:	Level 2.2
Process Name	:	Calculate Quantity to order
Purpose	:	To get right quantity to order
Input	:	Purchase requisition details and inventory turnover details
Output	:	Reorder quantity and details

Begin

Read Purchase requisition details and inventory turnover rate

Compare purchase requisition details with inventory turnover rate

Compute quantity reorder

End

Process Number	:	Level 2.3
Process Name	:	Enter Reorder Details
Purpose	:	To update reorder transaction file and spare part master file with reorder quantity and details
Input	:	Reorder quantity and details
Output	:	Reorder quantity and information

Begin

Do While there are more reorder details in calculate quantity order

Get reorder quantity and information

Add reorder quantity in spare part master file

Update reorder transaction file

End Do

End

Process Number	:	Level 2.4
Process Name	:	Print Purchase Requisition
Purpose	:	To print purchase requisition
Input	:	Reorder information
Output	:	Purchase requisition

Begin

Display Purchase Requisition

Put P/R_No. + Department Name + P/R_Date + Date Required + Item + Spare Part Code + Spare Part Name + Quantity + UOM + Price/Unit + Total Amount + Remark

Valid purchase requisition = P/R_No. + Department Name + P/R_Date + Date Required + Item + Spare Part Code + Spare Part Name + Quantity + UOM + Price/Unit + Total Amoount + Remark

Print Valid purchase requisition

End

Process Number	:	Level 3.1 - 3.2
Process Name	:	Check Spare Parts Received and Reject Spare Parts
Purpose	:	To check spare parts received
Input	:	Item received and Reorder information
Output	:	Valid item and Invalid item

Begin

Do While there are more spare parts received from Manufacturer

Read reorder information and details of spare parts received

Match reorder information and spare parts received

If spare parts received match with reorder information

Then Get details of Valid items received

Else Get Invalid items

contact the manufacturer regarding the Invalid items

End If

End Do

End

Process Number	:	Level 3.3
Process Name	:	Assign Location No.
Purpose	:	To assign location no. for spare parts received
Input	:	Valid Item received
Output	:	Details of item received and location

Begin

Do While there are more Valid item received from Manufacturer

Get details of valid items received

Read Location

Match quantity of items received with location no.

Put location no. of items received

End Do

End

Process Number	:	Level 3.4
Process Name	:	Convert Amount from ATS to THB
Purpose	:	To convert amount of cost/unit in ATS to THB currency
Input	:	Details of Item received
Output	:	Details of Item received

Begin

Do While there are more details of item received in the invoice

Get spare part code, cost/unit in ATS and exchange rate

Calculate amount from ATS to THB

(Cost/unit in ATS * exchange rate) = Cost/unit in THB

Write spare part code, cost/unit in ATS, exchange rate and Cost/unit in THB

End Do

End

Process Number	:	Level 3.5
Process Name	:	Check Spare Part Code in Stock
Purpose	:	To check spare part code in stock for updating record or inserting a new record
Input	:	Details of item received and Item information
Output	:	Details of item received

Begin

Get spare part code

Retrieve spare part code from spare part master file

If found

Then Call Add spare part quantity

Else Call Insert new spare part record

End If

End

Process Number	:	Level 3.6
Process Name	:	Add Spare Part Quantity
Purpose	:	To increase stock balance added by spare part quantity received from Manufacturer
Input	:	Details of item received
Output	:	Details of item received

Begin

Do While there are more details of item received in the invoice

Get item (spare part code and spare part quantity)

Edit spare part record in spare part master file = spare part code

Do stock balance = stock balance + spare part quantity received in the Manufacturer invoice

End Do

End

Process Number	:	Level 3.7
Process Name	:	Insert New Spare Part Record
Purpose	:	To define spare part code for a new spare part name and increase it into spare part master file for updating
Input	:	Details of item received
Output	:	Item information

Begin

Do While there are more details of items received in the invoice

Get item (spare part code, spare part name and quantity)

Do insert new record into spare part master file

End Do

End

Process Number	:	Level 3.8
Process Name	:	Calculate Average Cost of Spare Part
Purpose	:	To know the average cost of each spare part
Input	:	Details of item received and item cost
Output	:	Item information and cost

Begin

Do While there are more spare parts received in receipt transaction file

Read details of spare parts received and cost of each spare part

Calculate the average cost of spare parts received

(Add cost of each spare part) / Total unit received

Write spare part cost information

End Do

Print inventory cost report

End

Process Number	:	Level 3.9
Process Name	:	Check Reserved Items
Purpose	:	To check reserved items whether we have received them from the Manufacturer or not in order to inform Sales & Marketing Department
Input	:	Item information, Receipt and Reserve information
Output	:	Reserve Receipt Report

```
Begin
    Do While there are more received items in receipt transaction file
        Read spare part master file, receipt transaction file and reserve
        transaction file
        If spare part code in receipt transaction file = spare part code in reserve
          transaction file
            Then Get details of spare part received
                Print reserve receipt report
        End If
    End Do
End
```

Process Number	:	Level 4.1 - 4.2
Process Name	:	Read Available Requested Spare Parts Quantity and Decrease Spare Part Balance
Purpose	:	To reduce stock balance quantity subtracted by requested quantity
Input	:	Available item & Item requisition details
Output	:	Available requested spare part quantity

Begin

Do While there are more available requested spare part code in item requisition list

Get spare part code and requested quantity

Edit spare part record in spare part master file = spare part code

Do stock balance = stock balance - requested quantity

End Do

End

Process Number	:	Level 4.3 - 4.4
Process Name	:	Record Issue Details and Print Spare Part Transfer List
Purpose	:	To prepare information to print spare part transfer list
Input	:	Requested item details
Output	:	Spare part transfer list

Begin

Do While there are more requested item in item requisition list

Record requested items details in issue transaction file

Display Spare Part Transfer List

Put STL Date in issue transaction file

Read issue transaction file

Valid Spare part transfer list = STL Number + STL Date + Item + Spare Part Code + Spare Part Name + Quantity + UOM + IRL Number + Remark + Transfer by + Transfer To

Print Valid Spare Part Transfer List

End Do

End

Process Number	:	Level 4.5
Process Name	:	Transfer Spare Parts
Purpose	:	To transfer spare parts to Sales & Marketing Department
Input	:	Items and Spare part transfer list
Output	:	Items and Spare part transfer list

Begin

Do While the spare part is ready for transferring to the destination and there are more spare part transfer in spare part transfer list

Read spare part details in spare part transfer list

Transfer spare parts together with spare part transfer list to Sales & Marketing Department

End Do

End

Process Number	:	Level 5.1
Process Name	:	Receive Spare Parts Returned
Purpose	:	To record details of the spare part returned in return transaction file
Input	:	Item returned and Item return list
Output	:	Returned item information and item returned

Begin

Do While there is spare part returned from Sales & Marketing Department

Get details of item in item return list from Sales & Marketing Department with spare part returned

Update return transaction file

End Do

End

Process Number	:	Level 5.2
Process Name	:	Update the Quantity
Purpose	:	To update the quantity in spare part master file
Input	:	Returned item details
Output	:	Returned item quantity

Begin

Do While the returned spare parts are received

If the spare parts returned

ADD the quantity of spare parts returned with the quantity-on-hand in spare part master file

End If

End Do

End

Process Number	:	Level 5.3
Process Name	:	Claim with Manufacturer (if damaged)
Purpose	:	To claim with the manufacturer if damaged
Input	:	Item returned
Output	:	Item claimed

Begin

Do While there is the damaged spare part

Contact the manufacturer regarding the damaged spare parts

Claim with the manufacturer

End Do

End

Process Number	:	Level 6.1
Process Name	:	List Spare Parts for Checking Stock
Purpose	:	To list the spare parts for checking stock
Input	:	Request and Item information
Output	:	Item details for checking stock

Precondition 1

Physical inventory occurs

Postcondition 1

Spare part list is produced

Process Number	:	Level 6.2
Process Name	:	Enter Spare Parts to be Counted
Purpose	:	To enter spare parts to be counted
Input	:	Item details for checking stock
Output	:	Item No. to be counted

Precondition 1

Spare Part Count occurs

Postcondition 1

Counted spare part is produced

Process Number	:	Level 6.3
Process Name	:	Enter Count
Purpose	:	To enter count
Input	:	Item No. to be counted
Output	:	Count data and quantity

Precondition 1

Quantity count of spare part occurs

Postcondition 1

Completed for counting spare part is produced

Process Number	:	Level 6.4
Process Name	:	Post Difference
Purpose	:	To post difference between counted quantity in stock (enter count) and the record
Input	:	Count data and quantity
Output	:	Stock take difference

Precondition 1

Different quantity of physical inventory occurs

Postcondition 1

The adjust quantity is produced

Process Number	:	Level 6.5
Process Name	:	Print Stock Take Difference Report
Purpose	:	To print stock take difference report
Input	:	Stock take difference
Output	:	Stock take difference report

Begin

Do While there are more stock take difference details in post difference

Get stock take difference

Print stock take difference report

End Do

End

Process Number	:	Level 7.1 - 7.6
Process Name	:	Select Reports and Print Reports
Purpose	:	To print reports
Input	:	Item information
Output	:	Inventory quantity balance report, ABC analysis report, Min/Max reports, Inventory cost report and Spare Part List Report

Begin

Do While not EOF spare part master file and issue transaction file

Get item information

Select Inventory quantity balance report or ABC analysis report or Min/Max reports or Inventory cost report or Spare part list Report

