



SAP Configuration Control System

by

Ms. Pornphet Prasertchaiyakul

A 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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The Graduate School of Assumption University has 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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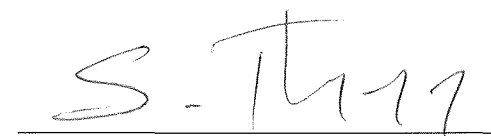
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ABSTRACT

With the passage of the time, every organization grows in term of size, complexity and specialization. The demand and needs of reliable, accurate and economical information by people at all levels of management also grows at a much faster rate. Thus in today's context of information needs, without computerization manual provision of information is inadequate. The use of computerized system tends to increase day by day, it is no longer costly to have a computerized system to serve in an organization.

Readymixed Pioneer Concrete (Thailand) Ltd. is the headquarter located in Thailand. The company sells the quarry aggregates, pre-mixed concrete and cement. The company has branches in Thailand. The company uses the SAP Program that provides a single point of access information and also does not restrict a company to SAP solution and service. The standard program of SAP can be configured to fit the company's system. In order to record the configured program, lots of processed are required, involving much documentation. This project is initiated to develop an effective information system to facilitate the process of SAP configuration.

The proposed system is developed to improve the SAP program configuration efficiency and to provide an information pool for easy access. The proposed system also provides the accurate information about configuration program and related information that is involved in this proposed system. The proposed system is developed using modern structured system analysis and design techniques. After the new system is implemented, it helps to provide updated information on program configuration and greatly reduce the paperwork.

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I. INTRODUCTION

1.1 Background of the Project

Previously, in the company each department has its own application that is not linked to the other different departments. That makes it difficult to access information or service.

SAP R/3 is the solution, it gives people a single point of access to information, applications, and services. So people can quickly and easily get to everything they need to do their jobs. With SAP employees can collaborate with co-workers. Access to shared folders, discussion forums, and other collaborative applications enables focused teams, the wider organization, and business partners and customers to work together. As an external community portal, SAP can help you extend your processes and planning across organizational boundaries to create seamless, responsive communities of stakeholders. Increased Productivity, SAP also provides a single point of convenient access to all the content that individuals need to do their jobs. It empowers employees and external users to serve themselves, to maintain and view the data that is important to them and manage their own business activities. That means people can work faster and more effectively. Moreover, SAP doesn't restrict you to SAP solutions and services. Support for open standards ensures seamless integration, and users have access to any content available. Plus, you can quickly and easily disseminate new business processes throughout the organization. SAP can be configured to meet the requirements and interests of an individual. For example, people can easily select the language of their choice or change their currency.

Readymixed Pioneer Concrete (Thailand) Ltd. is now the fourth largest supplier of pre-mixed concrete in the country. The company currently operates 20 pre-mixed

concrete plants located around Bangkok, the central plains, the eastern seaboard and at Chiangmai in the north, Khon Kaen in the north east and at Sadao in the far south of Thailand. Readymixed Pioneer Concrete (Thailand) Ltd. uses accounting module of SAP application that some program in SAP is configured to meet the requirement of company. Therefore SAP Configuration Control System will monitor of the flow of work on process and provide the log file related to the configured program. The system also increases flexibility to manage and operate information.

1.2 Objectives of the Project

The existing has inefficient information of configured program and slow response time problem. Moreover, the information stored in the hard copy form that has the opportunity to be lose or damage. The SAP Configuration Control System has been proposed to the company to meet the following objectives.

- (1) To analyze the existing system and design the new computerized system for more effective work
- (2) To provide the efficient information of configured program for system analyst and IT department
- (3) To decrease the unnecessary processes for documentation
- (4) To reduce the amount of documents and paperwork
- (5) To provide the security to access to information

1.3 Scope of the Project

Readymixed Pioneer Concrete (Thailand) Ltd uses SAP applications, which provide the capability to manage financial, asset, and cost accounting, production operations and materials, personnel, plants and archived documents. The program in SAP application can be configured or change to fit the company's system. SAP configuration control system will provide the IT department and system analyst the

effective information of the configured programs. Furthermore, the new system will use Intranet so that any system analysts and administrators can access configured information.

1.4 Deliverables

The SAP Configuration Control Project deliverables concern 3 aspects. First is system analysis that is Data Modeling Entity Relationship Diagram (ERD), Process Modeling and Network Modeling. Second is system design, which are Physical Data Flow Diagram, Database Design, Input and Output Design, User Interface Design and Software Design. The third aspect is new system implementation, which will deliver the new system.

1.5 Project Plan (Include Gantt Chart)

The configuration control systems started from the beginning of January till the end of April 2001. The project plan consists of three phase; system analysis phase, system design phase and system implementation phase. See Figure 1.1 Project Plan.

(1) System Analysis Phase

System Analysis is the dissection of a system into its component pieces to study how those component pieces interact and work. This phase surveys and plans of the system and project first, then the study and analyze of the existing business and information system and the definition of business requirements and priorities for a new or improved system. The technique is used to depict the existing system and requirement is modern structured analysis is a process -centered technique that is used to model business requirements of a system. The models are structured pictures that illustrate the processes, inputs, outputs, and files require to respond to business events. System and business analysts draw a series of process

models called Data Flow Diagram that depicts essential processes of a system along with inputs, outputs, and files.

(2) System Design Phase

System Design is the evaluation of alternative solutions and the specification of a detailed computer-based solution. It is also called physical design. Structure design techniques that is used for design is modern structured design. Modern structured design is a process-oriented technique for breaking up a large program into a hierarchy of modules that result in a computer program that is easier to implement and maintain. The software model derived from structured design is called a Structure Chart. The structure chart is derived by studying the flow of the data through the program.

(3) System Implementation Phase

System Implementation is the construction of the new system and the delivery of that system into production. Construction is to build and test a functional system that fulfills business and design and to implement the interfaces between the new system and existing production systems. The System Implementation consists of the construction and delivery phase. The construction phase comprises of build and test networks, build and test databases, install and test new software package, and write and test new programs. Delivery phase comprises of conduct system test, prepare conversion plan, install database, train system and finally convert to new system.

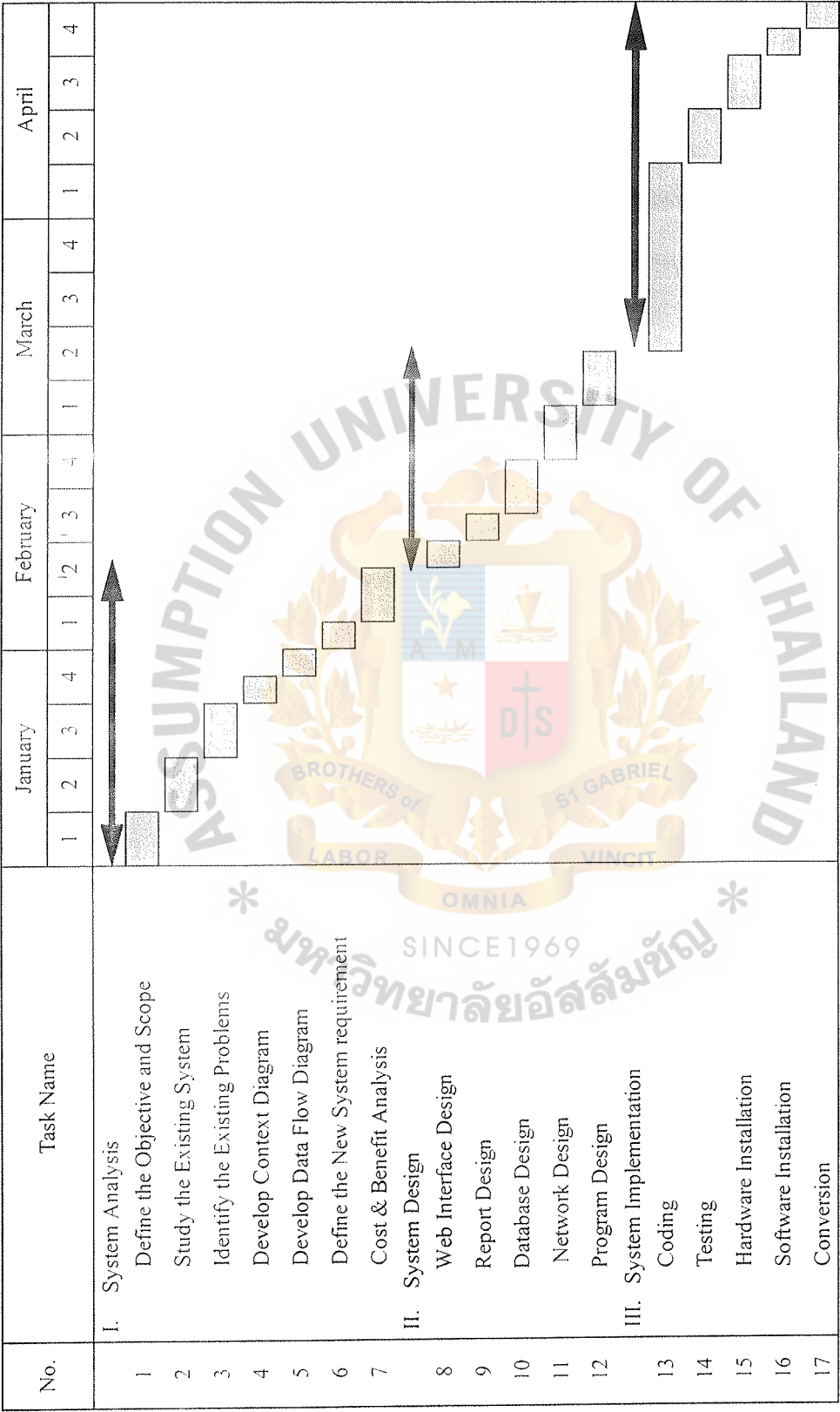


Figure 1.1. Project Plan for SAP Configuration Control System in Readymixed Pioneer Concrete (Thailand) Ltd.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

Readymixed Pioneer Concrete (Thailand) Ltd. commenced operation in 1992. It is a part of Pioneer Group which has a head office located in Sydney, Australia. Its primary products are quarry aggregates, pre-mixed concrete and cement. And now Readymixed Pioneer Concrete (Thailand) Ltd. is the fourth largest pre-mixed concrete supplier in Thailand. Furthermore, in this business, we have a unique geographical spread, with operation 20 branches. Readymixed Pioneer Concrete (Thailand) Ltd. is located at 1000/46-48 P.B Building, Sukumvit 71 Road, Klongtun, Bangkok.

Readymixed Pioneer Concrete (Thailand) Ltd. consists of 5 departments,

- (1) Marketing Department responses for purchasing pricing and sales management
- (2) Financial Department is responsible for accounting and budgeting
- (3) Manufacturing Department is responsible for inventory control and warehousing
- (4) Human Resource Department is responsible for payroll, recruitment, personal records, and promotion
- (5) IT Department responses for supporting information technology, transporting program and system administration.

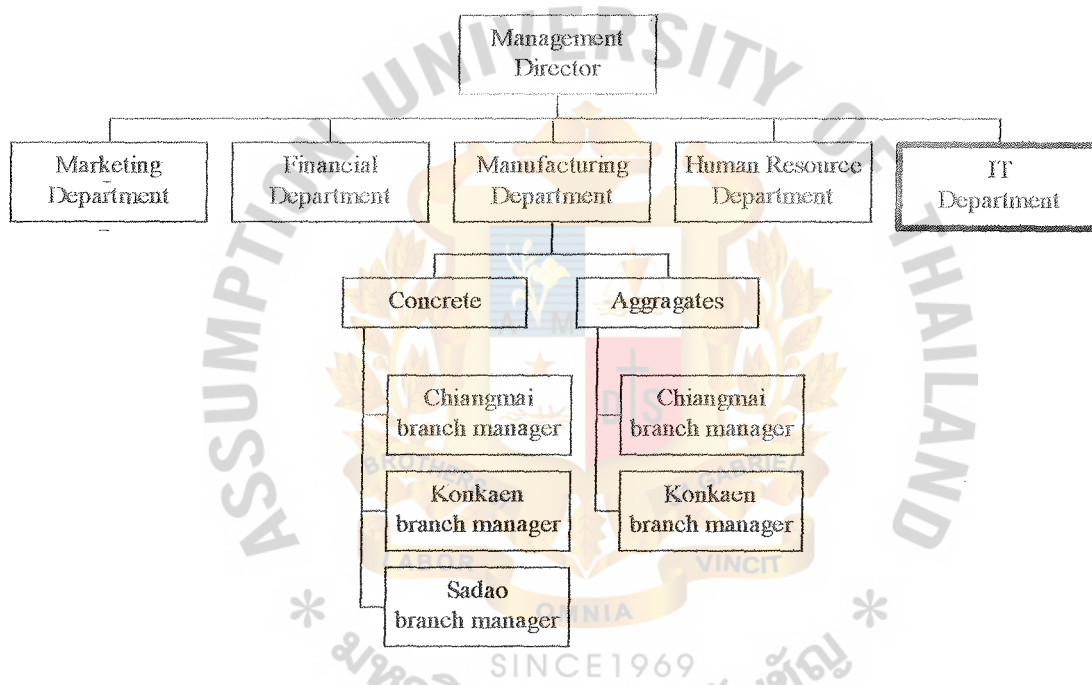


Figure 2.1. Organization Chart of Readymixed Pioneer Concrete (Thailand) Ltd.

2.2 Current Problem and Areas for Improvement

Due to SAP application provides the flexibility to develop or configure the standard program and support seamless integration. Thus whenever some module used by end-user has an error or it works improperly. The end-user will send the request form to functionary to configure the program. The event that occurs will be recorded. At present, the existing system operates by manual which is functionary configure the program as the end user's request to fit the company's system and they send the configured program to auditor to test. If the configured program is approved by auditor, the functionary will make the hard copies that contains the information of configured program for example, end-user's name, who configures the program, the status test and pass them to IT department who has authorization to transport the configured program to end-user. Usually, IT staffs will keep the information of configured program in hard copies that are easily to be lost or damaged, but if IT staffs or system administrator have time, they will record the information in MS Excel as database. So it is difficult to edit the information because most information is stored in paper. Moreover, the current file lacks some important information such as change specification. Nobody can access to the database except IT staffs. So it frequently takes a lot of time to manage such as updating, searching and access to information when functionary wants to use the information. In addition to this, the existing system is not use Intranet system, it works through unnecessary process to finish one job, each person responses only one process. The existing system is shown in Figures 2.2 and 2.3 respectively.

