CUSTOMS CLREARING TIME REDUCTION BY APPLYING DMAIC MODEL: A CASE STUDY OF PETROCHEMICAL COMPANY

By
ORNRAMPHA SAWANGJAN

A Proposal of the Six-Credit Course
SCM 2202 Graduate Project

Submitted in Partial Fulfillment of the Requirements for the Degree of
MASTER OF SCIENCE IN SUPPLY CHAIN MANAGEMENT

Martin de Tours School of Management
Assumption University
Bangkok, Thailand

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Approved for Graduation on: August 30, 2014

Martin de Tours School of Management and Economics
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Bangkok, Thailand

August 2014

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Customs Clearing Time Reduction by Applying DMAIC Model: A case study of petrochemical company

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I confirm that this thesis/project has been carried out under my supervision and it represents the original work of the candidate.

Signed _____

(A. Thanapat Panthanapratez)

Date _____

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Ornrampha Sawangjan
Assumption University
August 2014

ABSTRACT

According to petrochemicals, many people have never been thinking of them before but at the present time petrochemicals are related to everyday life, the four necessities of life (living, foods, clothes, and drug). Due to the growth of petrochemicals, the growth of the economy and the growth of petrochemical industry, the company has a larger production scale with integrated production processes both downstream and upstream and it has become a huge amount of purchase raw materials and spare parts for supporting growth. And the company always has a long customs clearing time for importing the customs process. So the company needs to develop a strategy for more efficiency to serve its expanding business.

According to Jirasukprasert, Garza-Reyes, Kumar and Lim (2013) DMAIC is an important part of Six Sigma, can be described as a structured approach for solving problems. DMAIC is an important key to define the problem of long import customs process and analyze the root cause to find the new way to improve the processes. There are five steps to execute the goal of the process improvement and stability of reduction. The steps are defined as measure, analyze, improve and control. It was recommended when the cause of the problem is unknown or unclear (Breyfogle et al., 2001). So this case study choose DMAIC for solve the problem of long customs clearing time.

The DMAIC model supports the researcher to define the problems, understand the root causes of the problem, identify the as-is process and area of improvement then recommend a to-be process. Moreover it suggested the way to control the end guarantee and the maintainable customs clearing time.

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Ms. Ornrampha Sawangjan

and hereby certify that the verbiage, spelling and format is commensurate with the quality of internationally acceptable writing standards for a master degree in supply chain management.

Signed _____

(Michael L. Welch)

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Date: August 26, 2014

CHAPTER I

GENERALITIES OF THE STUDY

According to petrochemicals, many people have never been thinking of them before but at the present time petrochemicals are related to everyday life, the four necessities of life (living, food, clothes, and drugs).

Due to the growth of petrochemicals, growth of the economy and growth of the petro chemical industry, the company has a larger production scale with integrated production processes, both downstream and upstream, and it becomes a huge purchaser of raw materials and spare parts to support its growth. And the company has always had long customs clearing time for imports through the customs process. So the company needs to develop a strategy for more efficiency to serve the expanded business.

DMAIC is an important key to define the problem of the long import customs process and analyze the root cause to find a new way to improve it.

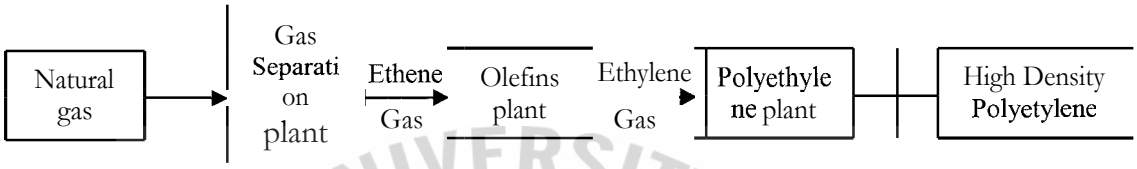
This chapter refers to the company background, background of the study, statement of the problem, research objectives, scope of the research, significance of the research, limitations of the research and definition of terms.

1.1 Background of the Research

PPP Company is a leading integrated petrochemical and refining company, strengthened with its diversity of products in both Olefins and Aromatics lines, which improves its competitive advantage as well as the ability to reduce risks in the petrochemical industry. A larger production scale is a result of integration and will enable the Company to leverage its significant economies of scale to reduce unit costs as well as to achieve a fully integrated production process that delivers more value-

added products, especially the ability to pursue additional downstream specialties. The synergy achieved by the consolidation will also unlock greater benefits in terms of production and market optimization.

Figure 1.1: Integrated Production

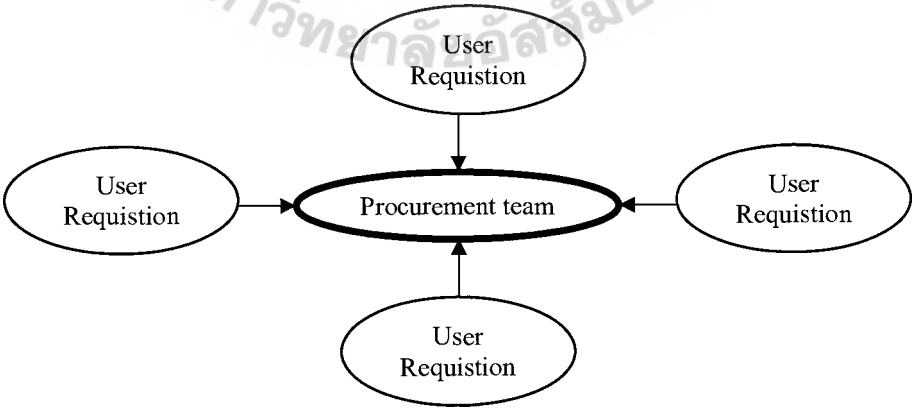


Source: Author

Figure 1.1 shows the production line, both downstream and upstream. And also shows products of PPP Company.

PPP Company has 5 subsidiaries, one head office and twelve plants and one procurement team. All plants use shared services. All purchase requisitions were assigned to the procurement team to issue purchase orders and expedite imports from overseas suppliers.

Figure 1.2: Procurement Share Service

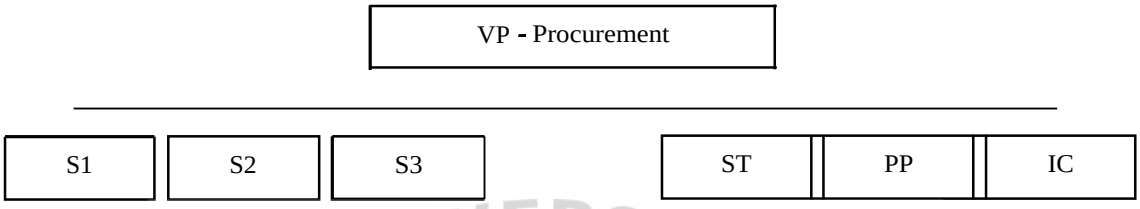


Source: Author

Figure 1.2 shows process of procurement share service of PPP Company

The procurement team has 7 divisions to support all requisitions, each division is separated by categories of purchase requisitions.

Figure 1.3: Procurement team

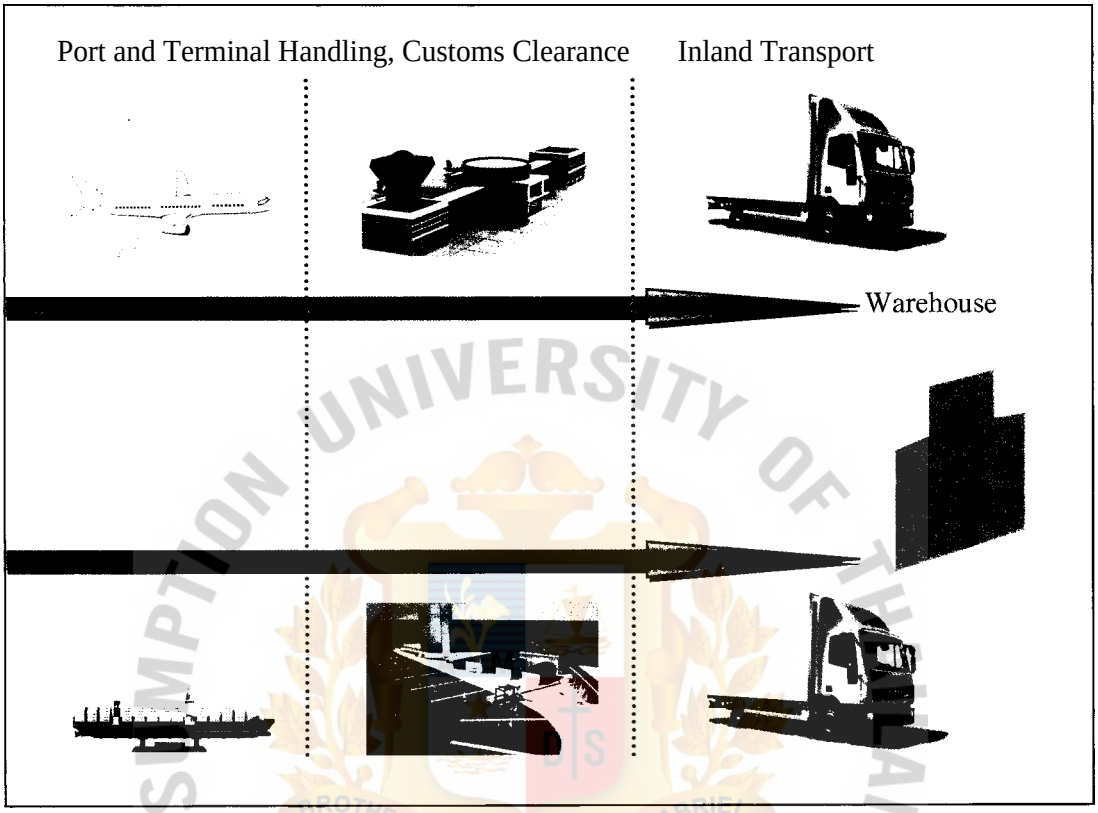


Source: Author

Figure 1.3 shows the procurement structure, consisting of 7 divisions. Si is responsible for purchase requisitions of plant services. S2 is responsible for purchase requisitions of administrative services, human resource, safety, packaging, logistics, lab, gas, electrical, instrument and IT. S3 is responsible for purchase requisitions of inventory and spare parts. ST is responsible for purchase requisitions of chemicals. PP is responsible for purchase requisitions of projects. The researcher included minor project and major project in one category because all import processes of them are the same. IC is responsible for supporting all 6 divisions, including export, import and insurance services.

The researcher works under the IC team, responsible for coordinating with shipping agents, buyers and users for supporting any processes of import shipments which are the most important processes of trading across borders as detailed below in Figure 1.4.

Figure 1.4: Trading Across Boarder Process

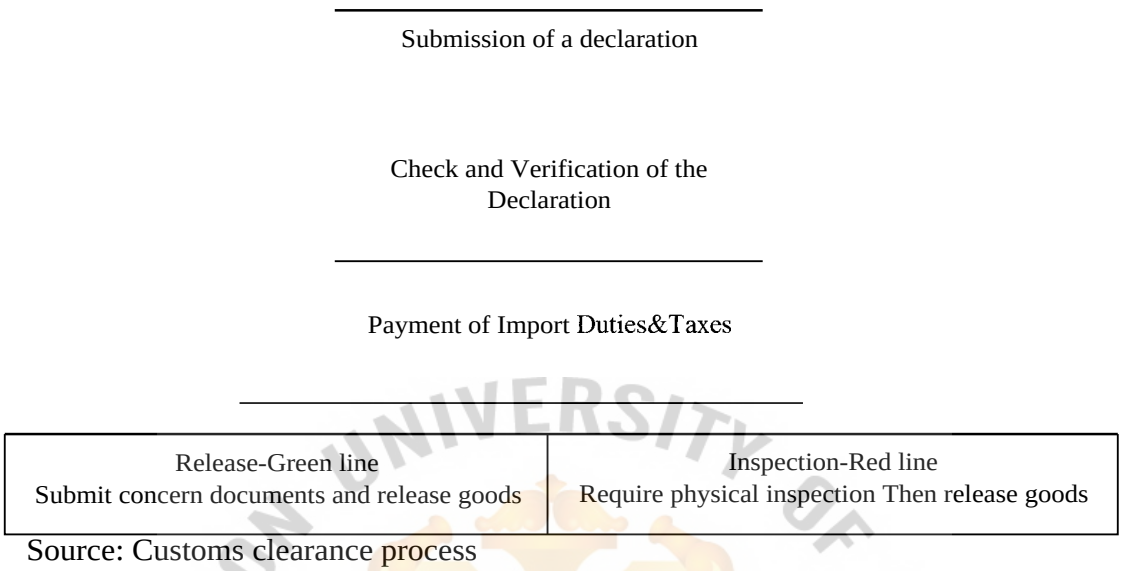


Source: Author

Figure 1.4 shows the process of import shipments from arrival at the port to delivery at the warehouse, there are three processes. The first is port and terminal handling, the next is customs clearance and the last one is inland transport.

The important point of overseas purchasing is customs clearance, goods are not allowed into Thailand without permits from customs officers. That is to say that when shipments arrive at the port of destination; there are 4 stages of the customs clearance process as detailed in Figure 1.5. Importers are required to submit a declaration of goods and document support to the Customs officer. Goods are not permitted to enter to destination until they get authorized by Customs, and applicable taxes and duties are paid. Taxes and duties charged depend on the nature of goods and the value.

Figure 1.5: Declaration and Customs Clearance Process



Source: Customs clearance process

Figure 1.5 shows the process of customs clearance, there are 4 stages as detailed below

Submission of a Declaration: The first stage of the import clearance process is to complete an Import Declaration and submit it to the e-Customs system. When shipment arrives at port, the shipping agent and importer have to submit the manifest, import declaration and concerned documents as shown below in the e-Customs system

Documents support for Customs Clearance

Declaration of goods

Bill of Lading or Air Waybill

Invoice

Packing List

Import License (if applicable)

Certificates of Origin (if applicable)

Other related documents such as catalogue, product ingredients, materials etc.