Print selected report

End Do

End

APPENDIX E

Structure Chart

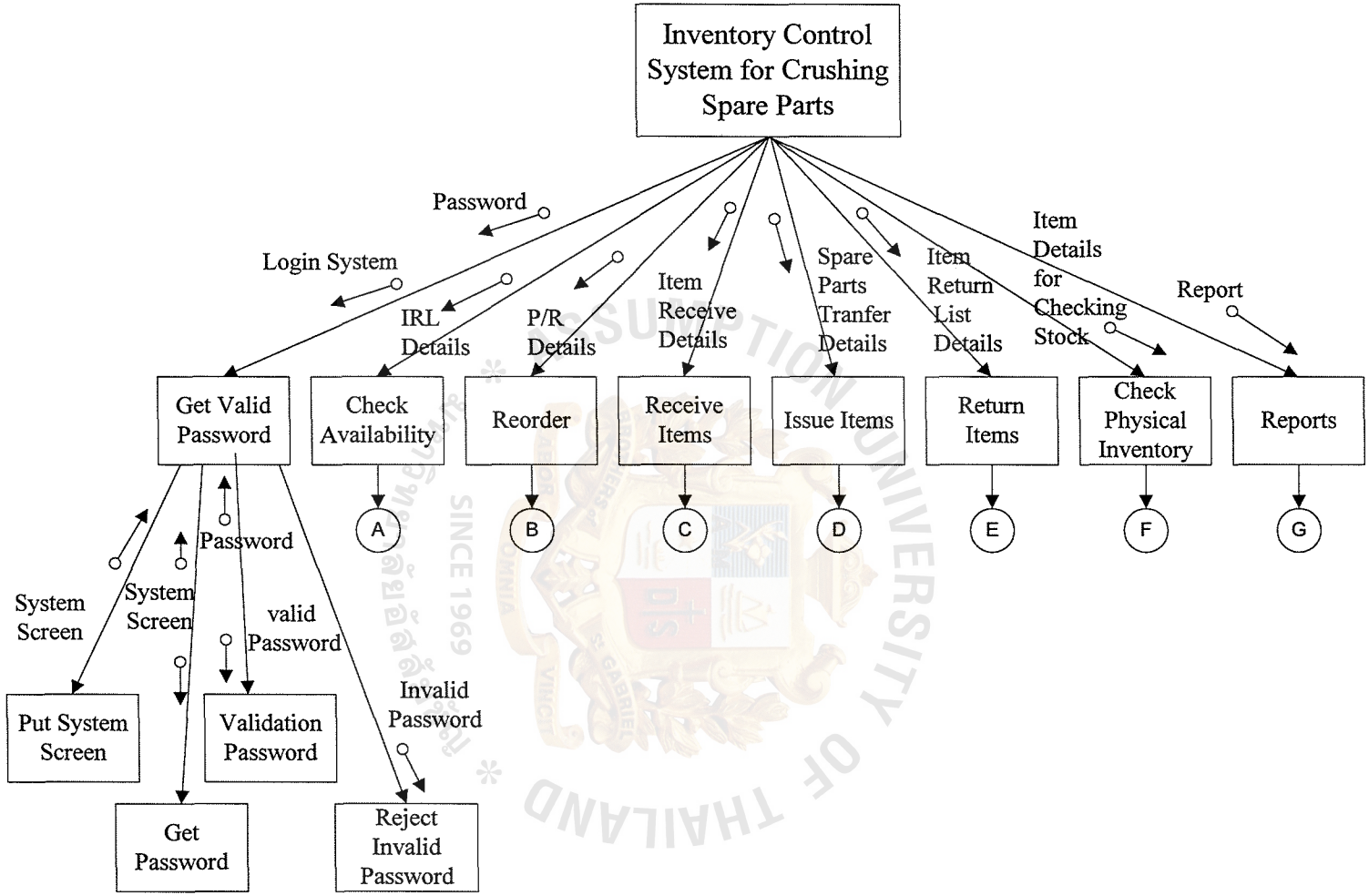

Figure E.1. Structure Chart of Inventory Control System for Crushing Spare Parts

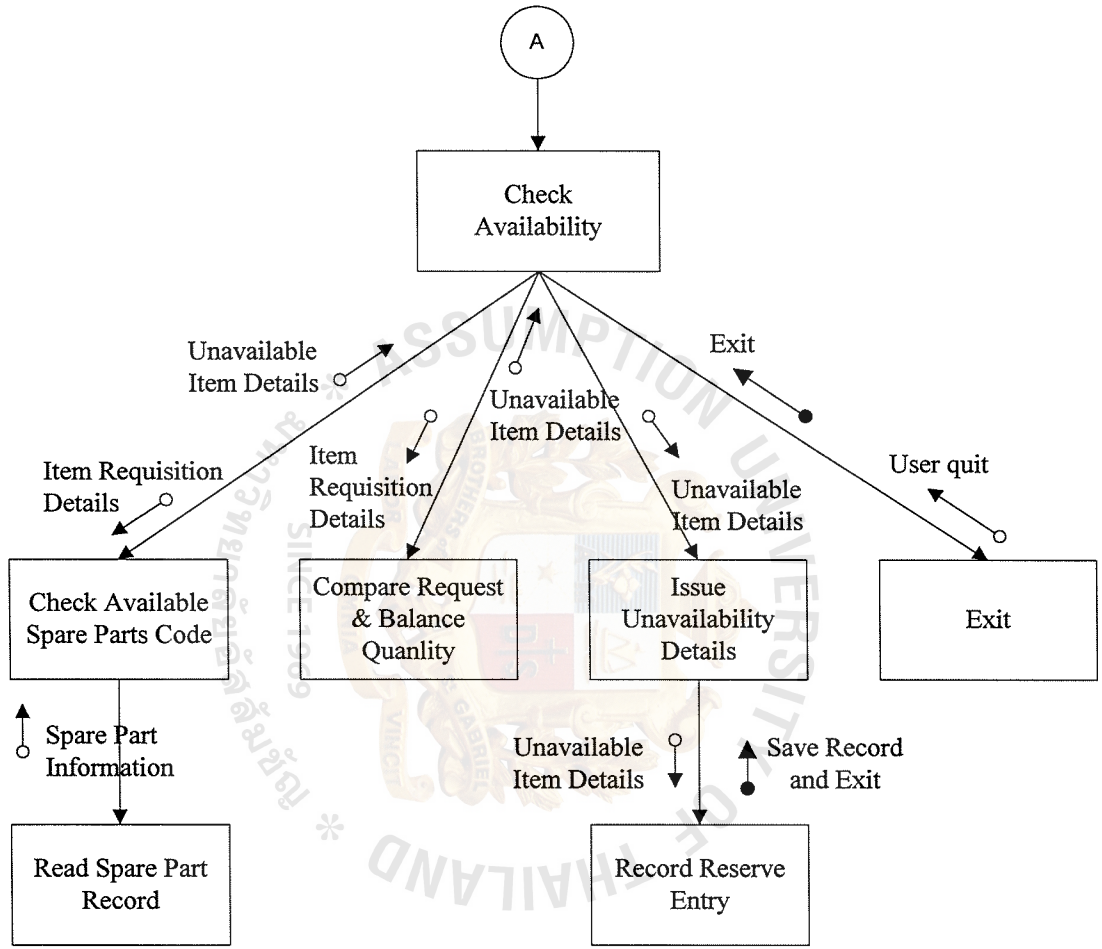

Figure E.2. Structure Chart of Check Availability

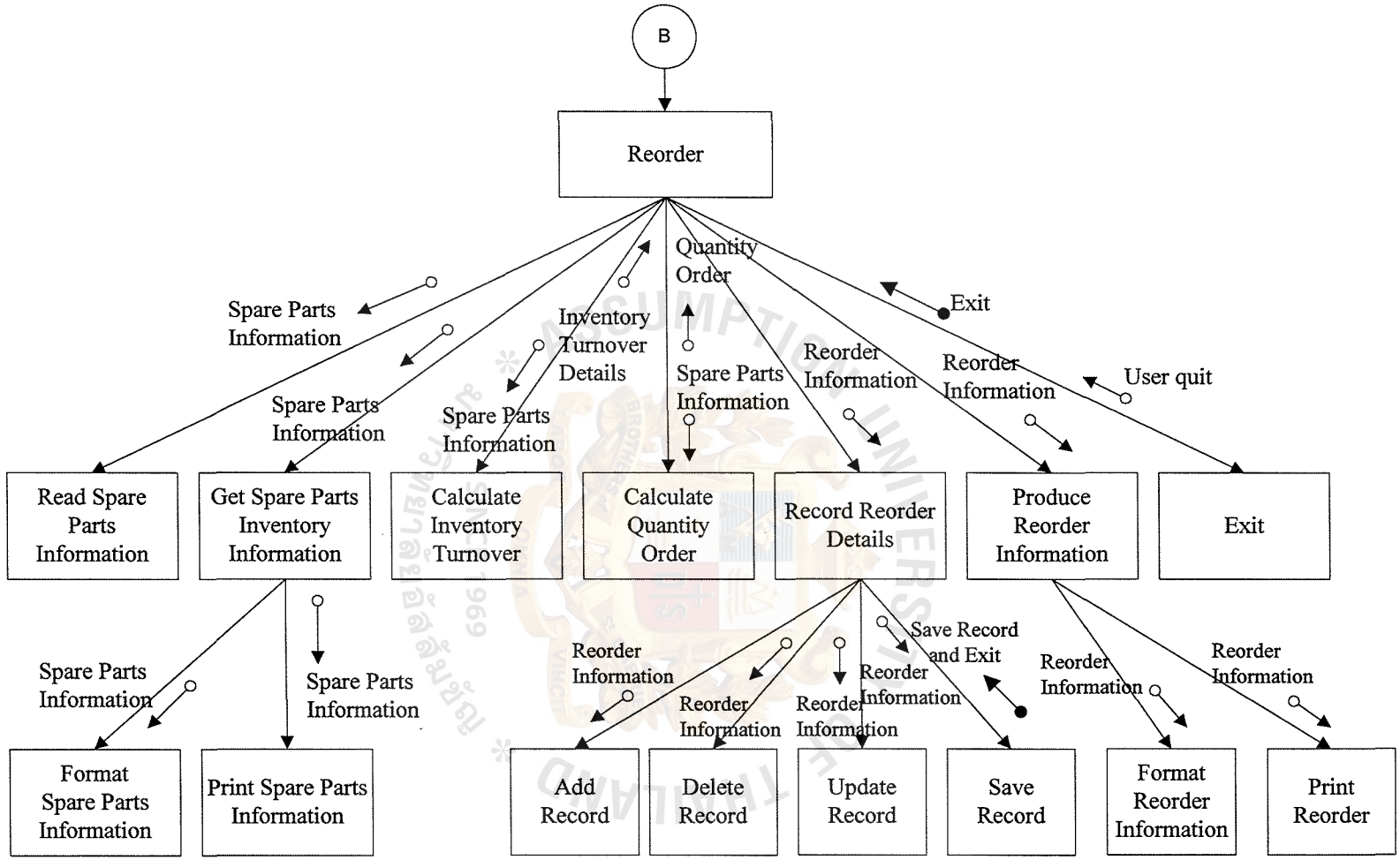

Figure E.3. Structure Chart of Reorder

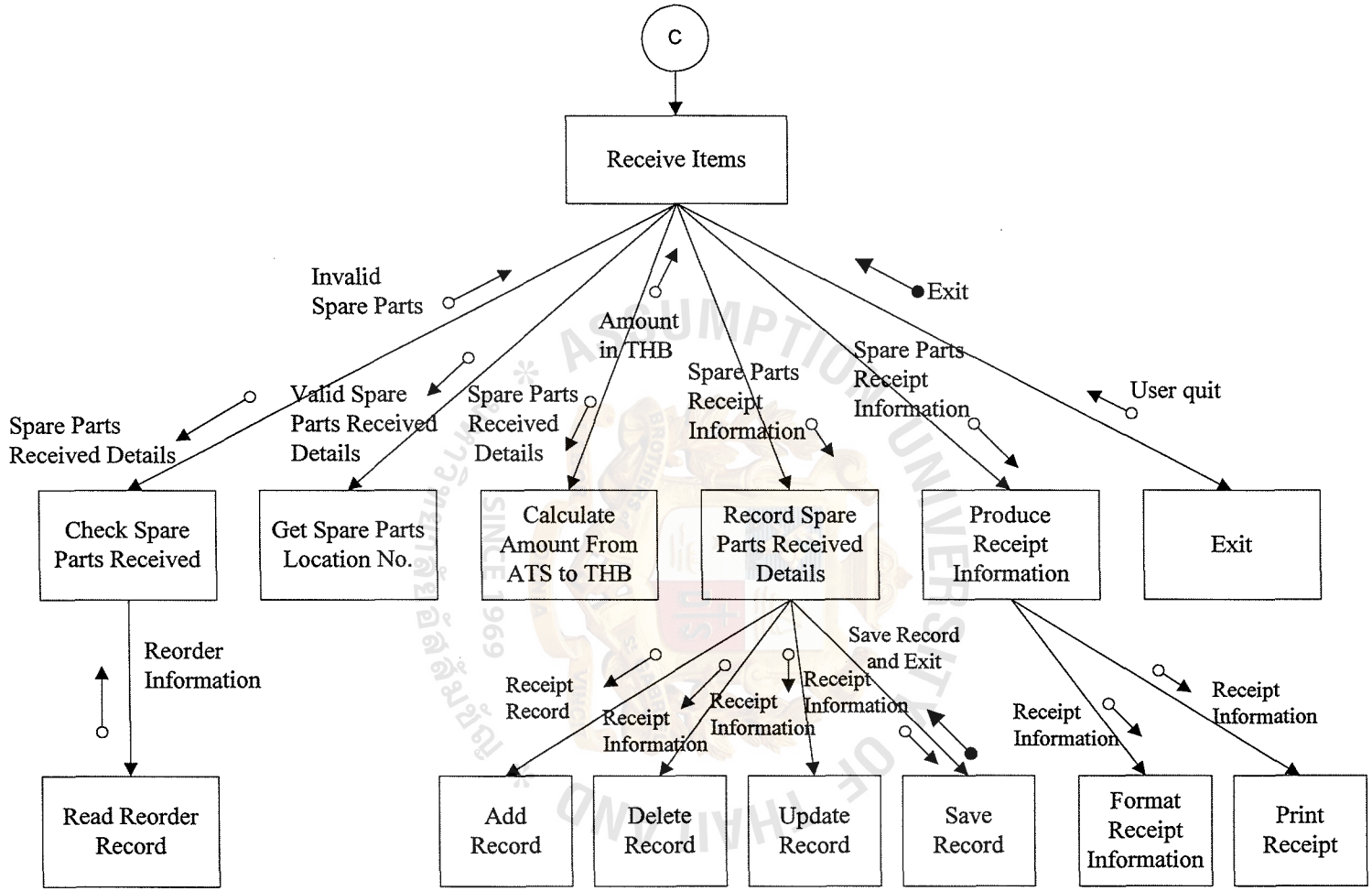

Figure E.4. Structure Chart of Receive Items

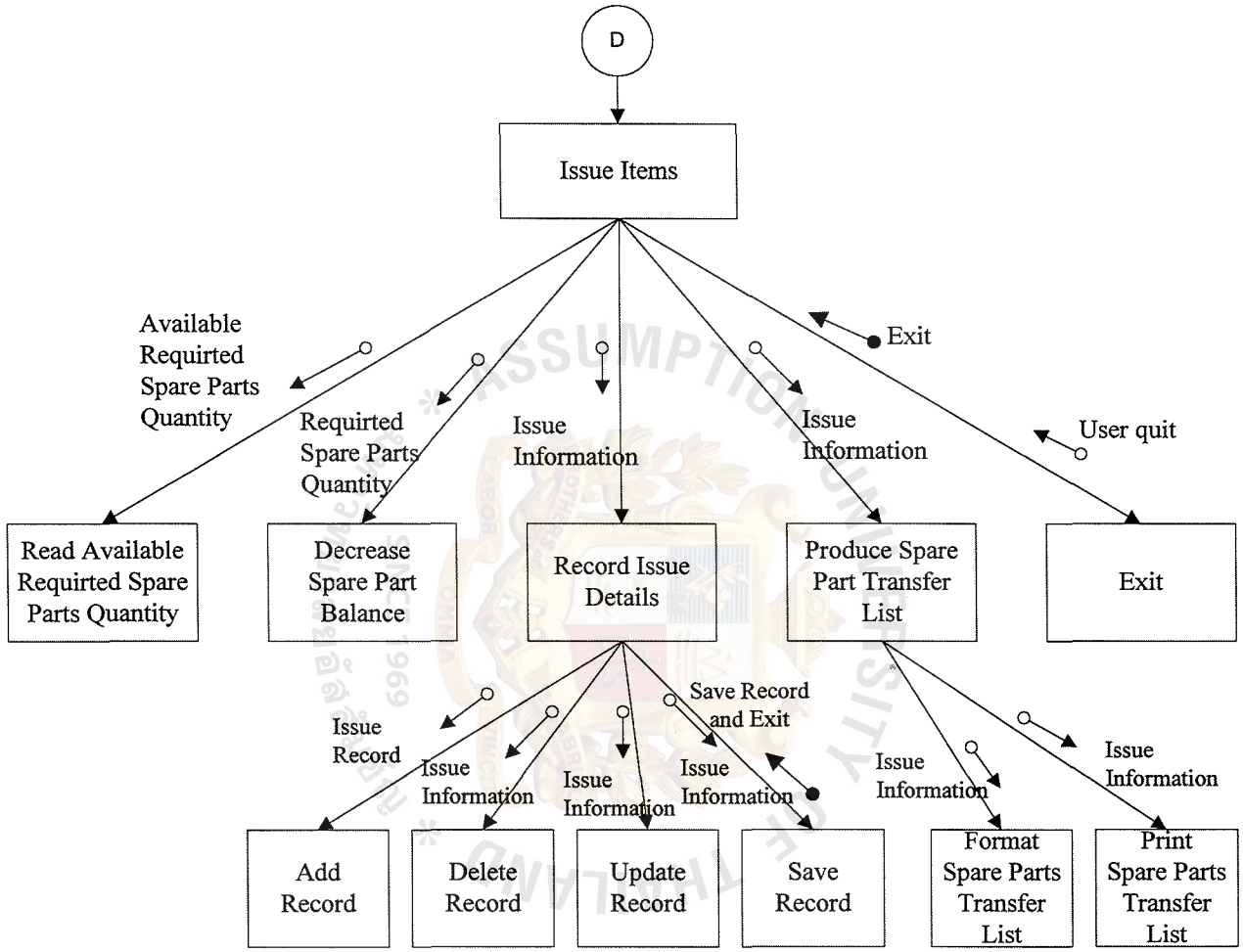