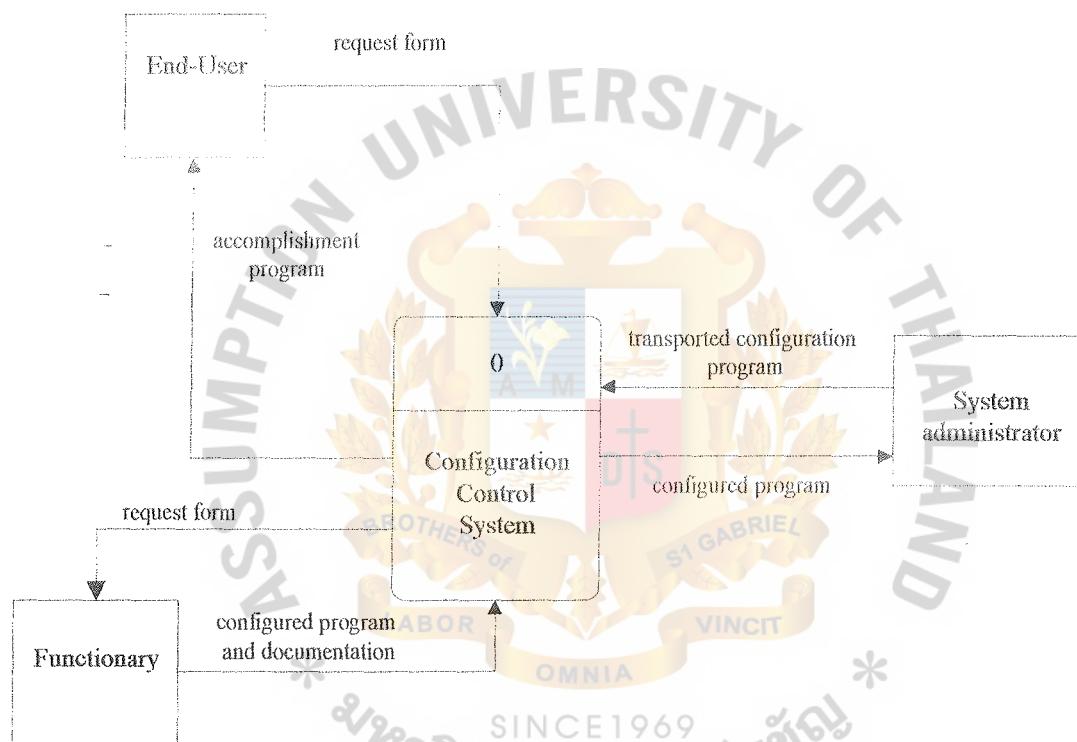


Figure 2.2. Context Diagram of Existing System.

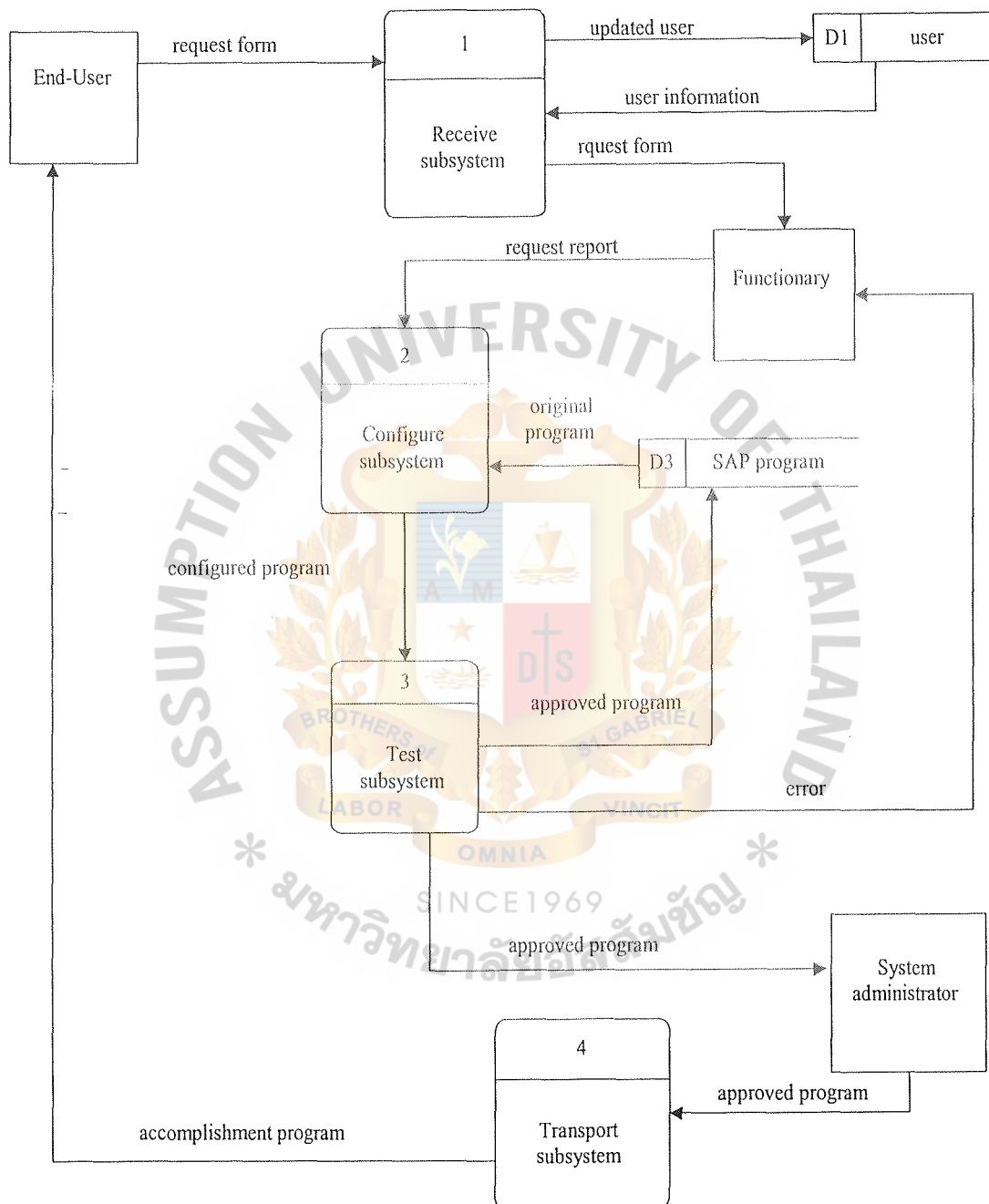


Figure 2.3. Data Flow of Existing Diagram.

The new system will improve IT department area in many aspects. Beginning to monitor the flow of configuration program from functionary to end-user. Secondly, to increase speed of working process and response time with a standard solution if repeated requirements occur, and reduce time consumption for defining the solution of each requirement. Besides, provide effective information of configured program that will be used by functionary and system administrations for operate. Finally, the proposed system will be used with Intranet that provides management and users with a common interface to applications and information.

2.3 Existing Computer System

In IT department has many sets of computer which consist of PC. And using client/server network platform (three-tiered or n-tiered) that distributes database and application to separate servers. Currently, the company has LAN implemented that connected to one or more server computers through cable in a single building. The specifications of existing computer system are as following:

Processor - 2 Intel Pentium III processors 866 MHz

- 2 Intel Pentium III processor 800MHz

Two Intel Pentium III processors 866 MHz are used as SAP server which run Window NT program and Intel Pentium III 800 MHz used as database server which is managed database by SQL. The other of Intel Pentium III 800 MHz used as Web Server run on Window 2000 Advance Service operating system and used IIS 5.0 for web server application. Four printers are shared as network printer.

Usually, all information about purchase data, order data are recorded in word processor such as Microsoft Word and information about user is recorded in Excel. All data kept as computer file or hard copy.

III. THE PROPOSED SYSTEM

3.1 User Requirement

Due to increasing in number of user's requirement to the system, the existing system is now not efficient enough to handle the increasing work. And the company needs the proposed system, which provides data as follows:

- (1) SAP Configuration Control System shall provide the end - user profile of each requirement. The functionary can recall the end - user information to support end-user's need any time.
- (2) The proposed system shall provide the information of configured program history. The functionary and system administrator can use the history record to support the configure process which will be faster than the existing system. The Program ID will be used to access to configured program history data.
- (3) SAP Configuration Control System provides the details of solutions that can be used by functionary.
- (4) SAP Configuration Control System provides the details of problems and can refer to the accurate the solution. When the repeated problem occurs, the functionary can use the standard solution.
- (5) Provide data consistency and data accuracy
- (6) SAP Configuration Control System provides security and internal control processing system.
- (7) SAP Configuration Control System decreases the response time to access to information.

(8) SAP Configuration Control System provides output to screen and to printer.

The authorized user can access the SAP Configuration Control System's screen and provide the useful report. The report can be printed out on the network printer.

(9) The proposed system provides standard for record keeping of end - user, functionary, system administrator and program data.

(10) SAP Configuration Control System is user friendly to user.

3.2 System Specification

In IT department of Readymixed Pioneer Concrete (Thailand) Ltd. requires SAP Configuration Control System which can manage the information of configuration program effectively and solve the problem occurring from existing manual system.

In order to achieve the target, SAP Configuration Control System should have these components. First, end-user information converted from Excel to database is used as reference when the end-user sends request to process. The process will know who end-user is. Secondly, transported program that is actually recorded in hard copy form by functionary is converted into database. Transported program database stores the information about accomplishment program and source code that is available for authorized person such as functionary and system administrator to access. We can know whether the request is new or not by checking the transported program. In addition to this, if the request is old one the process will re-configure the program that stored in transported program database. Thirdly, SAP program when the new requirement occurs, the process will modify some module of SAP program to fit the company's system. Fourth, configured program database comes about when SAP program is configured. Configured program database developed to help the process to test the syntax and symmatrix error of configured program by auditor. If there are some errors occurred, the

process will send the program back to configure process until it is approved by an auditor. Finally, the output of SAP Configuration Control System is the efficient information of configured program that can be accessed and operate easily by authorized person and reduce the response time.

Initially, the argument was economics. Companies speculated that they could downsize applications too much cheaper platforms that, through cooperative processing, could achieve equal or better throughput and response time. For network architecture that is used for purposed system is the Intranet architecture. The Intranet could provide management and users with a common interface to applications and information. It could become the new mechanism by which users start all enterprise computing applications, process transactions, initiate data inquiries, and distribute information. It is conceivable that Internet and Intranet browsers (such as Internet Explorer and Netscape Navigator) will effectively merge with the client and server operating systems (such as Windows 98) to make desktop applications virtually indistinguishable from all other server and Internet applications. In a sense, users will be able to surf their Intranet for all computing applications.

3.3 System Design

3.3.1 Analyst Design

To improve the performance and to make the proposed system friendly to user. We will design the system by using data modeling and process modeling in the system design phase.

Data Modeling is a technique for organizing and documenting a system's data. Entity Relationship Diagram (ERD) is technique to depict data in terms of the entities and relationships described by the data. See Appendix A.

Process Modeling consists of the following:

Context diagram

Decomposition Diagram

Data Flow Diagram

Data Dictionary

Structured Chart

Context Diagram

To construct the context diagram, we need to establish the initial project scope. The context diagram contains only one process and external entities are around the process. It is used to represent pictorially the scope of boundaries of the system. The context diagram of SAP Configuration Control System is shown in Figure 3.1. The end-user makes a request and sends to proposed system. The system will send the request form to functionary who will configure program as request form and transmit both configured program and information to process. The system will release the configured program to system administrator who responses to transport the configured program to end-user.

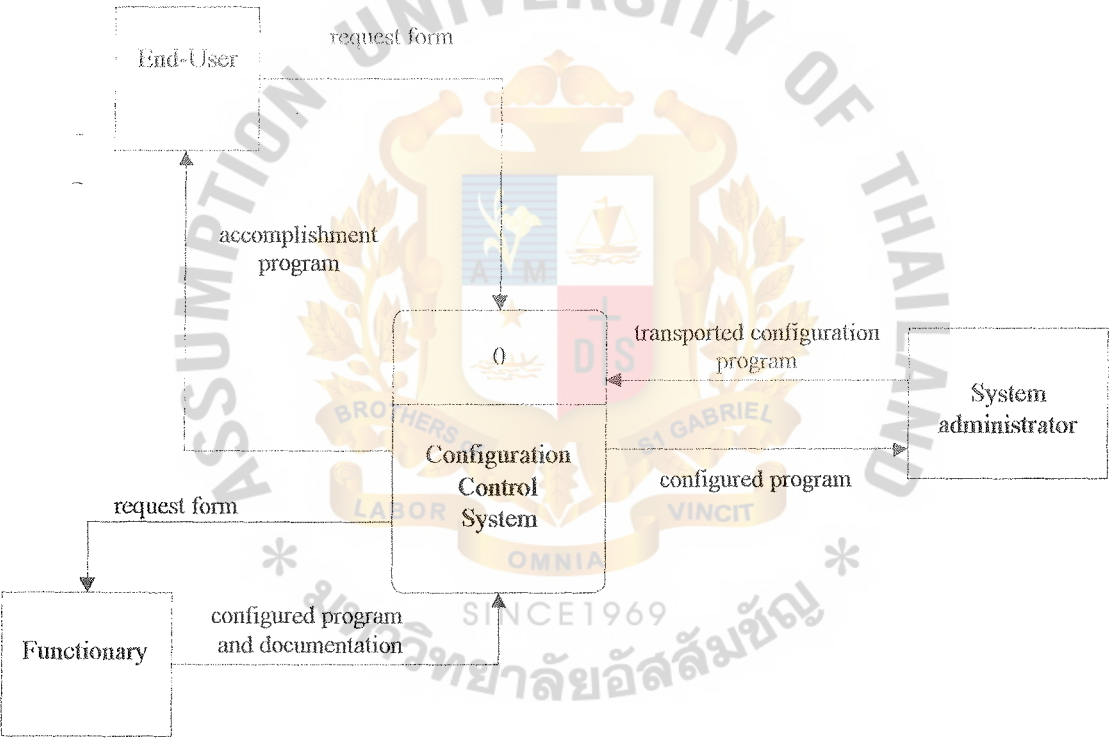


Figure 3.1. Context Diagram of Proposed System.

Decomposition Diagram

A complex system is usually too difficult to fully understand when viewed as a whole. Therefore, in system analysis we separate a system into its component subsystems, which in turn decomposed into smaller subsystems, until such a time as we have identified manageable subsets of the overall system. We call this technique decomposition. Decomposition is the act of breaking a system into its component subsystems, processes and subprocesses. Each level of abstraction reveals more or less detail about the overall system or a subset of that system.

An alternative layout that is supported by many CASE tool and development methodologies is called a decomposition diagram. A decomposition diagram also called a hierarchy chart, shows the top-down functional decomposition and structure of a system. Decomposition is shown in Figure 3.2.