Check and Verification of the Declaration: The second stage is the checking and verification of the Declaration, all documents were sent to be submitted on the e-Customs system, then the customs officer will check and verify the goods and concerned documents. After that the shipment was specified as a Green Line (normal shipment, goods was released after pay import duties and taxes) or Red Line (goods was sent to inspection before release) in this stage.

Payment of Import Duties and Taxes: The third stage is payment of duties and taxes. When passed the second stage the importer has to prepare the payment of duties and taxes. There are 2 options for the payment: pay at the Customs Department, and pay via the e-Payment system.

Inspection and Release of Cargo: The last stage is to inspect and then release the cargo.

Green line for normal goods submits the verified Declaration together with the payment receipt for the release of goods. Red line for inspection of goods is where the Port Authority removes goods for physical inspection by Customs before the release of the cargo.

Step (1,2,3) starts when the goods arrive at the destination port, the company has to submit a declaration including air waybill or bill of lading, invoice, packing list, import license (if applicable), certificates of origin (if applicable), catalogues, product ingredients, materials, and a declaration of goods to customs. Then the customs officer will check and verify all submissions. And then the company has to do a payment process for import duties and taxes. Next is the release of goods, divided into 2 conditions that are the green line for general goods and the red line for goods that require inspection before release.

1.2 Statement of Problem

The researcher works in the procurement team, division IC, responsible for export and import jobs and found that import jobs have more problems and are the main of delay in the delivery of goods to the warehouse. So the researcher collected data of import shipments from January 2013 to December 2013, a total 958 shipments and found that customs clearing time on average for all categories of goods is 5.806 days but the target was set at 5 days.

Table 1.1: Average customs clearing time

Number of shipment Jan'13 – Dec'13 (shipments)	Total customs clearing time (days)	Average customs clearing time (days)
958	5562	5.806

Source: KPI monthly report

Table 1.1 shows the average of all import shipments from January 2013 to December 2013, the result is 5.806 days (calculate from total customs clearing time divided by number of shipment)

$$\text{Average customs clearing time} = \frac{\text{Total customs clearing time}}{\text{Number of shipment}}$$

$$= 5562/958$$

$$= 5.806 \text{ days}$$

The overall average customs clearing time is not too much far from the target, then the researcher scoped down to find the average customs clearing time by categories of purchasing and found that the average customs clearing time of the project procurement (PP) is far from the target, took twice as many times over the target (about 11-12 days) as detailed in Table 1.2.

Table 1.2: Average customs clearing time by category

Category	Number of shipment Jan'13 – Dec'13 (shipments)	Total customs clearing time(days)	Average customs clearing time (days)
S1	5	40	8
S2	7	49	7
S3	77	433	5.623
ST	242	1431	5.913
PP	20	231	11.50

Source: KPI monthly report

Table 1.2 shows an average customs clearing time by category; calculated from the total customs clearing time divided by the number of shipments. The results are S1 is 8 days, S2 is 7 days, S3 is 5.62 days, ST is 5.91 days and the last one **PP** is 11.50 days. So the researcher focused on the problems of PP (project procurement).

From the above data, that shows the average customs clearing of project procurement took time over the target, so the research focused on DMAIC models that help to find the root cause and reduce long customs clearing time of import project procurement, more details in chapter 3. This study is aimed to answer the researchers question *"How can DMAIC model help to reduce customs clearing time for import process of project procurement?"*

1.3 Research Objectives

The research focuses on identifying the root cause and reduced long customs clearing time of import project procurement by applying the DMAIC model. The objectives of this research are:

1.3.1 To define the problems.

1.3.2 To measure the impact of problems.

1.3.3 To analyze the root cause and identify as-is process.

1.3.4 To propose to-be process.

1.3.5 To propose control to-be process to maintain the good results.

1.4 Scope of the Research

This research is based on historical data of import shipments from January 2013 to December 2013. The researcher used Cause and Effect diagrams to find the root cause and apply the DMAIC model to understanding the process work flow for reducing and preventing future long customs clearing time. At the end of this case study, improved processes will be suggested to be implemented and developed.

1.5 Significance of the Research

This research used the DMAIC model to solve the problem of importing process and this study helps the company to identify the root cause of problems and the final results which may help the company reduces long customs clearing time then recommend improvement. Moreover this research will help the company increase performance and profitability.

1.6 Limitations of the Research

This study is focus on the purchase of spare parts of a project procurement. For the other categories of goods, they could be different.

1.7 Definition of Terms

Air Waybill	A document issued by a carrier/airline to ship goods, purposes to receipt for the goods was shipped and it evidenced the contract of carriage (Wood, Barone, Murphy, Kin & Wardlow, 2002).
Bill of Lading	A document issued by a carrier/vessel line to ship goods, purposes to receipt for the goods was shipped and it evidences the contract of carriage (Levi, 2005).
Cause and Effect Diagrams	The process to identify factors using a structured approach with techniques designed to provide a focus for identifying and solving problems (Sproull, 2001).
Customs Clearance	A method when a shipment arrives at a destination, importers are required to file a goods declaration and supporting document for the imports with a Customs officer at the port of entry. Imported cargos are not allowed to enter the country until they get authorized by a Customs officer, and applicable taxes and duties have been paid (Durgavich, 2009).

DMAIC	There are five steps to execute the goal of the process improvement and stability of reduction. The steps are defined as measure, analyze, improve and control. It was recommended when the cause of the problem is unknown or unclear (Breyfogle et al., 2001).
Pareto Analysis	Pareto analysis is a concept by defining quality control by ranking orders from the highest to the lowest and a considerable 80% of the amount of cumulative percentage (Karuppusami and Gandhinathan, 2006).
Process Flow Chart	The structure method represents a process of activities. Showing step by step of as various boxes, and connected them with arrows. Process flow charts are used to analyze and manage a process of work (Fryman, 2001).

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter is proposes to review the related literature under concepts of the focus point to reduce the long customs clearing time of import project procurement by applying DMAIC. Related literatures are as below:

2.1 Supply Chain Management

Supply Chain Management was first developed in the middle of the 1990s. Keith Oliver, a consultant of Booz Allen Hamilton Company was interviewed for the Financial Times in 1982 on the subject.

According to Christopher (1998) Supply Chain Management is the network of organizations that are involved in both upstream and downstream activities, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer.

The purpose of supply chain management is improving the long-term performance of the company, suppliers and customers as a whole chain (Mentzer et al., 2001).

The supply chain of petrochemical products has many chains involved and this research is focused on import customs clearance that makes the most problems of overseas purchasing.

2.2 Import Customs Process

For the chemical industry, most imported goods are raw materials for manufacturing operations. And import processes will depend on the Incoterm which are commercial terms agreed on the sale contract stated by ICC – Incoterms (2011). For example purchases under ex-work terms, import processes include booking transportation, preparing document support (invoice, packing list, permit and license), preparing customs clearance, transfer of goods from port to destination. And this research focused on import customs clearance of overseas purchasing that makes the most problems to company.

According to Clark, Dollar, & Micco (2004) and Fugate, Mentzer, & Stank (2010), supply chain both downstream and upstream has a key factor important for success, that are transportation and logistics which are a part of overseas purchasing. And customs clearance is one important key of success.

McTiernan (2006) said the impacts of long customs clearance are direct cost (storage, fees) or indirect costs (staff costs), time and flexibility. The main problem factor for import processes was a problem from the declaration of duties (Oviedo, 2012). So the importer and shipping agent must clearly understand the products (material, spec, and sometimes need catalogue support), that are concerned with duties and taxes (Woodle, 2008). And all for a good process, **all** concerned documents have to be completely filled out in advance to avoid a delay in customs clearance (Durgavich, 2009).

2.3 Lean

The root of lean comes from the car manufacturer in 1908, after the Second World War in Japan. The Company has to operate with limited resources with the efficiency of flows and meet the customers needs. So Lean was developed to be a strategy, practices, tools and techniques to serve this situation (Larsson, 2008).

According to Bollbach (2012) lean is the activities that seek to minimize waste, such as excess inventory and defective products. There are 5 dimensions that should be implemented by Lean (Duque & Cadavid , 2007) are the elimination of waste, continuous improvement, continuous flow and pull-driven systems, multifunctional teams and information systems.

According to Shah & Ward (2003) Lean is suitable to apply for services. Successfully applying Lean requires a long term improvement. And Lean will only succeed if the organization's infrastructure reflects a common focus. Difficulty is achieved in a complicated structure. There are 5 steps in the application guide to Lean.

(a) Specify value from the customer's perspective
(b) Identify the stream of processes used to provide value
(a) Remove non-value-added activities from the value chain
(b) Create pull by having all work initiated by customer demand
(c) Strive for perfection

Lean focus on eliminating waste of work flow and cannot control statistics, so the results are tangible. So Six Sigma was developed to be used for process improvement.

2.4 Six Sigma

In 1986, the foundations of Six Sigma were established by Bill Smith at Motorola Corporation in response to product quality.

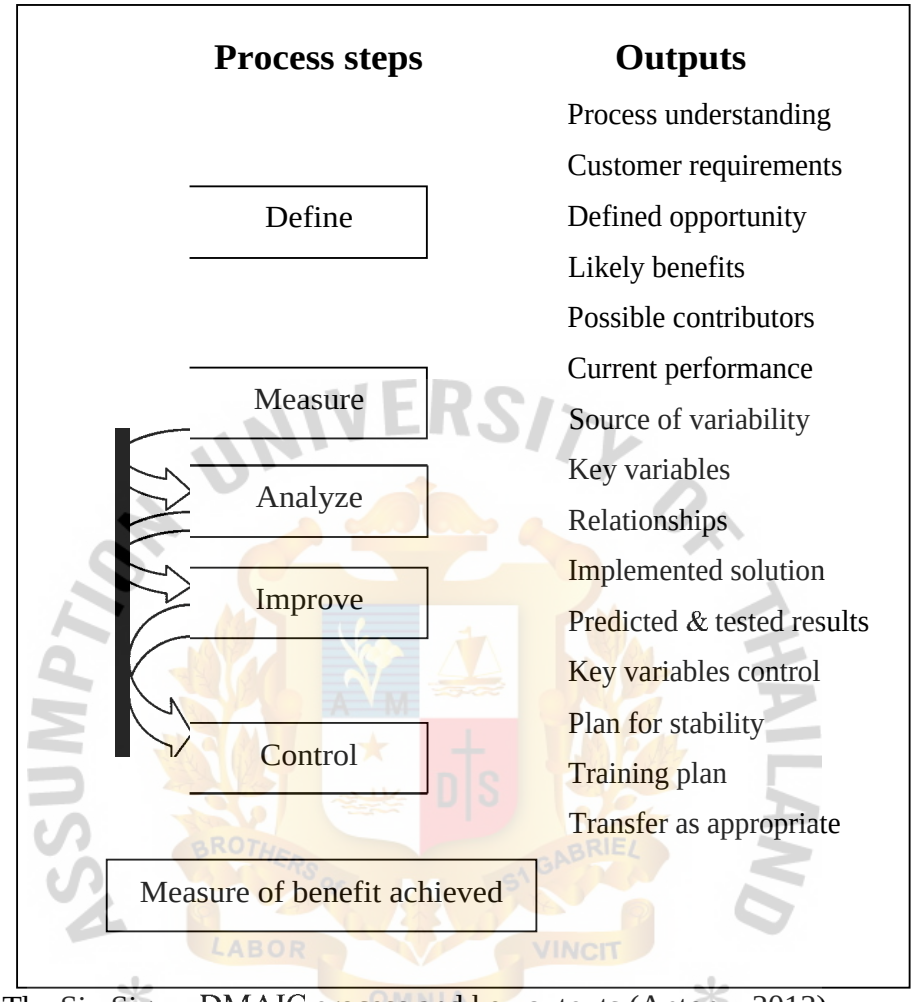
According to Goldsby & Martichenko (2005), Six Sigma is as a methodology to reduce defects to zero in the production process, to improve quality and eliminate causes of the defects, by using a set of statistical tools to understand the fluctuation of the process.

According to Robert (2003), Six Sigma focuses on process improvement. These efforts seek to eliminate the causes of variation in processes while leaving the basic process intact. Solution problems for Six Sigma normally use 5 phases of the DMAIC model to solve the problems.

2.5 DMAIC Model (Define, Measure, Analyze, Improve, Control)

According to Jirasukprasert, Garza-Reyes, Kumar and Lim (2013) DMAIC is an important part of Six Sigma. The DMAIC model can be described as a structured approach for solving problems. The origins of DMAIC come from Six Sigma and are widely used in businesses, suitable for complicated projects while it is less suitable for projects with a smaller scope (de Mast & Lokkerbol, 2012) (George, et al., 2005).

Figure 2.1: DMAIC Model



Source: The Six Sigma DMAIC process and key outputs (Antony, 2012).

Figure 2.1 shows DMAIC process and key outputs

D stand for **Define**

The major part is in the define phase, begins by defining the problem. What are the customers requirements and identify the problems that are causing the process to fall of expectations (Robert, 2003).

M stand for **Measure**

The next phase is focused on measuring the process. Key process characteristics are categorized, measurement and data was collected (Robert, 2003)

A stand for **Analyze**

After collecting the data, the intent is to produce information that provides insights into the process and its problems. Including identifying the fundamentals and most important causes of defects in the process (Robert, 2003).

I stand for **Improve**

In the improve phase potential solutions to the problem should be developed and optimized by identifying and implementing potential solutions to the problem of the process. The results of this process changs are carefully measured and necessary (Robert, 2003).

C stand for **Control**

The control phase has the purpose of verifying that the implemented solution is satisfactory as well as that the improvement is sustained (George, et al., 2005). This step is the maintenance phase of methodology to assure that no expected changes occur (Robert, 2003).

According to Breyfogle et al., (2001) DMAIC was recommended when the cause of the problem is unknown or unclear.

