IFS-Maintenance Management Implementation for the Electricity Generating Authority of Thailand

by

Mr. Amornnart Pansock

A Final Report of the Three-Credit Course
CE 6998 Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer and Engineering Management
Assumption University

November 2004

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Project Title	IFS-Maintenance Management Implementation for the Electricity Generating Authority of Thailand
Name	Mr. Amornnart Pansook
Project Advisor	Dr. Akajate Apikajornsin
Academic Year	November 2004

The Graduate School of Assumption University has approved this final report of the three-credit course, CE 6998 PROJECT, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer and Engineering Management.

Approval Committee:

(Dr. Akajate Apikajornsin)
Advisor

(Prof.Dr. Srisakdi Charmonman)
Chairman

(Dr. Chamnongin fhirapanich)
Dean and Co-advisor

(Assoc.Prof. Somchai ThaYarnyong)
CHE Representative

November 2004

ABSTRACT

Electricity Generating Authority of Thailand (EGAT) was formed on May 1, 1969, by the merging of three former regional electricity authorities-Yanhee Electricity Authority (YEA), Lignite Authority (LA) and Northeastern Electricity Authority (NEA).

EGAT's present activities include the construction, operation and maintenance of power plants and transmission network; purchase of power from SPPs and IPPs; and sale of power Provincial Electricity Authority (PEA) and Metropolitan Electricity Authority (MEA), a number of direct customers and neighboring countries; and implementation of demand side management programs.

Currently EGAT utilizes both paper-based and Microsoft Access systems to support and store Maintenance Management data. The administrative staffs are required to maintain the system. They encountered the general problems of manual system, which are the cause of delay of Plant Maintenance Operation schedule.

The new proposed information system will be developed to replace the manual and some computerized information system with IFS, Enterprise Resource Planning Application (ERP). IFS provide functionality to help EGAT to improve work order management process, spare part and consumable process and the efficiency of invoice verification.

ACKNOWLEDGEMENTS

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I. INTRODUCTION AND THEORY

1.1 Background of the project

IFS are developer and supplier of component-based business applications for medium and large enterprises. IFS Applications, which is based on web and portal technology, offers 60+ enterprise application components used in manufacturing, supply chain management, customer relationship management, financials, engineering, maintenance and human resource administration. IFS provide customers step-by-step evolution to the extended enterprise with e-business solutions that offer partner, customer and supplier collaboration.

One of IFS modules is maintenance management. Maintenance management is one of the most important modules in a power plant. It is the main support of plant maintenance. In the power plant, there are millions of parts that need to be maintained and replaced in a certain period to make sure that the plant can run smoothly.

Maintenance management module is also able to integrate data to the other modules such as Finance or Distribution module to reduce the approval process and travel time of document from one division to the other division.

The Electricity Generating Authority of Thailand, known as EGAT, was formed on May 1, 1969, by the merging of three former regional electricity authorities- Yanhee Electricity Authority (YEA), Lignite Authority (LA) and Northeastern Electricity Authority (NEA). These authorities were soon well united after a couple of years. Following the 29% rise of power demand prior to their merging, many new power plants were urgently expanded to end power shortages.

This study is considered as one part of overall IFS Service Management implementation at EGAT. EGAT plans to implement IFS Service Management package which contains Maintenance module, Financials module, Sales and Distribution module, Project Management and Document Management modules.

1.2 Objectives of Project

The purpose of this document is to illustrate the study of the Electricity Generating Authority of Thailand in service management system. Our readers are mainly students (from undergraduate to graduate level), researchers, and other members of the public interested in science. In other words, we try to illustrate what would have the clearest possible appeal to such a diverse readership. The study covers assessment of an as-is practice, identification for improvements, costs and benefit analysis and implementation of solution.

1.3 Scopes of Project

The Electricity Generating Authority of Thailand has decided to implement Enterprise Resource Planning (ERP) application in Maintenance Business Unit. This ERP is an integrated application which contains Maintenance module, Financial module, Sale and Distribution module, Project Management and Document Management module.

In this study, we will concentrate on Maintenance Management module. The list of the highlight scope is as follows:

(1) Focus on Work Order Management Process

(2) Focus on Spare Part and Consumable material Process

(3) Procurement Process

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1.4 Deliverables

The deliverables of this study are as following:

(1) System design

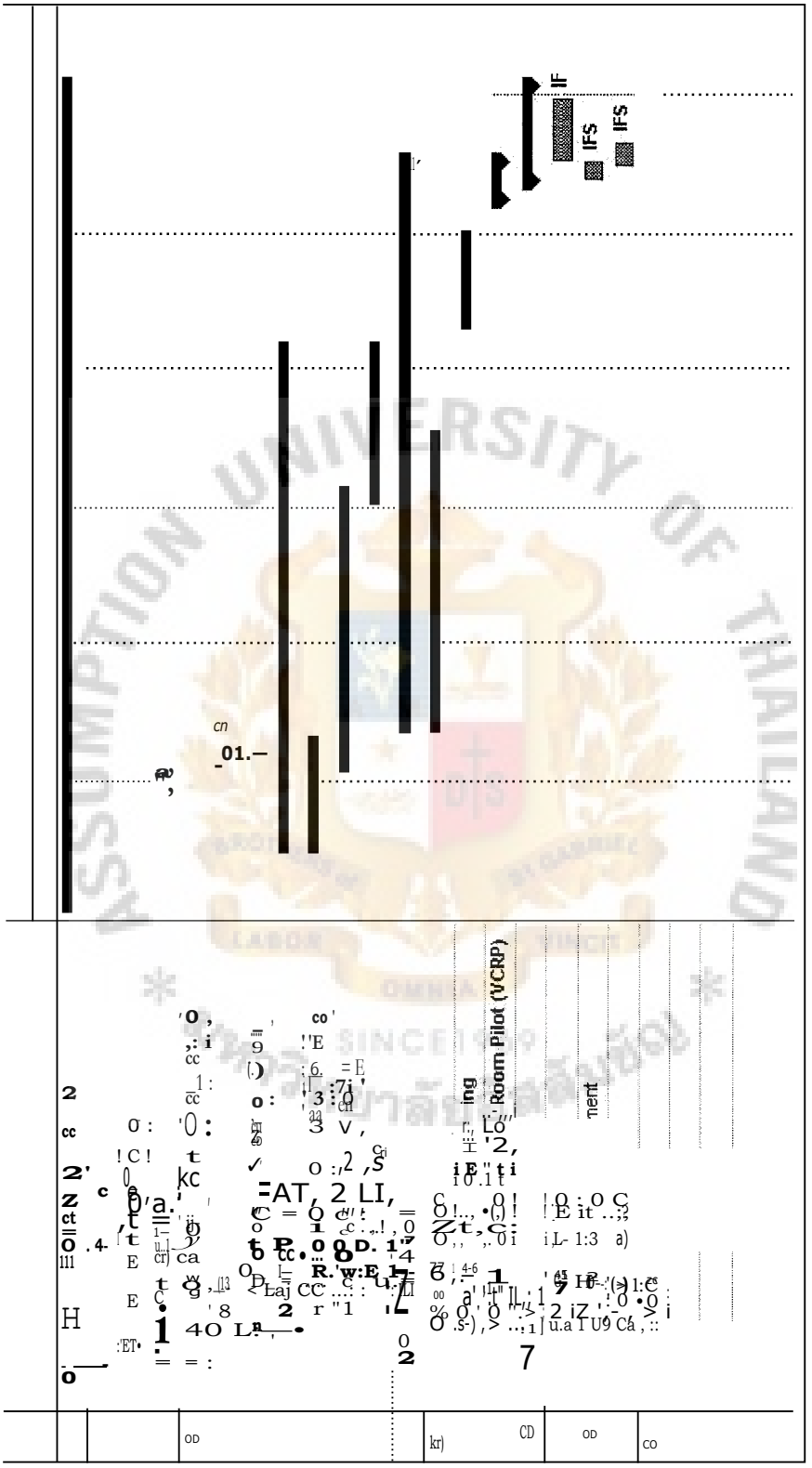
(2) Problem analysis and solution

(3) Hardware and software recommendation

(4) Costs and benefit analysis

1.5 Project Plan

The implementation for Maintenance Management system functionality is proposed over a time frame of 6 months. The plan is to start the implementation by the first week of July 2002 with the objective of going live latest by 2nd January 2003. Based on the requirements, IFS is required to advise the appropriate phasing and `go-live'- schedule. An indicative high-level schedule is depicted below.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1.6 Implementation Theory

1.6.1 Implementation strategy

IFS Implementation contains a well-structured, clearly defined methodology that assures a successful high quality implementation of an IFS business system. The implementation is done in three phases: Implementation Study, Implementation, and Go Live.

1.6.2 In the first phase, Implementation Study

We define the project scope and goals. Implementers, we break down overall project goals; identify what is to be done and who should do it. We specify the solution and how it will support the customer's operations. We decide the project scope and develop a plan for it. If the customer has operations in more than one country or in several locations, then we also decide in which order the system will be implemented. Generally, we recommend starting where the largest profits can be realized and the company can benefit most, or where the fastest returns on investment can be achieved.

(1) Common planning

Together, IFS consultants decide on an implementation plan in which project deliverables (what is to be delivered during the project) are listed, project milestones set, responsibilities are divided between customer and the Implementers, and a budget is agreed upon. The Implementation Plan is supplemented by a Project Plan that defines project activities and the day-to-day schedule. The results of the Implementation Study are compiled in a report that specifies IFS solution: configuration of the IFS system, possible customizations (integrations, special reports, and other modifications), data migration strategy and needs, technical infra-structure and system architecture, training plan, process design and work routine

change needs. Our starting point is always the customer's key issues and expectations.

(2) The steering committee

A steering committee is appointed. The steering committee "owns" the project and makes the most important project decisions. It is also responsible for monitoring the project at a milestone level to see that the project is on course. The project management team is responsible for running the project day by day. It reports regularly to the steering committee on the status of the project, assesses risks, and provides information needed for the steering committee to make decisions.

(3) IFS teams work across borders

Our experienced consultants, with expertise in IFS system, have access to a company-wide reference database with information on all implemented solutions for different industry segments. At customer, we work across borders in intra company teams so that staff get the overall picture and can quickly understand and help Implementers.

(4) Common frame of reference

We use our process-modeling tool, IFS Business ModelerTM, to describe our business processes and how IFS system supports. These graphical process models are intuitive, easy to understand, and are powerful means of communication. The graphical models become a common frame of reference, which makes it easy to communicate and reduces misunderstandings. Our standard process reference models, which describe how IFS systems supports business processes in our system, serve as a starting point. Modeling is done quickly. After the system is implemented, the models can be used as a platform for the internal communication

of processes and responsibilities in business development and quality control projects.

(5) Milestones in the Implementation Study phase:

(a) Objectives for the project are defined

(b) Steering committee is appointed

(c) Project management team is appointed

(d) Project organization chart

(e) Project scope is defined

(f) Customer site readiness is assessed

(g) Organization is ready and resources allocated

(h) Project core team members are trained in relevant standard functionality

(i) Project groups for sub-projects are appointed

(j) Implementation plan is defined

(k) Application solution is specified

(1) Possible needs for customizations are analyzed and defined in a delivery plan

(m) Data migration needs are defined

(n) Training needs for end-users are defined

(o) Needs to change work routines are identified

(p) The technical platform and system architecture are specified.

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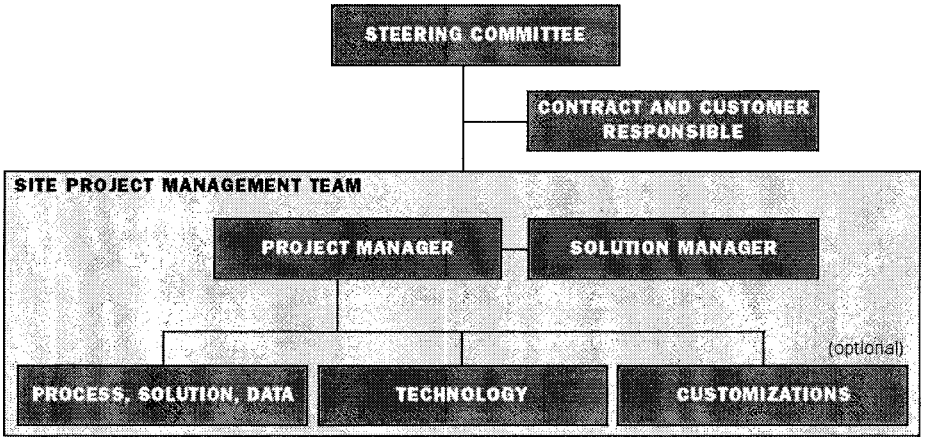

Figure1.2. Implentation Team Structure.