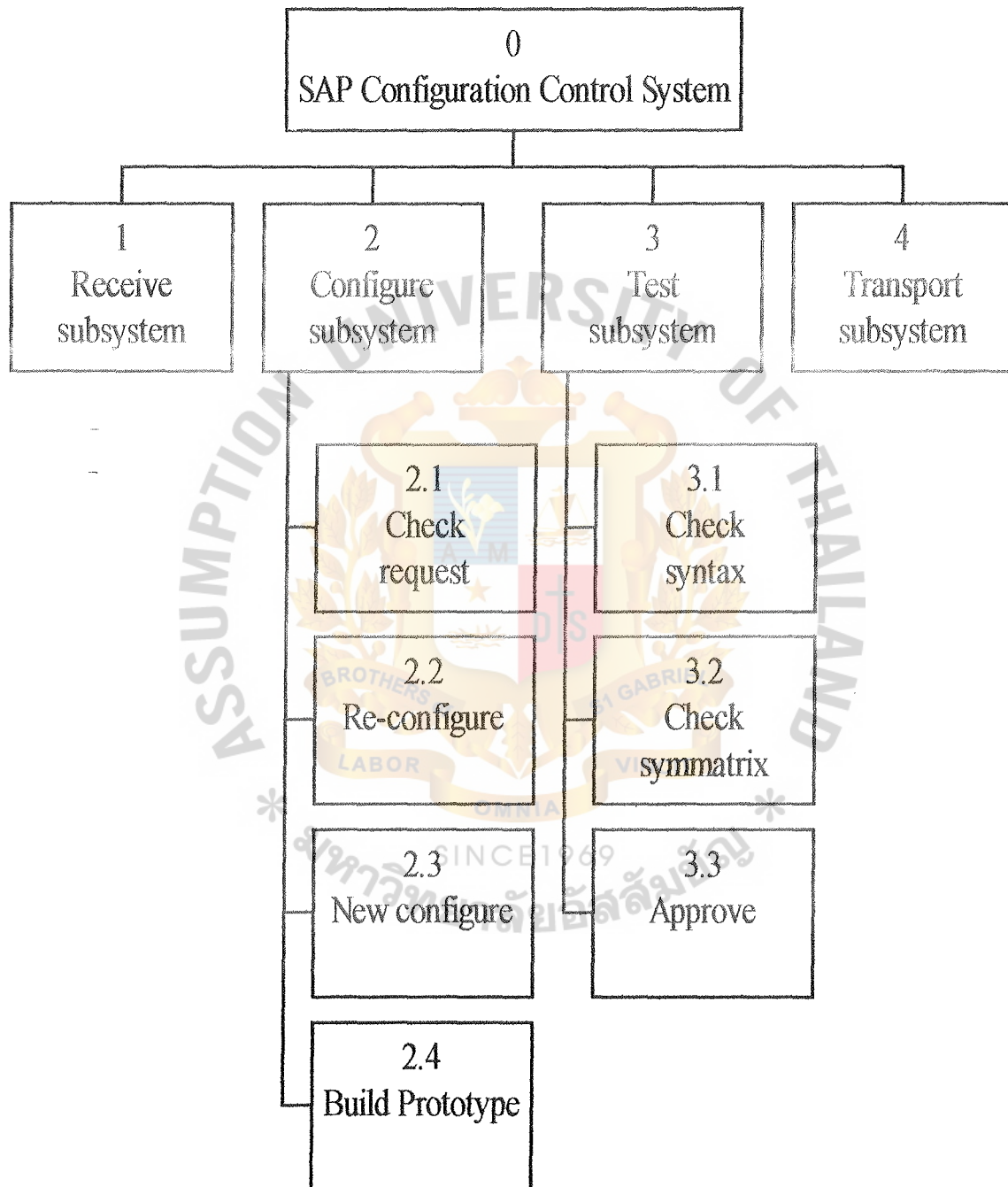


Figure 3.2. Decomposition Diagram of Proposed System.

Data Flow Diagram

It is a tool that depicts the flow of data to, from and within a system. Data Flow Diagram consists of its processes, data store, external entities and data flow that represented by arrow. The data flow diagram (level 1) of SAP Configuration Control System is shown in Figure 3.3 (See Appendix B for more detail of Data Flow and Appendix D for Process Specification). The following is the explanation for DFD level 1 of the proposed system by each process.

Subsystem 1: Receive: First of all end-users send the request form that mention about the problems of program that need to be configured. Since the program is not working correctly. The system will check who end-user is from end-user database and update the end-user database. After that the Receive system will provide the information of the end-user and their requirement for functionary.

Subsystem 2: Configure: After the functionary received the request form from the Receive subsystem process. The functionary sends request report to Configure system to check whether the request report is new or not by checking from the transported program database. This database stores both of source code and program information that are transported to end-user. If the repeated requests occur, the system will re-configure program by using the source code be in transported program database. On the other hand, the system will use the SAP program for configuring when the request is new. After configured programs are complete, the system will store them in configured program database for using in next system.

Subsystem 3: Test: The system is responsible for testing syntax and symmatrix error by access the source code stored in configured program database. If the program has either syntax or symmatrix error, the system will inform the type of error to

functionary to improve. In contrast, the test system will send the approved program to system administrator and update the source code in transported program database.

Subsystem 4: Transport: In practice, the functionary has not authorize to transport the approved program so it is the duty of system administrator to transport program to Transport system. The system will access to transported program database to know which accomplishment program will be sent to whom.



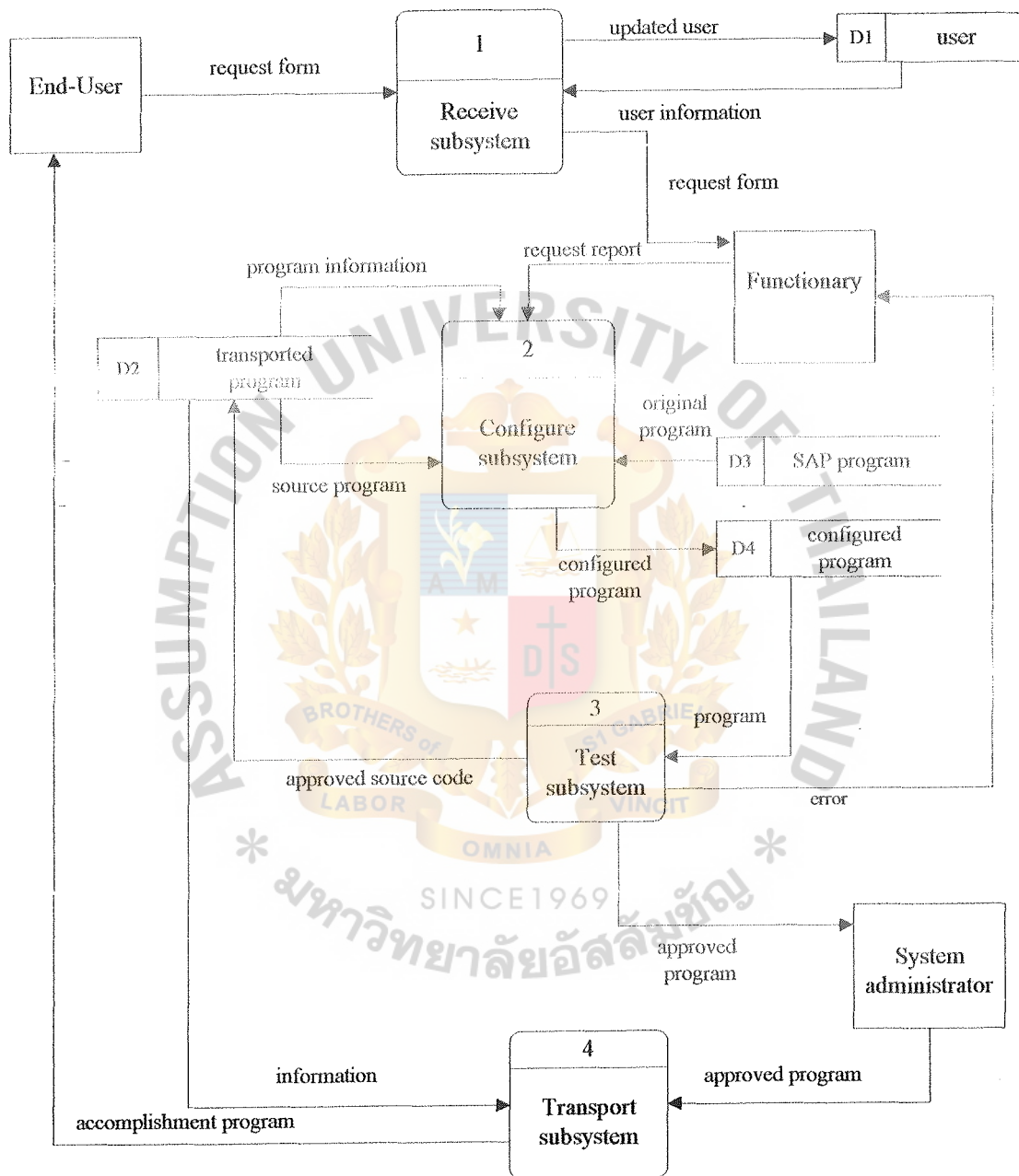


Figure 3.3. Data Flow Diagram of the Proposed System.

Data Dictionary

It is documentation that supports data flow diagrams. It is listing of terms and their definitions for all data items and data stores within SAP Configuration Control System. It contains the field name, the definition, size and the data type. The data dictionary will be shown in Appendix E.

Structure Chart

The structure chart is derived by studying the flow of data through the program. It is hierarchy diagrams that shows the control structure imposed on the system's processes. It represents the subordination or the hierarchical levels of rank between processes. The objective is to show which module is the boss and which is the worker. (See Appendix C)

3.2.2 Database Design

Database of SAP Configuration Control System is relational database. The data is stored in a tabular form that contains attributes, records, key. And it can relate data stored in one table to data in another via foreign keys.

Normalization organizes data attributes such as that they are grouped to form stable, flexible and adaptive entities. It is a three-step technique that places the data model into first normal form, second normal and third normal form.

First Normal Form (1NF) there is no attributes that can have more than one value for a single instance of the entity.

Second Normal Form (2NF) if it is already in 1NF, and the values of all non-primary key attributes are dependent on the full primary-key not just part of it.

Third Normal Form (3NF) if it is already in 2NF and if the values of its non-primary key attributes are not dependent on any other non-primary key attributes. Any

non-key attributes that are dependent on other non-key attributes must be moved or deleted.

3.2.3 Interface and Output Design

Input Design

This application uses GUI (Graphical User Interface) that provides flexible, integration and ease of use.

The screen has three sections; the top screen is heading section that describes the name of the function. The middle section is the body of the screen. It is used for data entry that consists of text box. Text box is used when the input data values are unlimited such as change description. Furthermore, captions and instructions that are supplied in this section are places on the left of blanks on the same line where data will be entered to help in entering the data in the right place. Finally, the bottom section displays command buttons for instance update, delete and accept button. See Appendix F.

Output Design

The output display in both screen and printed reports. The things that are considers in designing screen output are to keep the screen simple, keep screen presentation consistent, facilitate user movement among screens and create an attractive screen.

In designing printed output, it should include the heading or title of the report, the page number, and the column headings.

The output is the detailed reports that present information with little restrictions. These reports assist management planing and control by generating schedules and analysis. Moreover they display what event occurred. The output report of SAP Configuration Control System (See Appendix F) include these below main report as follows:

- (1) End-User Report (end-user profile i.e. end-user id, name, address etc.)

This report contains all general information of each end-user. The end-user can recall by User ID.

- (2) Program Report contains all information of program such as Program ID, Program Name, Configured Date. The functionary may want to know which program has been configured and when. And this report can refer to the Program Change Form Report.

- (3) Program Change Form Report listed by Form ID

This report contains all information of configured program, which is classified by the Form ID and Program ID. The functionary and system administrator will know what events occur with the program. For example, who makes the request, which program is configured by whom and when, how status test of configured program is.

3.4 Hardware and Software Requirement

3.4.1 Hardware and Software for Intranet Server

The proposed system will use Intranet system therefore the server must have the hardware specification, which can support Microsoft Windows 2000 Advance Server and other software. According to existing computer system, Readymixed Pioneer Concrete (Thailand) Ltd. already has Intel Pentium III 800 MHz used as Web Server run on Window 2000 Advance Server operating system and used IIS 5.0 for web server application. And 4 client computers (PC desktops) run on Window 98 second edition operating system. PC desktops are connected to server via LAN (Local Area Network). The detail of hardware and software specifications for Intranet Server are shown in Tables 3.1 and 3.2.

Table 3.1. The Hardware Specification for the Intranet Server.

Hardware	Specification
Processor	Intel Pentium III 800 MHz
Cache Memory	256 KB
Upgradability	Upgradable to dual processing
Memory	128 MB
Network Controller	3 Com EtherLink XL 10/100 PCI
Storage Controller	Integrated Dual Channel Wide Ultra2 SCSI Adapter
Diskette Drives	1.44 MB
CD-ROM	High Speed IDE
Maximum Internal	20 GB 1" internal hot plug drive cage only
Expansion Slots	I/O(Total) 6
	64 bit PCI 4
	32 bit PCI 2
Interface	Parallel 1
	Serial 2
	Pointing Device 1
	Graphics 1
	Hot Plug Keyboard 1
	External SCSI 1
	Network RJ-45 1
Graphics	Integrated ATI Rage IIC Video Controller with 4 MB Video Memory
Form Factor	Tower or Rack (5 U)

Table 3.2. The Software Specification for Intranet Server.

Software	Specification
Microsoft Windows 2000 Advance Server	Operation System
Internet Information Server 5.0	Web Server
SQL Server 7.0	Database Server

3.4.2 Hardware and Software for Client Computer

Since the company uses Intranet System thus the client computer should have capacity to run Web Browser such as Microsoft Internet Explorer, Netscape Navigator. Addition to this, the client computer should support the other application such as Microsoft Office. The hardware and software specifications for each client computer are shown in Table 3.3 and Table 3.4.

Table 3.3. The Hardware Specification for Each Client Computer.

Hardware	Specification
Processor	Intel Pentium II processor 650 MHz
Cache	256 KB
Memory	SD-RAM 128 MB
CD - ROM Drive	50 X
Harddisk	8.4 GB
Floppy Disk Drive	1.44 MB
Display Unit	Compaq S510 15"
Network Interface Card (NIC)	3 Com EtherLink XL 10/100 PCI

Table 3.4. The Software Specification for Each Client Computer.

Software	Specification
Operating System	Microsoft Windows 98 second edition
Web Browser	Microsoft Internet Explorer 4.0 or higher
Application Software	Microsoft Office 97

3.4.3 Software

SAP Configuration Control System will be developed using ASP (Active Server Pages) version 3 running on Personal Web Server and using Microsoft Access 97 as database. All of these run on Window 98 second edition.

3.4.4 Network Configuration

The company uses bus technology to provide the network topology. Bus technology is a direct point-to-point link between any two computer systems. The network can contain mainframes, minicomputers, personal computers, and dumb and intelligent terminals. Only one computer can send data through the bus at any given time. Ethernet is an example of the most common bus network topology used for client/server LANs. Ethernet's bus topology cooperate with a LAN operating system (such as Windows 2000 Advanced Server), manages the point-to-point communication between computers and devices on the bus and resolves contention that occurs when more than one computer or device attempts to send a message, instruction, or data across the bus at the same time. The network configuration is shown in Figure 3.4. Using client/server LANs provides the following by:

- (a) Network Resource Sharing: Network resources include printers and storage devices. Though the LAN is primarily host server based resource sharing.

TCP/IP based application like NFS can be run on individual workstation to have peer to resource sharing.

- (b) Database Sharing: A variety of database applications exist on server. The users throughout the organization can use these for various information acquisition purposes. The SAP Configuration Control System database will add to the suite of SQL Server database applications. Example of already existing database is Helpdesk database.