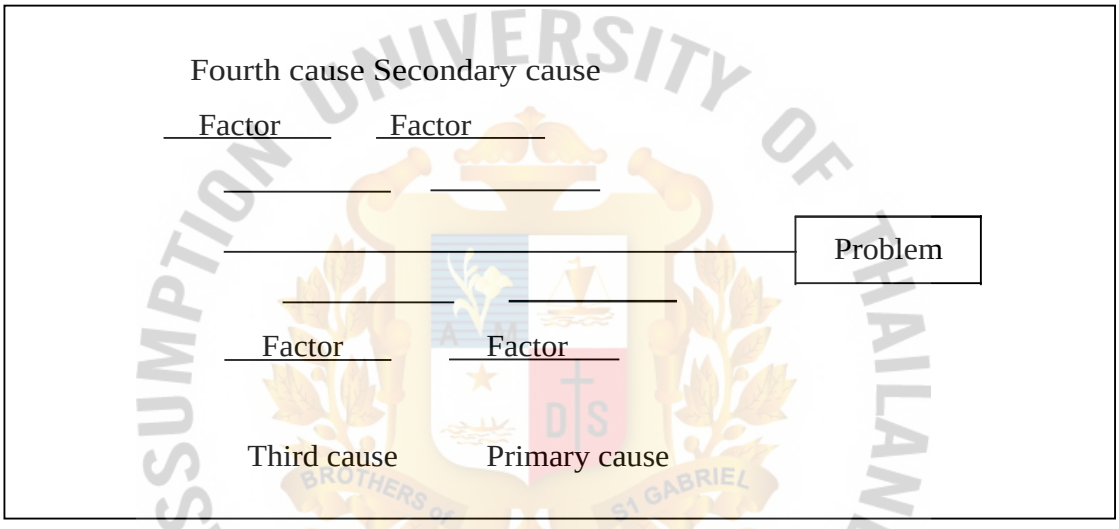
2.6 Cause and Effect Diagram

There are varieties of problems related to a long customs clearing time of the import process. To identify the root cause of the problems is a necessary step for improvement. The tools for identifying the root cause is a cause and effect diagram.

According to Wilson et al. (1993) a cause and effect diagram is also called Ishikawa diagram, Fishbone diagrams and Herringbone diagrams. Cause and effect diagrams were created by Kaoru Ishikawa in 1968 to determine root cause and factors. The way to solve a problem, the important thing which needs to understand is the root causes of a problem, which is the most basic reason for an undesirable condition or problem.

To analyze a cause and effect diagram starts with identifying the effect or problem by brainstorming with team members. Then write the exact core problem on the box at the right hand side. Then, list causes that are related to the problem or the effect. Categorized and established as the main causes, put them on each major branch of the fish bone diagram, as shown in Figure 2.2.

Figure 2.2: Cause and Effect Diagram



Source: Cause and Effect diagram (Bilsel & Lin, 2012)

Figure 2.2 shows a cause and effect diagram form also call a fishbone diagram, the problem is the head (right hand side), causes of problem are along the body of fish and the factors are the branches.

2.7 Pareto Analysis

According to Haughey (2006) Pareto analysis is a tool for decision making under statistical techniques, focus on 80% of problems to improvement. Moreover, Karuppusami and Gandhinathan (2006) said that Pareto analysis is a concept by defining quality control by ranking orders from the highest to the lowest and considerable 80% of amount of cumulative percentage.

Four steps of Pareto analysis

(a) List the causes and frequency as a percentage

(a) Rank order from the highest to the lowest

(b) Add cumulative percentage

(c) Select 80% of cumulative to improvement

2.8 Review related literature

The researcher applies the DMAIC model to identify and analyze the root cause of long customs clearing time. The solution needs to be proposed to the team for improving performance and achieving the target. The previous successfully studies have been reviewed as shown in Table 2.1.

Table 2.1: Summary of Six Sigma and DMAIC Research

Author	Objectives	Value	Result
Jirasukprasert, Garza-Reyes, Kumar and Lim (2013) "A Six Sigma and DMAIC application for the reduction of defects in a rubber gloves manufacturing process"	Using Six Sigma and DMAIC to improve product quality by reducing the number of defected products.	This study presents how the application of Six Sigma and DMAIC can help manufacturing to achieve quality process improvement.	The root causes of grove defect were oven temperature and conveyor's speed. 50 percent reduction in the leaking gloves defect from 195,095 to 83,750.
Prashar (2013) "Adoption of Six Sigma DMAIC to reduce cost of poor quality"	Using Six Sigma tools for identify and reducing cost of poor quality, problems of failing cooling fan assembly at the repair division.	This study uses the Six Sigma DMAIC model to repair and maintain cost of failure and improved processes.	The root cause of poor quality of a cooling fan. To improve cross-fitment bearings issue, bearing machine software was proposed. And changed to use electronic jig instead of manual jig.
White, Gracia, Hernandez and Meza (2009) "Cycle Time Improvement by a Six Sigma Project for the Increase of New Business Accounts"	To reduce the cycle time for acquiring a new credit account in a finance group.	The methodology used in this project was the DMAIC technique to analyze process inefficiencies in manufacturing.	Reduced cycle time from 49 days to 30 days which resulted in an expected annual savings of $300,000.00. Also an increased customer satisfaction and an increase of sales is expected.

Table 2.1: Summary of Six Sigma and DMAIC Research

Author	Objectives	Value	Result
Mishra and Sharma (2013) "A hybrid framework based on SIPOC and Six Sigma DMAIC for improving process dimensions in supply chain network"	To introduce a hybrid framework (suppliers, inputs, process, output and customers define, measure, analyze, improve and control (SIPOC, DMAIC) aimed at improving supply chain management (SCM) process dimensions in a supply chain (SC) network.	To improve SCM process performance is provided. The use of statistics in DMAIC provides better insight into the process performance, and process control.	Improving process performance based upon experiences, and use of statistical tools by cross functional teams with an effective coordination, guarantees success.
Mehrjerdi (2011) "Six-Sigma: methodology, tools and its future"	To introduce fundamentals of Six-Sigma and implementers to large and small companies as well as system development and/or planning.	Reviews concepts of Six-Sigma and analyzes why it is important for small and large organizations. To implement Six-Sigma concepts/DMAIC model into working methodology for quality improvement.	Identify the organization goals, modernize and simplify activities towards the goals by applying Six Sigma methodologies.
Ray, Das and Bhattacharya (2011) "Prevention of industrial accidents using Six Sigma approach"	To protect the accident in manufacturing industries by using Six Sigma to improve quality of product, process or service quality	To implement improving manufacturing process and purpose of accident prevention is still limited. Six Sigma can resolve problems, and prevention.	Root causes of accidents were identified by using the DMAIC methodology of Six Sigma, corrective action needs to be proposed to the relevant process.

Source: Author

CHAPTER III

RESEARCH METHODOLOGY

This research is a case study of PPP Company; proposed to identify the root cause of long customs clearing time of import process, propose to the problem solving and to recommend the problem improvement by applying the DMAIC model. This research methodology started with data collection, analysis, proposed model (DMAIC model) and the final is a summary.

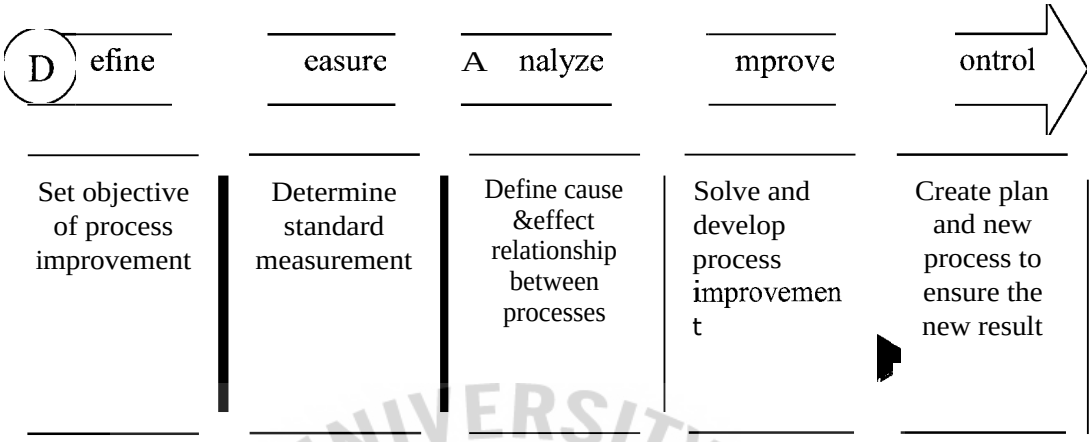
Data collection: The researcher collected data step by step directly from a set of import documents. The data consists of the number of total import shipments in 2013 from January to December, category of goods, arrival date, delivery date to the warehouse, KPI days, storage costs, value of shipments and reasons for delayed delivery.

Data analysis: The researcher analyzed the overall customs clearing time to compare it with the target and then analyzed the customs clearing time by category compares with the target. Then, drew the work flow of current processes and pointed out the weak point. Then the researcher analyzed the opportunities of loss that impacted the company.

Proposed model: The researcher found the model of Six Sigma which helped to solve the problems that could not find the root cause. Six Sigma, the DMAIC model helps the researcher step by step as a tool towards finding the root cause of the problem and improving the performance process. Five steps of the DMAIC model are to define measure, analyze, improve and control.

Summary: At the end of this chapter, the reader will understand the research methodology, understand the root causes to prevent future long customs clearing times, and ensure that this problem does not occur again.

Figure 3.1: DMAIC Methodology



Source: Author

Regarding Figure 3.1 it shows the DMAIC methodology. Starting with the define phase by data collection, purposed to set the objective of the process improvement. Then, the next phase is to measure, the purpose to determine a standard measurement of this improvement process by using data collection. The third phase is analysis, to identify causes and effects of relationships between the processes by using a cause and effect diagram. The fourth phase is the improve phase, to solve and develop points of the problems. The tool used should be the process flow chart. The last one is the control phase, the final phase is set to ensure that the new process still maintains good results.

3.1 Define Phase

The first step of the DMAIC model is the define phase. The main objective in this phase is to draft a scope of the project by collecting historical data (including number of import shipment from January 2013 to December 2013, purchase order number, category of goods, arrival date, delivery date, and storage cost). To identify the objectives of the research, the researcher divided work into 2 steps:

3.1.1 Find the average customs clearing time of all import shipments

First of all, the researcher collected data of the customs clearing times for importing shipments between January 2013 to December 2013, totaling 958 shipments by filling in the related data in an excel file. The researcher found that average time for customs clearance for all categories of goods was 6 days but the target was set at 5 days. Details are shown below in Table 3.1.

Table 3.1: Average customs clearing time for all categories

Number of shipment Jan'13 – Dec'13 (shipments)	Total customs clearing time (days)	Average customs clearing time (days)
958	5562	5.806

Source: KPI monthly report

Table 3.1 shows the average customs clearing time for all categories; calculated from total customs clearing time divided by number of shipments.

$$\text{Average customs clearing time} = \frac{\text{Total customs clearing time}}{\text{Number of shipment}}$$

$$= 5562/958$$

$$= 5.806 \text{ days}$$

The results of the average customs clearance for all categories is over the target but it seems not much, so the researcher scoped down the details into the average customs clearing time by procurement category.

3.1.2 Find the average customs clearing time by procurement categories and value

After the researcher got an average customs clearing time for all import shipments, the researcher tried to dive deep in the details of the data by finding an average customs clearing time by procurement categories and value. And found the main points of problem are category PP, project procurement as shown below in the details in Table 3.2.

Table 3.2: Average customs clearing time by procurement category and value

Category	Number of shipment Jan'13 – Dec'13 (shipments)	Total customs clearing (days)	Average customs clearing time (days)	Purchase value (baht)
PP	**20**	**231**	**11.50**	**1,045,238,738**
ST	242	1431	5.913	206,846,207
S3	77	433	5.623	190,909,685
S2	7	49	7	112,212,835
S1	5	40	8	87,733,022
			Total value	1,642,940,487

Source: KPI monthly report

Table 3.2 shows an average customs clearing time by category, specific to the project procurement (PP) that has the most clearing time. And the number of shipments did not meet the target which was 20 shipments. As the information shows in table 3.2, the researcher found the problem point was the import process. That is the category of project procurement, average customs clearing time did not meet the target.

The conclusion of the define phase is that the researcher gained the data and found the main point that made performance of the customs clearing time not meet the target (main problem is in the project procurement, average customs clearing day is 11.50 days but the target was set 5 days for process) and the value of the process is 1,045,238,738 baht (almost 70% of total purchase value). So the researcher focused on project procurement because of the high value, high impact, big amount of purchases and long customs clearing time.

3.2 Measure Phase

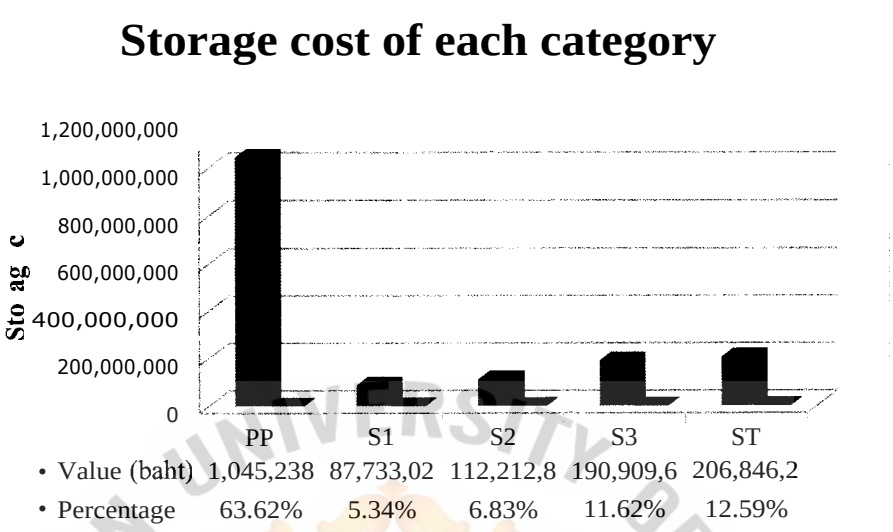
Measure is the phase of checking the performance and to be sure that the target of errors has been realized based on the standard measurement. The first step of this phase is to choose what you want to measure and the second is how to impact the company.