1.6.3 In the second phase, Implementation

After the Implementation Study has been completed and a joint decision has been made on how IFS system will be configured to bring the most customer value, implementation begins. From experience, we know which points are critical so we pay extra attention to them. We also know what the pitfalls are and how to avoid them.

During implementation, we build and configure the system that has been specified during the Implementation Study. If customizations are needed, these are developed, tested, and implemented. Data migration begins with data collection, data cleansing, and trial data migration of existing data to the new system. The business processes and the solution are validated. The technical infrastructure is installed and configured. Project team members receive advanced role-based training. Changes to the Implementation Plan are documented and prioritized. We always work toward the defined project objectives, and we continually follow up that they are fulfilled.

(1) The Implementation kickoff establishes the project

The implementation starts with a kick-off meeting in which all sub-project groups are represented. During the kick-off meeting, new project members get to know each other. The results of the Implementation Study are reviewed. Possible project risks are evaluated, and countermeasures are proposed and noted in the Implementation Plan. Support for the project objectives, as articulated by the customer's senior management, and the Implementation Plan are established.

(2) Implementation projects are run with IFS Project Management

With the help of IFS Project Management, a detailed project plan is created. Based on predefined templates, roles and responsibilities are assigned, resources allocated, deliverables scheduled, and tasks planned. It is easy to follow project progress in IFS Project Management. This allows the project management team to easily check that the implementation follows the intentions and targets that were defined in the Implementation Study.

(3) Collaboration and sharing of documents throughout the project

To make communication efficient and to ensure that everyone involved in the project has exactly the right up-to-date information at hand whenever needed, IFS makes a project portal available that enables Implementer to reach all project-relevant information via the Internet. The portal uses IFS Document ManagementTM software in which all project documents are stored, allowing collaborative sharing of documents and the use of an automatically controlled document approval process so that Implementer, IFS, and partners can retrieve and approve documents at any time. The portal contains an interface to the issue-tracking system for round-the-clock entry and tracking of support issues.

(4) Increased effectiveness with scheduled packaged deliveries

Throughout the Implementation Phase, we work step-by-step to deliver the customer solution in an orderly, well thought-out, and planned fashion.

Risks are minimized, and deployment time is reduced. Delivery of major deliverables such as work routines, training, and customizations are planned at joint start-up meetings in which deliverables and activities are reviewed, roles assigned and reviewed, and a comparison is made with the overall milestone plan and the project budget. The workload is predictable, and both Implementer and IFS personnel are used efficiently.

(5) Milestones in the Implementation phase:

(a) Routines to phase in the business system are decided

(b) The technical platforms and networks are configured

(c) The solution is configured according to the requirements from the Implementation Study

(d) Customizations are developed, tested, delivered, and approved

(e) Integrations to other systems are carried out and tested

(f) The application solution is validated through tests

(g) Work routines and new or redesigned business processes have been designed and described

(h) Training materials have been prepared

(i) Advanced training of core team project members has been carried out

(j) Data have been collected, and trial data are migrated to the new business system

(k) Change requests are documented and dealt with.

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1.6.4 In the last phase, Go live

At the end of the Go Live phase, the entire customer solution is validated in an extensive test by end-users using full-scale production data in order to confirm that the system meets the targets that were set when the project started. Together with the customer, we confirm that customer expectations have been fulfilled. In the Implementation Study, the concept for the customer's new business system was defined to support the customer's critical business processes. The focus was on system functionality that has the greatest potential to maximize effects. Throughout the Implementation phase, everything was done to prepare the system for going live. IFS works closely with the customer to ensure that each unit is well prepared and that each end user has the requisite knowledge to work efficiently with the system from day one. This provides for a frictionless system exchange and production start. Efficient operations become a natural and reliable continuation of a well structured project.

(1) Step-by-step

With IFS Applications, the complete final solution does not need to be installed all at once. Thanks to our component-based technology, we can begin with parts of the system that support the most critical business processes and then complement with the rest. Our step-by-step approach to implementation, in which deliverables are implemented on time according to a well planned fixed schedule, makes the production start easy to control, with minimal risks and fast returns on investment.

(2) A pilot installation gives valuable experience

For multi site customers that have operations in several locations and in one or more countries, we start with a pilot installation in a selected location. We generally

choose a unit that is ready to be in the forefront and that can deliver a quick payback to the customer.

(3) Increased focus throughout the rollout

It is now time to implement the solution at other customer sites. The IFS Implementation methodology for fast implementations is used to quickly implement a predefined customer solution at multiple sites. We build on experience from the pilot project so that there can be a smooth production start at other sites no matter where they are. For each site project, we are there to guide the users and adjust the solution to ensure that the business runs smoothly.

(4) Continuous collaboration

When the target of the project has been achieved, we meet to conclude the implementation. Jointly, we produce a support plan that describes how we will continue our work to optimize the new business system. The plan describes the organization, responsibilities, authorizations, change of management and development. We also specify, based on the IFS support concept, the design of the support processes.

(5) Milestones in the Go Live phase:

(a) The customer solution and the technical infrastructure are validated

(b) Work routines are validated

(c) End-users are trained

(d) Data migration is completed

(e) The solution goes live

(f) The support plan is developed

(g) The solution is "handed over" to system operations and support

During the project, the analyst found conflicting information regarding technologies, as well as pro and con references of software's...even among references provided by the vendor directly! In fact, the solution that was implemented was not necessarily the first choice of the analyst; however the user was very impressed by the demo, and pushed this alternative. The point is that the analysis is not a 1-2-3 type scenario where one stage leads flawlessly into the next. As shown in the business modeler. Solution Evaluation section of this site, multiple iterations of model generation and solution evaluation are to be expected. Also of note is the fact that this example details only the top levels of the business modeling.

While outside the scope of this site, additional issues in an Information System Analysis of IFS project may include:

(1) Development (Although not relevant for this project, in many situations an entirely new application may need to be developed.

(2) Implementation - This concerning not just hardware/software installations, but data conversion

(3) Training

Each of these issues may be cause for a re-thinking of aspects of the Analysis Phase. By definition, an Information System is a series of integrated components (hardware, software, people, data and procedures), brought together to achieve an intended purpose. Thus, these components do not exist in a vacuum, and the Analyst must take care to ensure they can and will function together as intended. Information Engineering seeks to achieve the optimal combination of these components, with the goal being to improve an organization's bottom line thru the most efficient and effective derivation and use of their greatest asset information.

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II. BUSINESS ANALYSIS THE EXISTING SYSTEM

2.1 Background of the Organization

Electricity Generating Authority of Thailand (EGAT) was formed on May 1, 1969, by the merging of three former regional electricity authorities-Yanhee Electricity Authority (YEA), Lignite Authority (LA) and Northeastern Electricity Authority (NEA). These authorities were soon well united after a couple of years. Following the 29% rise of power demand prior to their merging, many new power plants were urgently expanded to end power shortages.

During 1970s, Thailand relied on fuel oil and hydro power in electricity generation. All new power plants were finished ahead of schedule to replace the existing old and inefficient ones. Learning from these experiences, EGAT formulated its well-planned power development program to enable it to cater well for the growing economy. This policy has been passed on to all levels of EGAT management.

Vision: To be an international standard system control center of the country, manage the national grid and act as the power pool in the region.

Mission: EGAT's main mission is to run an efficient electricity business by providing and transmitting an efficient, reliable and reasonably priced electric powers supply to meet the country's demand in an environmentally responsible way. In light of the country's electricity industry reform, EGAT's immediate mission is also to restructure its organization to further improve efficiency and be prepared for its new role as the center that manages and controls the national grid in a more competitive market.

EGAT's present activities include the construction, operation and maintenance of power plants and transmission network; purchase of power from SPPs and IPPs; and sale of power Provincial Electricity Authority (PEA), a number of direct customers and neighboring countries; and implementation of demand side management programs.

All about business unit of EGAT I would like to select Operation & Maintenance Business Unit for case study.

Operation & Maintenance Business Unit: The reliability and availability of power supply system is very important to EGAT since failure to supply the electricity will cause the great loss to consumers and the whole nation's economics. Maintenance Divisions have been established for more than 30 years to serve maintenance work of all EGAT power plants including the equipment and EGAT power transmission system. EGAT recognize that these issues have set up Operation & Maintenance Business to serve their requirement.

Operation & Maintenance Business contains 7 Divisions and 1 Sub-Division in structure:

(1) Mechanical Maintenance Division

(2) Electrical Maintenance Division

(3) Production Efficiency Division

(4) Civil Maintenance Division

(5) Chemical Division

(6) Management & Finance Sub-Division

(7) Maintenance Service Management Division

(8) Division Manager to Maintenance Business :Acting Business Project for Power Plant Operation and Routine Maintenance , Ratchaburi Electricity Generating Co., Ltd. Manager

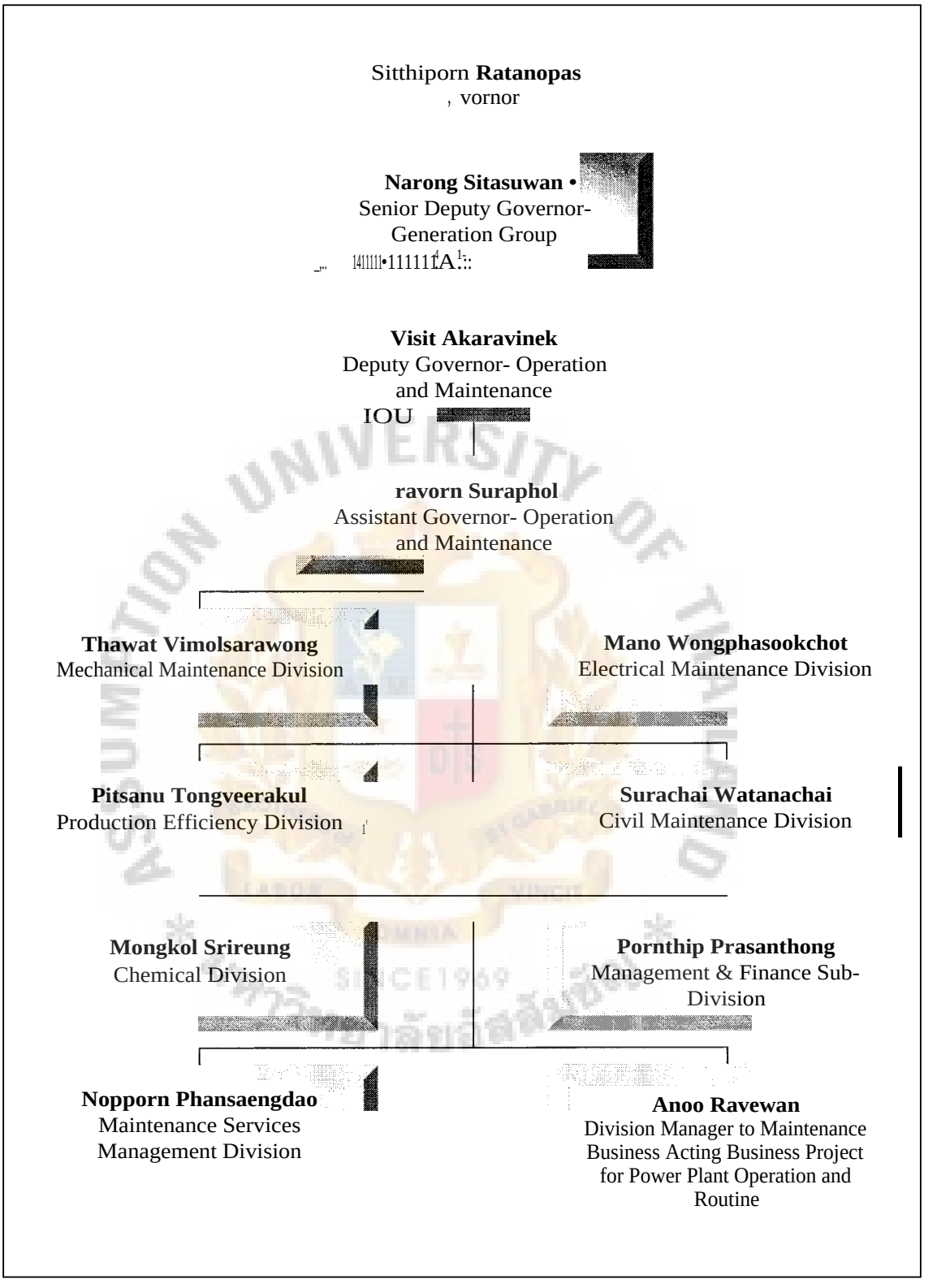

Figure2.1. EGAT Operation & Maintenance Business Organization Structure.