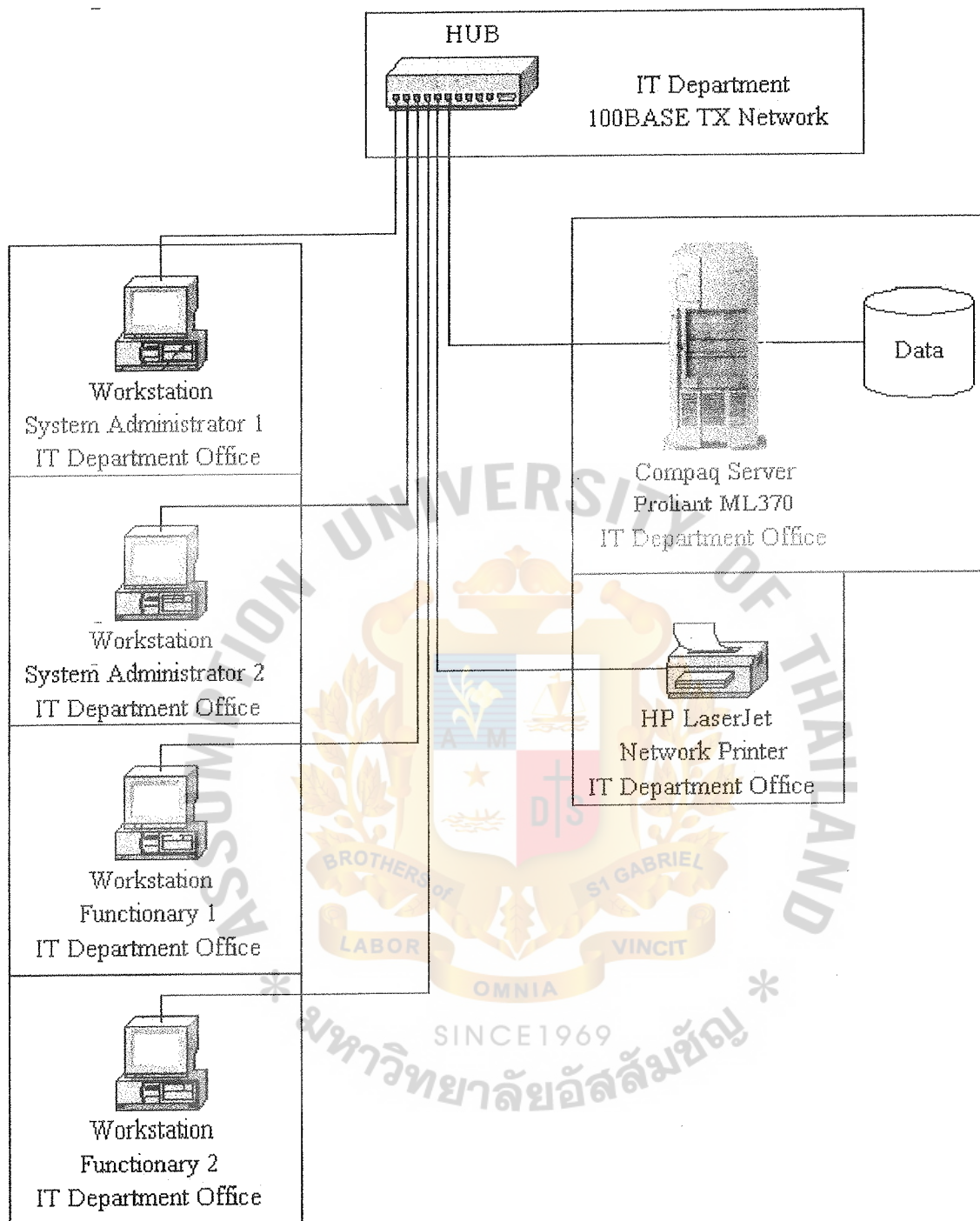


Figure 3.4. Network Configuration of the Proposed System.

3.5 Security and Control

Security of database should be considered the secrecy, availability and integrity.

Secrecy means preventing detecting the improper disclosure of information. In general, secrecy refers to the protection of data involved in highly protected environments. Privacy refers to information about individuals and is sometimes defined as the right of an individual, group to determine when, how and information can be collected, stored and released to other people. Therefore, privacy refers to environment where data about people or legal individual is maintained. The information should be sent to the right person and not be sent to wrong person. Availability means the ability to access the information in a normal fashion provided that the user has the sufficient rights to do. The security procedures should be robust but at the same time simple enough to ensure ready access with required privileges. Also converted in the scope of availability are proper procedures for backup and recovery to ensure availability of data.

Integrity of information means preventing and detecting the improper modification of information. Data integrity is a relevant aspect the good working of an organization to collect the right data.

Ensuring system availability, which is avoiding denial of services, means preventing, detecting improper denial of access to service provided by system.

Achieving security of database environment means identifying the threats and choosing the proper policies (what the security system is expected to do) and mechanisms (how the security system should achieve the security goals). Therefore, Information Security Policies and Standard have been established in order to corporate-wide guidelines for the protection of information asset. These are described in the following sections.

3.5.1 Access Policy

The Access Control Policies and Standards are based on the corporate-wide guidelines and are intended to support the implementation of access control requirements. Access policies are implemented through Access Control software to limit capabilities and privileges of users depending upon their status. Access Control software provides:

- (1) Application Access: Identification through User_id and Authentication through passwords. Before access to application functionary and system administrator has to fill login for identification and password must be required for authentication. Login will be successful, if functionary and system administrator enter valid user_id and password. On the other hand, login fails when user_id and password is incorrect.
- (2) Rules that define privileges and business function responsibilities of user.
- (3) Administration and Audit: Procedures and software to track significant events in systems and applications, including the creation of new users, change to user privileges, user authentication to system and application.

3.5.2 Microcomputer Viruses

- (1) Microcomputer and diskettes known or suspected to be infected with a virus are immediately isolated and no longer used.
- (2) Diskettes containing virus scanning are write protected.
- (3) Provisions are made for the recovery and restoration of information lost due to computer failure, loss, disaster or operator error.
- (4) Back-up copies of processing data/software must be made at least daily. LAN's identified as critical should have back-up copies stored off site. Other

micro-based information must be back-up on a schedule that reasonably reflects the risk associated with losing it.

3.5.3 Physical Security

- (1) Personal computers are kept in a secure area. Personal computers located in public access location are secured to prevent unauthorized access
- (2) Transfer of equipment to another unit, or relocation is strictly monitored and documented.
- (3) Microcomputer/PC's peripheral hardware, media and printed output is not removed from the work area without proper permission.
- (4) All storage media is clearly labeled to ensure that only the proper files are used for processing.

3.6 Cost and Benefit Analysis

3.6.1 Cost Analysis

The cost analysis method of the SAP Configuration Control System is Payback Period, which defines the number of years required to accumulate earnings sufficient to cover its costs. The cost of developing the SAP Configuration Control System is summarized in Table 3.5. And the Annual Operating Cost is shown in Table 3.6.

Table 3.5. Development Cost Analysis, Baht.

Cost Items	Description	Amount	Unit Price	Price
1. Development Cost:	1.1 Personnel Cost:			
	Systems Analyst (320 hrs/ea.)	1	112,000	112,000
	Programmer / Database Specialist (160 hrs/ea.)	2	30,400	60,800
	IT Specialist (80 hrs/ea.)	1	28,000	28,000
	Subtotal 1:			200,800
	1.2 New Hardware:			
	Upgrade Server's storage capacity (additional 20GB Hotplug Harddrive)	1	17,500	17,500
	Upgrade Server's memory capacity (additional 256MB Bus 133MHz)	1	12,000	12,000
	UPS 1000VA	1	16,500	16,500
	Subtotal 2:			46,000
	1.3 New Software:			
	License Windows 2000 Advanced Server	1	200,000	200,000
2. Operating Cost:	Client Software (Operating System, misc.)	4	10,000	40,000
	Subtotal 3:			240,000
	Total Development Cost			486,800
	2.1 Personnel Cost:			
	Programmer / Database Specialist	1	18,000	18,000
	IT Specialist	1	9,600	9,600
	Subtotal 1:			27,600
	2.2 Maintenance			
	Hardware Maintenance			56,800
	Software Maintenance			-
	Subtotal 2:			56,800
	Total Operating Cost			84,400
	Total Projected Annual Cost			571,200

3.6.2 Benefit Analysis

The benefit can be separated into two types; tangible and intangible benefit.

Tangible Benefits

Additional Minutes of duplicate work per data entry	15 Minutes
Average Annual Data Entries	850 Entries
Annual Minutes of Duplicate Data Entry per year	12,750 Minute
Annual Hours of Duplicate Data Entry	213 Hours
Total Annual Saving (Clerk: 45 Baht/hour)	9,562.50
Additional Minutes for Each Look Up	5 Minutes
Average Look Up per year	1,500 Look Ups
Annual Minutes of Information Look Up per year	7,500 Minutes
Total Annual Saving (Clerk: 45 Baht/hour)	5,625.00
Total Tangible Saving for Project implementation	15,187.50

Intangible Benefits

User Dissatisfaction

This may due to; error entry, error request and etc.

50% chance that the error entry fewer than 10% of his/her require other solution

20% chance that the error entry fewer than 50% of his/her require other solution

10% chance that the error entry fewer than 70% of his/her require other solution

3% chance that the error entry fewer than 100% of his/her require other solution

Estimated Loss of Business	25%
Regular User Average Annual Order Value	95,000
Estimate Loss of Business per User	23,750
Average Number of Users	20 Users
Total Estimated Annual Loss of Business	475,000.00

3.6.3 Payback Analysis

Payback is the way to assess whether a business should invest in a proposed information system based on how long it will take for the benefits of the system to pay back the costs of developing it. It is the method, which determines the number of years of operation that the information system needs to pay the cost of investing in it. See the payback calculation in Table 3.6 and Figure 3.5.



Table 3.6. Payback Analysis, Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development Cost:	-486,800.00					
Operation and Maintenance Cost		-84,400.00	-91,152.00	-98,444.16	-106,319.69	-114,825.27
Discount Factors (5%)	1.00	0.95	0.91	0.86	0.82	0.78
Time-adjust costs (adjusted to present Value)	-486,800.00	-80,380.95	-82,677.55	-85,039.77	-87,469.47	-89,968.60
Cumulative time-adjusted costs over lifetime:	-486,800.00	-567,180.95	-649,858.50	-734,898.27	-822,367.74	-912,336.35
Remark: Operation & Maintenance Cost Estimated Annual Growth Rate of 8%						
Benefits derived form operation of new system:	0.00	490,187.50	514,696.88	540,431.72	567,453.30	595,25.97
Discount Factors (5%)	1	0.95	0.91	0.86	0.82	0.78
Time-adjust benefits (adjusted to present Value)	0.00	466,845.24	466,845.24	466,845.24	466,845.24	466,845.24
Cumulative time-adjusted benefits over lifetime:	0.00	466,845.24	933,690.48	1,400,535.71	1,867,380.95	2,334,226.19
Remark: Operation & Maintenance Cost Estimated Annual Growth Rate of 5%						
Cumulative lifetime time-adjusted cost+benefits:	-486,800.00	100,335.71	283,831.97	655,637.44	1,045,013.21	1,421,889.84

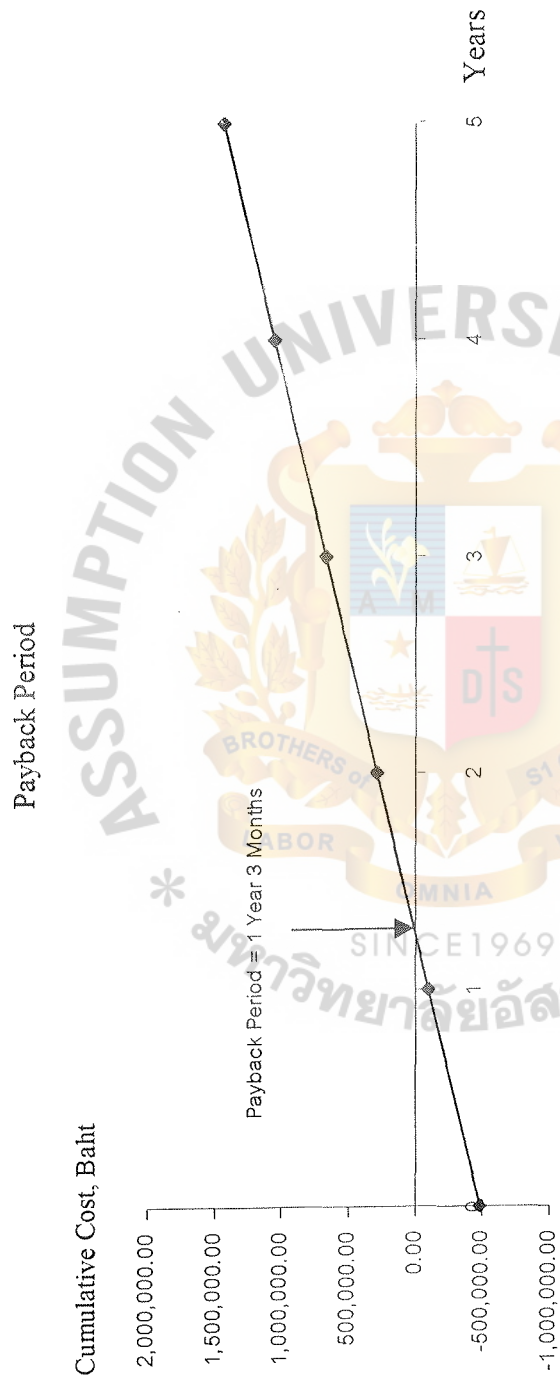


Figure 3.5. Payback Period.

Cost of Manual System

SAP Configuration Control System is used for tracking the configured program. Start to receive the end-user's requirement through transport an accomplishment program. At least three persons are required full time in order to support SAP Configuration Control System manually throughout the tasks of recording, maintenance processing and generating the reports. A lot of papers are also generated. Following are the costs associated with running the manual system.

Table 3.7. Cost of Manual System, Baht.

Cost Items	Years				
	1	2	3	4	5
Personal:					
Functionary (25,000 + 5% increase)	300,000	315,000	330,750	347,288	364,653
Operators (10,000 + 5% increase)	120,000	126,000	132,300	138,915	145,861
System Administrator (25,000 + 5% increase)	300,000	315,000	330,750	347,288	364,653
Office Equipment:					
Office facilities	60,000	65,000	70,000	75,000	80,000
Paper work and Document	40,000	50,000	60,000	70,000	80,000
Utility	20,000	25,000	30,000	35,000	40,000
Total Cost	840,000	896,000	953,800	1,013,491	1,075,167
Accumulative cost	840,000	1,736,000	2,689,800	3,703,291	4,778,458

Cost of Computerization

For the computerization the entire existing infrastructure is already existing.

Table 3.8. Cost of Computerization, Baht.

Cost Items	Years				
	1	2	3	4	5
Personal:					
Functionary (25,000 + 5% increase)	300,000	315,000	330,750	347,288	364,653
System Administrator (25,000 + 5% increase)	300,000	315,000	330,750	347,288	364,653
Hardware					
Development Server	5,900	5,900	5,900	5,900	5,900
UPS	3,300	3,300	3,300	3,300	3,300
Hardware Maintenance (2 years Warrantee)	-	-	56,800	56,800	56,800
Software:					
Server Software	40,000	40,000	40,000	40,000	40,000
Client Software	8,000	8,000	8,000	8,000	8,000
Office Equipment:					
Office Supply	200,000	50,000	40,000	30,000	20,000
Utility and other Expenses	90,000	40,000	35,000	30,000	25,000
Total cost	947,200	777,200	850,500	868,576	888,306
Accumulative cost	947,200	1,724,400	2,574,900	3,443,476	4,331,782

Table 3.9. The Comparison of the System Cost, Baht.