The collected data of long customs clearing time of the project procurement made the performance not meet the target and moreover the researcher focused on the impact that was possible to happen from this problem. The researcher collected data from the concerned parties and analyzed the impact of financial loss, divided into 2 steps:

3.2.1 Storage cost of each category

The researcher collected data from the payment receipts that the company had to pay for terminal operations about the storage charge for project procurement from Jan 2013 to Dec 2013, with a total cost of 1,405,238 baht per year.

Figure 3.2: Storage cost of each category



Source: KPI monthly report

Figure 3.2 shows the project procurement storage cost and other categories.

3.2.2 Opportunity Cost of delay

The delay cost of the project was collected by project including control team, delay cost for the delay of a project which was 30,000,000 baht per day. If the project cannot operate according to the timetable, that made the delay in production.

When the data was collected and analyzed, the researcher focused on the project procurement that had a high impact and high value. For the next phase, the researcher will analyze the problem to find the root cause and identify the current process.

3.3 Analyze Phase

Analysis is the third phase of DMAIC, where the researcher collected data and reviewed the KPI monthly report (data including arrival date, document submission date, verify of declaration date, payment date and release date, problem found and the reason of problem), the researcher analyzed the data according to the goals as shown below.

To identify the focus point of the customs clearance

To identify the delay problem of stage to submit a declaration

To identify the factors of the delay problems by using cause and effect diagram

To analyze as-is process

After the researcher passed two phases (define and measure), then in this analysis phase the researcher identified the root causes of the problem by using a cause and effect diagram, then analyzed the weak points of the process by using a process flow chart, divided and analyze the phase in 5 steps:

3.3.1 Analyze the focus point of the customs clearance

The purpose of this step is to analyze the focal points of the customs clearance process by data collection and reviewing the KPI monthly report.

In the define phase, the researcher set the objective of this research to focus on import customs clearance of the project procurement that took an average time over the target. But the customs clearance has 4 stages, so the researcher needed to know what stage was the main problem of the project procurement. The researcher scoped down the details by analyzing 4 activities involved with import customs clearance.

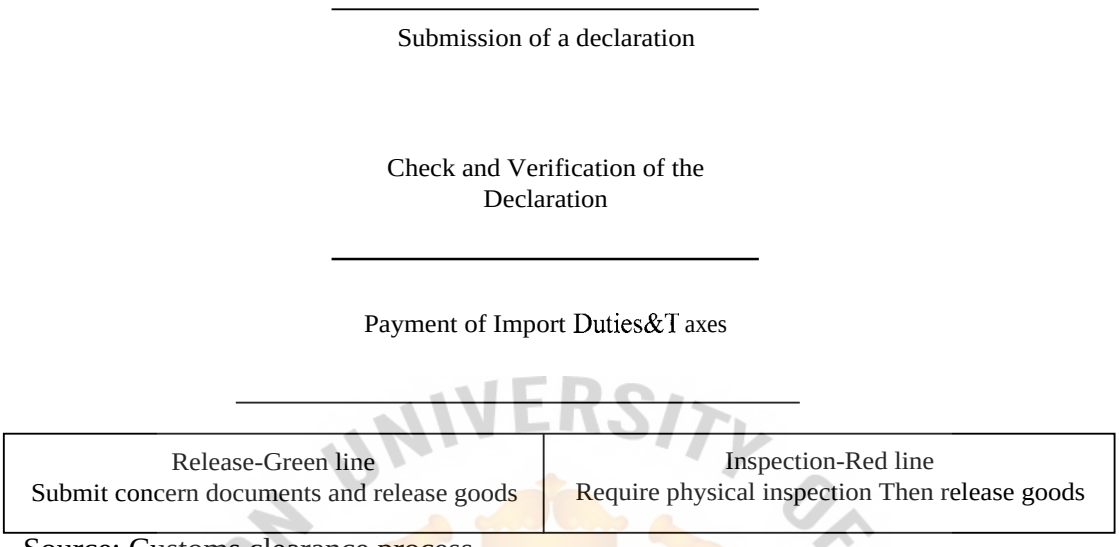
(a) Submission of a Declaration

(b) Check and Verification of the Declaration

(c) Payment of Import Duties and Taxes

(d) Inspection and Release of Cargo

Figure 3.3: Declaration and Customs Clearance Process



Source: Customs clearance process

Figure 3.2 shows the four stages of customs clearance. Starting with when the goods arrive at the destination port, the company has to submit a declaration including an air waybill or bill of lading, invoice, packing list, import license (if applicable), certificates of origin (if applicable), catalogue, product ingredients, materials, and a declaration of goods to customs. Then, a customs officer will check and verify all submissions. And then the company has to do a payment process for import duties and taxes. Next is the release of goods, divided into 2 conditions that are green line for general goods and red line for goods that require inspection before release.

After that, the researcher needs to know which stage of the customs process is the main problem for this case. The researcher collected the data from the KPI monthly report including an arrival date and submit date of each steps of the custom clearance process. The data of 20 PO of project procurement which was over the average customs clearing time was clarified by a specific date into each stage of the customs clearance, see in Table 3.3.

Table 3.3: Times of each stage of import customs clearance

PO	Arrival date	Stage 1 **Document** submit date	Amount day to submit declaration completely	Stage 2 Check and verify of **declaration**	Stage 3 Payment date	Stage 4 Release date	Ship to warehouse date	Total customs clearing days from arrival date to warehouse
P01	11 Jan	17 Jan	7	17 Jan	18 Jan	18 Jan	18 Jan	8
P02	8 Nov	12 Jan	5	12 Jan	13 Jan	13 Jan	13 Nov	6
P03	7 Dec	11 Dec	5	11 Dec	12 Dec	12 Dec	12 Dec	6
PO4	2 Nov	6 Nov	5	6 Nov	7 Nov	7 Nov	7 Nov	6
P05	10 Oct	13 Nov	34	13 Nov	14 Nov	14 Nov	14 Nov	35
P06	13 Dec	26 Dec	14	26 Dec	27 Dec	27 Dec	27 Dec	15
P07	2 Jun	7 Jun	6	7 Jun	8 Jun	8 Jun	8 Jun	7
P08	6 Aug	13 Aug	8	13 Aug	14 Aug	14 Aug	14 Aug	9
P09	7 Feb	22 Feb	16	22 Feb	23 Feb	23 Feb	23 Feb	17
P010	10 Jul	16 Jul	7	16 Jul	17 Jul	17 Jul	17 Jul	8
P011	14 Sep	18 Sep	5	18 Sep	19 Sep	19 Sep	19 Sep	6
P012	22 Jun	26 Jun	5	26 Jun	27 Jun	27 Jun	27 Jun	6
P013	23 Mar	27 Mar	5	27 Mar	28 Mar	28 Mar	28 Mar	6
P014	6 Jun	12 Jun	7	12 Jun	13 Jun	13 Jun	13 Jun	8
P015	6 Jun	10 Jun	5	10 Jun	11 Jun	11 Jun	11 Jun	6
P016	15 Jun	23 Jun	9	23 Jun	24Jun	24 Jun	24 Jun	10
P017	8 Jul	30 Jul	23	30 Jun	1 Aug	1 Aug	1 Aug	24
P018	1 Jun	15 Jun	15	15 Jun	16 Jun	16 Jun	16 Jun	16
P019	6 Aug	19 Aug	14	19 Aug	20 Aug	20 Aug	20 Aug	15
P020	5 Aug	20 Aug	16	20 Aug	21 Aug	21 Aug	21 Aug	17

Source KPI monthly report

Table 3.3 shows the arrival date and submission date of 20 shipments of project procurement, but the main problem is the first stage "Submission of a declaration", that took more time than other stages.

The conclusions of this step are after the researcher gathered the data of customs clearance activities and the submission date of each stage together, the researcher knew the focus point. That is the first stage of the customs clearance, "submission of a declaration". It took more time (5 days and over) than the other stage. After that stage 2 (check and verification of the declaration), stage 3 (payment of import duties and taxes) and stage 4 (inspection and release of cargo) took a few days for the delivery of the goods. The next step is to analyze the root cause of the problem that made the company submit concerned documents to customs officers lately, which is an internal problem.

3.3.2 Identify the delay problem of stage to submit a declaration

The purpose of this step is to identify the delay reason of submitting in the declaration stage by data collection.

In this step, the researcher pointed to the stage of submission by a declaration by finding the delay reasons. The researcher accumulated more data of 20 POs of project procurement by the summary report of import-export shipments for projects, the delay reasons of the projects was concluded in report after the processes have finished completely. The researcher collected delay reasons of each PO and filled in the table, seen in Table 3.4.

Table 3.4: Delay problems of the stage "submission of a declaration"

Item	PO number	Problem found		Remark
		Incomplete shipping documents	Incomplete product details	Delay reason
1	P01	✓		Need revise details on shipping documents/invoice
2	P02	✓		Request extra documents
3	P03	V		Need revise details on shipping documents/invoice
4	PO4	✓		Need revise details on shipping documents/invoice
5	P05		V	Need more details of goods for import duty
6	P06		V	Need more details of goods for import duty
7	P07	✓		Request extra documents
8	P08	V		Need revise details on shipping documents/weight on BL
9	P09	V		Shipping documents no show reference detail
10	P010		V	Need more details of goods for import duty
11	P011		V	Need more details of goods for import duty
12	P012	V		Need revise details on shipping documents/invoice
13	P013	V		Need revise details on shipping documents/price on invoice
14	P014		V	Need more details of goods for import duty
15	P015		V	Need invoice declared all part of goods
16	P016		V	Need more details of goods for import duty
17	P017	V		Need revise details on shipping documents
18	P018	✓		Need revise details on shipping documents/price on invoice
19	P019	✓		Need revise details on shipping documents/price on invoice
20	P020		V	Need more details of goods for import duty

Source: summary report of import-export shipment for project

Table 3.4 shows the delay reasons for project procurement of customs clearing time over the target. The first problem is the incomplete shipping documents, total number

is 12 POs. The second one is the incomplete product details, for a total number of 8 POs.

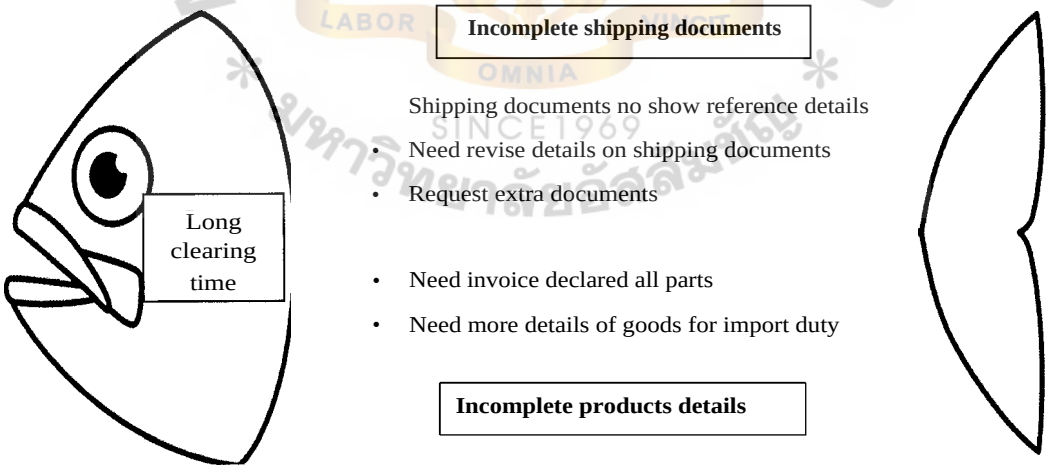
The conclusion of this step is to known the main delay reasons, "incomplete shipping documents" and "incomplete product details". In the next step, the researcher will identify the cause and effect of the delay reasons by using a cause and effect diagram.

3.3.3 Identify the factors of the delay problems by using cause and effect diagram

The purpose of this step is to identify the cause and effect of the delay reasons by using a cause and effect diagram.

From the above table, the researcher got the main delay reason of the stage submitted by a declaration of the project procurement, that are "incomplete shipping documents" and "incomplete product details". In this step, the researcher wants to know the factors of the problem. So a cause and effect diagram is a suitable tools to find it out.

Figure 3.4: Cause and Effect Diagram



Source: Author

Figure 3.4 shows the problems and factors of incomplete product details.

3.3.4 Identify focus problem by using Pareto Analysis

The cause and effect diagram defines the root causes of the problem based on 20 shipments that customs clearing time has over the target. Moreover, it helps the researcher scope down and focus on improvement efforts. Then Pareto Analysis was implemented in order to find 80% of the causes, which focused on implementation.

Table 3.5: Pareto Analysis by Problem found

Number	Problem found	Number of shipments	Percentage	Accumulative percentage
1	**Revise details on shipping documents**	**9**	**45%**	**45%**
2	**Need more details of goods for import duty**	**7**	**35%**	**80%**
3	Request extra documents	2	**10%**	90%
4	Shipping documents no show reference detail	1	5%	95%
5	Need invoice declared all part of goods	1	5%	100%
	Total	20	100%	

Source: Author

Table 3.5 shows five causes of problem found. According to the Pareto Analysis the researcher focused on 2 major causes of the problems found, that are revision details on shipping documents and needs more details of goods for import duty declaration, 80%.