After IFS gathered requirement from EGAT team. IFS team found problems as listed below:

2.2 Current Problems and Areas for Improvement

(1) Work Order Management Process:

(a) Resource Allocation

At the time maintenance planner received work order from marketing section, maintenance planner will arrange resource in each work order type, therefore check the resource load against of their man power and prepare delivery document. This process takes about 1-2 days to find the reference service order.

Maintenance Planner checks with HR department to know work load of employee and department and check for the availability of their man power. Often the employee information is not available so that he makes many calls to find out who actually is available. After the check he records the employee job in logbook (paper-based).

At the end of the day, maintenance planner enters all records in logbook into Ms Access system to update work load of each employees. Below are listed to update:

(1) Work Order Number

(2) Planned Start Date/Time

(3) Planned Finished Date/Time

(4) Hours/Operation

Once work order is finished, maintenance administration officer has to check the time record of work order against plan of work order, and work order logbook.

(b) Tools Allocation

Maintenance Planner reserve tools for maintenance based on tools reservation form (paper-based) with signature from maintenance manager.

The tools items in 'Tools Reservation' form were written in inconsistent format. The various formats can be tool codes and description, tool codes with some specification. Skillful officer handles these inconsistencies.

The withdrawal is made upon request, and must make reservation of the tools. Oftentimes required tools are not available. Some tools had many demands from other work orders.

At the end of the day, maintenance administrator enters all records in logbook into MS Access system to update tool. Below are listed to update:

(1) Reservation quantity

(2) Withdrawal quantity

(3) Cost per hour

(4) Storage Location

(5) Last issue date

(2) Procurement Process:

(a) Purchase Requisition

Requisitioner makes a call to purchasing department officer asking for price of required items.

Requester fills in required items in 'Requisition' form with the estimated price given by purchasing department. Then pass the form to

his/her section manager to approval. After getting approved form, he/she will place the form in department manager's mailbox for final approval (this approval hierarchy will be longer if the procurement amount is larger, most of the time department manager will be final approver for normal items).

The final approved form will be placed in the department's mailbox waiting for mailroom to bring it to purchasing department. Mail boy will take the document twice a day at 10.30 a.m. and 4.00 p.m.

Request cannot track the status of their request. Oftentimes requester's requisition form is lost during process.

(b) Purchase Order

Purchasing officer takes the approved requisition form to process to purchase order. He/She checks the purchasing item against contract. In case the purchasing item is subject to contract, the purchase order will be written referring to the contract. If not direct purchase order will be written. Purchase order is Ms Word format.

In case Request for Quotation (RFQ) is required, the document will be raised to vendors.

Purchasing officer completes purchase order form and forward to purchasing department manager for approval (the approval hierarchy is adopted for purchase order based on purchase order amount).

Afterward, the purchase order is faxed to respective vendor.

(3) Inventory Process

(a) Inventory Receipt

At the time vendor deliver purchased items, warehouse officer receives delivery document, therefore check the delivery item against delivery document and purchase order document. This process takes about 10-15 minutes to find the reference purchase orders. Sometimes if the reference purchase order could not be found, the check will only be against delivery document.

Warehouse officer makes call to recipient to come and check for goods. Often the recipient information is not available so that he makes many calls to find out who actually is requester. After the check he records the receipt item in logbook (paper-based).

At the end of the day, warehouse officer enter all records in logbook in MS Access system to update inventory. Below are listed to update:

(1) Receipt quantity

(2) Moving average price

(3) Storage location

(4) Last receipt date

Once vendor place an invoice, warehouse officer has to check the invoice against purchase order, and goods receipt logbook.

(b) Spare Part Issue

Warehouse officer issues spare part to maintenance staffs based on spare part withdrawal form (paper-based) with signature from maintenance manager.

The spare part item in 'Spare Part Withdrawal' form was written in inconsistent format. The various format can be spare

codes, spare codes with some specification, spare description. Skillful warehouse officer handles these inconsistencies.

The withdrawal is made upon request. There is no reservation of the spare parts have long delivery lead-time.

At the end of the day, warehouse officer enter all records in logbook in MS Access system to update inventory. Below are listed to update:

(1) Withdrawal quantity

(2) Moving average price

(3) Storage Location

(4) Last issued date

(c) Stock Count

Warehouse officer manually conducted normal stock count on yearly basis.

2.3 Existing Computer System

Maintenance business unit of EGAT does not have integrated information system to support maintenance management process. Most of the process has been done on Paper-based such as Work Order, Tool Reservation, Purchase Requisition or Purchase Order.

Microsoft Access has been used to create most of the forms and store some material inventory log sheet for material management reference.

III. THE PROPOSED SYSTEM

3.1 System Specification

The Electricity Generating Authority of Thailand requires a more efficient information system that can improve the maintenance management work flow and solve the problems occurring from the existing manual system.

The proposed system should have the capability to improve the following functionalities:

(1) Work Order Management Process

(2) Spare part and Consumable Management

(3) Integrated with Financials Module

3.2 System Design

IFS are integrated software which has capability to share and send data from one module to the other modules by using automatic online process, paperless solution.

According to EGAT's requirement, maintenance process, procurement process and inventory process need to be improved. Maintenance management module in IFS has functionality that meet EGAT's requirement. It also can integrate with Finance Module which is a part of EGAT IT Plan next year.

To meet EGAT's requirement, IFS needs to customize all parts of cost type of work order in work order module because of different cost types in EGAT organization that is specific and follow EGAT Regulation, work flow and Thai taxation from EGAT template.

Implementation team has designed procurement process, Spare Part and Consumable process and Work order process as follows:

(1) Procurement Process:

(a) Contracts

(1) Practice

(a) Better control through Reporting on Review Limit vs. value spent.

(b) Online Release Strategies

(c) Document Trail

(2) Benefits

(a) Users will not be able to post call-offs more than the value approved by the Tender Board.

(b) Manual signatures are unnecessary. Manual forms are not circulated amongst approvers. Lost forms are avoided.

(c) Any changes or updates in the contracts are stored in the change history online. The lists of logins, date, time and transaction code are listed.

(b) RFQ and Price Comparison

(1) Practice

(a) Company Estimate entered as a quotation using a default vendor

(b) Document linkage previous, or succeeding purchasing documents

(c) Use of collective number

(2) Benefits

(a) EGAT can compare the company's estimate against that of the vendor

(b) RFQ's for materials will be created with reference to requisitions. Since RFQ's are created with reference to Purchase Requisitions, there is no need to retype item descriptions and quantities on enquiry documents

(c) Use of RFQ functionality avoids re-keying of pricing data at the Purchase Order stage where pricing schedules entered into IFS at the "Maintain Quotation" stage

(d) Collective number field is used to compare quotations of several purchase requisitions

(c) Logistic and Procurement Structure

(1) Practice

(a) Distinct structures that reflect independent operations

(b) Structures that reflect shared access of information alongside distinct ones

(c) Standard and logical naming convention

(2) Benefits

(a) Transaction independence

(b) Less record locking of master data

(c) Segregation of authority, access to information and responsibilities

(d) Allows the flexibility for contractors to call off from contract created by the main EGAT offices

(e) Preserves the confidentiality of Commercial Services (CS) Contracts for EGAT'exclusive access

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(f) Allows the identification of structure and its place in the hierarchy

(d) Purchase Requisition

(1) Practice

(a) Commitment Monitoring

(b) Requisitions as basis of purchase orders

(c) Online Release Strategies

(d) Document Trail

(e) Assignment to supply source

(2) Benefits

(a) Greater transparency of information to the end-users with system accesses, e.g. It will be possible for the End-user to check the processing status of his/her Requisition

(b) Better quality and more comprehensive and consistent statistics, as the information will be entered as part of the purchasing activities

(c) Purchase orders can be created with reference to the requisitions, which means details entered in the requisitions need not be entered again

(d) Manual signatures are unnecessary. Requisition forms are not circulated amongst approvers. Lost forms are avoided

(e) Any changes or updates in the requisitions are stored in the change history online. The lists of logins, date, time and transaction code are listed

(f) At the time of PR creation, the contract will be specified. This information will be automatically adopted during PO creation. This is useful for the buyers not to miss specifying the PR number in release order creation

(e) Purchase Order

(1) Practice

(a) Online streamlining of the process

(b) Online Release Strategies

(c) Document Trail

(2) Benefits

(a) The creation of IFS Purchase Orders will streamline the process as the system does automatic matching of orders, receipts, and invoices without manual intervention

(b) Manual signatures are unnecessary. Manual forms are not circulated amongst approvers. Lost forms are avoided

(c) Any changes or updates in the Pos are stored in the change history online. The lists of logins, date, time and transaction code are listed

(f) Manage Purchasing Info Record

(1) Practice

(a) Optimize delivery time from suppliers to the warehouse

(b) Develop long-term agreements for frequently purchased materials/services

(c) Price Record for Consignment is kept in PIR

(2) Benefits

(a) Eliminate stock carrying cost

(b) Effective material tracking for Consignment through Stock Overview

(c) Reduces order cycle time

(d) Better price negotiation

(e) Efficient monitoring and control of consignment price

(2) Spare part and Consumable Management:

(a) Spare part Master

(1) Practice

(a) Maintenance of material masters in a centralized location

(b) Classification drill down facility

(c) Comprehensive purchase order text

(d) Restrict maintenance of views to responsible personnel

(2) Benefits

(a) Eliminate redundant erroneous and unnecessary data storage across departments

(b) Provides access to the same accurate information across department thereby reducing operational errors, increasing efficiency and improving responsiveness to change

(c) Changes made are immediately visible to any other department that accesses the record

(d) Facilitates fast finding of materials

(e) Guides the user

(f) Eliminates guess work

(g) Allows purchase of correct materials and allows engineers to select the correct equipment

(h) Prevents unauthorized changes to data (e.g. warehouse personnel require access to warehouse views)

(b) Manage Vendor Master

(1) Practice

(a) Only authorized users will have access to create and maintain vendor masters

(b) Centralized group to manage the vendor master maintenance

(2) Benefits

(a) Standardization

(b) No unauthorized entries

(c) Prevents unauthorized changes to data

(d) Standardization and variety control

(c) Service Management Master Data

(1) Practice

(a) Restrict access to authorized users

(b) Centralized group to manage the catalogue

(c) Minimized use of generics

(d) Categorization, Hierarchy, Generics

(e) Administrative rather than rationalized service masters

(f) Maintenance of data in a centralized location

(2) Benefits

(a) Standardization

(b) No unauthorized entries

(c) Specialist knowledge

(d) Greater efficiency using focal points

(e) More accurate master data

(f) Facilitates finding service master records

(g) Flexibility

(h) Provides access to the same accurate information across department increasing efficiency

(d) Spare part Receipt/Service Receipt

(1) Practice

(a) System documents created for every spare part receipt and spare part return

(b) Real time (just-in-time) record of physical spare part receipts and returns

(c) Proper signing and filing of documents

(d) Segregation of duties (PO Creation and spare part Receipt)

(e) Generating ad-hoc, daily, weekly or monthly reports

(f) Referencing the purchase orders

(g) Design shipping/ receiving stations to schedule and receive "cross-docked" materials

(h) Three way matching between Service Entry Sheet, Commitment (PO) and Invoice

(2) Benefits

(a) Facilitates efficient audit and control procedures

(b) More accurate reference for past goods movements

(c) Documents can be used to accompany goods as they are moved further along the line

(d) System receipts or returns matches actual physical material receipt or return

(e) Increase accuracy of transactions

(f) Minimizes time spent on investigations of wrong or late movements (Arrivals, Returns, quality inspection) by keeping physical and book inventory at similar levels

(g) More efficient and "true" book inventories in the event of stock checks

(h) Signing documents offers proof that materials have undergone quality inspection or have been handed over to the end user

(i) Spare part slip for stock materials will serve as labels for materials as they are placed in their storage bins

(j) Better facilitation of audit and control

(k) Documents generated by other departments or unauthorized IFS users will not change functions

(1) Preventive measure to address the risk of buyers purchasing and receiving goods for questionable reasons and transactions with conflict of interest

(m) Efficient monitoring of stock levels, stock locations, amounts, consumption, etc.