Figure E.5. Structure Chart of Issue Items

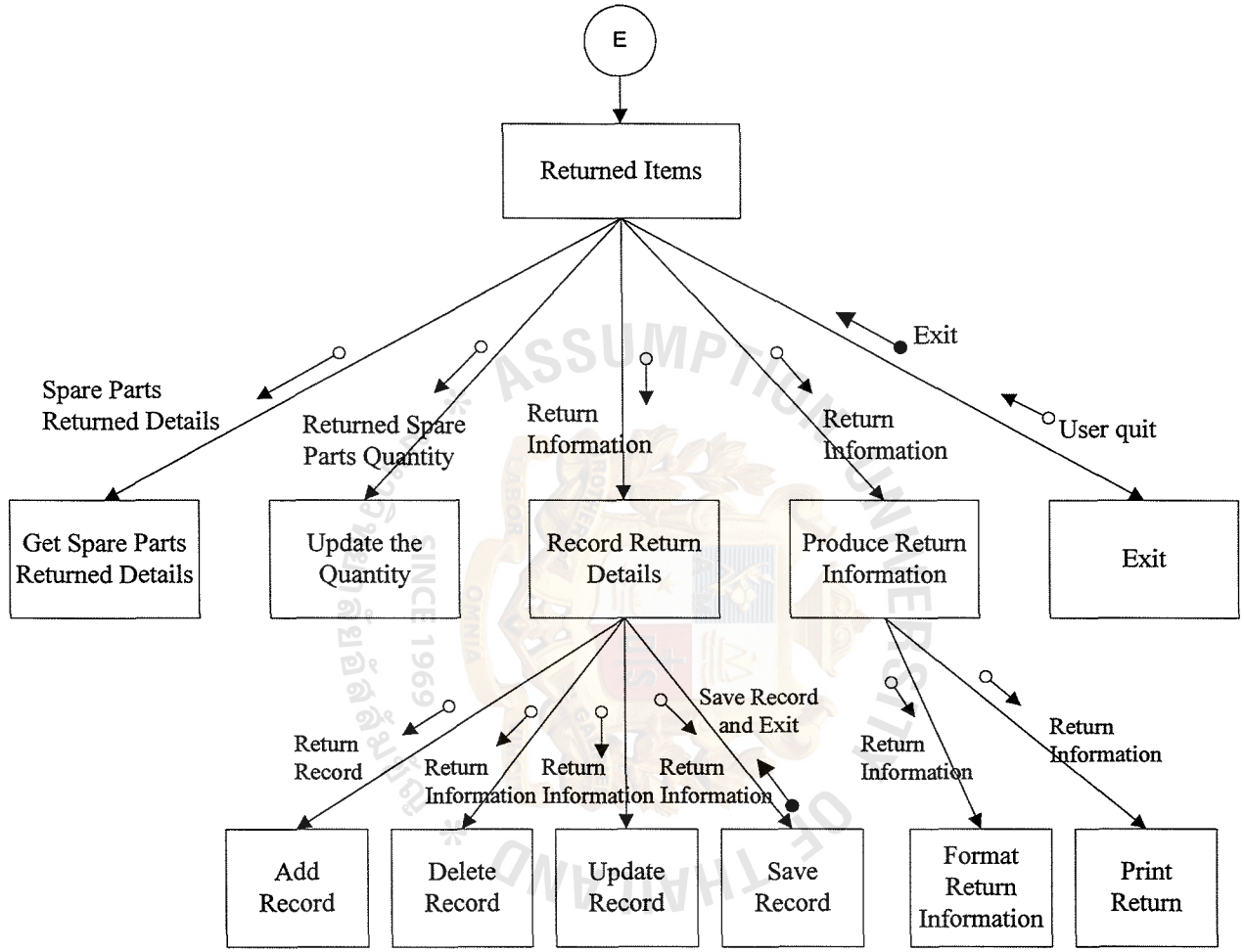

Figure E.6. Structure Chart of Returned Items

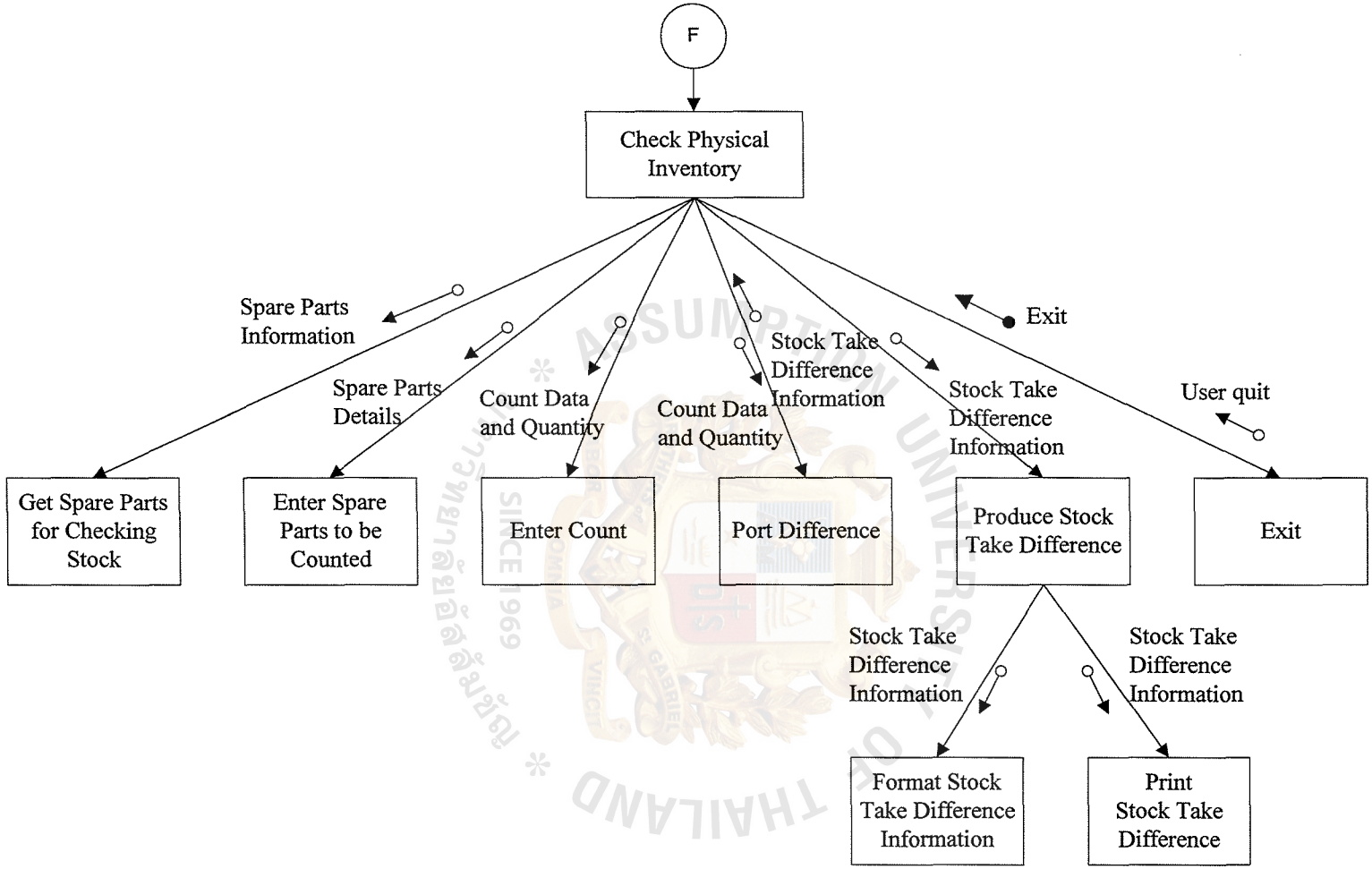

Figure E.7. Structure Chart of Check Physical Inventory

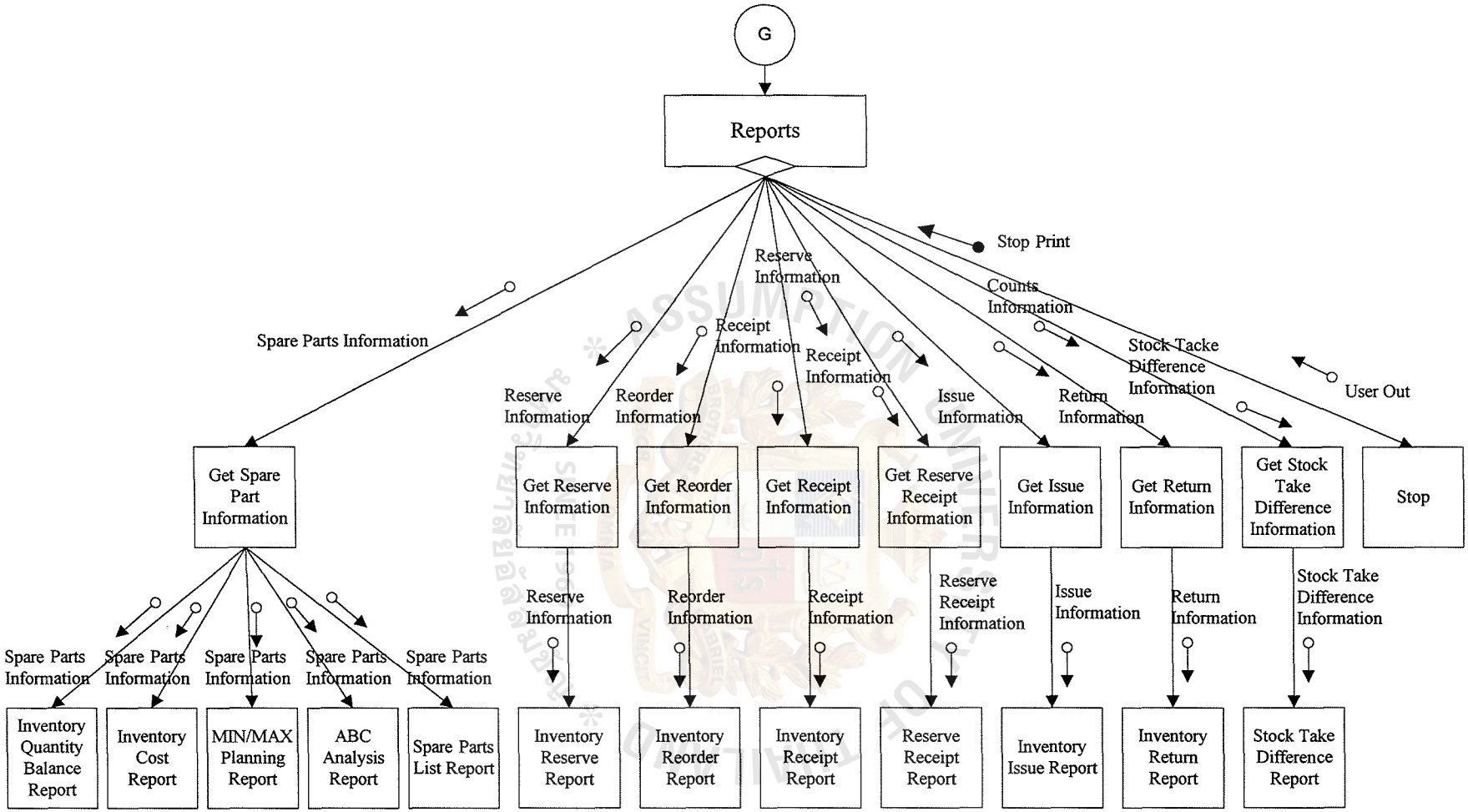

Figure E.8. Structure Chart of Reports

APPENDIX F

Data Dictionary

Data Dictionary

ABC Analysis Report = *The report of ranking of spare parts according to a criterion and then grouping them into classes.*