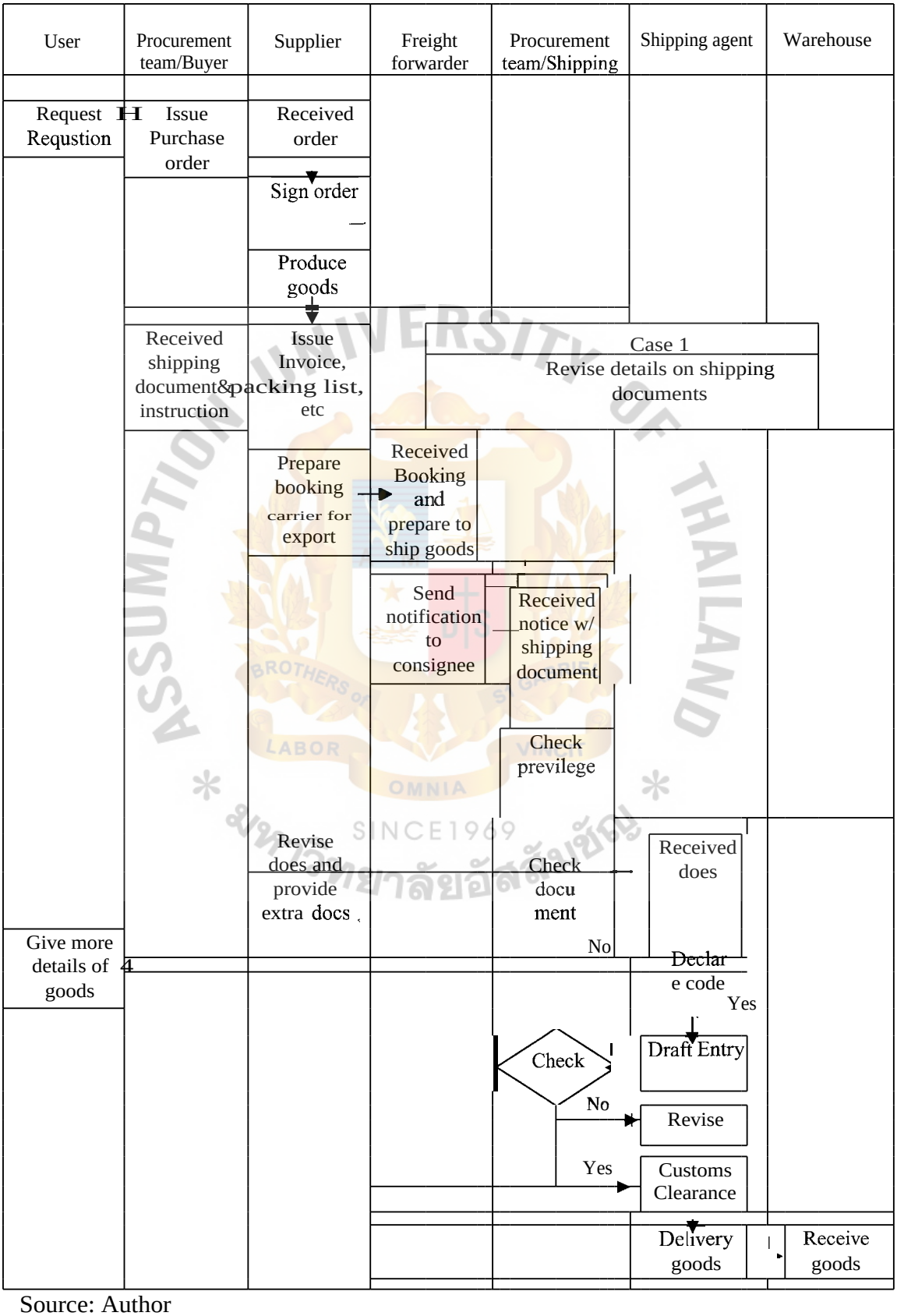
3.3.5 Analyze as-is process

The purpose of this step is to analyze the as-is process by using a process flow chart.

After analyzing the root cause of the problem, the researcher focused on customs clearing time of project procurement in the stage of submission and declaration. And the researcher concluded the delay reasons into 2 problems, "revise details on shipping documents" and "need more details of goods for import duties". In this step, the researcher analyzed the as-is process following the details of the delay reason **(1** delay reason for 1 as-is process).

For the first problem "revise details on shipping documents", when the goods are complete and ready to ship out, the supplier has to prepare shipping documents and send to the buyer. But no one forwarded the shipping documents to shipping team for advance checking. So, when the goods arrived to the destination and the company needed to submit all concerned documents to the customs officer, sometimes documents are not complete and there are mistakes. So the company cannot send them to the customs officer. The problem is the process between when shipping documents were issued completely by suppliers, they were sent to buyers for confirming back but no one sent to the shipping team for advance checking. So this causes problem of incomplete shipping documents, see as-is process in Figure 3.5.

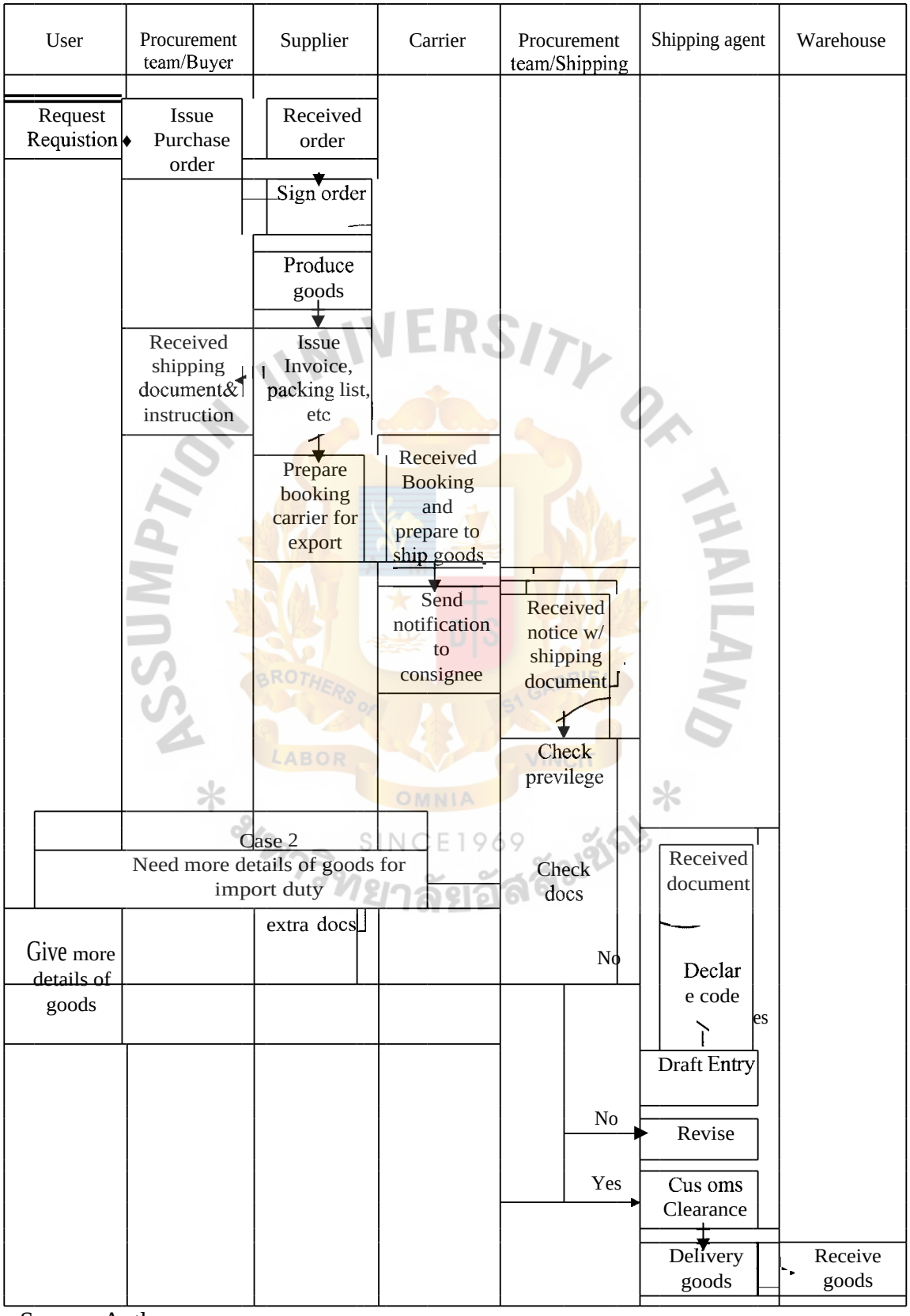
Figure 3.5: As-is process of problem "Revise details on shipping documents"



Source: Author

For the second problem "need more details of goods for import duty", Normally when goods arrive at the destination port, a company has to submit a declaration of goods (Declaration of goods, Bill of Lading or Air Waybill, Invoice, Packing List, Import License, Certificates of Origin Other related documents such as catalogue, product ingredients, materials etc.) to customs and this issue is concerned about the details of goods. When users request requisitions attached with details of goods (material and catalogue) to the buyer but no one sent details of goods to the shipping team in advance to prepare them to submit to customs. So, when the goods arrives at the destination port and the company has to submit a declaration to customs, the shipping team needs to ask for more details from the user and this point takes a long time and it is the cause of the problem for long customs clearing time, see as-is process in Figure 3.6.

Figure 3.6: As-is process of problem "Need details of goods for import duty"



Source: Author

After analyzing this phase, the researcher gained the exact point of the problem (submit a declaration), the delay reason (incomplete shipping documents and incomplete product details), the root cause of the problem and as-is process. In the next phase, the researcher will purpose a development to manage the problem.

3.4 Improve Phase

The objective of the improve phase is to purpose to develop the problem (as-is process) by mentioning the new solution, and new work instructions.

From the analysis phase, the researcher got an understanding of the current process (as-is process). Then in this improvement phase, the researcher selected the process that could be causing the problem and needed more attention by changing the process to prevent future long customs clearing times. And the weak point will be developed by a new solution recommend as the To-be process and it will be implemented to manage it.

Finish the fourth phase, the reader will get the To-be process to reduce long customs clearing times and for future development. New solutions will be chosen to implement.

3.5 Control

Control is the last stage of the process. It ensures that any discrepancy has failed before it affects the process negatively. This control phase makes DMAIC stay effective and continues with positive results.

The researcher will propose the new documents control (checklist) and instruction to all concerned parties to control documents concerning the details of goods for ensuring the new improvement process is continued and measured.

After passing the five steps of DMAIC, the reader will work under the new process and all employees will get training programs and the customs clearing time was reduce and prevented future problems.

Table 3.6: Framework for Action Research Approach

Phase	Activity	Result	Tools
Define	Collect data from Jan to Dec2013, KPI monthly report. Divided to 2 steps, average customs clearing time of all import shipments and by category and value	Define the scope to project, by focus on project procurement because of high purchase and high value	Data collection
Measure	Collect the data of impact when long customs clearing time happen to project procurement	Identify the impact of project procurement when result does not meet the target	Data collection
Analyze	Identify the root causes by collect from documents concern and draw and analyze the weak point of current process	Identify the point of problem, the delay reason and as-is process	Cause and effect diagram Data collection Process flow chart
Improve	To purpose develop As-is process by mention new work instruction	To-be work flow	Process flow chart
Control	Propose the new documents control (checklist) to maintain the results	New improve process is continued and maintain the good results	Checklists

Source: Author

Table 3.6 shows action research, and was concluded in the table for easy to see and easy to understand presentation.

3.6 Summary

This chapter explain the full details of DMA (define, measure, analyze), and focuses on identifying the root cause and the as-is process for the points that need improvement. Data shows steps of the research starting with the data collection analysis and the proposed model. Data analysis focused on finding the focus points of the import process by reviewing the reports, then identifying the problem causes by reviewing reports, and moving to identify the root cause by using a cause and effect diagram then using pareto analysis for ranking the 80% causes of the problem, and the last step is to analyze the as-is process of the main problem. Steps in this chapter are the preparation done before the improvement phase by proposing the to-be process and the control phase by setting documents to control for maintaining the results in the next chapter.

CHAPTER IV

PRESENTATION AND CRITICAL DISCUSSION OF RESULTS

After passed chapter 1 to chapter 3 (define, measure and analyze) by following the DMAIC model, the researcher has already understood a problem and the root cause of long customs clearing time. Then the results were focused on customs clearance time of the import process of project procurement. In chapter IV is the improvement phase, the researcher focus on implementing the to-be process for weak points. And the last one is the control phase to monitor and control improvements to maintain the results.

4.1 D – Define: To set objective of improvement

The researcher collected data of customs clearing time of all import shipments for import project procurement between January 2013 to December 2013, a total 958 shipments, and average customs clearing time of 5.806 days. Then the researcher scoped down by collecting data and tried to find customs clearing time of each category, and found that the main points of the problem are category PP (project procurement), average customs clearing times are 11.50 days. After passing the define phase, the researcher found the main point to study was improvement.

4.2 M – Measure: To be sure that the target of improvement has been realized based on the standard measurement.

The collected data was kept for 1 year from January 2013 to December 2013, and the data represented a long customs clearing time of import project procurement. So the researcher focused on the critical points, import process of project procurement which has a high impact, which are storage costs and costs of delay.

4.3 A – Analyze: To identify relationship between processes and deduct the root causes of problem.

A total of 20 shipments of project procurement (20 projects) are over the target. The 2 main reasons for the delay are incomplete shipping documents and incomplete product details. Then the researcher used a Cause and Effect Diagram to define the possible causes by collecting historical data, details shown in Figure 4.1.

Figure 4.1: Cause and Effect Diagram of long customs clearing of project procurement

Source: Author

Figure 4.1 shows the cause and effect diagram of the problems of a long customs clearing time, analyzed by the base of 20 shipments of project procurement that were over the target.

The cause and effect diagram define the root causes of the problem based on 20 shipments where the customs clearing time was over the target. Moreover it helps the researcher scope down and focus on improvement efforts. Then Pareto Analysis was used to find 80% of causes, which focused on implementation.