(n) Validation of delivery details with purchase order

(o) Information required for Goods Receipt (recipient, requiring/destination location) will be copied from the PO

(p) Improved efficiency in storing and preparing materials for cross-docking

(q) Reduces on-hand inventory

(r) Facilitates shipment planning

(s) Verification that the work has been completed. Accuracy of information

(e) Material Requirement Planning

(1) Practice

(a) Automatic replenishment through Reorder Proposal

(b) Reduce work load and maximize time for the controllers

(2) Benefits

(a) Reduces stock holdings, stock holding costs and time value of money

(b) Reduces the number of manual requisitions created for stock items

(c) The advanced visibility on purchasing requirements can help buyer negotiate better deals to reduce the external procurement costs

(d) Smooth the procurement cycles for regularly procured items. Automation can be used to eliminate the times of "opening period" and "purchasing department processing ",hence improving the supply chain

(e) Better control the replenishment of onsite and consign locations. Actual demands are captured and will trigger the replenishment

(f) Spare part Issue

(1) Practice

(a) Real time (just-in-time) record of physical spare part issues

(b) System documents created for every spare part issue

(c) Proper signing and filing of documents

(d) Segregation of duties

(e) Generating ad-hoc, daily, weekly or monthly reports

(f) Referencing Work Orders, Reservations or Manual Forms

(g) Identify materials for disposal and apply disposal methods effectively.

(2) Benefit

(a) System issues match actual physical material issue

(b) Increase accuracy of transactions

(c) Minimizes time spent on investigations of wrong or late movements (withdrawals)

(d) More efficient and "true" book inventories in the event of stock checks

(e) Facilitates efficient audit and control procedures

(f) More accurate reference for past goods movements

(g) Documents can be used to accompany goods as they are moved further along the line

(h) Proof that materials have been handed over to the end user or buyer, have been disposed properly or have been forwarded to onshore workshops for repair

(i) Quick reference to all accompanying documents (delivery note) and material documents when needed

(j) Better facilitation of audit and control

(k) Document generated by other departments or unauthorized IFS users will not post functions

(1) Restricts information and data access to documents within a person's responsibility

(m) Efficient monitoring of stock levels, stock locations, amounts, requirements, consumption, etc.

(n) Spare parts issuing can check whether the physical withdrawal corresponds to the proper authorization required

(o) For Work Orders/Reservations in particular

(p) The goods issuing location can check whether what was requested is actually issued

(q) Increases accuracy of transactions

(r) After a withdrawal, the quantity withdrawn is updated in the reference document and the reserved quantity is reduced accordingly. Thus, Inventory Management can monitor the withdrawal process and Materials Planning can update the stock/requirements list

(g) Stock Count Process

(1) Practice

(a) Use of the "Cyclic count" method of stock checking

(b) Eliminate stock carrying costs (Minimize idle surplus, tracking of discontinued, ageing, obsolete inventory, reduce inventory holding time)

(c) Segregation of duties (Stock checker)

(d) Generating ad-hoc, daily, weekly or monthly reports

(2) Benefits

(a) Eliminates the risk of laziness on the part of the Stock checker since he will not be made aware of book inventory amounts that are not included in the physical inventory document

(b) More accurate count result figures as actually checked by the Stock checker

(c) Reduces inventory cost

(d) Optimizes warehouse space

(e) Optimizes inventory planning

(f) Limits the access of individuals to restricted or exclusive transactions that may impact accounting (such as posting differences in book inventory and physical inventory)

(g) Efficient monitoring of stock levels, stock locations, amounts, consumption, etc.

(h) Stock Transfer Process

(1) Practice

(a) Real time (just-in-time) record of physical stock transfers

(b) System documents created for every stock transfer

(c) Proper signing and filing of documents

(d) Segregation of duties

(e) Generating ad-hoc, daily, weekly or monthly reports

(f) Design shipping/ receiving stations to schedule and receive "cross-docked" materials

(2) Benefits

(a) System stock transfers matches actual physical material transfers

(b) Increase accuracy of transactions

(c) Minimizes time spent on investigations of wrong or late movements (transfers)

(d) More efficient and "true" book inventories in the event of stock checks

(e) Facilitates efficient audit and control procedures

(f) More accurate reference for past goods movements moved further along the line

(g) Documents can be used to accompany goods as they are moved further along the line

(h) Proof that materials have been handed over to the end user at another location

(i) Quick reference to all material documents when needed

(j) Better facilitation of audit and control

(k) Documents generated by other departments or unauthorized IFS users will not change functions

(1) Limits the access of individuals to restricted or exclusive transactions that may impact accounting

(m) Efficient monitoring of stock levels, stock locations, amounts, transfers, changes in stock type, etc.

(n) Provide information to everyone to track the progress of his/her material requests through the supply cycle. The more information they have, the less they need to bother the supply departments

(o) Improved efficiency in storing and preparing materials for cross-docking

(p) Reduces on-hand inventory

(q) Facilitates shipment planning

Valuation of Material and Services

(1) Practice

(a) Monthly period-end closing check of stock value from material master against value in related financial accounts

(b) Valuation at Plant level

(c) Activation of Split Valuation

(d) Use of Moving Average Price

(2) Benefits

(a) Monthly reconciliation of differences in inventory value and G/L Account value.

(b) Proper facilitation of efficient investigation for differences

(c) Flexibility is obtained in the case of future requirement to have different valuation of different plants

(d) Allows more flexible set-up in case of future requirements to valuate stocks of the same materials separately

(e) Parts receipts are posted at the Parts receipt value

(f) The price in the material master is adjusted to the delivered price

(g) Price differences (PR/IR) occur only in exceptional circumstances

(h) Manual price changes are usually unnecessary. However, they're possible

(i) goods issues are posted with the current material value

3.3 Hardware and Software Requirement

IFS application supports on all major operation system and database platform. EGAT have selected Window 2000 Server and Oracle 9i for IFS system platform because their enterprise already have Window 2000 Server License and want to standardize operation system on all servers for support reason.

Based on Sizing document on IFS web page, system implementer has sent number of users per IFS module and estimate number of transactions per day per module. IFS pervade feedback of recommended hardware sizing for EGAT's server as follows:

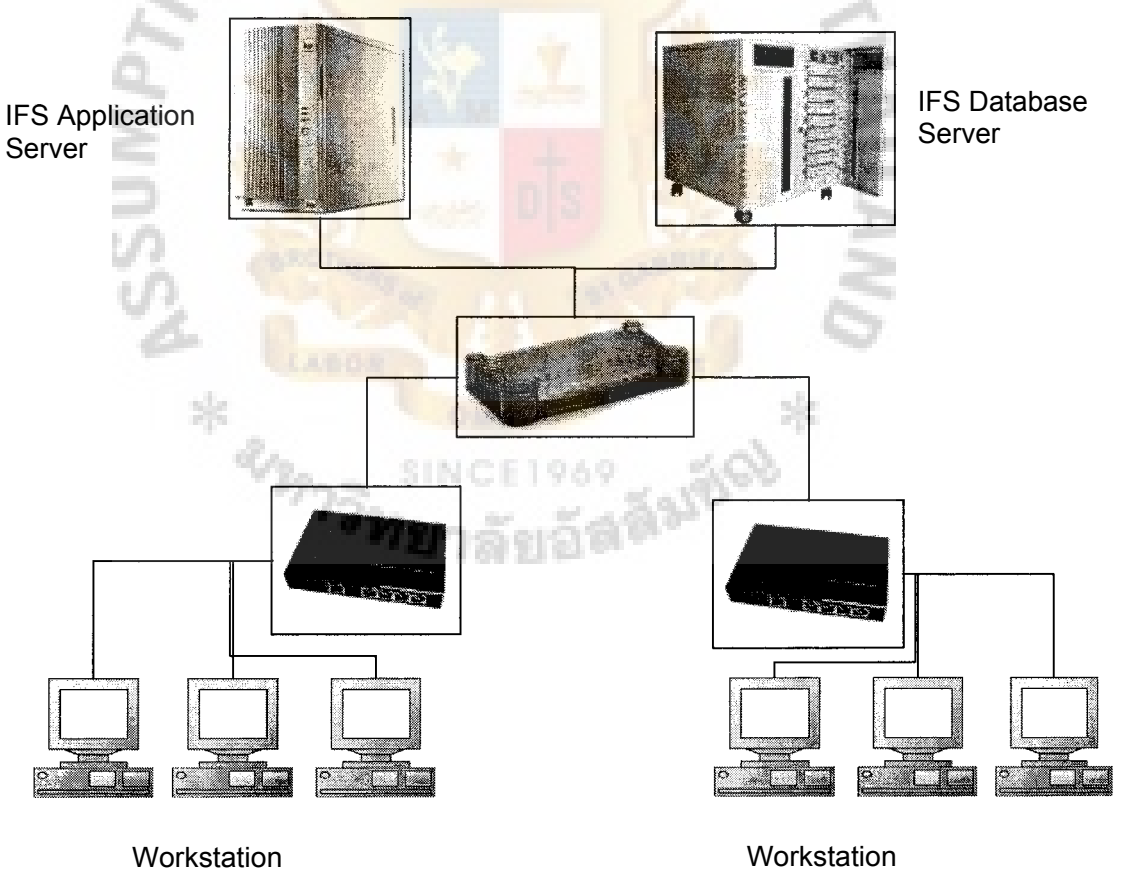

Figure 3.1. Network Diagram.

Table 3.1. Server Specification.

Hardware	Specification
CPU	Dual Xeon 1 GHz
Cache	512 KB or higher
Memory	2 GB or higher
Hard Disk	108 GB or higher on RAID 5
CD-Rom Drive	52X or Higher
Floppy Drive	1.44 MB
Network Adapter	Fast Ethernet 10/100/1000- Base T
Display Adapter	SVGA card
Display	21" Monitor
UPS	30 VA

Table 3.2. Workstation Specification.

Hardware	Specification
CPU	Pentium 4 2.0 GHz or higher
Cache	512 KB or higher
Memory	256 MB or higher
Hard Disk	40 GB or higher
CD-Rom Drive	52X or higher
Floppy Drive	1.44 MB
Network Adapter	Fast Ethernet 10/100-Base T
Display Adapter	SVGA card
Display	15" Monitor
Printer	Laser Jet

To optimize IFS Functionality, Microsoft Office 2000 is required on all IFS Client Workstation. IFS have some features that can export some data or report in Microsoft Office format. And for performance optimization, IFS recommends Window 2000 SP2 as the standard operation system for IFS Client Workstation.

Table 3.3. Server Software Specification.

Software	Specification
Operating System	Microsoft Windows 2000 Server (Service Pack 2)
Web Server	Microsoft Internet Information System 4.0 or Higher
Application Server	IFS Application 2002
Database Server	Oracle 9i

Table 3.4. Workstation Software Specification.

Software	Specification
Operating System	Microsoft Windows 2000 (Service Pack 2)
Web Browser	Internet Explorer 6.0
Application	IFS Application 2002 Client Runtime
Other	Microsoft Office 2000

3.4 Cost and Benefit Analysis

(1) New Maintenance Management System Cost Estimation

Table 3.5. Estimated Costs for a Proposed System Solution.