ABC_Code = *Identification of code of class A, B or C*

ATS = *Austria Shilling*

Available Balance = *The balance of available quantity which is calculated from stock balance, added by reorder quantity, and subtracted by reserve quantity.*

Class A = *The high issue quantity of the spare part*

Class B = *The low issue quantity of the spare part*

Class C = *None of Quantity is issued.*

Cost = *The cost of the spare part*

Count File = @Document No. + Document Date + Reference No. + Remark + Item + Spare Part Code + Spare Part Name + Location + Count Qty + UOM

Count Qty = *The count quantity*

Exchg_Rate = *The Exchange Rate*

Inventory Cost Report = *The report of spare parts cost information*

Inventory Issue Report = *The report of issued spare parts information from the Inventory Department*

Inventory Quantity Balance Report = *The report of spare parts quantity information*

Inventory Receipt Report = *The report of received spare parts information from reorder process of the company*

Inventory Reorder Report = *The report of ordered spare parts information which the company has ordered.*

Inventory Reserve Report = *The report of requested spare parts which are unavailable in stock and reserved by the customer.*

Inventory Return Report = *The report of spare parts returned to the Inventory Department*

IRL	=	*Item Requisition List*
Issue File	=	@STL Number + STL Date + Item + Spare Part Code + Spare Part Name + Quantity + UOM + IRL Number + Remark + Transfer by + Transfer To
Item Requisition List	=	*List of spare parts which are requested from the Sales and Marketing Department for delivering to the customers.*
Item Return List	=	*List of spare parts which are returned to the Inventory Department due to some reason by Sales and Marketing Department.*
Manufacturer	=	*The factory or company that produces and sells crushing spare parts.*
Maximum Planning Report	=	*The report which is a method of determining when and how much to order based on user-defined maximum inventory level.*
Max_Qty	=	*The Maximum Quantity*
Minimum Planning Report	=	*The report which is a method of determining when and how much to order based on user-defined minimum inventory level.*
Min_Qty	=	*The Minimum Quantity*
P/R	=	*Purchase Requisition*
Purchase Requisition	=	*The request of spare parts purchase from the manufacturer*
Receipt File	=	@Receiving No. + Receiving Date + P/R No. + Spare Part Code + Spare Part Name + Quantity + UOM + Cost/Unit(ATS) + Exchg_Rate + Cost/Unit(THB) + Total Amount + Remark
Reorder	=	*The company spare parts order to the manufacturer*
Reorder Qty	=	*Reorder quantity*

Reorder File	=	@P/R_No. + Department Name + P/R_Date + Date Required + Item + Spare Part Code + Spare Part Name + Quantity + UOM + Price/Unit + Total Amount + Remark
Reserve	=	*The requested spare parts which are unavailable in the stock.*
Reserve Qty	=	*Reserve quantity*
Reserve Receipt Report	=	*The report of reserved spare parts which are received from manufacturer.*
Reserve File	=	@Reserve Number + IRL Number + Date + Spare Part Code + Spare Part Name + QtyOnRequest + Qty Unavailable + UOM + Date Required
Return File	=	@Item Return List No. + Date Returned + Item + Spare Part Code + Spare Part Name + Quantity + UOM + Reason
Spare Parts List Report	=	*The report of spare parts which shows the status details of the spare parts.*
Spare Part Master File	=	@Spare Part Code + Creation Date + Spare Part Name + Type + Dimension + Weight + UOM + ABC_Code + Cost/Unit + Location + Min_Qty + Max_Qty + Reorder Qty + Reserve Qty + Stock Balance + Available Balance
Spare Part Transfer List	=	*List of spare parts which are transferred to Sales and Marketing Department as requested on Item Requisition List.*
STL	=	*Spare Part Transfer List*
Stock Balance	=	*The balance of quantity in stock*
Stock Take Difference Report	=	*The report of comparison between the quantity of stock balance and the quantity of stock count balance*
THB	=	*Thai Baht*
UOM	=	*Unit of Measurement*