Table 4.1: Pareto Analysis by Problem found

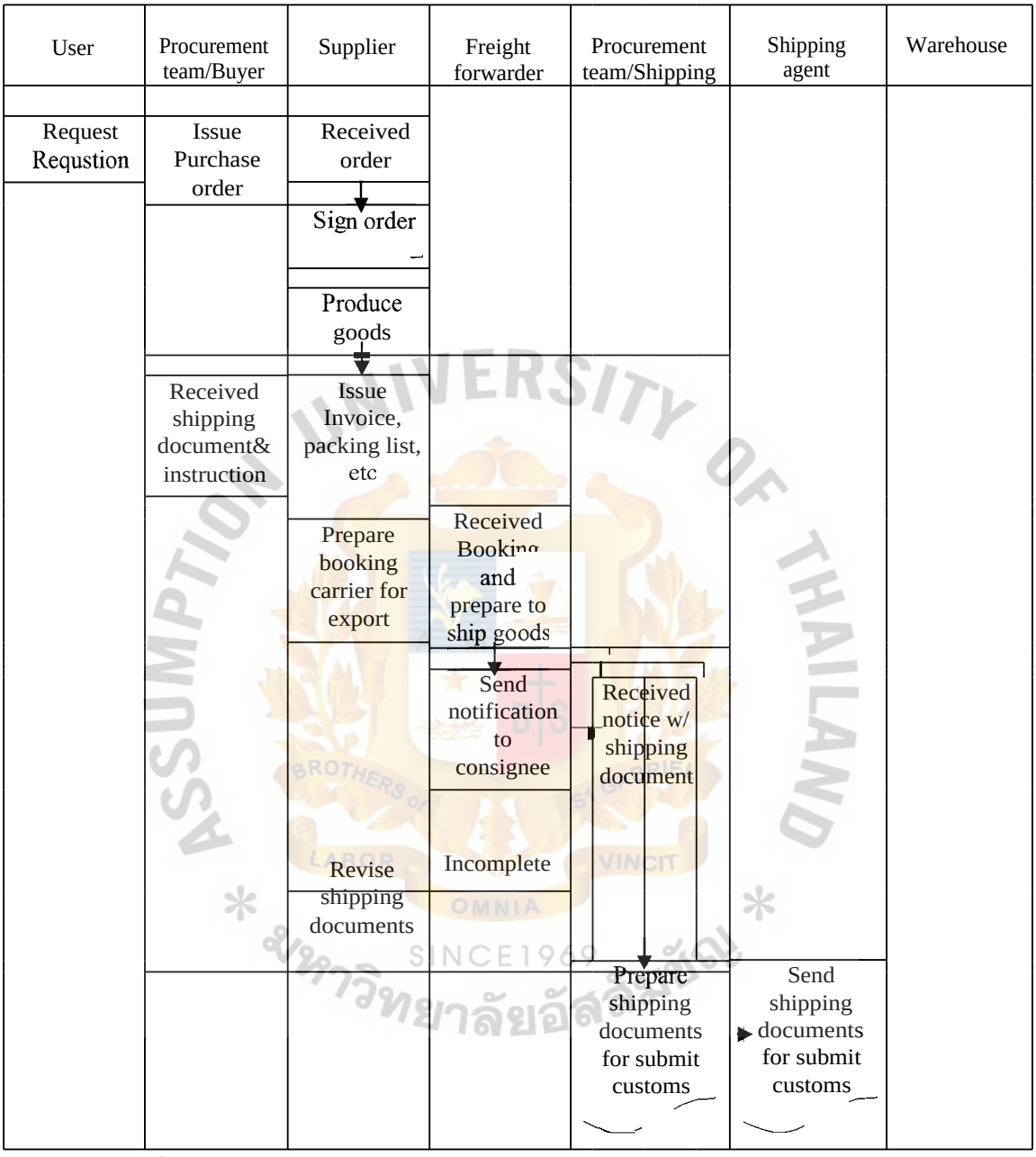
Number	Problem found	Number of shipments	Percentage	Accumulative percentage
1	**Revise details on shipping documents**	**9**	**45%**	**45%**
2	**Need more details of goods for import duty**	**7**	**35%**	**80%**
3	Request extra documents	2	10%	90%
4	Shipping documents no show reference detail	1	5%	95%
5	Need invoice declared all part of goods	1	5%	100%
	Total	20	100%	

Source: Author

Table 4.1 shows five causes of the problems found. According to the Pareto Analysis the researcher focused on 2 major causes of problems, that were revision details on shipping documents and need more details of goods for import duty declaration, 80%.

4.3.1 Revised details on shipping documents: After analyzing the data of the problems found by reviewing the summary report of import-export shipments for the project, the researcher found the first main problem is revised details on shipping documents. When the goods are complete and ready to ship out, suppliers have to prepare shipping documents and send them to the buyer. But no one forwarded shipping documents to the shipping team for advance checking. So when the goods arrived to the destination and the company needed to submit all concerned documents to customs officers, we found mistake and had to send them back to the supplier revise, see as-is process in Figure 4.2.

Figure 4.2: As-is process of problem "Revise details on shipping documents"

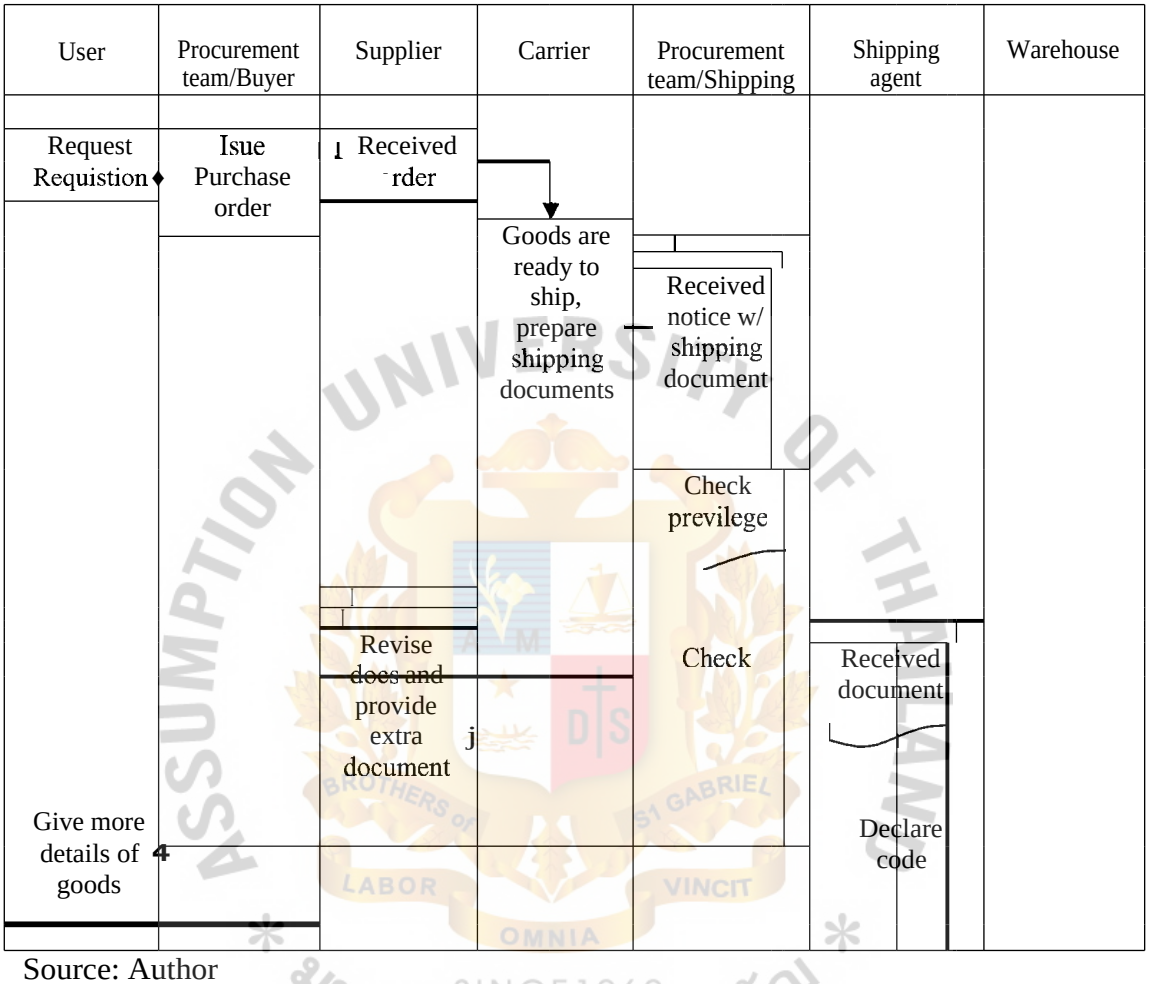


Source: Author

Figure 4.2 shows the as-is process of problem revise details on shipping documents.

4.3.2 Need more details of goods for import duty declaration: After analyzing the data of the problem found by reviewing the summary report of import-export shipments for the project, the researcher found the second problem is need more details of goods for import duty declaration. When goods arrive at the destination port, the company has to submit the declaration of goods (Declaration of goods, Bill of Lading or Air Waybill, Invoice, Packing List, Import License, Certificates of Origin Other related documents such as catalogue, product ingredients, materials etc.) to customs and this issue is concerned about import duties. This problem always happens when users request requisitions attached with details of goods (material and catalogue) to buyers but no one sent details of the goods to the shipping team in advance to prepare them to submit to customs. So when the goods arrive to the destination port and teh company has to submit a declaration to customs, the shipping team needs to ask for more details to user and this point takes long time and it is the cause of the problem of long customs clearing time, see as-is process in Figure 4.3.

Figure 4.3: As-is process of problem "Need more details of goods for import duty declaration"



Source: Author

Table 4.3 shows the as-is process of problem need more details of goods for import duty declaration.

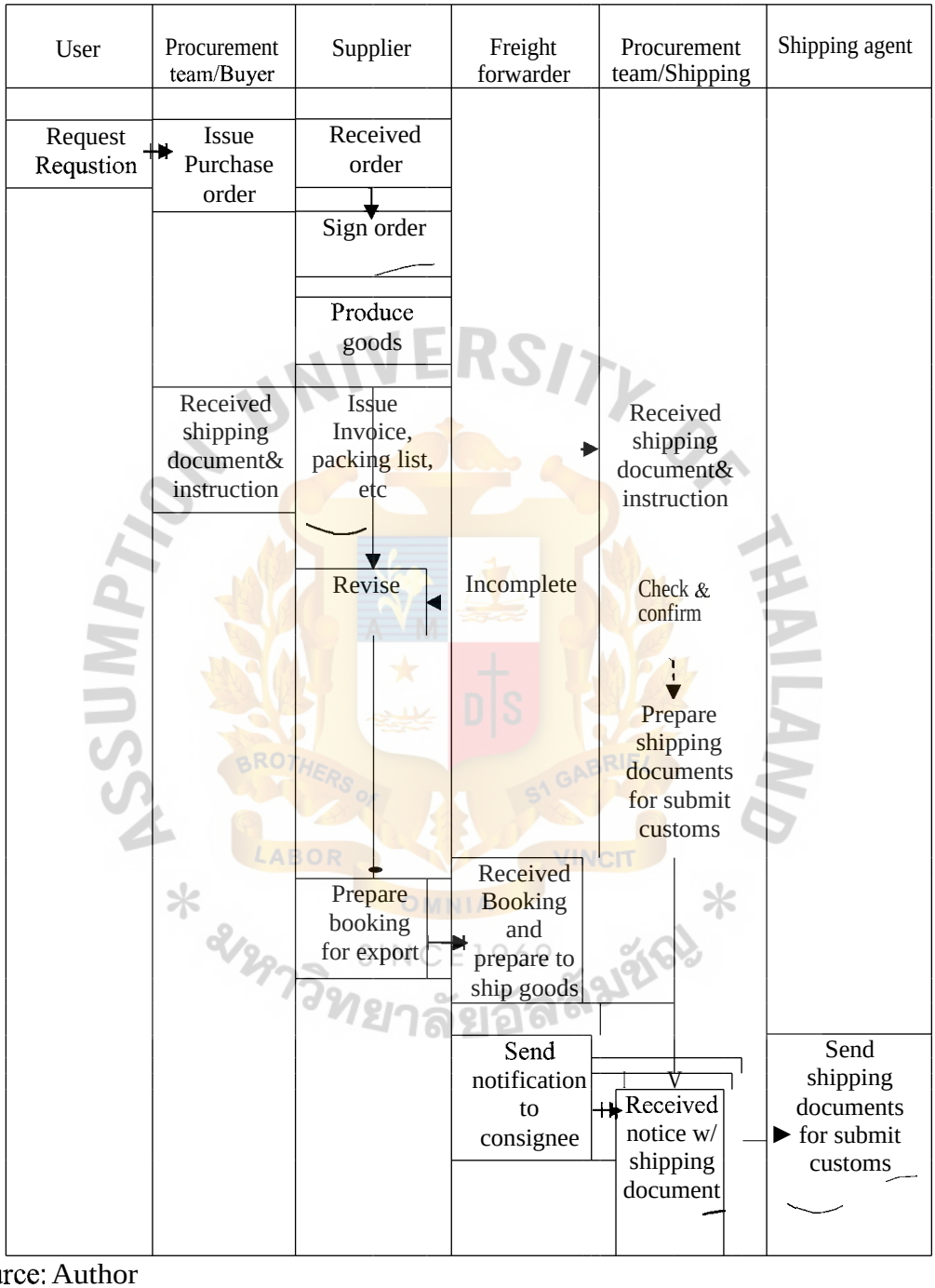
After reviewing the analyzed data, the researcher learnt that the long customs clearing time of project procurement was based on internal problems of the company. And from the as-is process, in this chapter the researcher tried to find the new solution by applying the DMAIC model to improve the process and eliminate the problem. Moreover the researcher applied the DMAIC model to control and ensure that the problem will not happen in the future. So the company will get the benefit, of reduced long customs clearing time and better KPI.

4.4 I – Improve: To propose To-be process

This phase is to propose the new process (to-be process) to propose the way to reduce the long customs clearing time. There are two solutions to improve the two causes of the problem.

4.4.1 Revise details on shipping documents: After the researcher understands the as-is process of the problem, the revised details on the shipping documents. That is procurement team/shipping received shipping documents after the arrival date, so the solution focused on when suppliers issue shipping documents, they have to send to both the procurement team/buyer and the procurement team/shipping for confirmation. This to-be process may help to develop and eliminate the problem. See to-be process in figure 4.4.