Cost Items	Description	Amount	Unit Price (/day)	Price
1.Development Cost:	1.1 Personnel Costs:			
	System Analysts (100 days)	5	3,000	1,500,000
	Programmer/Analysts (20 day)	2	2,000	80,000
	Telecommunications Specialist (20 days)	1	3,000	60,000
	System Administrator (100 days)	1	3,000	300,000
	IFS Training(5days)	5	2,000	50,000
	Subtotal 1:			1,990,000
	1.2 New Hardware:			
	Production Server (Pentium IV class)	1	2,000,000	2,000,000
	Workstation (Pentium IV class)	20	40,000	800,000
	Subtotal 2:			2,800,000
	1.3 New Software:			
	IFS software	1	4,500,000	4,500,000
	Operating System (NT 4.0 Enterprise)	1	200,000	200,000
	Database (Oracle 8i)	1	300,000	300,000
	Subtotal 3:			5,000,000
	Total Development Cost			9,790,000
2. Operating Cost :	2.1 Personnel Cost:			
	Analysts (200 days)	3	1,000	600,000
	Procurement Officer (200 days)	2	1,000	400,000
	Warehouse Officer(200 day)	4	700	320,000
	Subtotal 1 :			1.320,000
	2.2 Maintenance:			
	Hardware Maintenance		100,000	100,000
	Software Maintenance		500,000	500,000
	Miscellaneous		17,000	17,000
	Subtotal 2:			617,000
	Total Operating Cost			1,937,000
	Total Projected Annual Cost			11,727,000

Table 3.6. Payback Analysis for IFS System Alternative, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Development Cost:	-9,790,000						
Operation & maintenance cost:		-1,937,000	-1,917,000	-1,897,000	-1,877,000	-1,857,000	-1,837,000
Discount factors for 12%	1	0.893	0.797	1	0.638	0.567	0.507
Time-adjusted costs (adjusted to present value):	-9,790,000	-1,729,741	-1,527,849	-1,350,664	-1,197,526	-1,052,919	-931,359
Cumulative time-adjusted Costs over lifetime:	-9,790,000	-11,519,741	-13,047,590	-14,398,254	-15,595,780	-16,648,699	-17,580,058

Benefits derived from operation of new system:	0	1,000,000	1,200,000	1,500,000	1,700,000	2,000,000	2,300,000
Discount factors for 12%	1	0.89	0.80	0.71	0.64	0.57	0.51
Time-adjusted costs (adjusted to present value):	0	890,000	960,000	-1,350,664	-1,197,526	-1,052,919	-931,359
Cumulative time-adjusted Costs over lifetime:	-9,790,000	-11,519,741	-13,047,590	-14,398,254	-15,595,780	-16,648,699	-17,580,058

(2) Current Maintenance management system

Table 3.7. Manual System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
Fixed Cost					
Typewriter 2 units @ 10,000	20,000.00				
Calculator 4 units @ 500	2,000.00				
Total Fixed Cost	22,000.00				
Operating Cost					
Salary Cost:					
Inventory Manager 1 person @ 25,000	25,000.00	27,500.00	30,250.00	33,275.00	36,602.50
Staff:					
Stock officer 10 persons @ 15,000	150,000.00	157,500.00	165,375.00	173,643.00	182,325.00
Purchasing officer 4 persons @ 20,000	80,000.00	84,000.00	88,200.00	92,610.00	97,240.00
Dispatch officer 1 persons @ 6,000	6,000.00	6,300.00	6,615.00	6,945.00	7,293.60
Total monthly salary Cost	236,000.00	108,900.00	119,790.00	131,769.00	144,945.90
Total Annual Salary Cost	2,832,000.00	2,937,600.00	3,122,280.00	3,278,394.00	3,422,314.00
Office Supplies & Miscellaneous Cost					
Stationary Per Annual	3,000.00	3,300.00	3,630.00	3,993.00	4,392.30
Paper Per Annual	7,000.00	7,700.00	8,470.00	9,317.00	10,248.70
Utility Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Miscellaneous Per Annual	2,000.00	2,200.00	2,420.00	2,662.00	2,928.20
Total Annual Office Supplies & Miscellaneous Cost	17,000.00	18,700.00	20,570.00	22,627.00	24,889.70
Total Annual Operating Cost	2,849,000.00	2,992,300.00	3,142,850.00	3,301,021.00	3,467,203.50
Total Manual System Cost	2,871,000.00	2,992,300.00	3,142,850.00	3,301,021.00	3,467,203.50

Table 3.8. Five Years Accumulated Manual System Cost, Baht.

Year	Total Manual Cost	Accumulated Cost
1	2,871,000.00	2,871,000.00
2	2,992,300.00	5,863,300.00
3	3,142,850.00	9,006,150.00
4	3,301,021.00	12,307,171.00
5	3,467,202.50	15,774,373.70
6	3,640,562.10	19,414,935.80
Total	19,414,935.60	-

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

Year	Accumulated costs (Manual System)	Accumulated costs (IFS System)
1	2,871,000.00	11,519,741.00
2	5,863,300.00	13,047,590.00
3	9,006,150.00	14,398,254.00
4	12,307,171.00	15,595,780.00
5	15,774,373.70	16,648,699.00
6	19,414,935.80	17,580,058.00

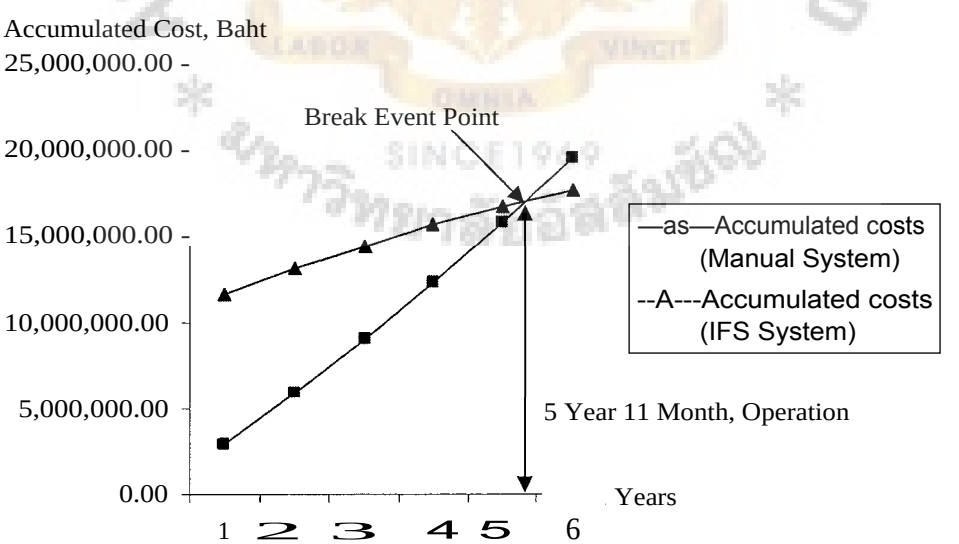

Figure 3.2. Cost Comparison between Manaul and IFS System.

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IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

(1) Implementation Strategy

The project for maintenance management and financials management will be implemented in the same timeframe with second timeframe of continued project support. The need for an implementation timeframe is driven by a business need to quickly replace the exiting legacy system, however the data required to implement the maintenance management for plant maintenance will not be fully documented and as-built until approximately another half year. This is because a large amount of spare part information is in hardcopy format. The second timeframe of 'continued project support' is required to support the EGAT business process owners. The project will retain responsibility for initial data cleansing, development of management reporting, outstanding or remedial work, post system go-live training and coaching.

The detailed implementation strategies are as follows:

(a) The project will leverage from several knowledge bases. This includes Group IFS Template, previous projects, other upstream projects, Asia Pacific projects and local projects.

(b) Detailed work plans, which identify tasks by individual team member, will be prepared and monitored throughout the project. Sample deliverables will be discussed and agreed upon upfront.

(c) Quality will be considered throughout the implementation. A Quality Plan will be prepared. The engagement quality partner and a nominated system expert will conduct quality Reviews. A Client Satisfaction Survey (CS S) will be completed at the end of the project.

(d) A Risk Monitoring Mechanism will be prepared at the start of the project identifying key risks and potential impact. Periodic reviews of the mechanism will be conducted to identify additional risks and assess whether risk impact and probabilities are increasing or decreasing.

(e) An Expectation Matrix will be prepared and monitored to ensure that expectations are met.

(f) Key Performance Indicators (KPIs) will be identified and measured for all members of the team.

(g) Standard IFS functionality will be used unless there is a business justification to deviate.

(h) There will be many information transfers from legacy systems to IFS such as vendor information, equipment information and others. Data quality is the responsibility of the relevant business process owner.

(i) Key users and stakeholders will be involved at every stage of the project.

(2) Control

Implementation of an efficient control environment is a critical deliverable of the project and will be managed as a core integration issue within the IFS Project Team. The project will require input from the finance controller to ensure controls (and procedures) are appropriately addressed across the project both from a process/module and a technical standpoint. The IFS team controls strategy will be developed during Phase I design using a controls advisor. The controls design will be approved by the steering committee.

The controls environment will also be reviewed post Go Live by IFS. It is anticipated that this will be a focused/high level review (i.e. 2 weeks with 2-3 people including an external consultant).

(3) System Version Strategy

The project objective is to ensure that the IFS Application implementation is achieved on the latest IFS Application version release possible. This is to ensure that the IFS Application implementation gains the maximum benefit from the latest functionality and ensure that the need to upgrade the IFS Application system is kept to a minimum

Some of the factors considered in deciding which version of IFS Application to implement are as follows:

(a) Functionality. A later vision will provide more functionality, which may be relevant to EGAT, hence providing additional benefits to the users.

(b) Version life span. A version normally has a lifespan of 3 years (i.e. from the time of its general release to the time IFS stops providing support for it.) Hence, the latest available vision should be used.

(c) Cost of upgrade. There are costs associated with upgrades. These costs are driven by a few factors like number of IFS modules, whether system is in production or development, the degree of screen layout changes, the degree of customization or enhancement. Hence, in the case where an upgrade is inevitable, these factors will directly impact the cost.

(4) Planning Guide-lines and Assumption

The following are the guidelines and assumptions adopted in the planning and estimating for the project:

(a) Key user representatives will be available and actively involved in all the relevant activities of the project. The project team will develop a timetable on user involvement. This timetable will be

discussed with the users and later endorsed by the Steering Committee.

(b) Data clean up will be done by the users.

(c) All reviews and signoffs are completed as scheduled.

(d) All IT resources (PCs, LAN, disk space, IFS development environment, etc.) are available for prototype development, system development, system test and training.

4.2 Source Codes

Because IFS Application is an integrated application which contains the templates for any specific industry such as Power Plant or Utility. EGAT is considered as Power Plant Industry organization so we can select power plant template from IFS to customize the configuration to meet EGAT's requirement. This template contains forms, programs and Power Plant base configuration.

Currently we have to customize work order cost type from 4 element to 15 element to serve EGAT' rules and regulation that effect with standard IFS program and other requirements on changing standard program that will be customized to follow EGAT' requirements.

4.3 System Test

(1) Test Plan

Test Plan is developed concurrently with the specification it is testing. It accurately and completely documents the test's conditions and expected results. The test plan also contains a list of test cycles: logical groups of test conditions that facilitate the preparation and execution of the test model. The test plan is verified with the specification it is testing to ensure that the

specification is testable and that the test plan is sufficiently accurate and complete to allow the preparation of test scripts to proceed.

EGAT Implementation project has 4 test cycles as follows:

(a) Cycle 1 — Functional Process

(b) Cycle 2 — Product Cost Testing Exclusive / Integration/ User Exit / Critical Customized Report

(c) Cycle 3 — Month / Year End

(d) Cycle 4 — Authorization / Security

In this study, we will concentrate only Cycle 1 — Functional Process for Maintenance Management.

(2) Test Script

Test script describes all the conditions to test and to ensure that the business capability can be installed correctly. This deliverable also indicates the expected results of those conditions.

Table 4.10. Overall Test Script.