APPENDIX G

Graphic User Interface (GUI) Design

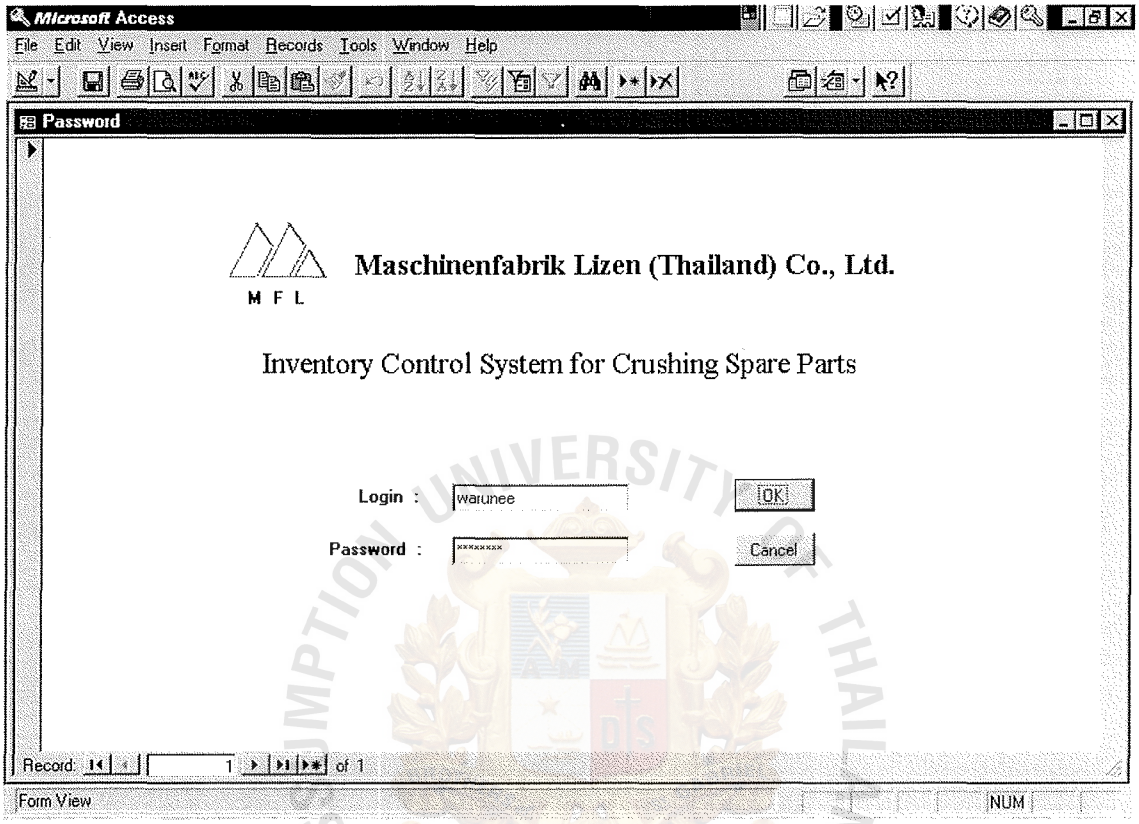

Figure G.1. Login Inventory Control System for Crushing Spare Parts Screen

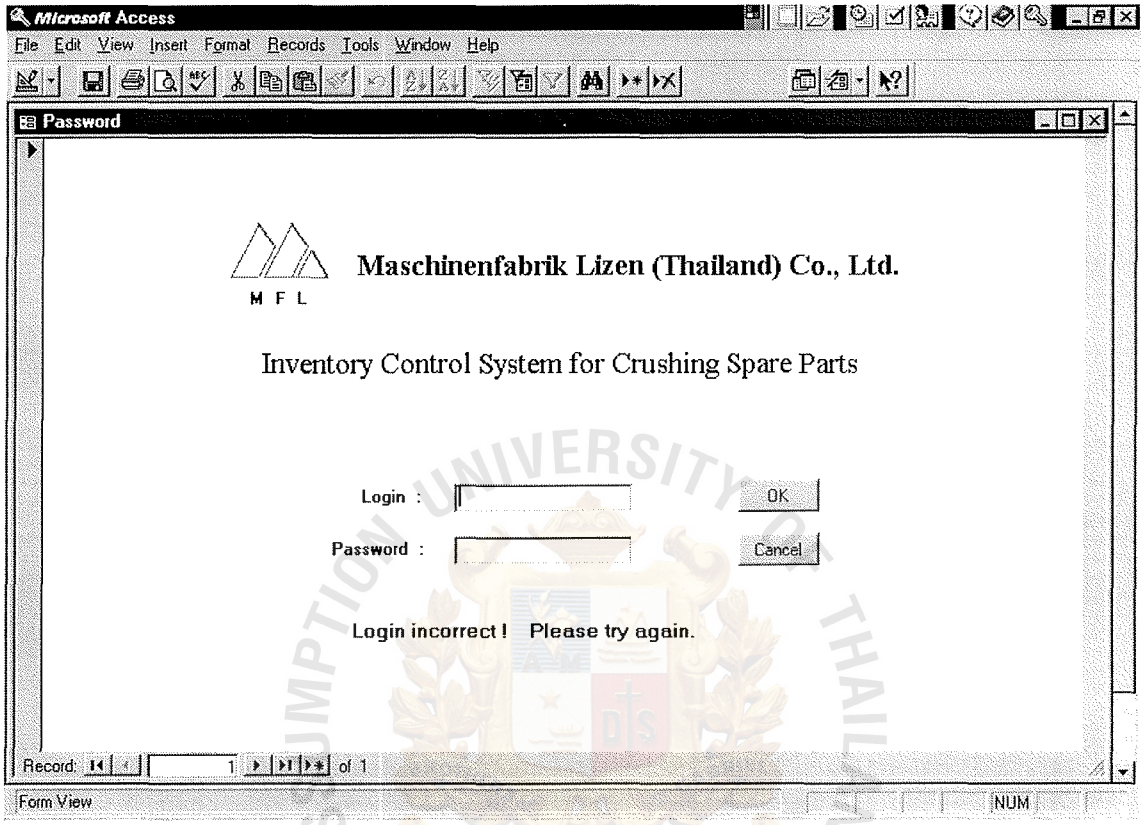

Figure G.2. Login Incorrect Screen

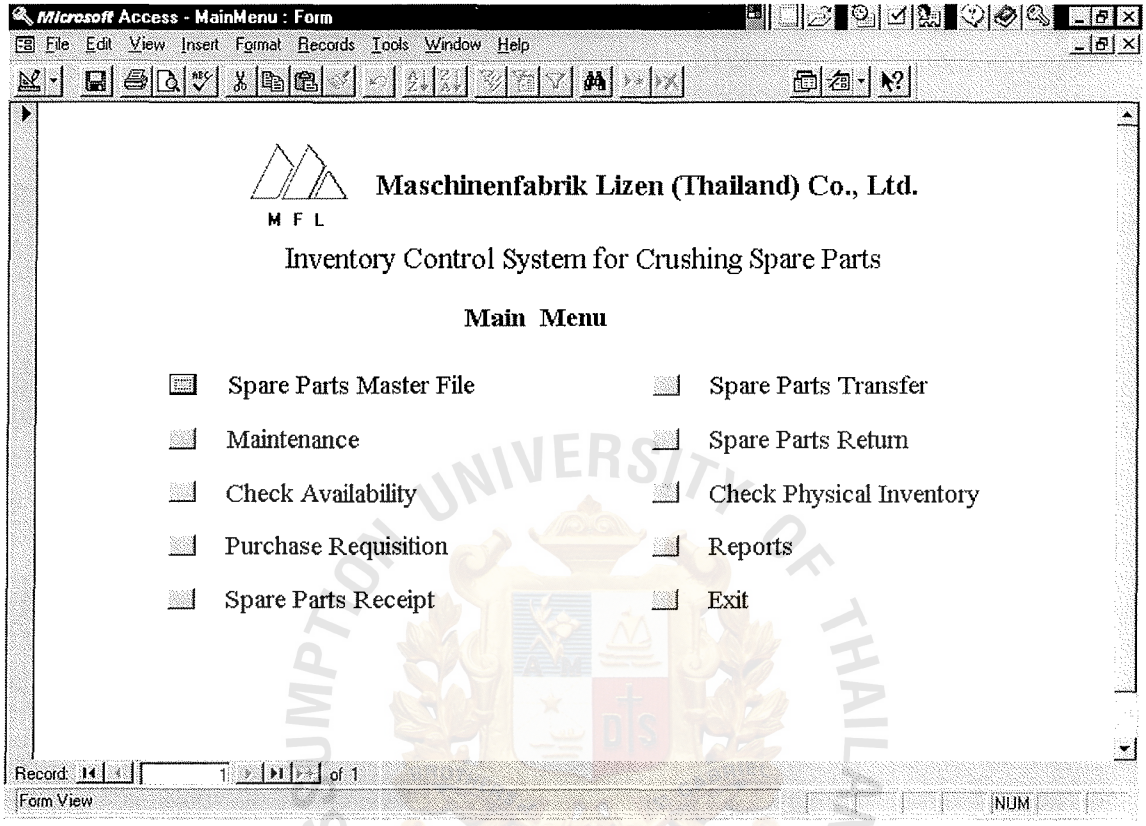

Figure G.3. Main Menu Screen

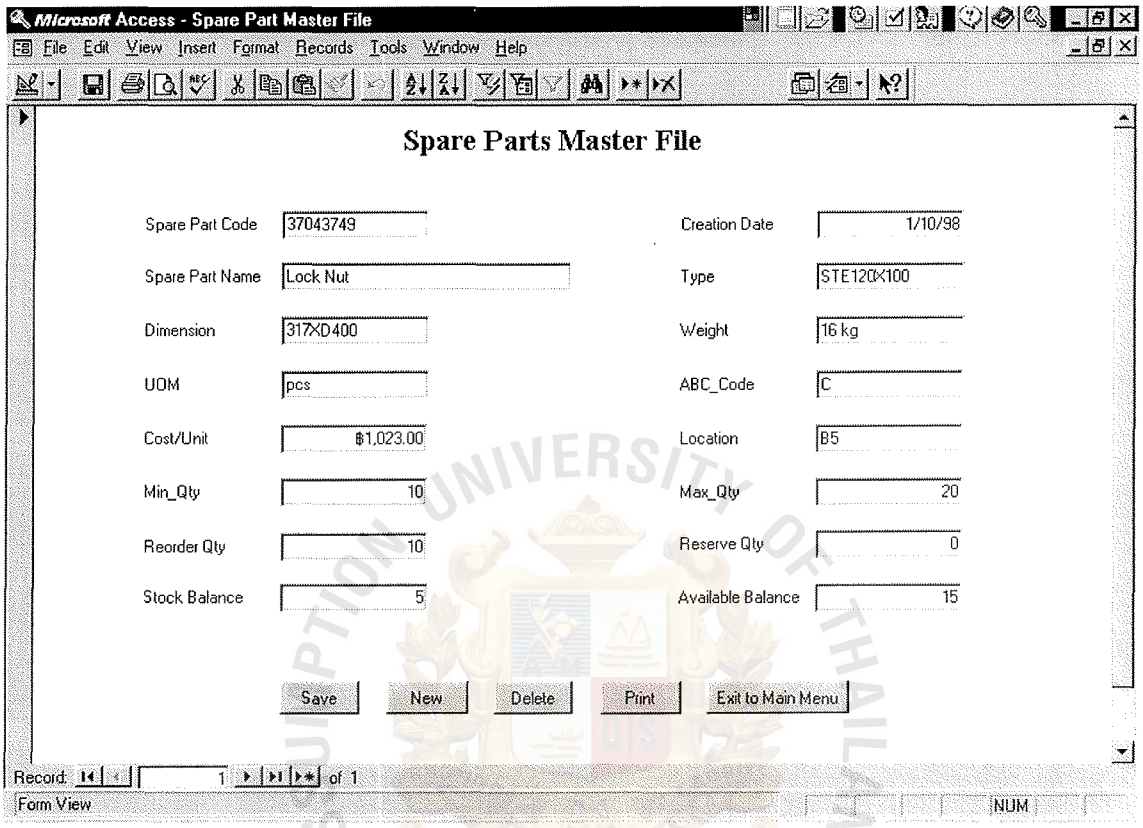

Figure G.4. Spare Parts Master File Screen

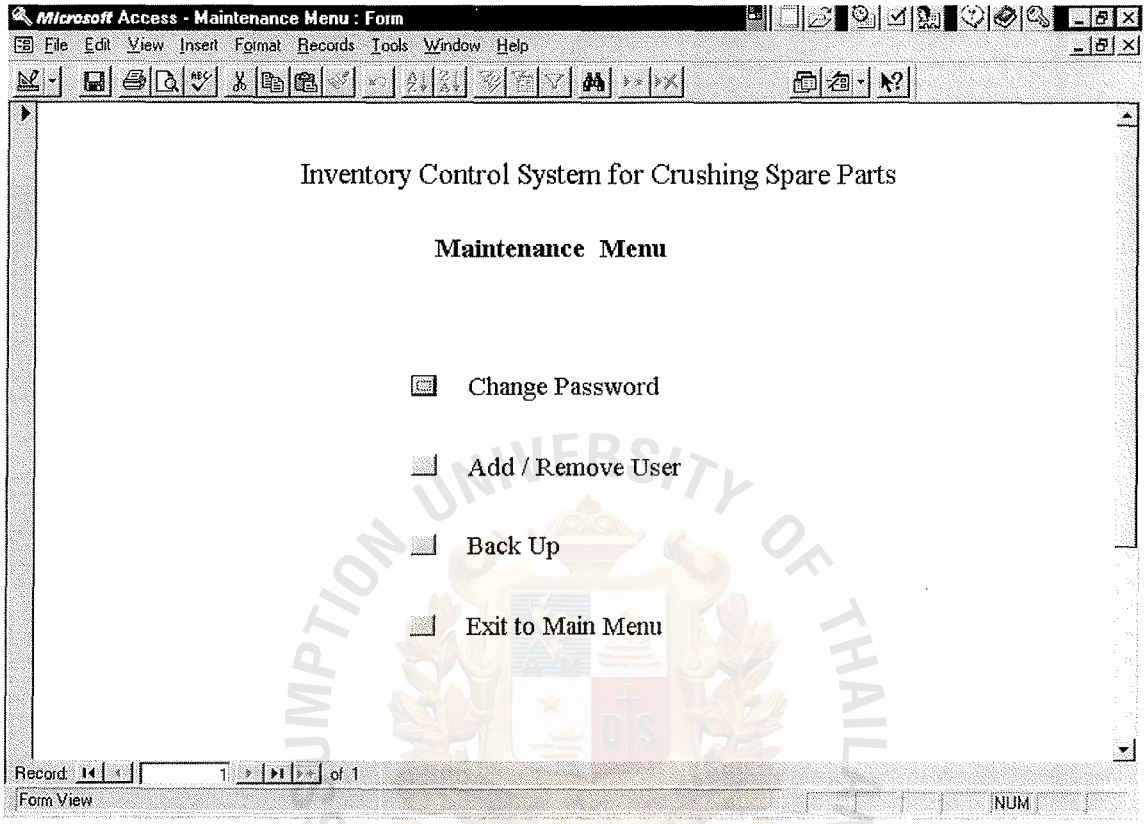

Figure G.5. Maintenance Menu Screen

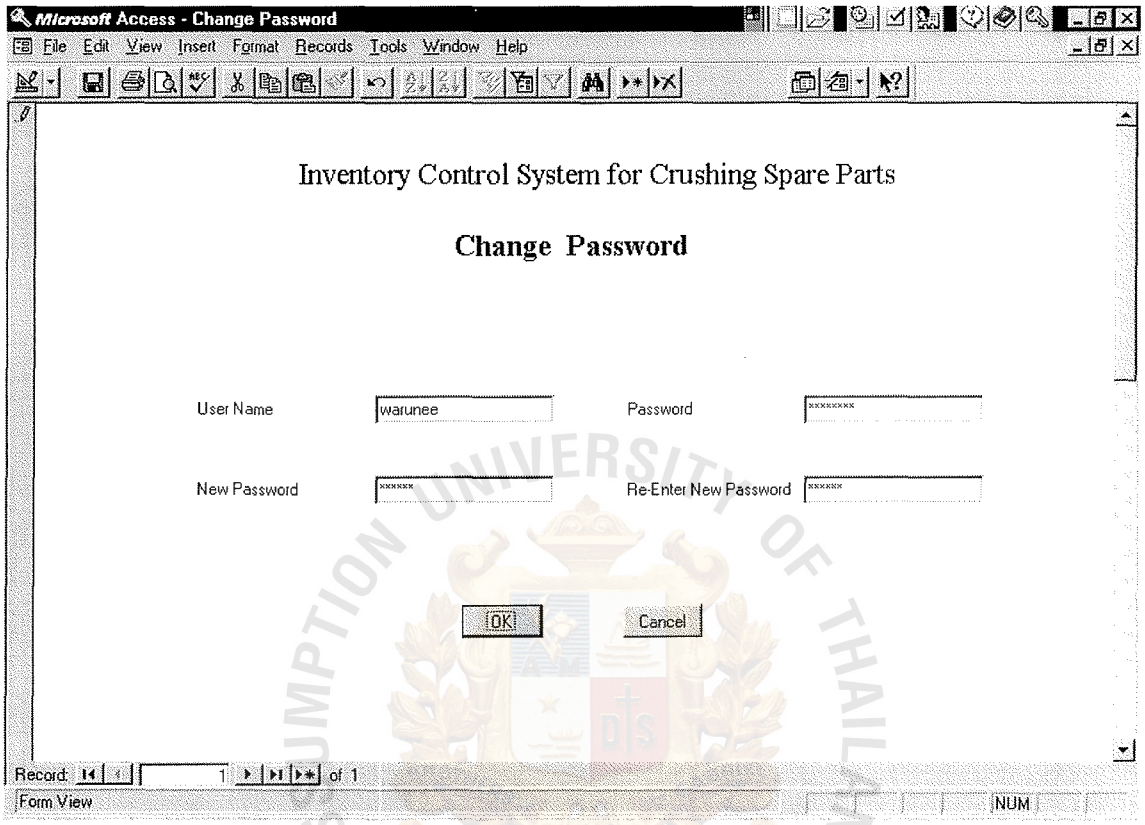

Figure G.6. Change Password Screen

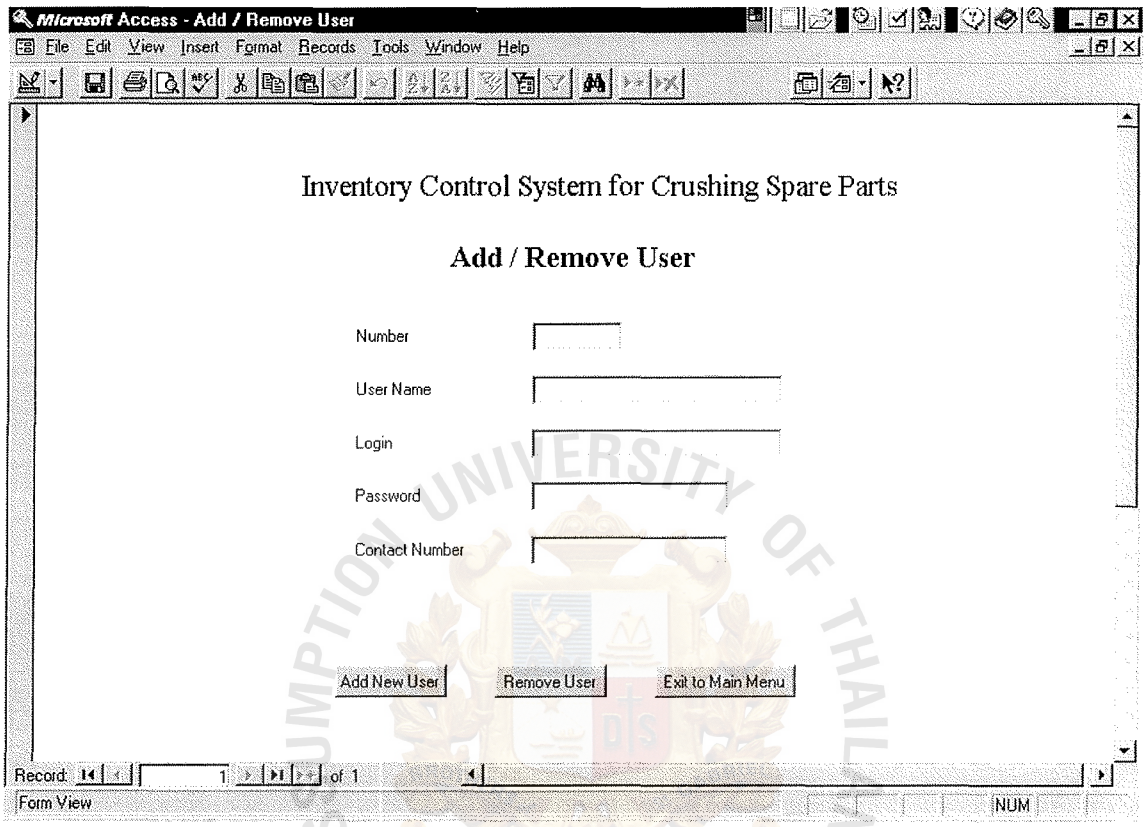

Figure G.7. Add / Remove User Screen

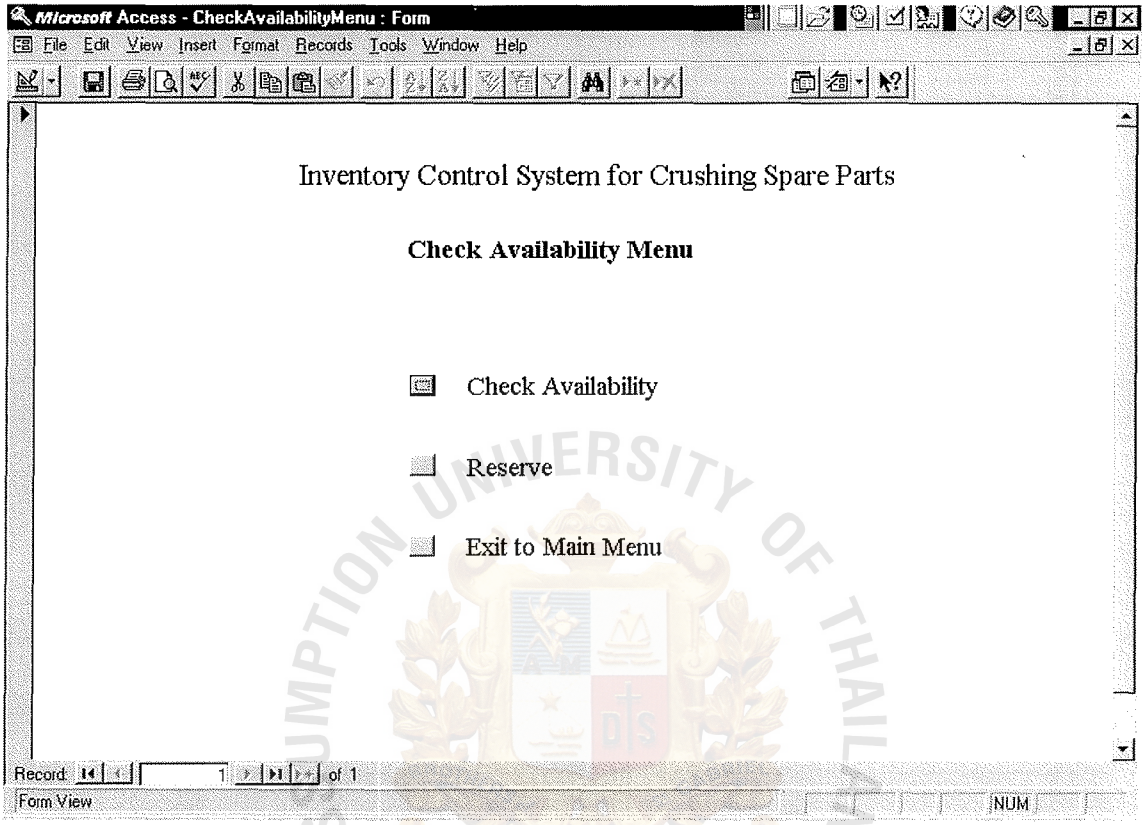

Figure G.8. Check Availability Menu Screen

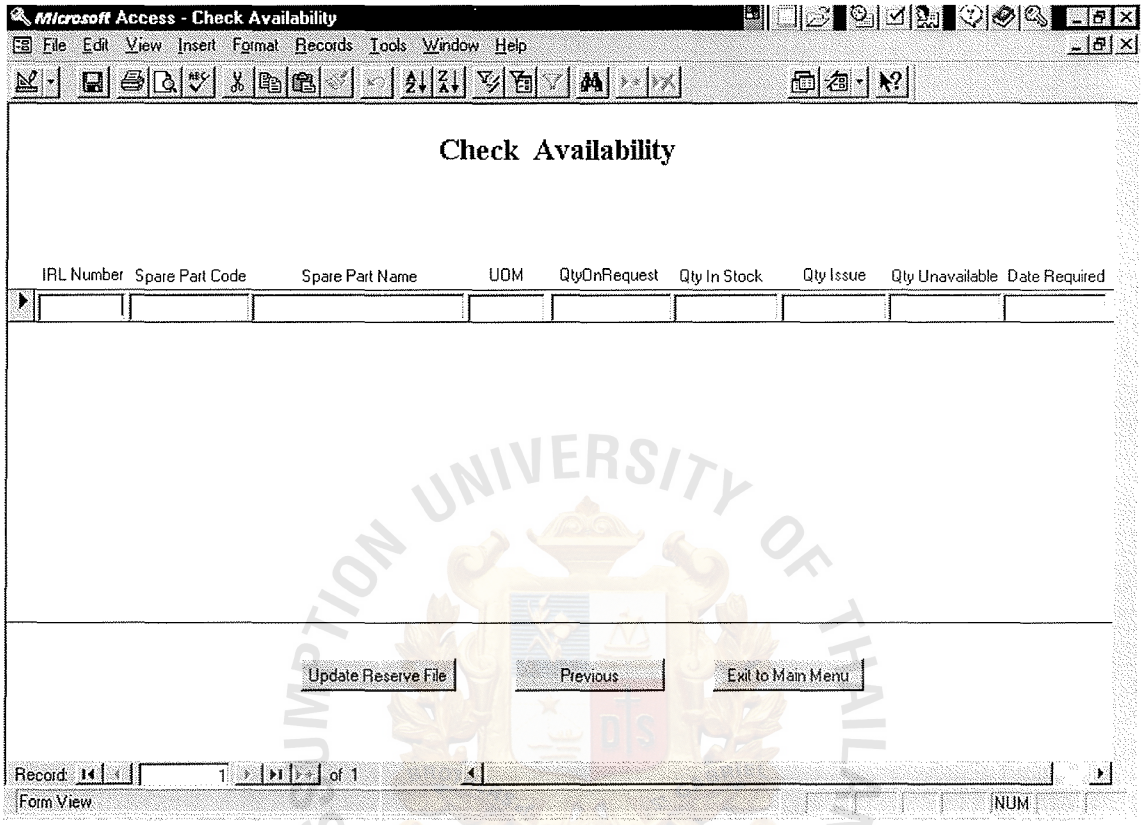

Figure G.9. Check Availability Screen

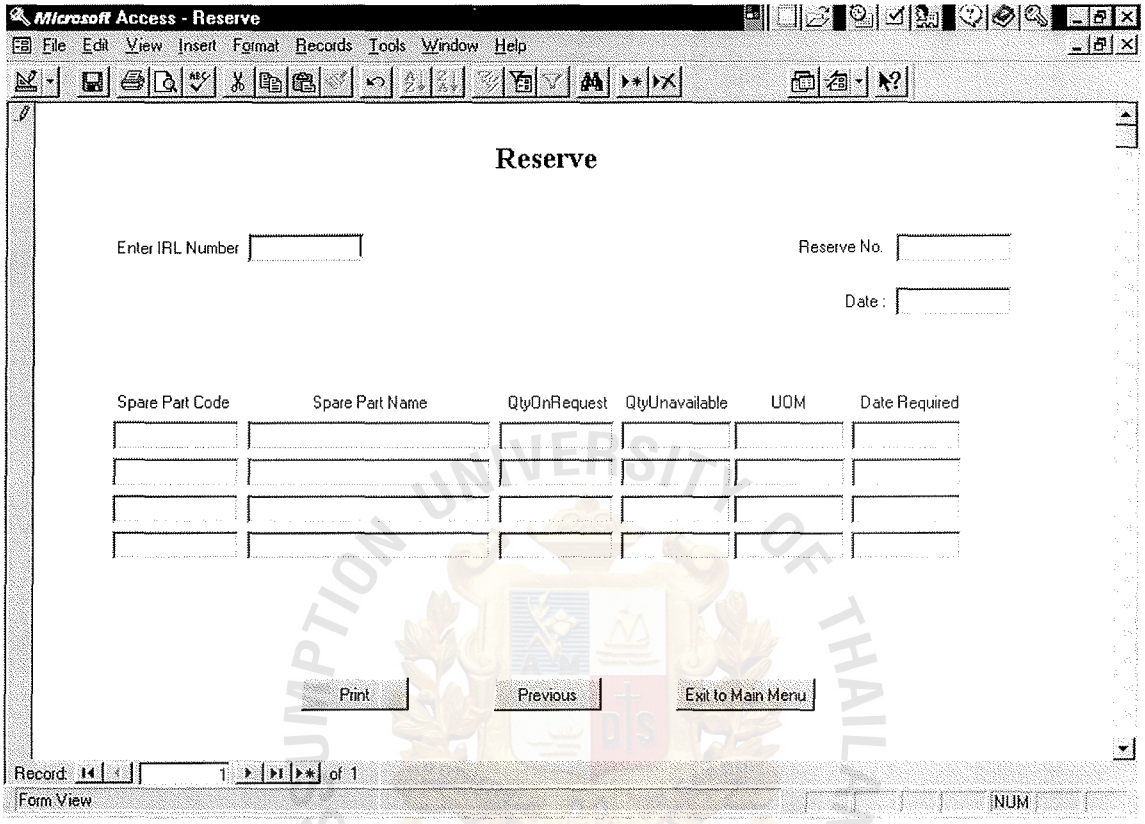

Figure G.10. Reserve Screen

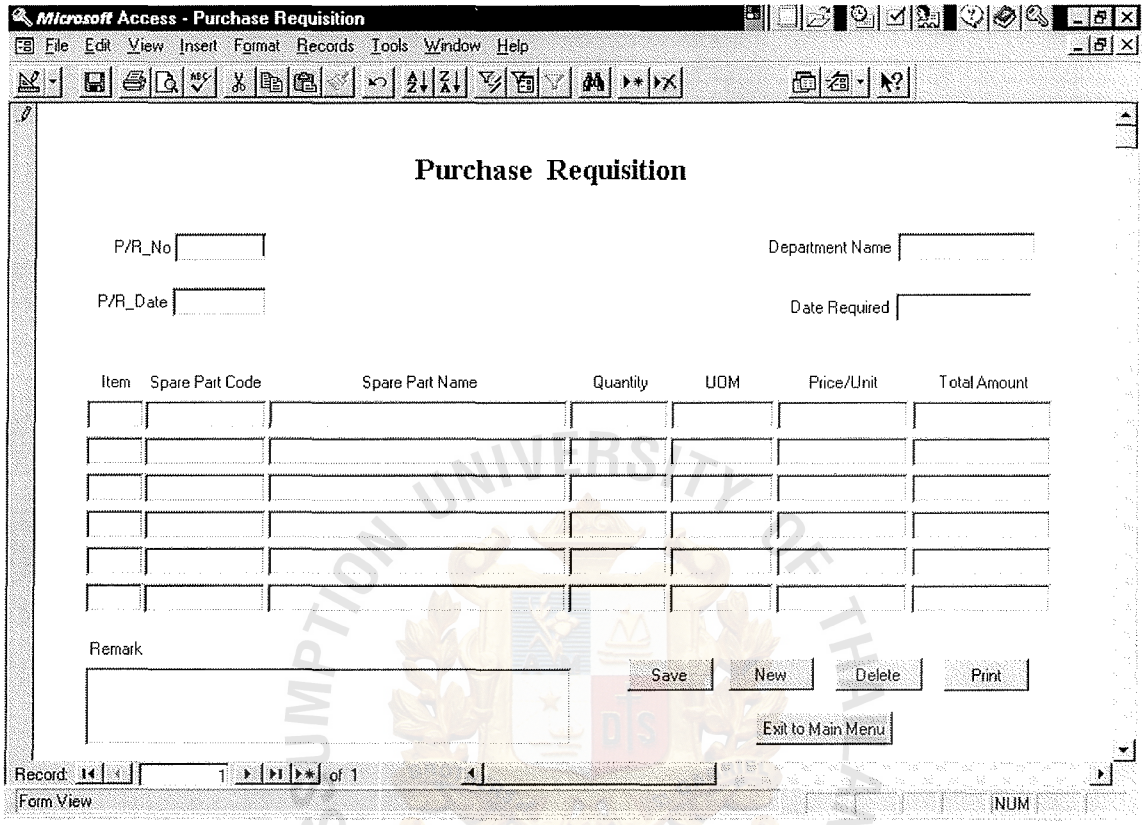

Figure G.11. Purchase Requisition Screen

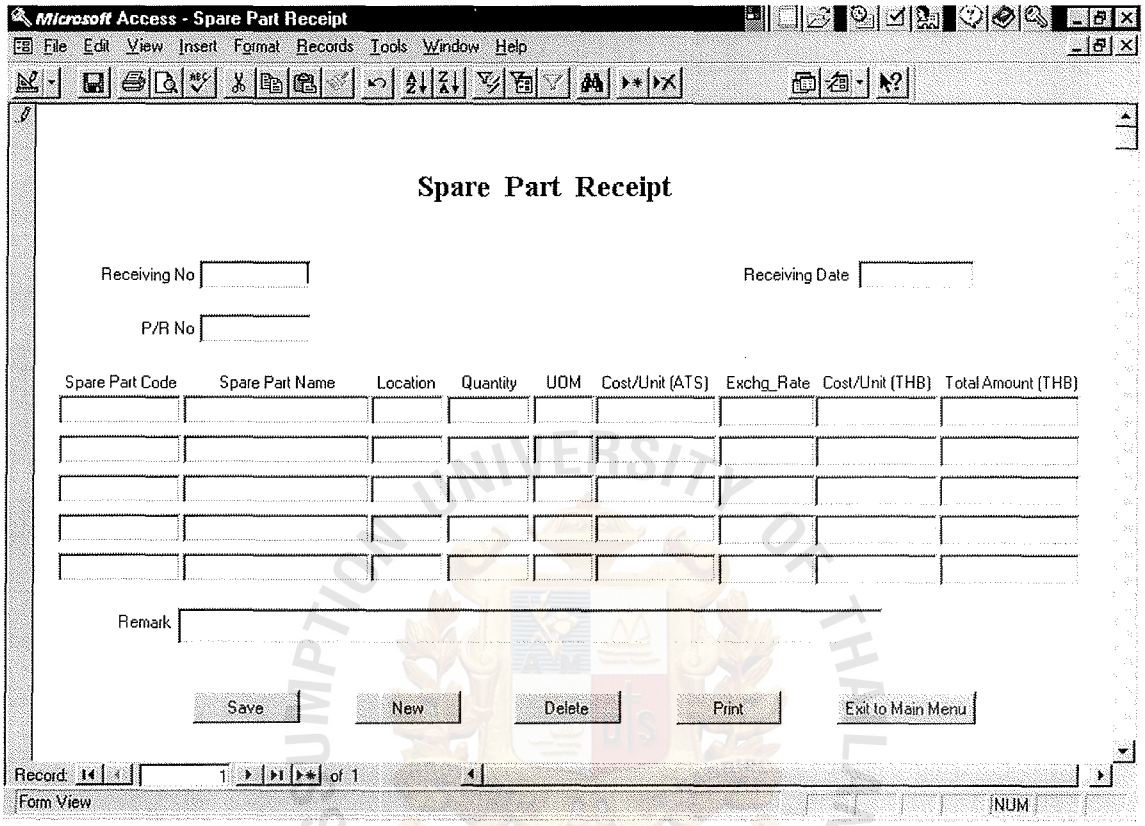

Figure G.12. Spare Part Receipt Screen

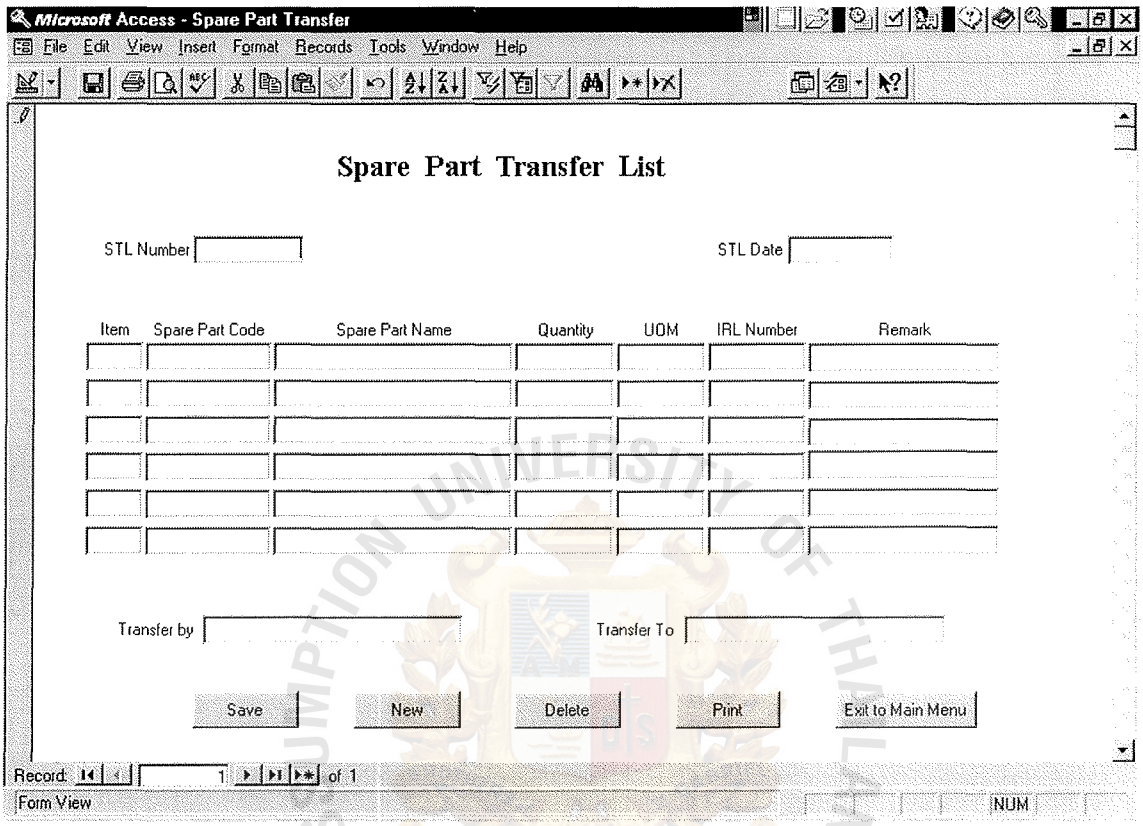

Figure G.13. Spare Part Transfer List Screen

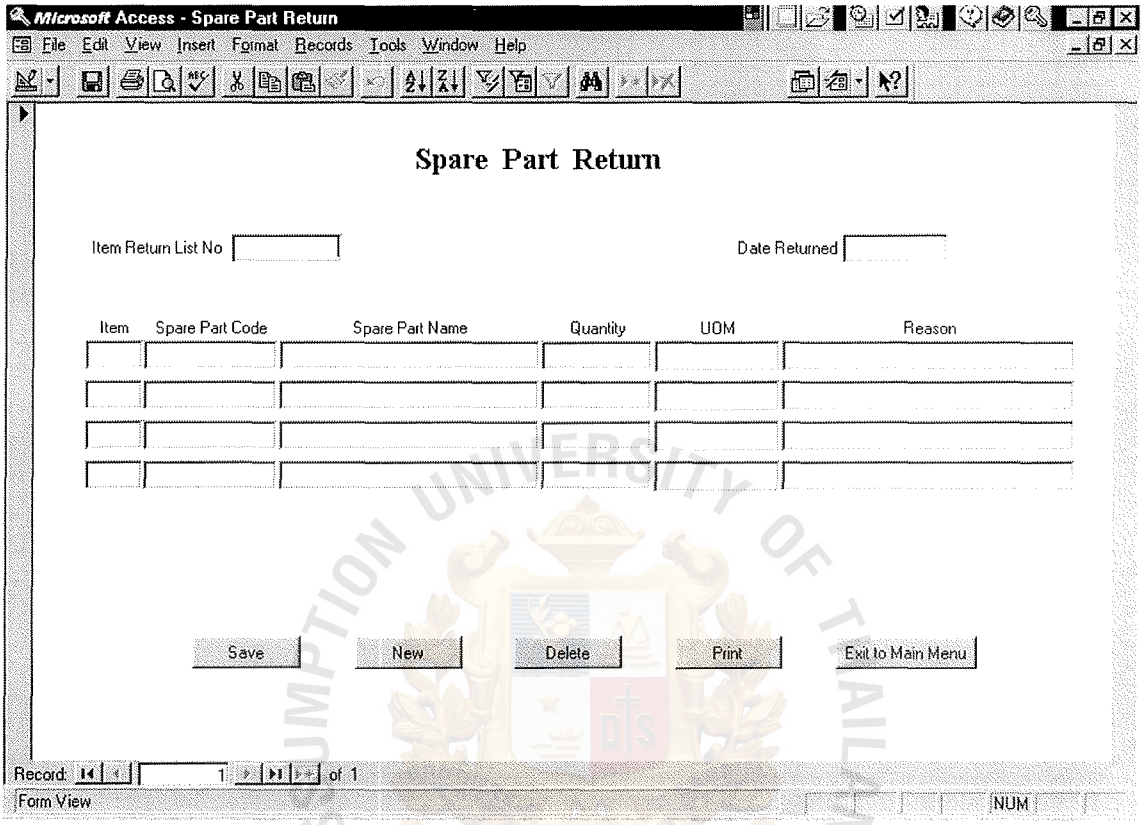

Figure G.14. Spare Part Return Screen

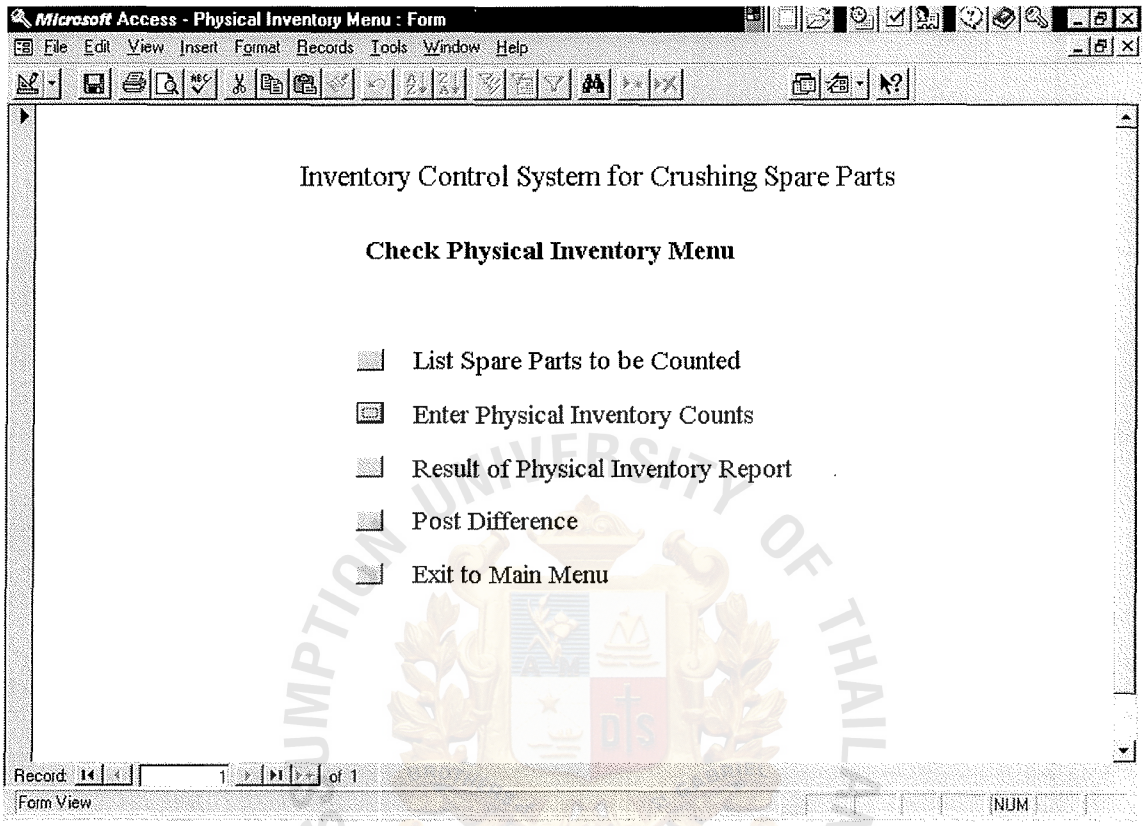

Figure G.15. Check Physical Inventory Menu Screen

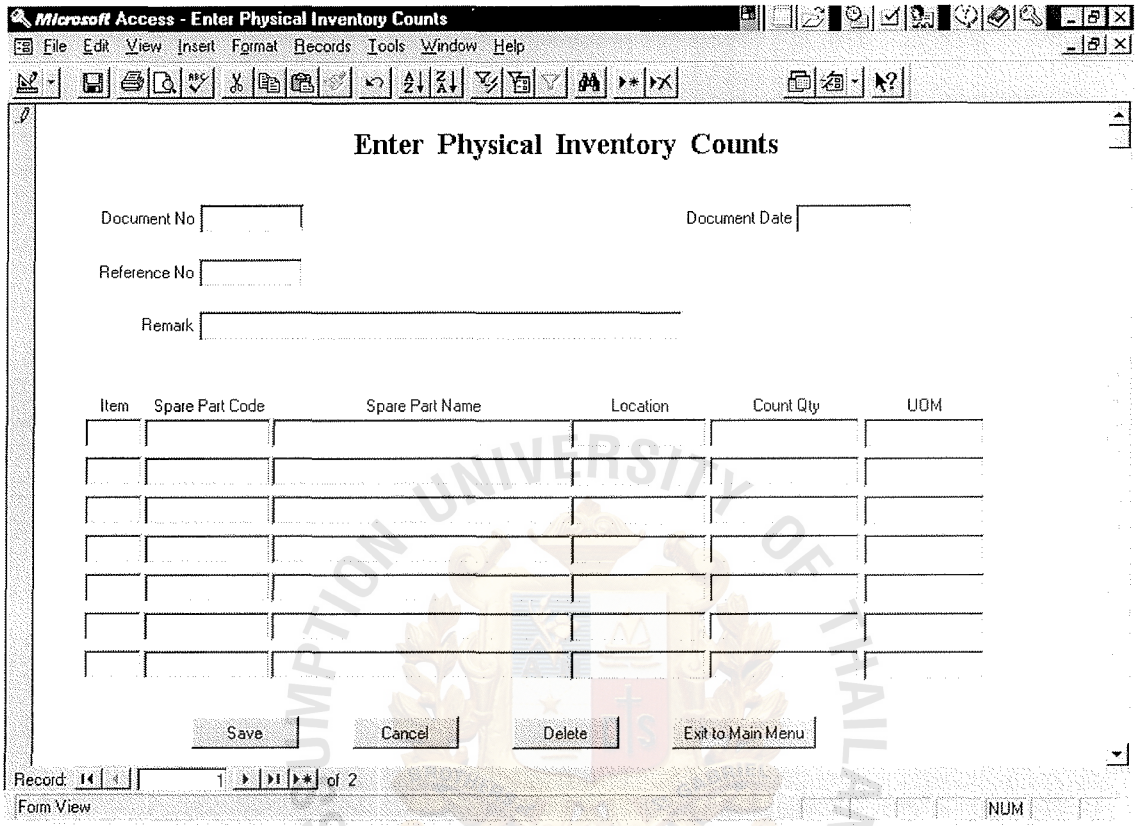

Figure G.16. Enter Physical Inventory Counts Screen

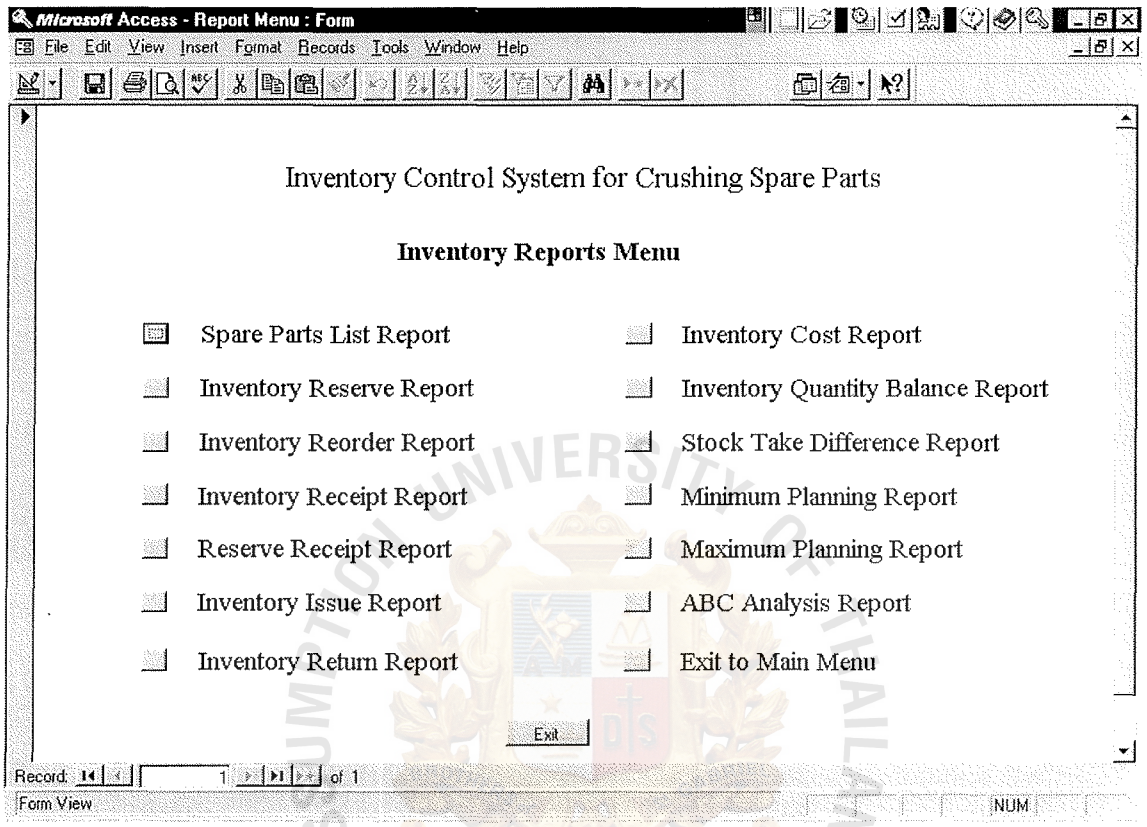

Figure G.17. Inventory Reports Menu Screen

APPENDIX H

Reports and Forms Design

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Spare Parts List Report

As of October 31, 1998

Spare Part Code	Spare Part Name	Type	Stock Balance	UOM	Dimension	Weight	Location
02874200	Washer*037	CC102	18,000	st		100 kg	A1
43054549	Fastening Ring	CC102	1,000	st	20XD367	750 kg	A2
43087900	Stripper Ring	CC102	1,000	st	16XD280		A3
01297700	Clamping Sleeve	STE120X100	5	pcs		23 kg	B1
02645200	Split Pin	STE120X100	4	pcs			B2
36034849	End Cap	STE120X100	5	pcs	115XD355	33 kg	B3