Figure 4.4: To-be process of problem "Revise details on shipping documents"



Source: Author

Figure 4.4 shows to-be process of problem revised details in the shipping documents. For prevention of this problem, when suppliers send shipping documents to the procurement team/buyer, the supplier should add the procurement team/shipping in an

e-mail loop. Because of the procurement team/shipping needs to review shipping documents in advance for checking and confirmation.

The researcher set shipping instruction to help this problem by sending the letter attached with shipping instructions for project procurement and needs suppliers and freight forwarder confirmation acknowledgement back, shipping instructions include the details of the data that are important for the procurement team/shipping and it is sent to all parties (project team, procurement/buyer and supplier) and send to suppliers before the goods are shipped out and suppliers must follow the instruction details on the shipping instruction, see details in Figure 4.5.

Figure 4.5: PPP Company Shipping Instruction

PPP Company Shipping Instruction

PPP Project name

Dear all concerns/Project coordinator,

Please be informed that the following details are absolutely required for all shipments to Thailand to avoid any unexpected expenses during customs clearance. And please send all concerns shipping document to person on attention e-mail below.

Onsite handling

Due to avoid any unexpected during customs clearance, PPP Company require supplier and logistics provider

Contact details

PPP Company Limited

(Project name)

123/4 Energy Complex, Building A, 14-18th Floor Vibhavadi Rangsit road,

Chatuchak, Chatuchak, Bangkok 10900 Thailand

Contact person: Mr.A/ Tel: 6622658400/ E-mail: a@pppcompany.com

Packaging

Packing must always be prepared in such a way that it will allow and encourage use of safe and proper lifting and movement method, with full protection from all possible damages from mishandling. No hay, flax or straw to be used for packing. All boxes and crates if used should be made waterproof.

Shipping marks

Required: Consignee name / Address / / Project name / Purchase order number Gross weight / Net Weight / Measurements / Port of Discharge

Services, Delivery Address and Shipping Instructions

Airfreight Shipments

Please send all airfreight shipments to Bangkok International airport only.

Airway Bill (AWB) must be sent consigned to:

Consignee: PPP Company Limited

Address: 123/4 Energy Complex, Building A, 14-18th Floor Vibhavadi Rangsit road, Chatuchak, Chatuchak, Bangkok 10900 Thailand

Notify: Same as consignee

Contact: Mr.A

Project name:

Seafreight Shipments

Please send all airfreight shipments to Laem Chabang port only.

Bill of Lading (BL) must be sent consigned to:

Consignee: PPP Company Limited

Address: 123/4 Energy Complex, Building A, 14-18th Floor Vibhavadi Rangsit road, Chatuchak, Chatuchak, Bangkok 10900 Thailand

Notify: Same as consignee

Contact: Mr.A

Project name:

Documents

Copy of AWB & Invoice must be received 3 working days before arrival date.

Copy of BL & Invoice must be received 1 week after departure date.

The descriptions of goods on the invoice must match with descriptions on the packing list.

Each item on the invoice must be individually priced. Descriptions such as "One lot spares" are most definitely not acceptable.

For all shipments, the price on an invoice must be an actual value of materials to avoid under-valuation declaration and causing penalized by Customs.

For shipment with no commercial value (e.g. samples), please indicate on an invoice "No Commercial Value – For Customs Purpose Only".

Courier Shipments

In case of sending via courier shipment, please make sure weight of goods are less than 30 kg and be sure to send us a pre-advise with the full details of the shipment including courier company, number of pieces and tracking number.

Delivery to Warehouse

Warehouse PPP Company Limited

1234 Rayong

Att: Mr.B/Tel: 6638-996000

Dangerous Cargo

Project need to complete a special form for dangerous goods. These forms will be provided upon request and the completed forms should reach us before shipment is dispatched.

Insurance

All goods must be fully insured with all risk coverage. Insurance can be provided upon request.

Heavy & Oversized Shipments

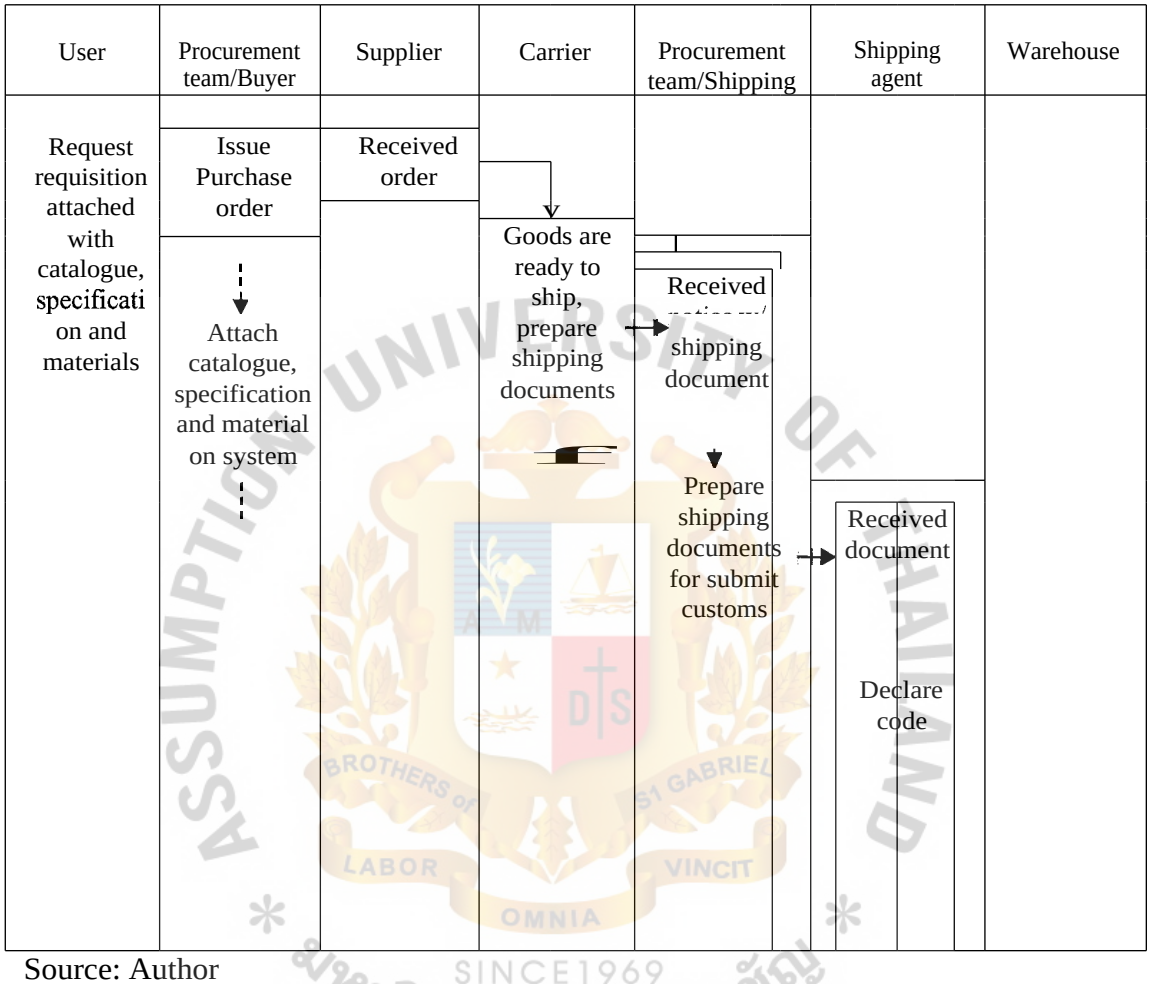
A heavy and oversized shipment that weight excess of 1000 kg and 5 CBM that requires the use of a forklift mobile crane for installation. PPP Company request supplier informs us before arrival date 2 weeks. A detailed layout should also be provided to better assist our onsite operations.

Source: Author

Figure 4.5 shows **PPP** Company shipping instruction, that is provide to give to supplier and freight forwarder to follow the details on instruction.

4.4.2 Need more details of goods for import duty declaration: After the researcher understands the as-is process of the problem, need more details of goods for import duty declaration. The solution focus on when user request requisition order, they have to send details of goods (catalogue, materials, specification of goods and picture of goods) to procurement team/buyer for issue purchase order. They should attached details of goods (catalogue, materials, specification of goods and picture of goods) on purchase order system (company called Ariba). This solution may help procurement team/shipping easy to need the details for declaration goods to customs.

Figure 4.6: To-be process of problem "Need more details of goods for import duty declaration"



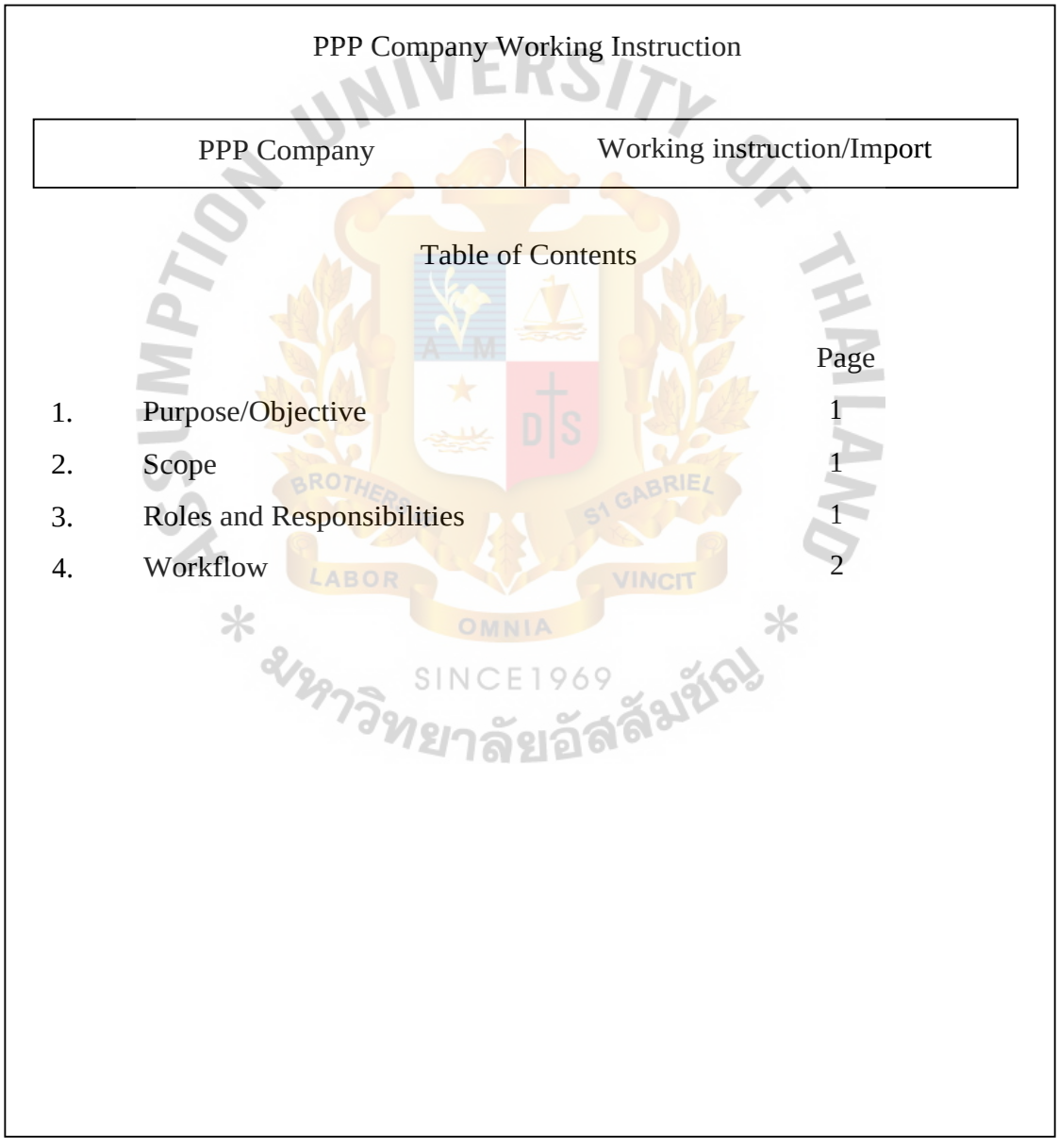
Source: Author

Table 4.6 shows the as-is process of problems needing more details of goods for import duty declaration. For the prevention of this problem, the researcher recommend the way that when the procurement team/buyer received requisition and issued a purchase order on system/Ariba, they should add on the details of the goods on the system/Ariba.

And when the procurement team/shipping needs more details of a good for declaration of import duty, they can find it from the system.

The researcher set the working instructions for providing to concerned parties (user, procurement team/buyer and procurement team/shipping) to follow, working instruction include the important details for the procurement team/shipping. Internal PPP Company (procurement team/buyer and user) must follow the instruction details on the working instruction, see Figure 4.7.

Figure 4.7: PPP Company Working Instruction


PPP Company Working Instruction

PPP Company	Working instruction/Import

Table of Contents

Purpose/objective

Purpose of this working instruction is to provide guideline for the efficient process of import customs clearance.

Scope

The scope of working instruction is to describe the process of import goods in order to normal goods for general work, normal goods for project, goods require permission, goods are requiring privileges.

It was applied to PPP Company and its subsidiaries under share service agreement.

Roles and Responsibilities

Shipping team

- Check and confirm notification and shipping documents for completely.
- Coordinate with shipping agent for support any process of customs clearance and delivery goods.