Cycle	Module	Process	Processes	Conditions
i. Functional Processes		1.0	Reservation	
		1.1		Over and under issue
		1.2		Check for Final Issue prior to full issue
		1.3		Check for Deletion prior to full issue
		1.4		Material Exception
	Maintenance	2.0	Spare part Issue	
		2.1		Over scrapping and reversal
		2.2		Change in Price/ condition of Pipeline Issue and reversal
		2.3		Consumption to alternative cost centers from allocation plant
		2.4		Issue to sales without Order Reversal (MTBE Allocation)
		3.0	Parts Receipt	
				Reversal amt larger than receipt amount for receipt without
		3.1		order (Feedstock Methanol Allocation & Borrow)
		3.2		Receipt greater than purchase
		3.3		Additional receipt after Delivery Complete
		3.4		Receipt referencing a locked/ deleted line
		3.5		Receipt by Line Items
		3.6		Receipt reversal after settlement
		3.7		1O
		4.0	Stock Transfer	
		4.1		Different Material Type
		4.2		Different Base Unit of Measure
		4.3		Matching Unit of Issue with Base Unit of Measure
		4.4		Transfer Stock Type
		5.0	Stock Count	
		5.1		Material Selection
		5.2		Stock Count
		5.3		Post Difference

Table 4.2. Over and Under Delivery Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
1.1	Over and Under Delivery				
1.1.1	List of Stock Availability	M1			
	Fields to be entered				
	Material :		Mat #1 (PROH)	QTY : 1000	
			Mat #2 (PFER)	QTY : 1000	
			Mat #3 (PERS)	QTY : 1000	
			Mat #4 (PUNB)	QTY : 1000	
1.1.2	Create Single and Multiple lines for Manual Reservation	Ml			
	Movement Type :		201		
	Single Line Reservation			Reservation number generated (Res #1)	
	Fields to be entered			Res # : 0000000061	
	Material :		Mat #1		
	Quantity :		5		
	Cost Center :		1001		
	SLOC :		P901		
	Multiple Line Reservation			Reservation number generated (Res #2)	
	Fields to be entered				
	Material :		Mat #2		
	Quantity :		10		
	Material :		Mat #3		
	Quantity :		15		
	Material :		Mat #4		
	Quantity :		20		
1.1.4	Display Reservation List	MI			
	Fields to be entered				
	Material :		Mat #1		
			Mat #2		
			Mat #3		
			Mat #4		
1.1.5	Picking	MI			
	Selection List				
	Fields to be entered				
	Material :		Mat #1		
			Mat #2		
			Mat #3		
	Picking List				
	Fields to be entered				
	Material :		Mat #1	1) Note that the field for storage bin is populated with data from material master	
	Quantity :		5		
	Material :		Mat #2		
	Quantity :		10		
	Material :		Mat #3		
	Quantity :		15	2) Goods Movements are posted	
	Material :		Mat #4		

Table 4.2. Over and Under Delivery Test Script (Continued).

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
	Quantity :		25		
	<Save>			Goods Movement Generated	
1.1.6	Reservation List	M1			
	Selection List			1) Reservations displayed	
	Fields to be entered		Mat # I	2) Mat #1 Checked for	
			Mat #2		
			Mat #3	3) Mat #2 not checked for	
	Posting Date :			Final Issue	
	Cancellable Mvt :		Check		
				4) Mat #3 check for	
	List			Final Issue	
	Fields to be entered				
	Choose Layout		Reservation	5) Mat #4 checked for	
				Final Issue	
1.1.7	Change Reservation	Ml			
	Multiple Line Reservation				
	Fields to be entered				
	Material :		Mat #2	Res # : 0000000062	
	Final Good Issue		Uncheck		
	Quantity :		5		
	Materials:		Mat #3		
	Final Good Issue		Uncheck		
	Quantity		20		
	Material:		Mat #4		
	Final Good Issue		Uncheck		
1.1.8	Picking	M1			
	Selection List				
	Fields to be entered				
	Material :		Mat #1		
			Mat #2		
			Mat #3		
	Picking List				
	Fields to be entered				
	Quantity :		5		
	<Save>			Goods Movement Generated	
1.1.9	Reservation List	M1			
	Selection List			1)Reservations displayed	
	Material :		Mat # I	2) Mat #1 check for	
			Mat #2	Final Issue	
			Mat #3		
			Mar #4	3)Mat #2 not checked for	
				Final Issue	
	Posting Date :			Mat #2 negative issue	
	Goods Movement not Possible		Check		
				4) Mat #3 check for	

Table 4.2. Over and Under Delivery Test Script (Continued).

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
	List			Final Issue	
	Choose Layout		Reservation	5) Mat #4 not checked for	
				Final Issue	
1.1.10	Plant stock availability	MI			
	Selection list				
	Fields to be entered				
	Material :		Mat #1	Qty : 995	
			Mat #2	Qty : 990	
			Mat #3	Qty : 980	

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Table 4.3. Final Issue Test Script.

Condition Number	Test Condition	Posting Ctrl	Input Data	Expected Results	Actual Result
1.2	Final Issue				
1.2.1	List of stock availability	MI			
	Fields to be entered				
	Material :		Mat #1	Qty : 995	
1.2.2	Create Single line for Manual Reservations	M1			
	Movement Type :		201		
	Plant :		P900		
	Single Line Reservation			Reservation number generated (Res #1)	
	Fields to be entered			Res : 0000000064	
	Cost Center :		1001		
	Material		Mat #1		
	Quantity :		5		
	Sloc :		P901		
1.2.3	Display Reservation List	M1			
	Fields to be entered				
	Matetrial :		Mat #1		
1.2.4	Picking	Ml			
	Selection List				
	Material :		Mat #1		
	Picking list				
	Material :		Mat #1		
	Quantity :		2		
	<Save>			Good MovementGenerated	
1.2.5	Reservation List	M1			
	Selection List			1)Reservations displayed	
	Material :		Mat #1	2) Mat #1 not checked for	
	Posting Date :			Final Issue	
	List				
	Choose Layout		/ MM P1C 1		
1.2.6	Change Reservation	M1			
	Multiple Line Reservation				
	Material :		Mat #1		
	Final Parts Issue	M50	Check		
1.2.7	Picking	M1			
	Selection List			No selection possible	
	Material :		Mat #1		
1.2.8	Plant stock availability	M1			
	Selection List				
	Fields to be entered				
	Material :		Mat #1	Qty . 993	

Table 4.4. Deletion Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
1.3	Deletion				
1.3.1	List of Plant stock availability	Ml			
	Fields to be entered				
	Material :		Mat #1	Qty : 993	
1.3.2	Create Single line for Manual Reservations	MI			
	Movement Type :		201		
	Plant:		P900		
	Single Line Reservation			Reservation number generated (Res #1)	
	Fields to be entered			Res 0000000065	
	Material :		Mat #1		
	Quantity :		5		
	Cost center :		1001		
	Sloc :		P901		
1.3.3	Display Reservation List	M1			
	Material :		Mat #1		
	Variant :		/MMP1C1		
1.3.4	Picking	MI			
	Selection List				
	Fields to be entered				
	Material :		Mat #1		
	Picking List				
	Material :		Mat #1		
	Quantity		2		
	<Save>			Goods Movement Generated	
1.3.5	Reservation List	M1			
	Selection List			I) Reservations displayed	
	Material :		Mat #1	2)Mat #1 not checked for	
	Posting Date :			Final Issue	
	List				
	Choose Layout		/MM_P1C1		
1.3.6	Change Reservation	M1			
	Multiple Line Reservation				
	Material :		Mat #1		
	Mark for Deletion	MI	Check		
1,3.7	Picking	MI			
	Selection List			No selection possible	
	Material :		Mat #1		
1.3.8	Plant stock availability	MI			
	selection List				
	Material :		Mat #1	Qty 991	

Table 4.5. Exceptions Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
1.4	Exceptions				
1.4.1	Create Single line for Manual Reservations	M1			
	Movement Type :		201		
	Plant:		P900		
	Single Line Reservation			Error Message generated	
	Fields to be entered				
	Material Description		Text Material		
	Quantity :		5		
	Sloe :		P901		
	Cost Center :		1001		
	<Enter>				
1.4.2	Create Single line for Manual Reservations	MI			
	Movement Type :		201		
	Single Line Reservation			Error Message generated	
	Fields to be entered				
	Material :		Mat #5 (PPIP)		
	Quantity		5		
	<Enter>				

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Table 4.6. Over Scrapping & Reversal Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
2.1	Over Scrapping & Reversal				
2.1.1	List of Plant stock A vailability	MI			
	Fields to be entered				
	Material :		Mat #1 (PROH)	QTY : 991	
			Mat #2 (PFER)	Qty : 990	
			Mat #3 (PERS)	Qty : 980	
			Mat #4 (PROH)	Qty : 980	
2.1.1	Scrap Material	M6			
	Single Line entry				
	Fields to be entered			1) Error Msg indicating the deficit amouant	
	Movement Type:		551		
	Plant:		P900		
	Material:		Mat # 1		
	Material Slip:		P2C1		
	Document Header Text:		Requested by: A1SNG01		
	Quantity:		100000		
	Sloc:		P901		
	Cost Center:		1001		
	Multiple line entry				
	Fields to be entered				
	Movement Type:		551	1)Movement Generated only for PROH and PERS	
	Plant:		P900	2)Material Document generated	
	Material Slip:		P2C1	3)Not posible for Finished	
	Document Header Text:		Requested by:Al SNG01	Mat Doc # : 4900000006	
	Material:		Mat # 2		
	Quantity:		10		
	Sloe:		P907		
	Material:		Mat # 3		
	Quantity:		15		
	Sloc:		P905		
	Material:		Mat # 4		
	Quantity:		20		
	Sloe:		P901		
	Skip:>Edit>Cancel				

Table 4.6. Over Scrapping & Reversal Test Script (Continue).

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
2.1.2	List Material Document	M1			
	Fields to be entered			1)Listing with Material Slip	
	Material:		Mat # 2		
			Mat # 3		
			Mat # 4		
	Plant:		P900		
	Movement Type:		551		
			552		
	Choose Display variant		/MM P2C1		
2.1.3	List of Plant Stock Availability	M1			
	Fields to be entered				
	Material:		Mat # 1 (PROH)	Qty : 991	
			Mat # 2 (PRER)	Qty : 990	
			Mat # 3 (PERS)	Qty : 965	
			Mat # 4 (PUNB)	Qty 960	
2.1.4	Reversal Posting				
2.1.4.1	Reversal through Movement 552	M6			
	Fields to be entered				
	Movement Type:		552	1)Quantity reversed larger than quantity scrapped	
	Plant:		P900	2)Movement passed through	
	Material:		Mat # 3		
	Material Slip:		P2C1 Reverse		
	Document Header Text:		Requested by: AISNG01		
	Quantity :		20		
	Sloe:		P905		
	List Material Document	M1			
	Fields to be entered			1)Listing with Material Slip	
	Material:		Mat # 3		
	Plant:		P900		
	Movement Type:		551		
			552		
	Choose Display variant		/MM_ P2C1		
	List of Plant Stock Availability	M2			
	Fields to be entered				
	Material:		Mat # 3(PERS)	Qty:985	

Table 4.6. Over Scrapping & Reversal Test Script (Continue).

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
2.1.4.2	Reversal through cancellation	MI			
	Fields to be entered			1)Scarping for Mat #3,#4 canceled	
	Material Document Number:		Mat Doc # :4900000006	2)New material document generated	
	<Enter>				
	<Save>				
	List Material Document	MI			
	Fields to be entered			1)Listing with Material Slip	
	Material :		Mat # 2		
			Matti 3		
			Mat # 4		
	Plant :		P900		
	Choose Display variant		/MM_ P2C1		
	List of plant Stock Availability	MI			
	Fields to be entered				
	Material :		Mat # 2	Qty :990	
			Mat # 3	Qty :1000	
			Mat # 4	Qty :980	
2.1.4.3	Further cancellation	M6			
	Fields to be entered				
	Material Document Number:		Mat Doc# : 4900000006	Error Msg: Full qty reversed	

Table 4.7. Change of Price/Condition of Issue and Reversal Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
2.2	Change of Price/Condition of Issue Reversal				
2.2.1	Issue	M50			
	Fields to be entered			1) Movement Posted	
	Cost Center :		1001	2) Material Document generated	
	Plant :		P900	Mat Doc *4* : 4900000009	
	Material:		Mat *4* 5 (PPIP)	Info Record :5300000039	
	Quantity :		50		
	Vendor:		Vendor # 1		
	Material:		Mat *4* 6 (PPIP)	Info Record :5300000040	
	Quantity :		60		
	Vendor:		Vendor # 1		
	Material:		Mat 4 7 (PPIP)	Info Record:5300000041	
	Quantity :		70		
	Vendor:		Vendor # 2		
2.2.3	Display Settlement				
	Fields to be entered				
	Company Code:		PCS		
	Material:		Mat 4 5	Amt : 12500	
			Mat # 6	Amt : 12000	
			Mat 4 7	Amt : 21000	
2.2.2	Change of Price/Condition	M19,M20			
	Fields to be entered				
	Vendor:		Vendor 4 1		
	Material:		Mat 4 6		
	P.Org :		PCSP		
	Info Category :				
	Conditions				
	Gross Price :		100		
	<Save>				

Table 4.7. Change of Price/Condition of Issue and Reversal Test Script (Continue).