Year	Accumulative Manual Cost	Accumulative Computerized Cost
1	840,000	947,200
2	1,736,000	1,724,400
3	2,689,800	2,574,900
4	3,703,291	3,443,476
5	4,778,458	4,331,782



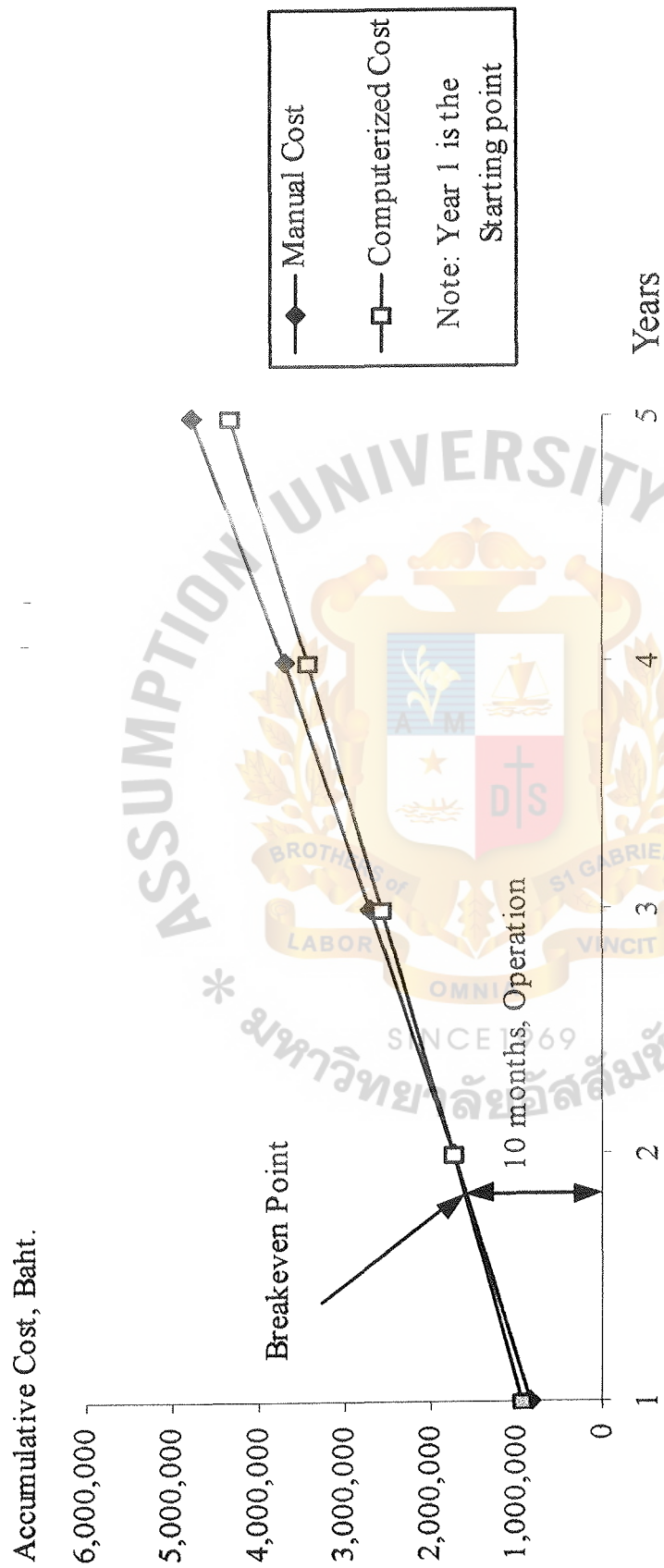


Figure 3.6. Cost Comparison between Manual and Proposed System.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

The proposed system will be implemented when we passed through system analysis and system design phase. In each phase usually represents considerable work and time, the phases are usually broken down into activities and tasks that can be more easily managed and accomplished. To develop the Configuration Control System spends four months. It starts from the beginning of January till the end of April 2001. System Implementation is the planned and orderly conversion from a current existing system to the new proposed information system. The proposed system should meet the desired objectives. System Implementation consists of Construction and Delivery Phases

Construction Phase

The construction phase is actually part of design/construction loop. The purposes of the construction are to build and test a functional system that fulfills business and design and to implement the interfaces between the new system and existing production system. To implement the proposed system, first upgraded memory of server from 128 MB to 256 MB and upgrade harddisk to 20 GB. Second, install service pack version 6.0 for Windows NT 4.0. Service pack is pack update for debug resided in Windows NT 4.0 and upgrade Internet Information Server to version 4.0 for running ASP Script (Active Server Page). After that we need to configure demo Web Site on Internet Information Server to test the proposed system. In addition to this, install SAP Configuration Control System program to virtual directory of Web Site that we set. Third, we set up database for testing on SQL Server.

Delivery Phase

Delivery Phase means deliver the new system into operation. After the proposed system is tested then install Internet Explorer version 4.0 into client computers that will use the proposed system. Then make the manual document used for training user.

4.2 Test Plan

Testing that is an important skill includes Unit testing, System testing and regression testing.

- (1) Unit testing ensures that the stand alone program fixes the bug without side effects. The test data and current performance that you benchmarked are used here.
- (2) System testing ensures that the entire application of which the modified program was a part, still works. Again, the test data and current performance are use here.
- (3) Regression testing extrapolates the impact of the changes on program and application throughput and response time from the before and after results using the test data and current performance.

4.3 Training

Training is provided for all system administrator and functionary in IT department. System administrator and functionary have to operate the system on their daily work. So training of the proper use of the system will reduce error in data entering and reduce time to search data and preparing reports.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The project study is concerning about Configuration Control System for a well established concrete industry, "Readymixed Pioneer Concrete (Thailand) Ltd." the area under study describes especially on IT department of Readymixed Pioneer Concrete (Thailand)

The existing system is run under manually process, which was not easy to control and manage successfully. After the project team completed studying the existing system, the problems that occurred in the main area under study for the IT department including:

- (1) The information stored in hard copy form which can be lost or damaged easily.
- (2) The information is not available among several persons when more than one person want to use the information at the same time because the information is not recorded in database.
- (3) Access to information take more response time since the most information is not stored in database.
- (4) Lack of information history is used to reference.

The SAP Configuration Control System is conducted to improve Readymixed Pioneer Concrete (Thailand)'s IT department and to ease the functionary to record the transactions send to system administration more effectively and accurately.

This study has proposed a new system especially for IT department that is demonstrated by Context Diagram and Data Flow Diagram of the proposed system. (Appendix B)

In depth analysis, design and implementation are on the IT department according to the IT manager's requirement. The reason why the SAP Configuration Control System is so important and sophisticated area for the management because the most of time is spent to operate the information of configuration program.

This proposed system is designed and implemented in the way to solve the existing problems and result in satisfying the user requirements and improving the management of IT department. SAP Configuration Control System will be a base system that brings the company to better management of other related system such as Help Desk.

The proposed computerized procedure and database system also provide several benefits such as access to information timely, providing information available, providing security of database. The data will be kept in a computerized system, which can be easily accessed and retrieved. The reports are also to generate as requested. Costs/Benefits analysis is identified in chapter 3 and the new system also shows a payback.

The proposed system operates less time than existing system that has to operate many unnecessary steps. Table 5.1 shows the time performance on each process of the proposed system compared with the existing system. Each process of the proposed system uses less time than the existing system because it uses the database for store and search the configured program.

Table 5.1. The Degree of Achievement of the Proposed System.

Process	Existing System	Proposed System
Receive Process	1 hour	30 minutes
Configure Process	2 hours	1 hour 30 minutes
Test Process	1 hour	45 minutes
Transport Process	30 minutes	15 minutes
Total	4 hours 30 minutes	3 hours

Description for each Process why Proposed System uses less time than Existing System.

- (1) Receive Process: the proposed system uses less 30 minutes than the existing system because the system will alert when the new requirements come and the proposed system has the database storing the user's requirement and user information that it reduces access time to search the information. While the existing system receives the requirement as the paper that can loss or damage.
- (2) Configure Process: it uses less 30 minutes than the existing system. Since the proposed system can check whether the requirement occurred is new or not from transported program database. If the requirement had been occurred, the system will re-configure. This system helps functionary to configure the program faster because it reduces time for configuration the repeated requirement.
- (3) Test Process: the proposed system does not reduce the much process time compared with the existing system. However this process enables the auditor to it uses less 15 minutes than the existing.

- (4) Transport Process: the system uses less 15 minutes than existing system because the system handle for searching users who request this configured program. The system helps system administrator to transport a program to a user faster than the manual system. The system reduce an incorrect of transport program to wrong user, it can verify a correct user to transport a program.

5.2 Recommendations

To complete the most acceptance test, the next steps of the implementation phase after completing the Proposed SAP Configuration Control System. Test are as follows:

- (1) Conduct training courses and prepare training documents for users.
- (2) Operate the system by parallel run with manual system and compare its result daily, weekly and monthly in order to make the corrections for any unexpected problems. After 3 month experimentation and the computerized system is workable, the new system can be run solely and the manually system can be stopped running.
- (3) Re - evaluate alter the system might be performed within 6 to 12 months after the system is implemented. The purpose is to determine whether some system enhancement should be made to further improve or refine it. The user should review the list of functionary and system administrator complaint and evaluate the efficiency of the workflow of the new system.

By determining when the peak load will occur, the quantities of paper work flowing through the system, the accuracy, the utility and the timeliness of the output report should be monitored as day - to - day performance of the system as well as evaluating the possible changes to improve.

However, from the study, the first priority area to implement later is "Help Desk". This system will support the SAP Configuration Control System to be more efficiency. Moreover, it will support the management to have more accurate of end-user' requirement, to give better and timely service to end - users.

The effective management of any of these processes required information about configured program, requirement and program for configuration. Modern information systems are easily able to handle such information and to assist in its effective management.

The proposed system should be apply to the technology of Graphical User Interface (GUI) to ease for user in providing the report. The technology of Graphical User Interface can also give more vision to Management team for overview the feasibility of information.





APPENDIX A

ENTITY RELATIONSHIP DIAGRAM

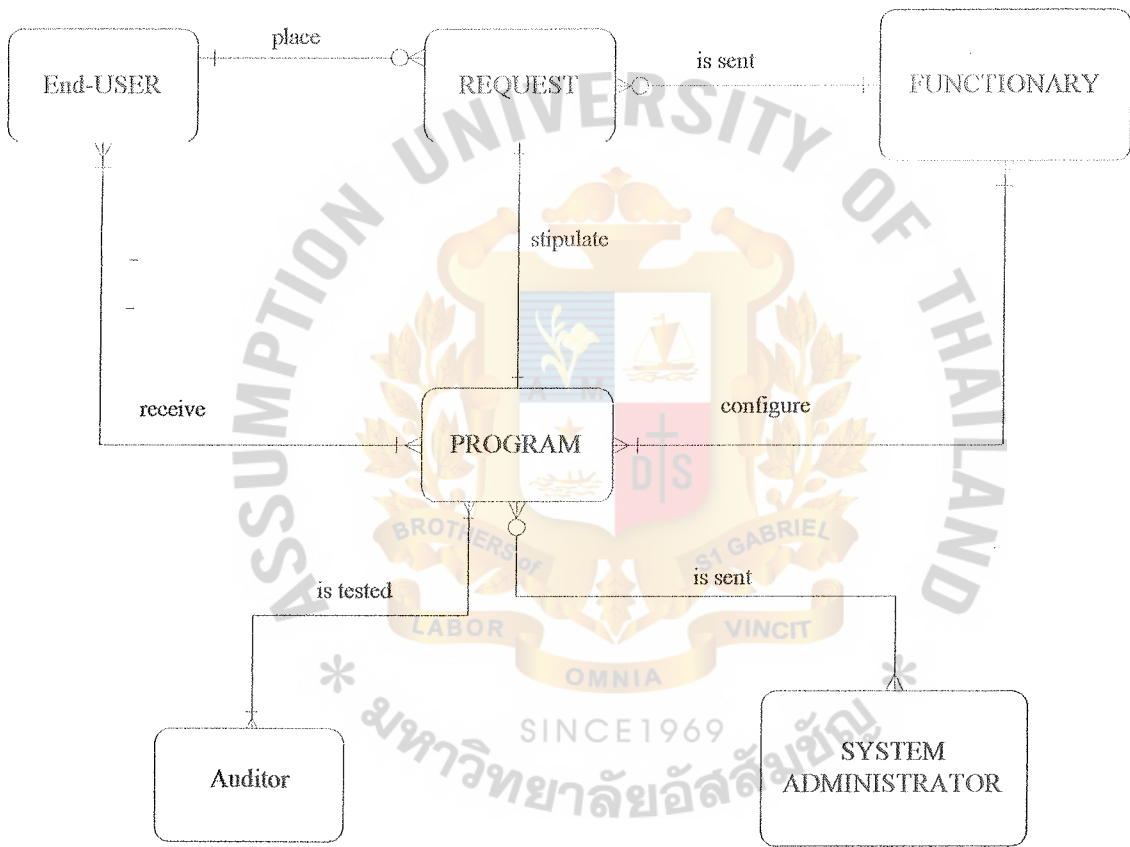


Figure A.1. Entity Relationship Diagram.

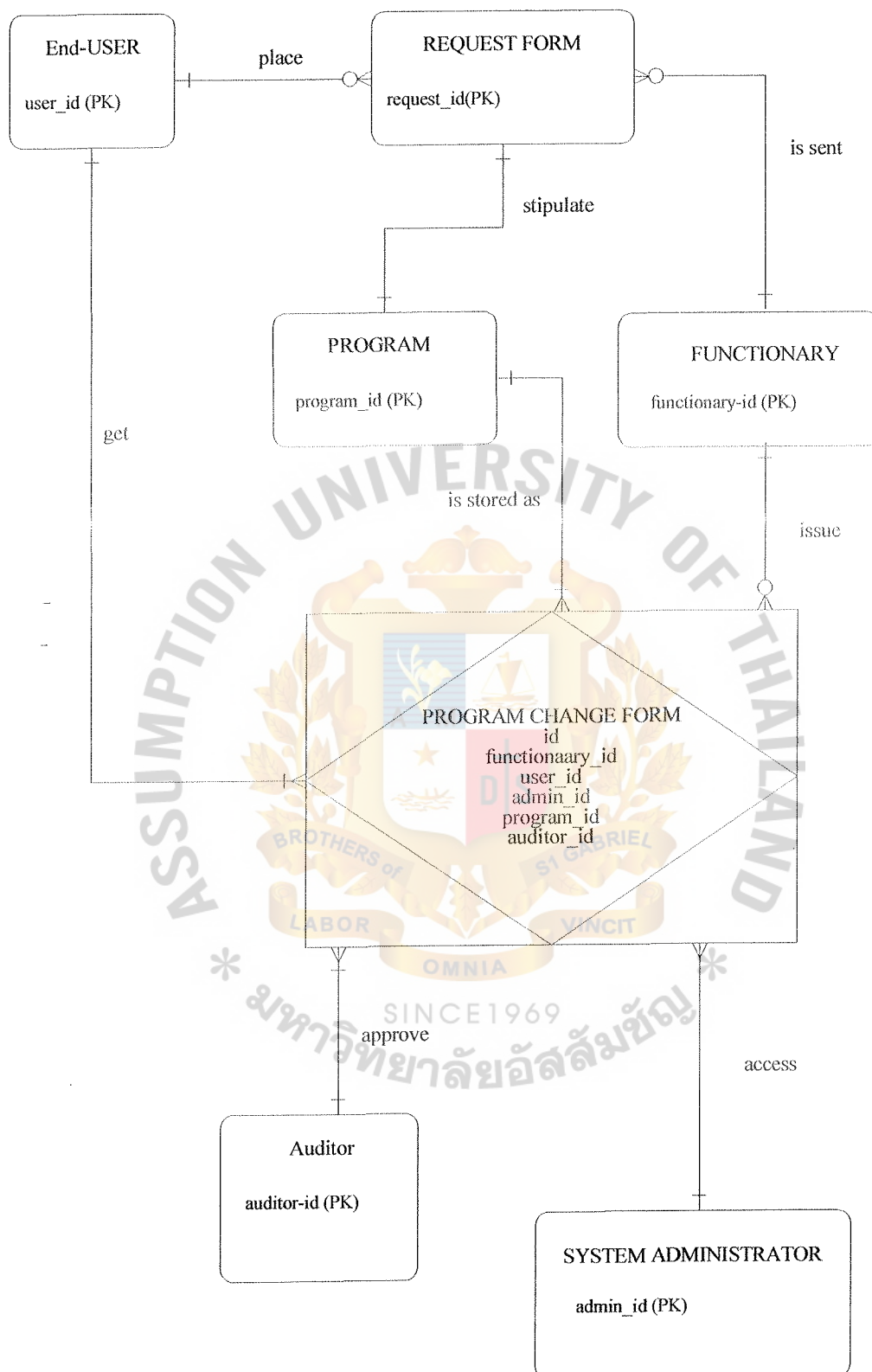


Figure A.2. Key Based Entity Relationship.