37015849	Vee Belt Pulley	STE120X100	1	pc	320XD1800	860 kg	B4
37043749	Lock Nut	STE120X100	8	pcs	317XD400	16 kg	B5

Figure H.1. Spare Parts List Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Inventory Reserve Report

Daily Ended October 31, 1998

Spare Part Code	Spare Part Name	Reserve Quantity	UOM	Date Required	Reserve No.
00031400	Filter Element	1	pc	15-Nov-98	0010
00103100	Pressure Gauge 0-4 Bar	2	pcs	10-Nov-98	0010
00337800	Level Switch	1	pc	15-Nov-98	0010

Figure H.2. Inventory Reserve Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Inventory Reorder Report

For Week Ended October 31, 1998

Spare Part Code	Spare Part Name	Reorder Qty	UOM	Price/Unit (ATS)	Total Amount	Date Required	P/R No.
00031400	Filter Element	30	pcs	203	6,090	15-Nov-98	00102
00103100	Pressure Gauge 0-4 Bar	20	pcs	353	7,060	10-Nov-98	00102
00337800	Level Switch	10	pcs	1,673	16,730	15-Nov-98	00102
03433300	V-Belt	20	pcs	191	3,820	30-Nov-98	00103
25860500	Glyd Ring	10	pcs	1,330	13,330	30-Nov-98	00103
27286500	Temperature Control	5	pcs	7,618	38,090	30-Nov-98	00103
40007800	Gear Ring	10	pcs	70	700	30-Nov-98	00103

Figure H.3. Inventory Reorder Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Inventory Receipt Report

As of October 31, 1998

Date	Spare Part Code	Spare Part Name	Location	Reorder	Qty Received	Qty UnReceived	UOM	P/R #	Cost/Unit	Total Amount
15-Oct-98	00031300	Return Oil Filter	R8	20	10	10	pcs	00100	1,094.74	10,947.40
15-Oct-98	01314800	O-Ring	O3	15	15	0	pcs	00100	12.70	190.50
15-Oct-98	02996800	Hydraulic Ntg	H7	10	10	0	pcs	00100	706.12	7,061.20
30-Oct-98	40017500	Manometer	M2	10	10	0	pcs	00101	896.62	8,966.20

Total Amount in THB **27,165.30**

Figure H.4. Inventory Receipt Report

Date : 25-Oct-98

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Reserve Receipt Report

Date	Spare Part Code	Spare Part Name	Qty Received	Reserve Qty	UOM	Reserve No.
25-Oct-98	00031300	Return Oil Filter	10	2	pcs	0010
25-Oct-98	40017500	Manometer	10	1	pcs	0011