Condition Number	Test Condition	IFS Posting Ctrl.	Input Data	Expected Results	Actual Result
2.2.3	Display to be Settlement	MI			
	Fields to be entered				
	Company Code:		PCS		
	Material:		Mat # 5	Amt : 12500	
			Mat # 6	Amt : 12000	
			Mat # 7	Amt : 21000	
				Pipeline price registered on instance of entering issue in system	
2.2.4	Settlement	MI			
	Fields to be entered			1)Document Created	
	Company Code:		PCS		
	Material:		Mat # 5		
			Mat # 6		
			Mat # 7		
2.2.5.2	List Material Document	Ml			
	Fields to be entered			1) Reduction due to first Issue	
	Material:		Mat # 6	2) Increment due to second reverse issue	
	Movement Type:		201		
			202		
2.2.5	Pipeline Reversal				
2.2.5.1	Reversal	M50			
	Fields to be entered			1) Movement Posted	
	Cost Center:		1002	2) Material Document generated	
	Vendor:		Vendor # 1	Note: Reversal > Issue Different CCTR	
	Material:		Mat # 5	Mat Doc # : 4900000012	
	Quantity:		100	Reversal more than Issue	
2.2.5.2	List Material Document	M1			
	Fields to be entered			1) Reduction due to first Issue	
	Material:		Mat # 5	2) Increment due to second reverse issue	
	Movement Type:		201		

Table 4.7. Change of Price/Condition of Issue and Reversal Test Script (Continue).

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
2.2.5.3	Reversal	M50		1) Entire material document is reversed	
	Fields to be entered			2) New material document generated	
	Material Document :		4900000009	Mat Doc # : 4900000013	
2.2.5.4	List Material Document	M1			
	Fields to be entered			1) Entire amount reversed	
	Material :		Mat # 5	Amt : 12500	
			Mat # 6	Amt 12000	
			Mat # 7	Amt : 21000	
	Movement Type:		201		
			202		
2.2.6	Display Settlement for Reversal	M I			
	Fields to be entered				
	Company Code:		PCS		
	Material :		Mat # 5	Amt : 12500	
			Mat # 6	Amt : 12000 (for reversal of 4900000009) Reverse actual amount posted Amt : 10000 (for mvt 202P) Reverse based on new Info Rec price	
			Mat # 7	Amt : 21000	
2.2.7	Settlement for Reversal	M I			
	Fields to be entered			1) Document Created	
	Company Code:		PCS		
	Material:		Mat # 5		
			Mat # 6		
			Mat # 7		
2.2.5.4	List Material Document	Ml			
	Fields to be entered			1) Entire amount reversed	
	Material :		Mat # 5	Amt : 12500	
			Mat # 6	Amt : 12000	
			Mat # 7	Amt : 21000	
	Movement Type:		201		
			202		

Table 4.8. Consumption to alternative Cost Centers from Allocation Plant Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
2.3	Consumption to alternative Cost Centers from Allocation Plant				
2.3.1	List of Plant Stock Availability	MI			
	Fields to be entered				
	Material :		Mat #1 (PROH)	QTY : 991	
			Mat #2 (PFER)	Qty : 990	
			Mat #3 (PERS)	Qty : 1000	
			Mat #4 (PROH)	Qty : 980	
2.3.2	Material Issue	M50	CCTR : (from P100)		
	Single Line			1) Material Document generated	
	Fields to be entered			2) Issue printed	
	Material Slip :		P2C3		
	Movement Type:		201	Mat Doc :4900000014	
	Plant:		P900		
	Cost Center :		P100		
	Material:		Mat # 1		
	Quantity:		10		
	Sloc :		P901		
	<Save>				
	Multiple Line			1) Material Document generated	
	Fields to be entered			2) Issue Printed	
	Material Slip :		P2C3		
	Movement Type:		201	Mat Doc :4900000015	
	Plant:		P900		
	Cost Center :		(any from P200)		
	Material :		Mat # 2		
	Quantity:		20		
	Sloc :		P908		
	Material:		Mat # 3		
	Quantity:		30		
	Sloe :		P905		
	Material:		Mat # 4		
	Quantity:		40		
	Sloc :		P901		
	<Save>				

Table 4.8. Consumption to alternative Cost Centers from Allocation Plant Test Script (Continued).

Condition Number	Test Condition	IFS Posting Ctrl.	Input Data	Expected Results	Actual Result
2.3.3	List Material Document	MI			
	Fields to be entered			1) Listing with Material Slip	
	Material:		Mat # 1		
			Mat # 2		
			Mat # 3		
			Mat # 4		
	Plant:		P900		
	Movement Type:		201		
2.3.4	List of Plant Stock Availability	MI			
	Fields to be entered				
	Material:		Mat #1 (PROH)	QTY: 981	
			Mat #2 (PFER)	Qty : 970	
			Mat #3 (PERS)	Qty : 970	
			Mat #4 (PROH)	Qty : 940	

Table 4.9. Issue to Sales without Order Reversal Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
2.4	Issue to Sales without Order Reversal				
2.4.1	List of Plant Stock Availability	M1			
	Material :		Mat # 1 (PROH)	Qty :981	
			Mat # 2 (PEER)	Qty :970	
			Mat *4* 3 (PERS)	Qty :970	
2.4.2	Material Issue	M50	CCTR :(from P100)		
	Single Line			1) Material Document generated	
	Fields to be entered			2) Issue printed	
	Material Slip :		Sales_1		
	Movement Type:		252	Mat Doc:	
	Plant:		P900		
				Note:Do not enter cost center	
	Material:		Mat # 2		
	Quantity:		20		
	Sloc:		P908		
	Multiple Line				
	fields to be entered			1) Error msg. Only Finished goods can go though this movement	
	Material Slip :		Cons_CCTR_2		
	Movement Type:		252		
	Plant:		P900		
	Cost Center:		(any from P200)		
	Material:		Mat # 1		
	Quantity:		10		
	Sloc:				
	Material:		Mat # 3		
	Quantity:		30		
	Sloc:				
	Material:		Mat # 4		
	Quantity:		40		
	Sloe:				
2.4.3	List Material Document	M1			
	Fields to be entered			I) Listing with Material Slip	
	Material:		Mat # 2		
	Plant:		P900		
	Movement Type:		251		

Table 4.10. Issue to order Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
2.5	Issue to Order				
2.5.1	List of Plant Stock Availability	M1			
	Material :		Mat # 1 (PROH)		
			Mat # 2 (PFER)		
			Mat # 3 (PERS)		
2.5.2	Material Issue	M50	CCTR (From P100)		
	Single Line			1) Material Document generated	
	Fields to be entered			2) Issue printed	
	Material Slip :		Order I		
	Movement Type:		261	Mat Doc:	
	Plant:		P900		
	Maintenance Order:		Mo # 1		
	Cost Center:		P100		
	Material :		Mat # 1		
	Quantity:		10		
	sloc:				
	<Save>				
	Multiple Line			1) Material Document generated	
	Fields to be entered			2) Issue printed	
	Material Slip :		Order_2		
	Movement Type:		261	Mat Doc:	
	Plant:		P900		
	Internal Order:		10 # 1		
	Cost Center:		P200		
	Material:		Mat # 2		
	Quantity:		20		
	sloc:				
	Material:		Mat # 3		
	Quantity:		30		
	sloc:				
	<Save>				
2.5.3	List Material Document	M1			
	Fields to be entered			1) Listing with Material Slip	
	Material :		Mat # 1		
			Mat # 2		
			Mat # 3		
	Plant:		P900		
	Movement Type:		261		
2.5.4	List of Plant Stock Availality	MI			
	fields to be entered				
	Material:		Mat #1 (PROH)		
			Mat # 2 (PFER)		
			Mat # 3 (PERS)		

Table 4.11. Receipt and Reversal without Purchase Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
3.1	Receipt and Reversal without Purchase				
3.1.1	List of Plant Stock Availability	Ml			
	fields to be entered				
	Material:		Mat # 1 (PROH)	QTY: 981	
			Mat # 2 (PFER)	Qty : 970	
			Mat # 3 (PERS)	Qty : 970	
			Mat # 4 (PROH)	Qty : 940	
			Mat # 8 (PFDS)	Qty : 1000	
3.1.2	Receipt without Purchase	M5			
	fields to be entered				
	Movement Type:		501		
	Plant:		P900		
	Material Slip:		Feed 1		
				2) Material document generated with only PFDS in line item	
	Material:		Mat # 1		
	Quantity:		10	>Edit>Cancel	
	Sloe:		P901		
	Material:		Mat # 2		
	Quantity:		20	>Edit>Cancel	
	Sloc:		P908		
	Material:		Mat # 3		
	Quantity:		30	>Edit>Cancel	
	Sloc:		P905		
	Material:		Mat # 4		
	Quantity:		40	>Edit>Cancel	
	Sloe:		P901		
	Material:		Mat # 8		
	Quantity:		50		
	Sloc:		P906		
	<Enter>				
	<Save>				
3.1.3	List of Plant Stock	Ml			
	fields to be entered			Only Mat # 8 is increased	
	Material:		Mat # 1 (PROH)		
			Mat # 2 (PFER)		
			Mat # 3 (PERS)		
			Mat # 4 (PUNB)		
			Mat # 8 (PFDS)		

Table 4.11. Receipt and Reversal without Purchase Test Script (Continued).

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
3.1.4	Reversal of Receipt				
	fields to be entered				
	Movement Type:		502		
	Plant:		P900		
	Material Slip :		Feed_1		
				2) Material document generated with only PFDS in line item	
	Material:		Mat # 8		
	Quantity:		100		
	Sloc:		P906		
3.1.5	List Material Document	MI			
	fields to be entered			1) Listing with Material Slip	
	Material:		Mat # 8		
	Plant:		P900		
	Movement Type:		501 to 502		
3.1.6	List of Plant Stock Availability	M1			
	fields to be entered			Reduction in Mat # 8	
	Material:		Mat # 8 (PFDS)		

Table 4.12. Receipt Greater than Purchase Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
3.2	Receipt Greater than Purchase				
3.2.1	Display Purchase Document	M10			
	fields to be entered				
	PO:		4300000006	Mat # 1 : (5)	
				Mat # 3 : (10)	
				Mat # 4 : (15)	
3.2.2	Receipt	MIO			
	fields to be entered			Error Msg	
	PO:		4300000006	PU ordered qty exceeded	
	Delivery Note:		DN 06		
	For Mat # 1				
	Qunatity:		10		
	<Save>				

Table 4.13. Additional Receipt after Delivery Complete Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
3.3	Additional Receipt after Delivery complete				
3.3.1	Display Purchase Document	MI			
	fields to be entered				
	PO:		4300000006	Mat # 1 : (5)	
				Mat # 3 : (10)	
				Mat # 4 : (15)	
3.3.2	Receipt	Ml0			
	fields to be entered			1) Material Document generated	
	PO:		4300000006		
	Delivery Note:		P3C3		
	For Mat # 3				
	Quantity:		3		
	Dilivery Complete:		Set		
	Item OK:		Check		
	<Save>			Mat Doc # :5000000011	
3.3.3	List Material Document	MI			
	fields to be entered				
	Material:		Mat # 3		
	Plant:		P900		
3.3.4	Display PO	M18			
	fields to be entered				
	PO # :		4300000006	The delivery complete indicator is set	
3.3.5	Receipt	MIO			
	fields to be entered			1) Material Document generated	
	PO:		4300000006		
	Delivery Note:		P3C3		
	For Mat # 3				
	Quantity:		3		
	Item OK:		Check	Further receipt is still accepted. The delivery complete indicator is reset	
	<Save>				
3.3.3	List Material Document	M1			
	fields to be entered				
	Material:		Mat # 3		
	Plant:		P900		

Table 4.14. Receipt referencing a locked / deleted line Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
3.4	Receipt referencing a locked/ deleted line				
3.4.1	Display Purchase Document	M18			
	fields to be entered				
	PO:		4300000007	Mat # 1 : (5) Locked	
				Mat # 3 : (10) Del	
				Mat # 4 (15)	
3.4.2	Receipt	M10			
	fields to be entered			Mat # 1 Not shown	
	PO:		4300000007	Mat # 3 Not shown	
	<back>				

Table 4.15. Receipt by Line Item Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
3.5	Receipt by Line Item				
3.5.1	Display Purchase Document	M18			
	fields to be entered				
	PO:		4300000008	Mat # 1 : (5)	
				Mat # 3 : (10)	
				Mat # 4 : (15)	
3.5.2	Receipt	M10			
	fields to be entered			1) Material document created	
	PO:		4300000008	Mat Doc # :5000000002	
	Delivery Note:		DN 08		
	For Mat # 1				
	Qunatity:		10		
	Item OK:		Check		
	For Mat *4* 3				
	Qunatity:		10		
	Item OK:		Not Checked		
	For Mat # 4				
	Qunatity:		10		
	Item OK:		Not Checked		
	<Save>				
3.5.3	List Material Document	MI			
	fields to be entered				
	Material :		Mat # 1		
			Mat # 2		
			Mat # 3		
	Plant:		P900		
3.5.4	List of Plant Stock Availality	M1			
	fields to be entered				
	Material:		Mat # 1	991 (increased by 10)	

Table 4.15. Receipt by Line Item Test Script (Continue).