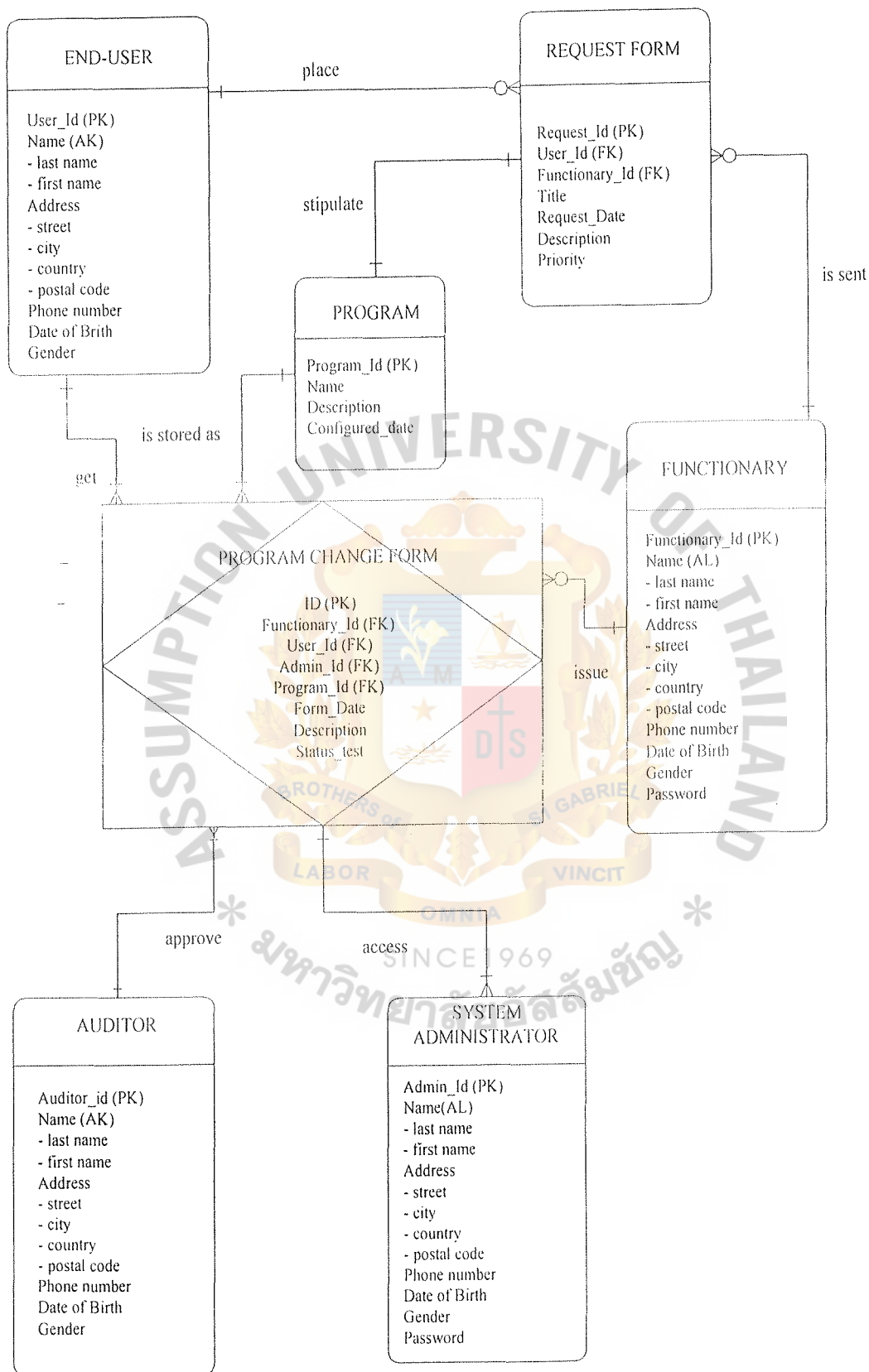


Figure A.3. Fully Attribute Entity Relationship.



APPENDIX B

DATA FLOW DIAGRAM

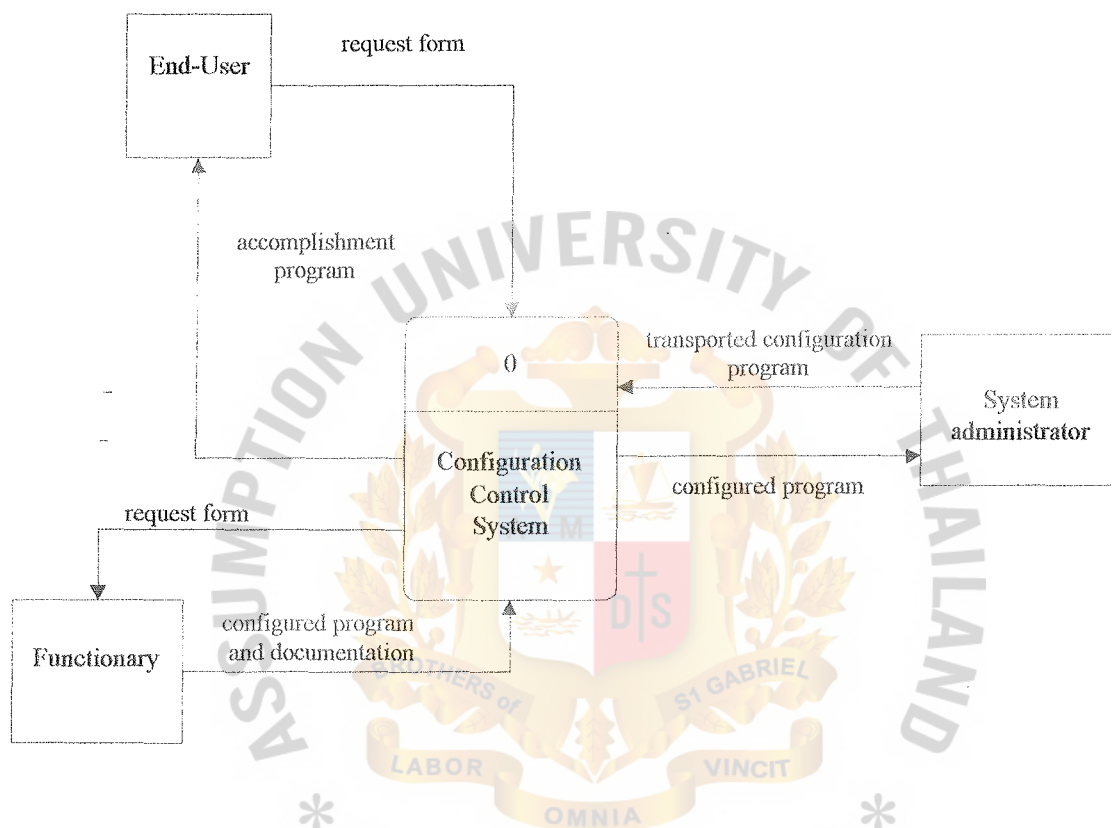


Figure B.1. Context Data Flow Diagram of Proposed System.

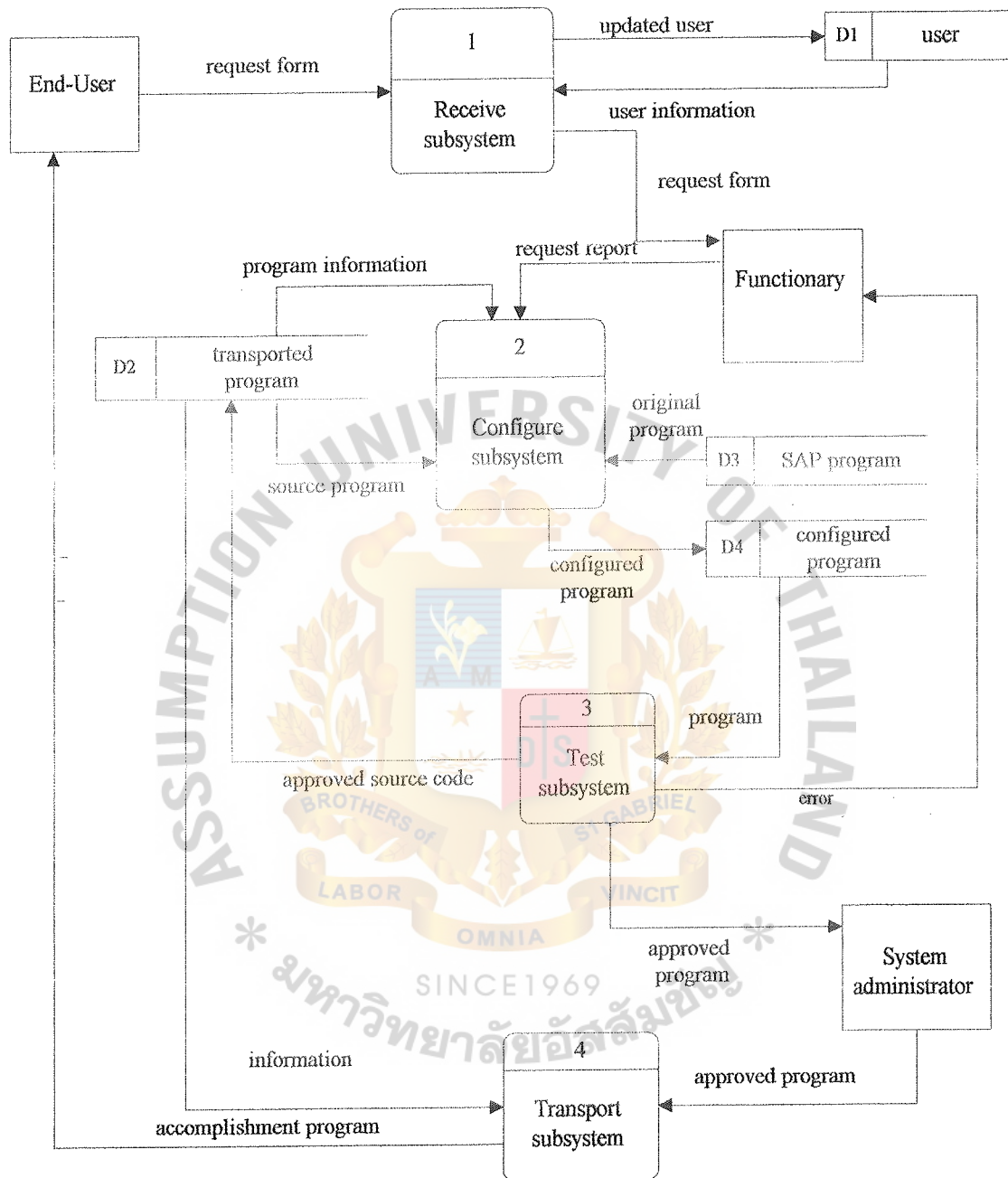


Figure B.2. Data Flow Diagram (Level I) of Proposed System.

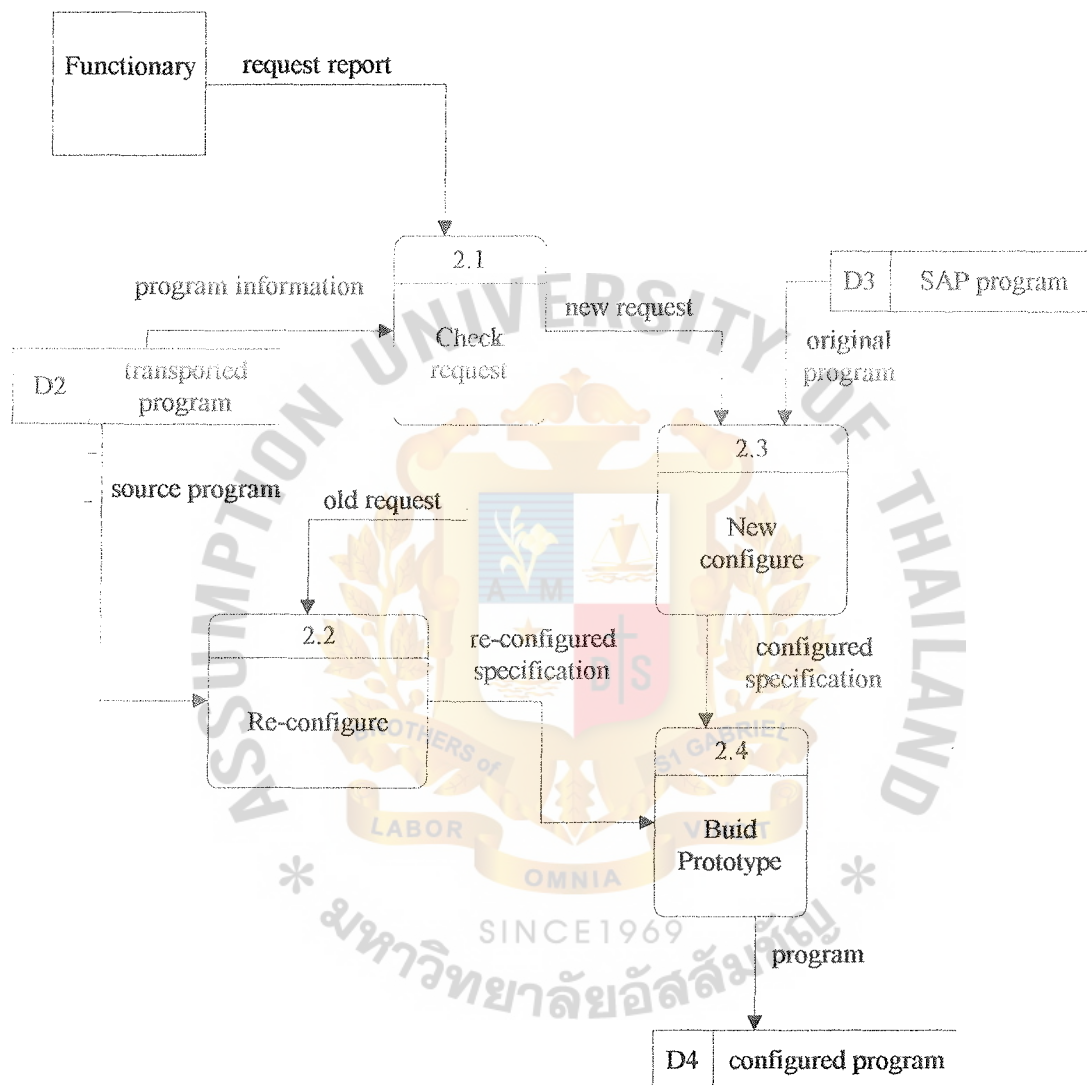


Figure B.3. Data Flow Diagram (Level II) of Proposed System Process II Configure Subsystem.