Figure H.5. Reserve Receipt Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Inventory Issue Report

As of October 31, 1998

Issue Date	Spare Part Code	Spare Part Name	Quantity	UOM	IRL Number
15-Oct-98	00031300	Return Oil Filter	1	pc	0090
20-Oct-98	00337800	Level Switch	2	pcs	0090
25-Oct-98	03433300	V-Belt	3	pcs	0091
27-Oct-98	25860500	Glyd Ring	1	pc	0092
30-Oct-98	40017500	Manometer	1	pc	0092

Figure H.6. Inventory Issue Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Inventory Return Report

As of October 31, 1998

Date	Spare Part Code	Spare Part Name	Quantity	UOM	Cost/Unit	Total Amount	Item Return List #	Reason
25-Oct-98	00031300	Return Oil Filter	1	pc	1,094.74	1,094.74	0001	Damaged
30-Oct-98	00337800	Level Switch	2	pcs	4,249.42	8,498.84	0001	Wrong Item

Total Amount in THB 9,593.58

Figure H.7. Inventory Return Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Inventory Cost Report

As of October 1st, 1998

Spare Part Code	Spare Part Name	UOM	Average Cost/Unit (THB)
00031300	Return Oil Filter	pc	1,094.74
00337800	Level Switch	pc	4,249.42
01314800	O-Ring	pc	12.70
02996800	Hydraulic Ntg	pc	706.12
03433300	V-Belt	pc	485.14
25860500	Glyd Ring	pc	3,378.20
40017500	Manometer	pc	896.62

Figure H.8. Inventory Cost Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Inventory Quantity Balance Report

As of October 31, 1998

Spare Part Code	Spare Part Name	UOM	Stock Balance	Reserve Qty	Reorder Qty	Available Balance
00031300	Return Oil Filter	pcs	9	0	0	9
01297700	Clamping Sleeve	pcs	5	5	10	10
02645200	Split Pin	pcs	4	1	0	3
36034849	End Cap	pcs	5	2	10	13
37015849	Vee Belt Pulley	pcs	1	0	15	16
37043749	Lock Nut	pcs	8	0	10	18
00337800	Level Switch	pcs	7	0	0	7

Figure H.9. Inventory Quantity Balance Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Stock Take Difference Report

As of June 30, 1998

Item	Location No.	Spare Part Code	Spare Part Name	UOM	Stock Balance	Count Qty	Difference Qty
1	B1	01297700	Clamping Sleeve	pcs	5	5	0
2	B2	02645200	Split Pin	pcs	4	4	0