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
			Mat # 3	970	
			Mat # 4	940	

Table 4.16. Reversal after settlement Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
3.5	Receipt by Line Item				
3.5.1	Display Purchase Document	M18			
	fields to be entered				
	PO:		4300000008	Mat # 1 : (5)	
				Mat # 3 : (10)	
				Mat # 4 : (15)	
				Check that the check box for "GR based Invoice" under tab "Invoice",ischecked	
3.6.2	Receipt	M10			
	fields to be entered			1) Material Document generated	
	PO:		4300000006		
	Delivery Note:		DN 06	Mat Doc # : 500000003	
	For Mat # 1				
	Quantity :		10		
	Item OK:		Check		
	For Mat # 3				
	Quantity :		10		
	Item OK:		Check		
	For Mat # 4				
	Quantity :		10		
	Item OK:		Check		
	<Save>				
3.6.3	List Material Document	M I			
	fields to be entered				
	Material:		Mat # 1		
			Mat # 3		
			Mat # 4		
	Plant:		P900		
	Movement Type:		101		
3.6.4	Settlement	MI			
	fields to be entered			Document generated	
	Invoice Date:		Current date		
	Delivery Note:		P3C6DN 06	Doc# : 5105600101	
	Calculate Tax:		Check		
	Amount:		Total amount with tax		

Table 4.16. Reversal after settlement Test Script (Continued).

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
	Baseline date:		Current date		
	<Simulate>				
	<Post>				
3.6.5	Display PO	M18			
	fields to be entered				
	PO:		4300000006	1) Invoice and Receipt tracked in PO	
			>Purchase Order History		
3.6.6	Reversal of Receipt	M10			
	fields to be entered				
	Mat Doc:			1) Error msg will result indication that there is a deficit between PO and IR. This is only valid for GR based Invoice	

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Table 4.17. Internal Order Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
3.7	IO				
3.7.1	Display Internal Order				
	IO		70001	Mat # 3	
3.7.2	Issue to IO	M51			
	fields to be entered			Material Doc generated	
	10:		70001	Mat Doc # : 4900000018	
	Delivery Note:				
			P3C7		
	<Enter>				
	For Mat # 3				
	Quantity:		10		
	Item OK:		Check		
	<Save>				
3.7.1	Display Internal Order				
	fields to be entered				
	10:		7001	Cost of Mat # 3 registered	
3.7.2	Receipt	M5			
	IO:		70001		
	Delivery Note:		P3C7		
	<Enter>				
	For Mat # 1				
	Quantity:		12		
	Item OK:		Check		
	<Save>				
3.7.4	Display Internal Order				
	10:		70001	Cost of Mat # 3 registered	
3.7.5	List Material Document	MI			
	Material:		Mat # 3		
	Plant:		P900		
	Movement Type:		261/262		

Table 4.18. Different Material Type Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
4.1	Different Material Type				
4.1.1	List of Plant Stock Availability	M1			
	Material:		Mat *4* 1 (PROH) KG		
			Mat # 2 (PFER)KG		
			Mat # 9 (PEER) KG		
4.1.2	1-step Transfer	M3			
4.1.2.1	Single Line				
	fields to be entered			Material Document generated	
	Movement Type:		309		
	Plant:		P900		
	Material Slip:		P4C1		
	Receiving Plant:		P900		
	Receiving Sloe:		P906		
	Receiving Mat:		Mat # 9		
	Material:		Mat # 1		
	Quantity:		5		
	Sloc:		P901		
4.1.2.2	Multiple Line				
	fields to be entered			Material Document generated	
	Movement Type:		309		
	Plant:		P900		
	Material Slip:		Mat Type Transfer		
	Receiving Plant:		P900		
	Receiving Mat:		Mat # 9		
	Material:		Mat # 1		
	Quantity:		5		
	Material:		Mat # 2		
	Quantity:		5		
4.1.3	List Material Document	M1			
	Material:		Mat # 1		
			Mat # 2		
			Mat # 9		
	Plant:		P900		
	Movement Type:		309		
4.1.4	List of Plant Stock Availability	M1			
	Material:		Mat # 1		
			Mat # 2		
			Mat # 9		

Table 4.19. Different Base Unit of Measurement Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
4.2	Different Base Unit of Measurement				
4.2.1	List of Plant Stock Availability	MI			
	fields to be entered				
	Material :		Mat # 3 (PERS) PC		
			Mat # 9 (PEER) KG		
4.2.2	1-step Transfer	M3			
4.2.2.1	Single Line				
	fields to be entered		Error Msg		
	Movement Type:		309	"Stock keeping unit differ"	
	Plant:		P900		
	Material Slip:		P4C2		
	Receiving Plant:		P900		
	Receiving Sloe:		P908		
	Receiving Mat:		Mat # 9		
	Material:		Mat # 3		
	Quantity:		5		
	Sloc:		P905		
4.2.3	List of Plant Stock Availability	M1			
	fields to be entered				
	Material:		Mat # 3	No Change	
			Mat # 9	No Change	

Table 4.20. Match Issue Unit and Base Unit Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
4.3	Match Issue Unit and Base Unit				
4.3.1	List of Plant Stock Availability	M1			
	fields to be entered				
	Material :		Mat # 9 (PEER) KG		
			Mat # 10 (PERS) BUOM:PC,IUOM:KG		
4.3.2	1-step Transfer	M3			
4.3.3	Single Line				
	fields to be entered			Error Msg	
	Movement Type:		309	Stock keeping units differ	
	Plant:		P900		
	Material Slip:		P4C3		
	Receiving Plant:		P900		
	Receiving Sloc:		P908		
	Receiving Mat :		Mat # 9		
	Material:		Mat # 10		
	Quantity:		5		
	Sloc:		P905		
4.3.4	List of Plant Stock Availability	MI			
	fields to be entered				
	Material:		Mat # 9	No Change	
			Mat # 10	No Change	

Table 4.21. Transfer Stock Type Test Script.

Condition Number	Test Condition	Posting Ctrl.	Input Data	Expected Results	Actual Result
4.4	Transfer Stock Type				
4.4.1	List of Plant Stock Availability	MI			
	Material:		Mat # I - Block	0	
			Mat # 1 - Unrestricted	991	
4.4.2	Receipt	M10			
	fields to be entered			Material Document posted	
	PO:		4300000008	Mat Doc # : 5000000005	
	Delivery Note:		P4C4		
	For Mat # 1				
	Quantity:		10		
	Stock Type:		Block		
	Item OK:		Check		
4.4.3	List of Plant Stock Availability	M1			
	fields to be entered			1) Material posted to block stock	
	Material:		Mat # 1 - Block	10	
			Mat # 1 - Unrest	991	
4.4.4	Stock Type Transfer	M4			
	fields to be entered			1) Material Document posted	
	Movement Type:		343		
	Plant:		P900		
	Material Slip:		P4C3		
	Receiving Sloe:		P901		
	Mat:		Mat # 1		
	Quantity:		10		
4.4.5	List of Plant Stock Availability	MI			
	Material:		Mat # 1 - Unrest	1001	
4.4.6	List Material Document	MI			
	fields to be entered				
	Material:		Mat # 1		
	Plant:		P900		
	Movement Type:		343		

Table 4.22. Financials Transaction.

				Currency			Baht	
Account				Dr.	Cr.	Rate	Dr.	Cr.
Create AP								
IIV 20030106	610113	Manual	Expense	7,600,000.00		40.00	30,400,000.00	
IIV 20030106	210107	IP1	AP		7,600,000.00	40.00		30,400,000.00
				7,600,000.00	7,600,000.00		30,400,000.00	30,400,000.00
Create Defer VAT								
IIV 20030108	210107	IP1	AP		53,200.00	42.00		2,234,400.00
IIV 20030108	113108	11)3	Defer VAT	53,200.00		42.00	2,234,400.00	
IIV 20030108	610111	Manual	Expense	760,000.00		42.00	31,920,000.00	
IIV 20030108	610111	Manual	Expense		760,000.00	42.00		31,920,000.00
				813,200.00	813,200.00		34,154,400.00	34,154,400.00
Payment IIV 20030106								
PV 20030081	210107	IP1	AP	760,000.00		40.00	30,400,000.00	
Payment IIV 20030106								
PV 20030081	210107	IP1	AP	760,000.00		40.00	30,400,000.00	
PV 20030081	620531	PP12	Loss Ex. Rate			45.00	3,800,000.00	
PV 20030081	110501	Bank			760,000.00	45.00		34,200,000.00
				760,000.00	760,000.00		34,200,000.00	34,200,000.00
Payment IIV 20030108								
PV20030082	210107		AP	53,200.00		42.00	2,234,400.00	
PV20030082	113108		Def VAT		53,200.00	42.00		2,234,400.00
PV20030082	620531		Loss Ex. Rate			45.00	159,600.00	
PV20030082	113107		VAT	53,200.00		42.00	2,234,400.00	
PV20030082	210303		WHT		22,800.00	41.00		934,800.00
PV20030082	620531		Gain Ex.Rate			42.00		91,200.00
PV20030082	110501		Bank		30,400.00	45.00		1,368,000.00
				106,400.00	106,400.00		4,628,400.00	4,628,400.00

4.4 Conversion

The legacy material management system of EGAT is paper-based and MS Access to keep event log. All new master data on IFS system will be created by manual entry and script if that information has more than 500 records.

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V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

After this project, EGAT will get to the point of Breakeven on the fourth year, Up to fifth year, EGAT will get benefit from this implementation at 51.18% of the investment. This number has shown that EGAT can save a lot of money and increate performance of maintenance management system.

According to EGAT workflow, this project has improved approval process and enhanced automatic document transfer from one division to the other divisions to reduce the time and prevent the loss of documents during the transfer.

By using IFS technology, EGAT has a new capability to approve purchasing request or purchasing order by email. This feature gives EGAT more flexibility to division manager or the approver to work from different locations. And because of material management module, Warehouse officers can track or get automatic alert from IFS system when the quantity of spare parts is less than the minimum setting. In the past, warehouse officers have to go to warehouse and check spare parts stock manually and it took more than a day to check a thousand spare part items.

Material management system helps warehouse officers to track the location of current spare parts by just one click on IFS Application. It can also automatically matching spare parts when warehouse officers get request from maintenance division.

5.2 Degree of Achievement

Table 5.1. Degree of Achievement.

Process	Time for Manual System	Time for New System
Parts receipt	30 mins	5 mins
Parts issue	30 mins	5 mins
Purchase requisition	1 day	15 mins
Purchase order	1 day	30 mins

(1) Parts receipt

Because IFS Application is online system, warehouse officer can find purchase order and detail item from the system by referring to material number. The warehouse officer does not need to enter the records in logbook. After he/she receives goods, he/she will click at received button and all records will be saved.

(2) Parts issues

Warehouse officer can easily define specification and location of material that has been requested from the requester. Instead of finding information from hard copy, warehouse officer can check the information from online system. The stock can be monitored by online system. The system will alert warehouse officer when the stock level reaches the minimum level.

(3) Purchase requisition

Requester can find the price of required item from online system instead of making a call to purchasing department officer. During the approval process, line manager can see the request and approve it online. And the approved form will be automatically sent to purchasing department.

(4) Purchase order

Purchasing department manager can see all purchase orders then he/she can approve the order based on purchase order amount. IFS system will automatically generate Request for Quotation (RFQ) and send to vendor via email or fax.

5.3 Recommendations

By using IFS Application, EGAT can enhance the other features to automate transaction on Finance module, Maintenance module, Sale and Distribution module and Project Management module to help EGAT save costs and gain productive from the employees.

In the future, trends of technology will be the solution to reduce costs and workflow to let the customer have the faster process, less investment and more accurate on management information data. IFS have the functionality that the customer can apply the new hot packages that enhance the new functionality and fix current errors on the system automatically.

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