CHAPTER 1
Introduction

1.1 Background of the Business

Most of the Engineering businesses can be categorized into two characteristics base on the products and operations: manufacturing-based business and service-based business. There are more significant difference between two business types such as the main product characteristics, working operation, and facilities requirements. Manufacturing-based company is the company who produces both consumer and industrial products for customers. It requires factory, heavy machine, and warehouse for storing both raw materials and finished products. On the other hand, service-based company, for example construction company, is the company who supplies the customer with services as products.

XYZ Company is a subsidiary of XYZ Limited who has been established in Singapore for thirty years. It has been a service-based company that has objective in services the growing industrial sector for water and waste water treatment. XYZ is one of the leaders in this field, with an emphasis on quality and customer service. In Thailand, the company, founded in 1993, categorizes the business operations into two main functions base on the characteristic of work. The former is the supply of both complementary components and consumer products used in water treatment system. The latter, which will be the case study of this thesis, is the installation of both custom-designed system and turnkey project. The scope of system installation, handled by Engineering department, comprise the activities of design, procurement, and installation. Each function in project installation will be described below.

a. Design Procedure

Design activity is the beginning of proposal and quotation preparation. The design procedure includes the system selection, equipment specification, and the control mode selection. The system is designed depending on the specific characteristics of raw water quality such as the source of water e.g. deep well water and surface water and the

customer's requirement such as the quality of treated water to be used. As a result, the specific equipment, the number of equipment required, and the mode of operation would vary from one site to another. The output of design stage consist of the proposal, describing individual equipment specification, and the system flow diagram or process and instrument diagram. This diagram will be complied and specified the accessories after the project award. The system, however, would be designed not only by the company but also by the clients themselves. In case of the system is customer-based design, the company scope is only procurement and installation of those equipment. Further, plan layout is also attached to the customer for preparing the required area and performing the civil work before the installation stage will be started.

b. Equipment procurement

After the finishing of the system design, the stage of equipment procurement will be run. In procurement, equipment can be classified to two main categories according to their characteristic: fabricated equipment and buy-out equipment.

Most of equipment must be locally fabricated is all tank and system that are complex and specific such as Reverse osmosis and Ultrafiltration system. Those equipment are not produced to stock because they are designed in case by case due to the capacity and treated water requirement. Thus we associate with various subcontractors, which expertise in each field, to preparing those equipment. The equipment that to be fabricated includes:

- Steel pressure filter tank
- Steel water storage tank
- Reverse Osmosis system
- Ultrafiltration system, etc.

In addition to the fabricated equipment, there are several components must be purchased directly from oversea vendors or domestic vendors.

- Ultraviolet disinfection system
- All instruments, e.g. pressure gauge, flow meter, conduct and resistivity meter, pH meter, pressure regulator, and pressure relief.

c. The system installation

All fabricated and bought-out equipment will be installed. Site supervisor has responsibility in coordinating with customer and subcontractor, together with control the budget and schedule in order to make sure that all installation will be finish on time and the equipment will be test-run operation to complete the project.

The project management is a tool used for controlling the project to be finished on time within the budget. In addition to assessment the project completion, the quality of the project is evaluated to ensure that the project meets the customer satisfaction. Therefore, the quality assurance system is an importance role established for the project managing improvement.

1.2 Statement of the problems

Several service-based companies manage each project by following the project planning and scheduling formulated during bidding document or proposal providing time and revised it after company has been awarded. More companies face the problem in project management in several times. The majority of causes are lack of standardization, lack of step of work more rework, and more error.

Mostly, the project schedule is planned based on assumption that the operating quality of all activities is high. For example, the design step is no redesign activity in order to ensure that the project or system will not make a problem or the procurement step is no repurchase order since the supplier can not deliver equipment on time.

XYZ company is a service-based company that frequently found the problem in more reworks, some redesign since the site area change, some repurchase, resolve the same defect that occur more frequently in the same project, and so on. All of these activities will be caused the problem of project management to following the planing and scheduling. Unfortunately, all these activities are the causes of company suffering especially the project that has long period because the operating cost and fixed cost will increase until the project finish. Company loss in profitability. And the result of the project delay will make loss in customer satisfaction.

Therefore, the quality assurance system is presented to use in managing each project in order to ensure that all activities of works are performed based on the quality system, project consistency, and project can be assured in quality.