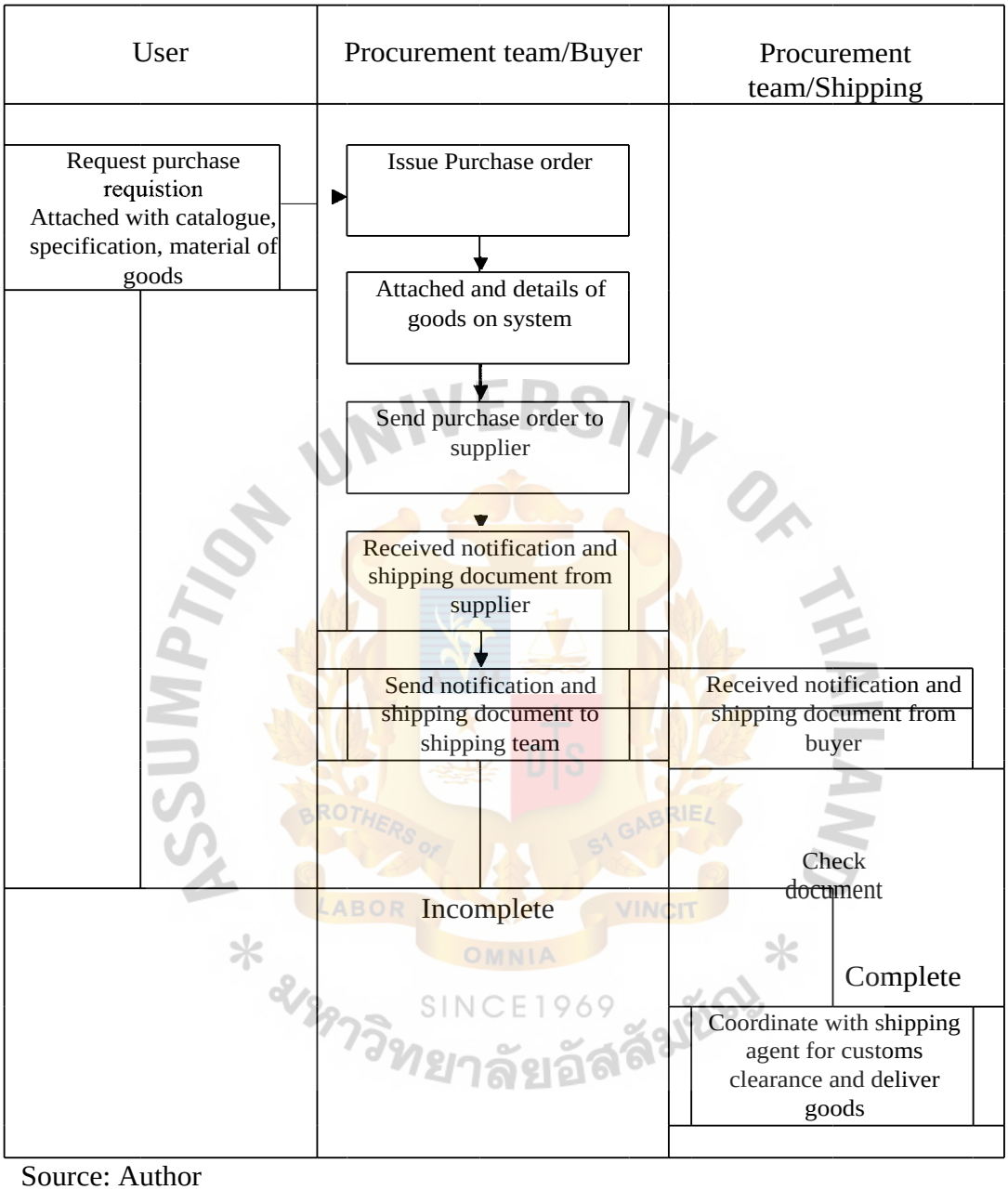
Buyer

- Issue purchase order as details from purchase requisition.
- Attached complete details of goods including catalogue, specification and material of goods on the system.
- Send the purchase order to supplier.
- When buyer receive notification and shipping documents from supplier, forward to shipping team in advance for check and confirm.

User

- Process purchase requisition attached with complete details including catalogue, specification and material of goods.

Oversea Purchasing Workflow



Source: Author

Figure 4.7 shows PPP Company's working instructions, and provides 3 parties concerns (user, procurement team/buyer, procurement team/shipping) to follow the step by step instructions including objective, scopes, roles and responsibilities and overseas purchasing workflow.

After the researcher has completed improving the phase by recommending the new solution to company, they may help the company reduce long customs clearing time and also can save the storage cost and costs of delay. Then the researcher moves to the control phase.

4.5 C – Control: To propose control to-be process to maintain the good results

The last phase of DMAIC is the control phase, the propose is to control the to-be process and to maintain the good results and make sure that the new solution makes customs clearing time reduced. Performance measures of the improvement process can guarantee effective; the researcher sets the working instructions for this concern.

As the researcher mentioned in the improvement phase to set shipping instruction and provide to the supplier and freight forwarder by sending it via letter and acknowledgement back; so, the researcher has to create the documents to keep records about this case.

Table 4.2 Acknowledgement Record

Supplier name/ Freight forwarder name	Sending letter date	Acknowledgement receive date

Source: Author

Table 4.2 shows the acknowledgement records, created to keep the record of acknowledgment letters that are given to suppliers and freight forwarders to learn and follow and order.

Moreover the researcher created control sheets for checking documents received before the process of customs clearance. This control sheet is done by the procurement team/shipping team, they do it when receiving notification then the team will check concerned documents that need to submit to customs.

Table 4.3 Control sheet

PO number	Arrival date	Shipping document		Product details	
		Complete	Received date	Complete	Received date

Source: Author

Table 4.3 shows the control sheet to check complete shipping documents and details of goods for submitting to customs.

After that the researcher created monitoring reports for controlling and reporting about the instructions that are provided to concerned parties and monitoring concerned parties to do as detailed on instructions by the procurement team/shipping team will do this report by reviewing the control sheet and summarizing into a monthly monitoring report.

Table 4.4 Monthly Monitor Report

Month: _____

Number	Purchase Order	Documents received before arrival date		Attached details of goods on system		Remark
		Yes	No	Yes	No	

Source: Author

Table 4.4 shows the monthly monitor report, created for controlling the improvement phase to maintain good results.

4.6 Summary

In conclusion, this chapter focused on identifying causes of problems found by using a cause and effect diagram, the researcher choose 80% of the major causes by using Pareto Analysis. Moreover the focus on the to-be process of weak points, to-be process has to be developed for improvement. And the last one, the researcher recommend the way to control the implementation by using instructions and reports to maintain the good results.

CHAPTER V

SUMMARY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the researcher provides the details of summary findings, conclusions and also recommendations by the researcher's results, theoretical suggestions, and managerial suggestions.

5.1 Summary of the Findings

According to the research question "How can DMAIC model reduce long customs clearing time for import process of project procurement?" The description of chapter one to four helps answer the research question. The researcher stated findings in the define phase, PPP company has long customs clearing time especially in project procurement, where the average customs clearing time is 11.50 days and also the highest purchase value of procurement (data from January 2013 to December 2013). Then the researcher moved to the measure phase, the researcher concluded the impact of long customs clearing time of project procurement into 2 cases, which are storage cost (1 million baht per year), data from KPI monthly reports and cost of delay (30 million baht per day), data from interviews with the project control team.

After that, the researcher analyzed the data by starting with data analyzing the focal point of the customs clearance process. As the researcher mentioned in the beginning, there are **4** stages of the customs clearance but which stage made the most problem? The researcher reviewed the data from the KPI monthly report and the conclusion of the main point was the stage "submission of a declaration" where the company has to submit the concern documents (declaration of goods, bill of Lading or air waybill, invoice, packing list, import license, certificates of origin, other related documents such as catalogue, product ingredients, materials etc.) to customs caused much delay. Then the researcher tried to identify the delay problems that made company submit a declaration late and the problems found were "incomplete shipping documents" and

"incomplete products details". Then the researcher moved to identify the factors of the problem found by using a cause and effect diagram, there are 5 factors. 3 factors of the problem were incomplete shipping documents that are revised details on the shipping documents and needed more details of goods for import duty and request extra documents. And 2 factors of the problem were incomplete product details that were shipping documents and no show reference details and needed invoices declared for all parts of goods. Then the researcher moved to identify the main factors by using Pareto Analysis, 80% of factors are revised details on the shipping documents (45%) and need more details of goods for import duty (35%). For the last step of the analysis phase it identified the as-is process.

Next, the researcher moved to the improvement phase. The points that needed to improve were proposed with the to-be process. Moreover the researcher recommended all concerned parties to use shipping instruction, working instruction and monthly monitor reports for controlling and maintaining the good results.

The key benefits of using DMAIC model to reduce long customs clearing time are:

To understand the root causes

To prevent future long customs clearing time

To ensure that this problem does not occur.

5.2 Conclusions

The propose of this study is to reduce long customs clearing time by applying the DMAIC model, concepts of improving the as-is process of PPP company based on historical data and the data was analyzed and came up with the researcher's suggested DMAIC model.

The DMAIC model supports the researcher to define the problems, understand the root causes of the problem, identify the as-is process and area of improvement then recommend a to-be process. Moreover it suggested the way to control the end guarantee and the maintainable customs clearing time.

5.3 Theoretical Implications

This study used the DMAIC model (define, measure, analyze, improve and control) to solve the problem of reducing long customs clearing times, focused on identifying the root cause and suggested the to-be process for solving the problems. DMAIC is an operative tool and suitable for improving processes.

5.4 Managerial Implications

This study is being an instruction for PPP Company to implement the proposed model to reduce customs clearing time by applying the DMAIC model. The benefit is long customs clearing times will be reduced for the long term operations; moreover this study can increase the KPI and also save storage costs.

5.5 Limitations and Recommendations for Future Research

The limitation of the case study is the research for PPP Company only for purchase orders of spare parts by applying the DMAIC model. The conceptual framework may not match to other businesses and other processes because of different environments and time.

Recommendations of this case study are the data focusing on reducing customs clearing time by applying the DMAIC model, recommended for being applied to petrochemical businesses and for purchase orders of spare parts only. In the future the company can use the DMAIC model to solve the problems in other business functions.

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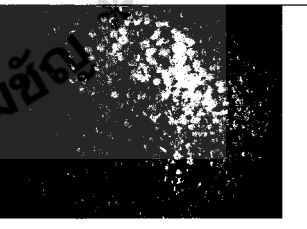
APPENDICES

APPENDIX A

PPP Company downstream products

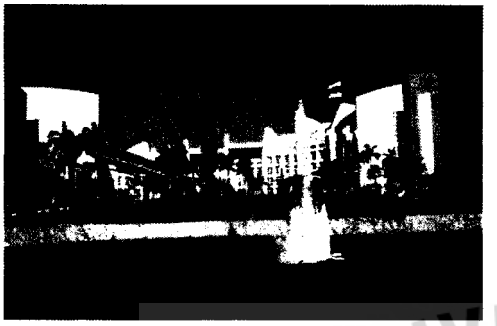
Products	
Benzene	
Paraxylene	
Cyclohexane	
Orthoxylene	
Toluene	
Mixed xylenes	

PPP Company upstream products

Products: polymer resins	
HDPE	
LLDPE	
LDPE	

APPENDIX B

PPP Company plants and subsidiaries



Branch 1 – Office and Lab Center

Branch 2 – olefins I-1

Branch 3 – olefins 1-4

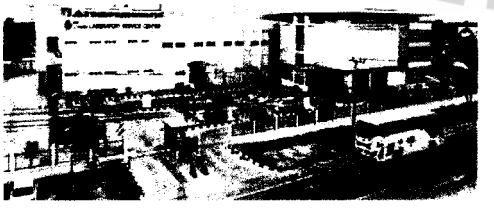
Branch 4 – aromatics 1

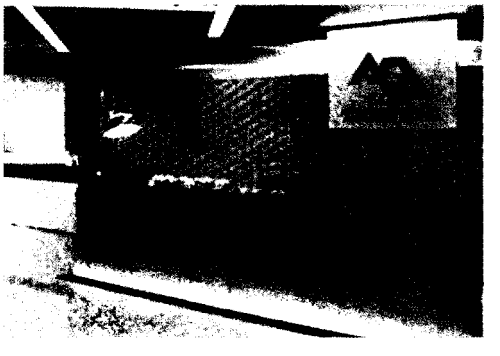
Branch 5 – aromatics 2

Branch 6 – Refinery

Branch 7 – Products warehouse and port

Branch 8 - Aromatics





Branch 9 – Lab service

Branch 10 – Quality Center

Branch 11 – olefins 3

Branch 12 – polyethylene plant

APPENDIX C

Harmonized System Code

Harmonized System Code (HS Code) is system to classify type of goods to 97 chapters for easy to taxation. And chapter 98-99 is a type of service.

Chapter	**Type of goods**
01-05	Animal & Animal Products
06-15	Vegetable Products
16-24	Foodstuffs
25-27	Mineral Products
28-38	Chemicals & Allied Industries
39-40	Plastics / Rubbers
41-43	Raw Hides, Skins, Leather, & Furs
44-49	Wood & Wood Products
50-63	Textiles
64-67	Footwear / Headgear
68-71	Stone / Glass
72-83	Metals
84-85	Machinery / Electrical
86-89	Transportation
90-97	Miscellaneous
98-99	Service

APPENDIX D

PPP Company Shipping Instruction

PPP Project name

Dear all concerns/Project coordinator,

Please be informed that the following details are absolutely required for all shipments to Thailand to avoid any unexpected expenses during customs clearance. And please send all concerns shipping document to person on attention e-mail below.

Onsite handling

Due to avoid any unexpected during customs clearance, PPP Company require supplier and logistics provider

Contact details

PPP Company Limited

(Project name)

123/4 Energy Complex, Building A, 14-18th Floor Vibhavadi Rangsit road, Chatuchak, Chatuchak, Bangkok 10900 Thailand

Contact person: Mr.A/ Tel: 6622658400/ E-mail: a@pppcompany.com

Packaging

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Shipping marks

Required: Consignee name / Address / / Project name / Purchase order number / Gross weight / Net Weight / Measurements / Port of Discharge

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Project name:

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Documents

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1234 Rayong

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APPENDIX E

PPP Company Working Instruction

PPP Company	Working instruction/Import

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