3	B3	36034849	End Cap	pcs	5	3	2
4	B4	37015849	Vee Belt Pulley	pcs	1	1	0
5	B5	37043749	Lock Nut	pcs	8	8	0

Figure H.10. Stock Take Difference Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Minimum Planning Report

For Week Ended October 31, 1998

Spare Part Code	Spare Part Name	UOM	Min_Qty	Stock Balance	Reorder Qty
01297700	Clamping Sleeve	pcs	3	5	0
02645200	Split Pin	pcs	10	4	6
36034849	End Cap	pcs	10	5	5
37015849	Vee Belt Pulley	pcs	5	1	4
37043749	Lock Nut	pcs	5	8	0

Figure H.11. Minimum Planning Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

Maximum Planning Report

For Week Ended October 31, 1998

Spare Part Code	Spare Part Name	UOM	Max_Qty	Stock Balance	Over Qty
01297700	Clamping Sleeve	pcs	5	5	0
02645200	Split Pin	pcs	20	4	0
36034849	End Cap	pcs	20	5	0
37015849	Vee Belt Pulley	pcs	10	1	0
37043749	Lock Nut	pcs	5	8	3

Figure H.12. Maximum Planning Report

Maschinenfabrik Lizen (Thailand) Co., Ltd.

ABC Analysis Report

As of October 31, 1998

Spare Part Code	Spare Part Name	Issue Quantity	UOM	ABC Class
01297700	Clamping Sleeve	20	pcs	A
02645200	Split Pin	14	pcs	A
36034849	End Cap	12	pcs	A
00031400	Filter Element	8	pcs	B
37015849	Vee Belt Pulley	5	pcs	B
37043749	Lock Nut	0	pc	C

Figure H.13. ABC Analysis Report

Spare Part Transfer List

Delivered To:
Sales & Marketing Dept.

No : STL 0099
Date: 25-Oct-98

Item	Spare Part Code	Spare Part Name	Quantity	UOM	IRL No.
1	00031300	Return Oil Filter	1	pc	0090
2	03433300	V - Belt	3	pcs	0090

Delivered By

Received By

Figure H.14. Spare Part Transfer List

Purchase Requisition

P/R No. P/R 0100 Department Name : Inventory Dept

P/R Date 30-Oct-98 Date Required : 15-Nov-98

Item	Spare Part Code	Spare Part Name	Quantity	UOM	Price/Unit	Total Amount
1	00031400	Filter Element	30	PCS	203	6,090
2	00103100	Pressure Gauge 0-4 Bar	20	PCS	353	7,060
3	00337800	Level Switch	10	PCS	1,673	16,730
			Total Amount in ATS			29,880

Approval by

Requested by / Date

Department Manager / Date

Figure H.15. Purchase Requisition