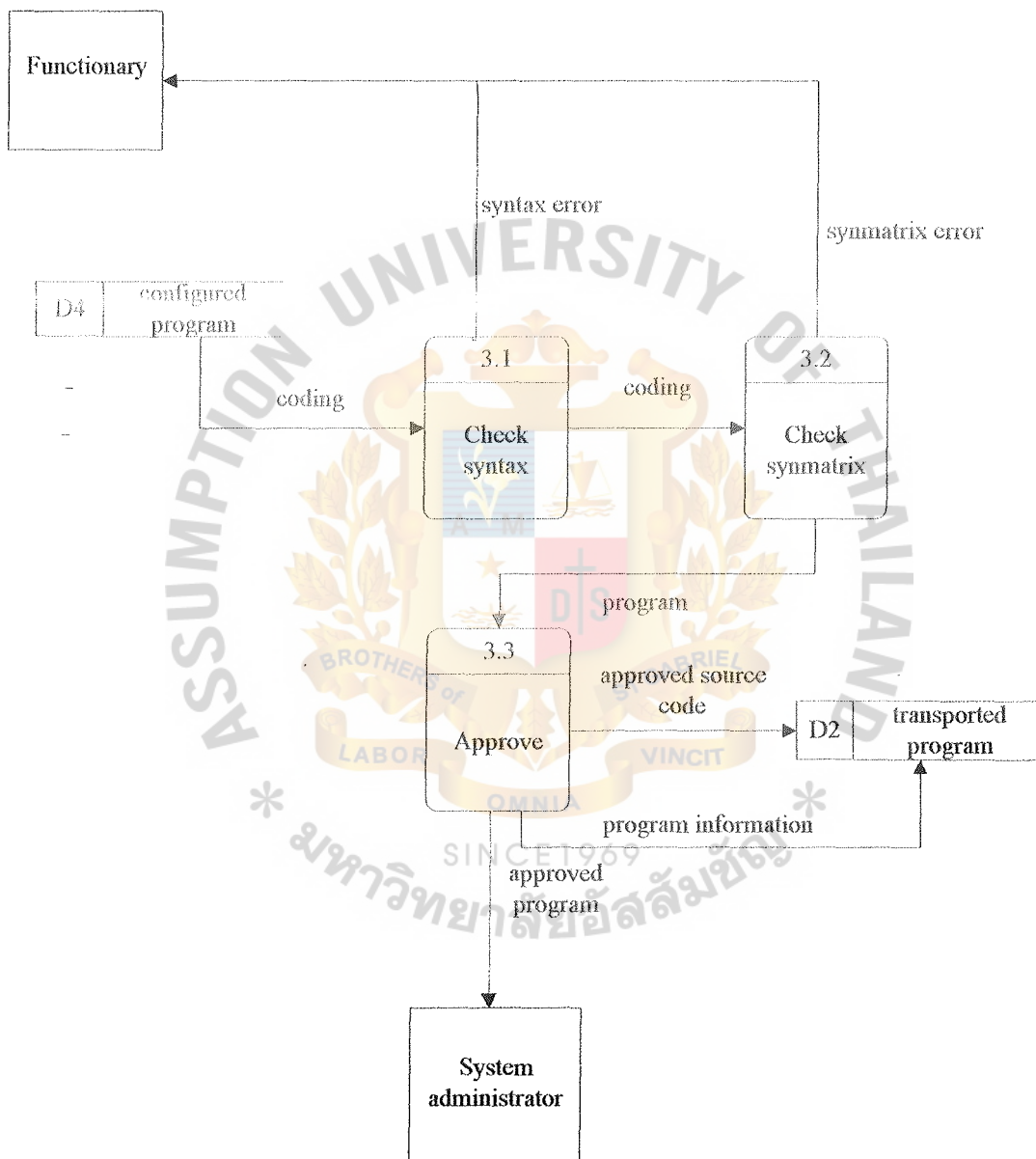


Figure B.4. Data Flow Diagram (Level II) of Proposed System Process III Test Subsystem.



APPENDIX C
STRUCTURE CHART

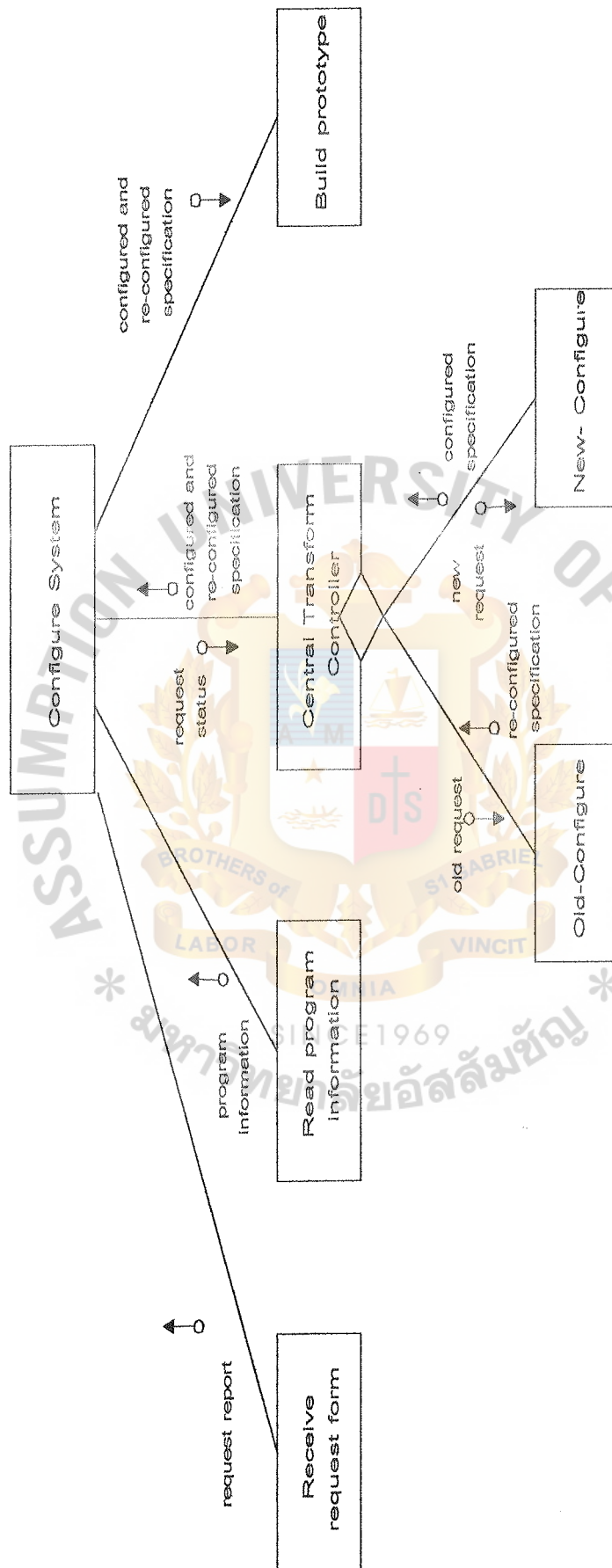


Figure C.1. Structure Chart of Configure System.

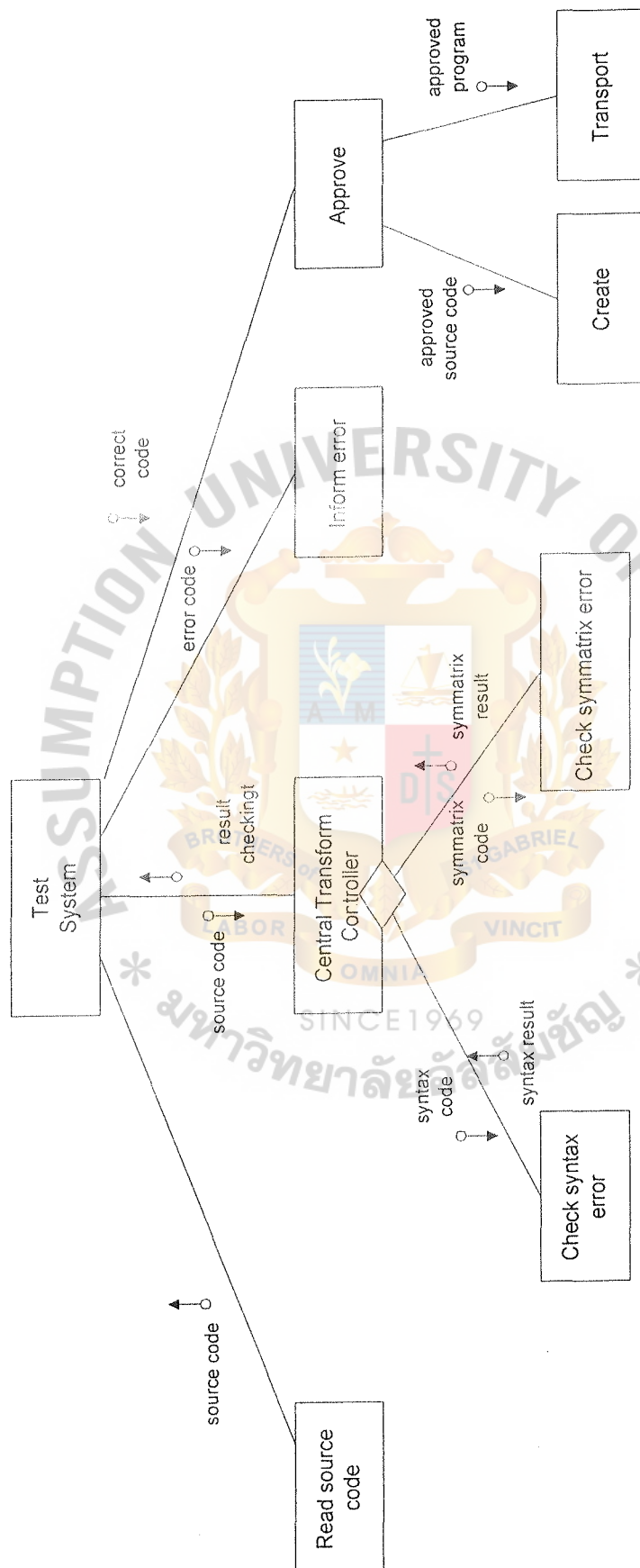


Figure C.2. Structure Chart of Test System.



APPENDIX D

PROCESS SPECIFICATION

PROCESS SPECIFICATION

Table D.1. Process Specification of Process 1.

Process Name:	Receive
Data In:	Request form (from end-use)
Data Out:	Request form User Information Created
Process:	(1) Get request form end-user. (2) Create new user information into User Database. This database will be updated once the end - user sends request.
Attachment:	(1) End - User (2) User Database (3) Functionary (4) Configure Process

Table D.2. Process Specification of Process 2.1

Process Name:	Check Request
Data In:	Request Report (from Functionary) Program Information (from Transport Program Database)
Data Out:	New Request Old Request
Process:	(1) Check the status of request whether new or not by compared the current request with transported program database. (2) Send the old request information to Re-Configure Process (3) Send the new request information to New Configure Process.
Attachment:	(1) Functionary (2) Transported Program Database (3) New Configure Process (4) Re - Configured Process

Table D.3. Process Specification of Process 2.2.

Process Name:	Re - Configure
Data In:	Old Request Information (from Check Request Process) Source Program (from Transported Program Database)
Data Out:	Re - Configured Specification
Process:	(1) Receive the Old Request from Check Request Process. (2) Re - Configure the program by rewrite the source code stored in Transported Program Database. (3) Send re - configure specification to Build Prototype Process.
Attachment:	(1) Check Request Process (2) Transported Program Database (3) Build Prototype Process

Table D.4. Process Specification of Process 2.3.

Process Name:	New Configure
Data In:	New Request Information Original Program
Data Out:	Configure Specification
Process:	(1) Receive the new request from Check Request Process. (2) Configure the program as new request information by using Original Program from SAP Program Database. (3) Send Configure specification to Build Prototype Process.
Attachment:	(1) Check Request Process (2) SAP Program Database (3) Build Prototype Process

Table D.5. Process Specification of Process 2.4.

Process Name:	Build Prototype
Data In:	(1) Configured Specification (2) Re - Configured Specification
Data Out:	Program
Process:	(1) Receive Re-configure or Configured Specification from Re-Configure or New Configure Process. (2) Build the program in prototype form. (3) Create the Program Information to store in Configured Program Database.
Attachment:	(1) New Configure Process (2) Re-Configure Process (3) Configured Program Database

Table D.6. Process Specification of Process 3.1.

Process Name:	Check Syntax
Data In:	Code Information
Data Out:	(1) Syntax Error (2) Coding
Process:	(1) Receive code information (from Configured Program) (2) Check Syntax Error
Attachment:	(1) Configure Program Database (2) Functionary (3) Check Symmatrix Process

Table D.7. Process Specification of Process 3.2.

Process Name:	Check Symmatrix
Data In:	Code Information
Data Out:	(1) Symmatrix Error (2) Program
Process:	(1) Receive Code Information from Check Syntax Process. (2) Check Symmatrix whether the code information is correct or not (3) Send Program to Approve Process.
Attachment:	Check Symmatrix Process

Table D.8. Process Specification of Process 3.3.

Process Name:	Approve
Data In:	Program
Data Out:	Approved Source Code Approved Program
Process:	(1) Receive Program from Check Symmatrix Process. (2) Send Approved Source Code and Program Information to Transported Program. (3) Send Approved Program to System Administrator.
Attachment:	(1) Check Symmatrix Process (2) Transported Program Database (3) System Administrator

Table D.9. Process Specification of Process 4.

Process Name:	Transported
Data In:	Approved Program Information (from Transported Program Database)
Data Out:	Accomplishment Program
Process:	(1) Receive approved program from system administrator. (2) Transport the accomplishment program.
Attachment:	System Administrator



DATA DICTIONARY

System: SAP Configuration Control System

Description: ADMINISTRATOR INFORMATION

Table E.1. Admin.

Name	Type	Length	Description
ADMIN_ID	Text	10	Admin ID
FNAME	Text	30	First Name
LNAME	Text	30	Last Name
SREET	Text	20	Street Address
CITY	Text	30	City
COUNTRY	Text	30	Country
POSTAL_CODE	Text	10	Postal Code
TELEPHONE	Text	10	Telephone Number
PASSWORD	Text	10	Password

PRIMARY KEY: ADMIN_ID

Description: FUNCTIONARY INFORMATION

Table E.2. Functionary.

Name	Type	Length	Description
FUNCTIONARY_ID	Text	10	Functionary ID
FNAME	Text	30	First Name
LNAME	Text	30	Last Name
SREET	Text	20	Street Address
CITY	Text	30	City
COUNTRY	Text	30	Country
POSTAL_CODE	Text	10	Postal Code
TELEPHONE	Text	10	Telephone Number
PASSWORD	Text	10	Password

PRIMARY KEY: FUNCTIONARY_ID

Description: PROGRAM INFORMATION

Table E.3. Program.

Name	Type	Length	Description
PROGRAM_ID	Text	10	Program ID
NAME	Text	15	Name of Program
DESCRIPTION	Text	100	Memo
CONFIGURED_DATE	Date/ Time		Configured Date

PRIMARY KEY: PROGRAM_ID

Description: FORM INFORMATION

Table E.4. Form.

Name	Type	Length	Description
FORM_ID	Text	10	Form ID
FUNCTIONARY_ID	Text	10	Functionary ID
USER_ID	Text	10	User ID
ADMIN_ID	Text	10	Administrator ID
PROGRAM_ID	Text	10	Program ID
FORM_DATE	Date/ Time		Form DATE
DESCRIPTION	Text	100	Description
STATUS_TEST	Text	1	Status Test (Y=Yes,N=No)

PRIMARY KEY: FORM_ID

Description: REQUEST INFORMATION

Table E.5. Request.

Name	Type	Length	Description
REQUEST_ID	Text	10	Request ID
TITLE	Text	10	Request Title
REQUEST_DATE	Date/ Time		Request Date
USER_ID	Text	10	User ID
DESCRIPTION	Text	10	Description
FUNCTIONARY_ID	Date/ Time		Functionary ID

PRIMARY KEY: REQUEST_ID

Description: USER INFORMATION

Table E.6. User.