1.3 The objectives of the study

The objective of study is to establish the quality assurance system for the project management of water treatment plant

1.4 Scope of the study

This thesis will be conducted under the scope as follows:

1. The project management of water treatment system only, including design, project planning, equipment procurement, equipment installation, testing, and commissioning.

2. Some section in International Organization Standard (ISO 9001 and ISO 9004) involved in project management.

1.5 Procedures

The procedures in conducting this research will be as follows:

1. Literature survey
2. Study water treatment system including system design, equipment procurement, equipment installation, testing, and commissioning.
3. Study the related theories and techniques, including project planning and management, the quality system standard, ISO 9001 and ISO 9004 standard, and quality assurance system and management.
4. Develop the quality assurance system into the functions involved in project management such as design engineer provides a complete listing of all the relevant components.
5. Set up the quality assurance document.
6. Implement the quality assurance system into a project as a case study

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7. Analyze and conclude the result of study comparing with the past project activity by activity in term of quality such as error (fault), rework, etc.
8. Prepare thesis.

1.6 Benefits Expected

The benefits of the study are mainly for the company improving the quality of work in all departments involved in the project, effectively utilizing the resources, and project consistency.

1.7 Literature survey

Ray Tricker (1997) state that the growing demand for quality assurance before a contract is awarded has reinforced. The purchasers not only expecting the quality of products but also the demanding proof that a company is capable of producing quality products or providing quality services. The quality assurance is a declaration given to inspire confidence that a product has achieved the highest standards and that its manufacture, modification or repair has been completed in an efficient and timely manner. The benefits of quality assurance are to increase capability of producing a product, to reduce in manufacturing and production cost, a greater involvement and motivation within a company's workforce, and to improve customer relationship through fewer complaints.

Jakrapong (1996) conclude that the quality assurance in production process of the model factory comprise continuously quality improvement, effectively quality control, and quality survey. If all activities are performed in systematic and related among them and using quality tools in each step appropriately, confidence is made to all

retention of customer.2). Eliminate of the number of audits and assessments and also a reduction in the time taken by customers to audit the system. 3) Improved controls, discipline, procedures, documentation, communication, and customer satisfaction. 4). Identification of ineffective and surplus procedures and documents and other forms of waste. 5) A better working environment.

Charles A. Mills (1989) define the quality audit that it is a management tool used to evaluate, confirm or verify activities related to quality. It helps prevent problems in the organization being audited through the identification of activities liable to create future problems that arise through the inefficiency or inadequacy of the activities concerned.

Harold (1995) state that successful project management must utilize effective planning techniques and the qualitative and quantitative tools for project planning must be identified. In addition, management must make effective utilization of resources.

Tawichart (1997) has developed the quality assurance system to the brake drum manufacturing process in order to control the quality of finished parts, which are at the consistently good level, before delivery to customer. The established quality assurance system consists of quality planning, quality control, and quality audit and prevention procedure. The quality control reports system applied to evaluate and analyze the quality results was check sheet, statistic method, control chart, and quality audit.

Somnuk (1997) has established the quality assurance of supplied parts for hard-disk drive manufacturing. The intention of his study is to develop the quality control for the suppliers' process. Tools applied in controlling and reviewing the process are Statistic Process Control (SPC) and Gage R&R (Repeatability and Reproducibility), respectively. FMEA technique was also applied to identify the potential product related process failure, to assess the potential customer effect of these failures, and to identify the potential causes and significant process variables to focus control of reduction. The results of his study was about 85% of all machines meet with Cpk of 1.33 in June 1996 and get to 100% in July, and quality improve more than 50% after taking corrective action on the major defect.

Chumpol (1996) has developed the quality control system for the Hot-Dip Galvanizing process, ladder cable tray product. The quality technique applied comprise Check sheet, Cause and Effect diagram, Control chart, Graph and Deming cycle. The proposed developing the quality control system were

1. Standard Product quality specification
2. A quality control system for finished goods
3. A quality control system for works in process
4. A quality control system for raw material
5. A cycle for improving in working applied cause and effect diagram
6. Establishment of quality control department for the organization

Chalermphon (1997) had applied Failure Mode and Effect Analysis for determining and controlling the tyre quality factor. The other tools employed are Cause and Effects Diagram, Relation Diagram and Three Diagram. After implementation, the passenger radial tyre decrease continuously from 1.009% to 0.932% and truck bias tyre decreased from 0.025% to 0% defect. The RPN after implementation is lower than prior to implementation 50% to 90%.