Name	Type	Length	Description
USER_ID	Text	10	User ID
FNAME	Text	30	First Name
LNAME	Text	30	Last Name
SREET	Text	20	Street Address
CITY	Text	30	City
COUNTRY	Text	30	Country
POSTAL_CODE	Text	10	Postal Code
TELEPHONE	Text	10	Telephone Number

PRIMARY KEY: USER_ID



APPENDIX F
WEB INTERFACE

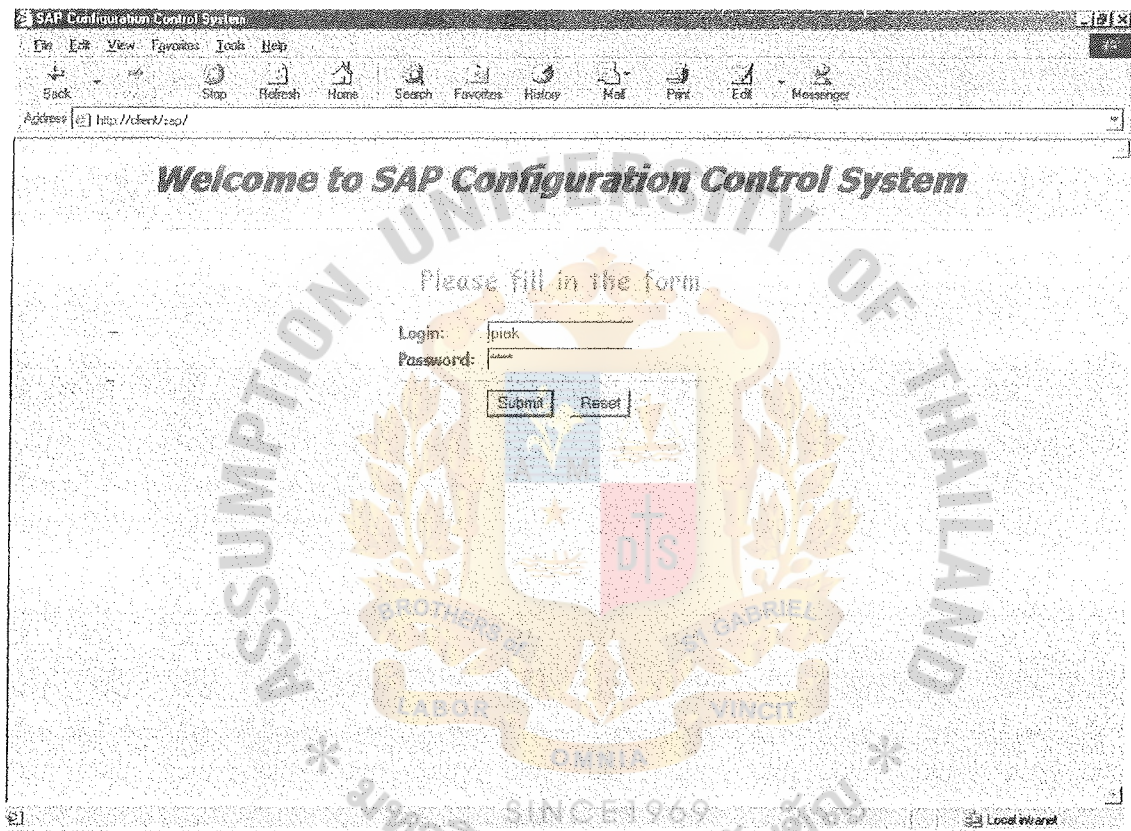


Figure F.1. Logging Form.

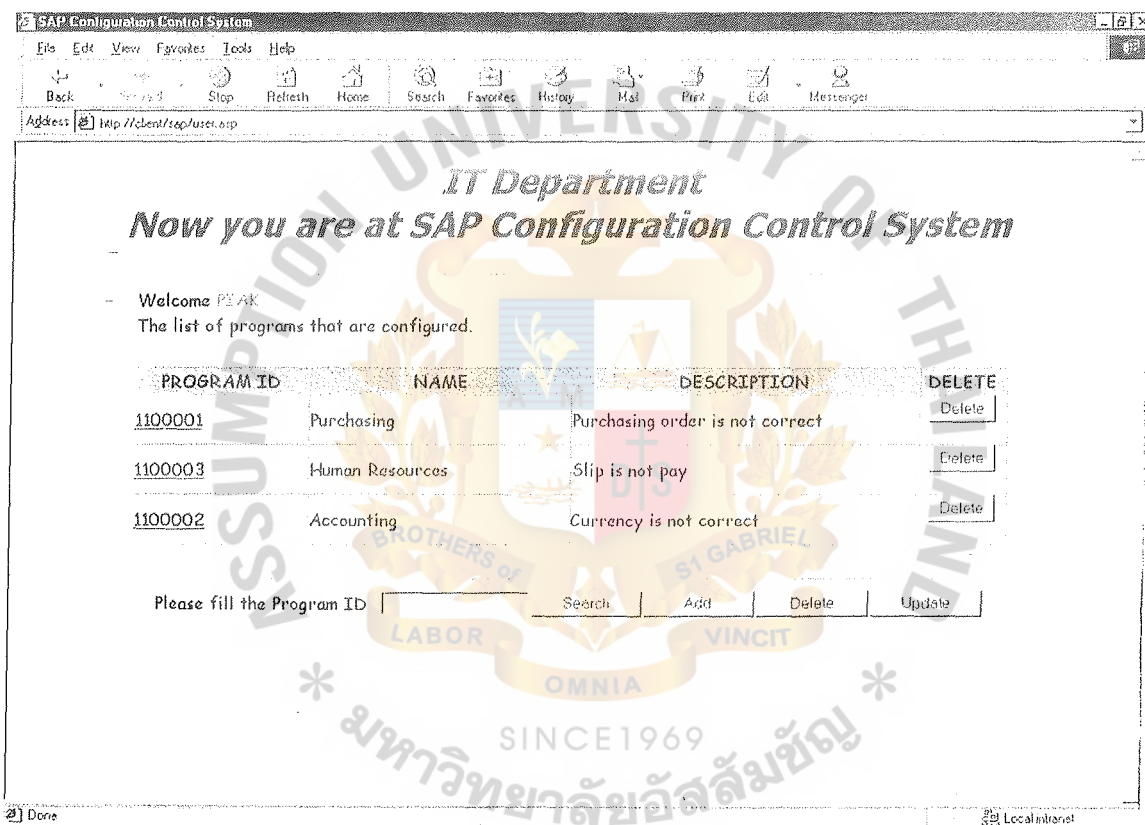


Figure F.2. Program.



Figure F.3. Update Program.

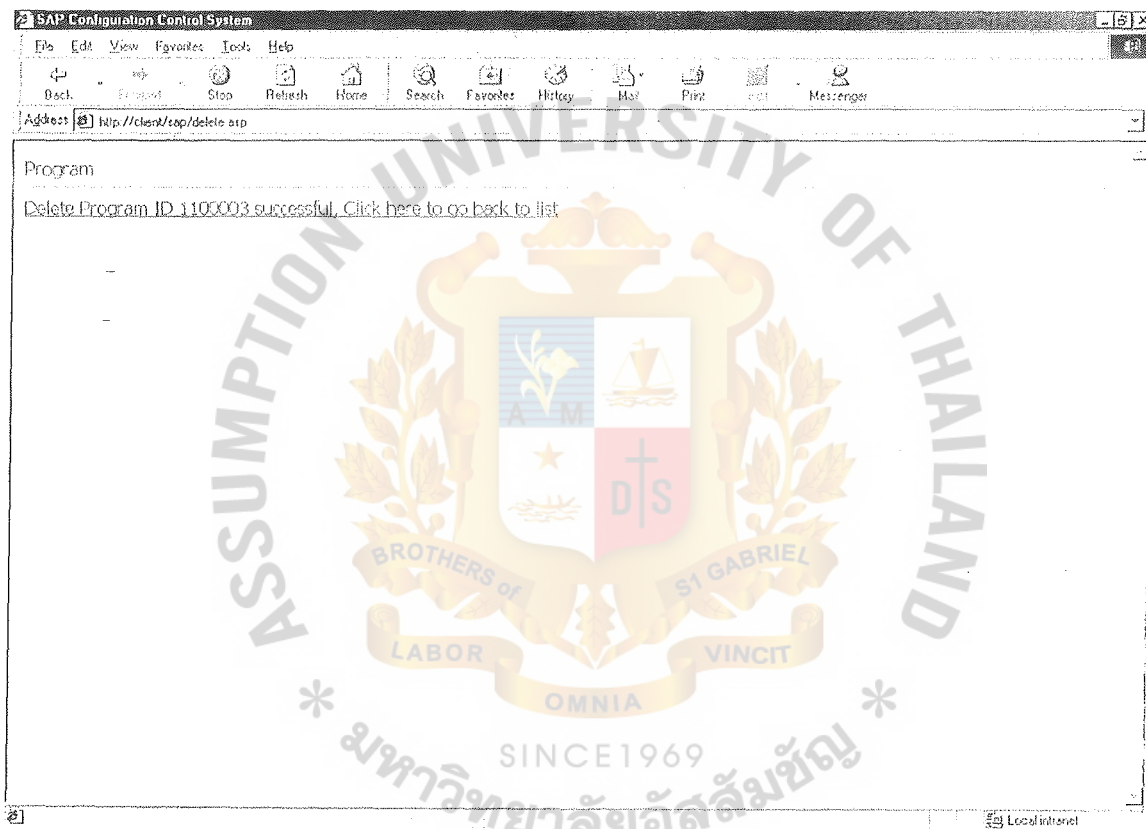


Figure F.4. Delete Program.

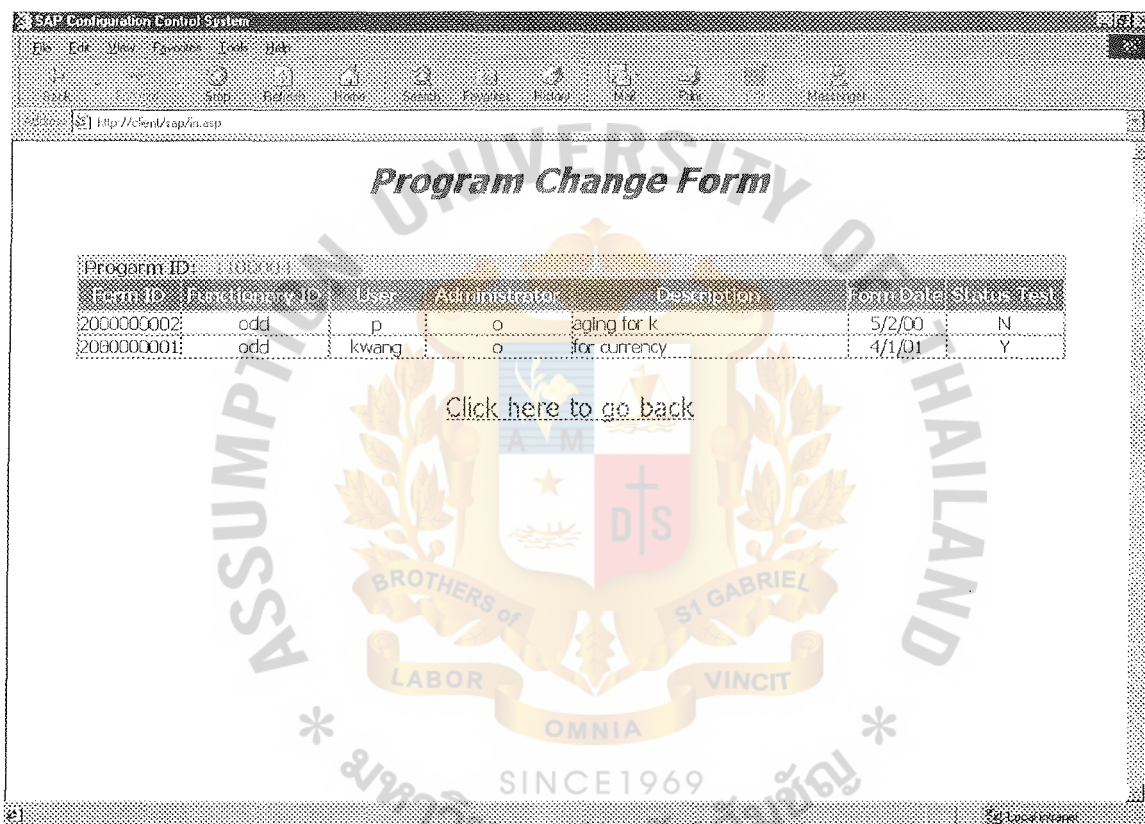


Figure F.5. Search Program.

SAP Configuration Control System

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Local Messenger

Address http://clerk/isp/n.asp

Program Add Form

Program_Id	1166004
Program_Name	Mer-eting
description	Promotion is not correct
Configured_Date	24/10/2000

submit reset

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Done Local intranet

Figure F.6. Add Program.

SAP Configuration Control System

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Messenger

Address http://client/sap/icom.asp?id=2000000001

This is the SAP Program Change Form of Pioneer

ID	2000000001
Program ID	11000001
User	k.wangj
Admin	o
Date	4/1/01
Description	for currency

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Figure F.7. Form.



APPENDIX G

OUTPUT REPORT

FORM REPORT

ID	frm0000002
FUNCTIONARY ID	fun0000001
USER ID	usr0000002
ADMIN ID	ADM0000004
PROGRAM ID	HR0020000
FORM DATE	9/ 9/00
DESCRIPTION	Asking for k
STATUS TEST	N

ID	frm0000001
FUNCTIONARY ID	fun0000002
USER ID	usr0000002
ADMIN ID	ADM0000002
PROGRAM ID	AC20020000
FORM DATE	1/ 4/00
DESCRIPTION	Accounting problem
STATUS TEST	Y

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Figure G.1. Form Report Printout.

ID	frm0000003
FUNCTIONARY ID	fun0000001
USER ID	usr0000003
ADMIN ID	ADM0000002
PROGRAM ID	FI00010000
FORM DATE	3/10/00
DESCRIPTION	Request from finance department
STATUS TEST	Y
ID	frm0000004
FUNCTIONARY ID	fun0000002
USER ID	usr0000001
ADMIN ID	ADM0000005
PROGRAM ID	P400010000
FORM DATE	2/11/00
DESCRIPTION	Change some detail
STATUS TEST	N
ID	frm0000005
FUNCTIONARY ID	fun0000002
USER ID	usr0000001
ADMIN ID	ADM0000003
PROGRAM ID	HR0030000
FORM DATE	15/11/00
DESCRIPTION	Change status of employee
STATUS TEST	N
9 March 2001	
Page 2 of 2	

Figure G.2. Form Report Printout (Continued).

Program Report of Readymixed Pioneer Concrete (Thailand) Ltd.,

<i>Program ID</i>	<i>Name</i>	<i>Description</i>	<i>Configure Date</i>
HR0030000	Human Resource	Work Hour	13/2/00
FI00010000	FIN_CURRENCY	This program created for change currency	10/10/00
FI00020000	FI-GL	Calculate the income	2/2/00
AC20010000	Account	Calculate tax	20/11/00
AC20000000	Audit	Audit the revenue and expense	2/5/00
HR0020000	Human Resource	Salary	12/12/00
HR0010000	Human Resource	Information of employees	2/2/00
AC20020000	Account	Account Connected to brance	15/10/00
SD30010000	Sale	Saling	25/9/00
P400010000	Production	Calculate the production	8/8/00

Figure G.3. Program Report Printout.

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