IMPROVING OF THE QUALITY CONTROL PROCESS IN TORSO ASSEMBLY AREA AT TOY MANUFACTURING

By

Natalia Setiawan

ID No. 004201300036

A Thesis Presented to the
Faculty of Engineering President University in partial
Fulfillment of the requirements of Bachelor Degree in
Engineering Major in Industrial Engineering

2017

THESIS ADVISOR
RECOMMENDATION LETTER

This thesis entitled **"Improving of The Quality Control Process in Torso Assembly Area at Toy Manufacturing"** prepared and submitted by **Natalia Setiawan** in partial fulfillment of the requirements for the degree of Bachelor Degree in the Faculty of Engineering has been reviewed and found to have satisfied the requirements for a thesis fit to be examined. I therefore recommend this thesis for Oral Defense.

Cikarang, Indonesia, 31st January, 2017

Anastasia Lidya Maukar, ST., M.Sc.,M.MT.

DECLARATION OF ORIGINALITY

I declare that this thesis, entitled **"Improving of The Quality Control Process in Torso Assembly Area at Toy Manufacturing"** is, to the best of my knowledge and belief, an original piece of work that has not been submitted, either in whole or in part, to another university to obtain a degree.

Cikarang, Indonesia, 31st January, 2017

Natalia Setiawan

Improving of the Quality Control Process in Torso Assembly Area at Toy Manufacturing

By

Natalia Setiawan

ID No. 004201300036

Approved by

Anastasia L.Maukar,ST.,M.Sc.,M.MT.

Thesis Advisor

Ir. Andira, M.T.

Program Head of Industrial Engineering

ABSTRACT

This project has done based on the most defects in PT. X called as LBO (number of defect). PT. X has a several process and the critical process which gives a big contribution to LBO is Torso Assembly. PT. X has goal LBO of 1,000 Parts Per Million (PPM) and today the LBO is 2,066 PPM. In PT. X, there are two inspection called Lot Buy Off (LBO) and Open Package Inspection. Today Torso Assembly has rank third to LBO and first rank to OPI in the year January 2015 – July 2016. Because of that, Torso Assembly has chosen as the selected area of observation and the process inside will be assessed. Therefore, to reduce the defect and align the process with current condition, the Improvement was held. The improving of quality control process aims to reduce defect, review the form used and a reporting system using Business Process analysis, Document Flow Diagram, Data Flow Diagram and document and form analysis. The improvements are redesigning the Business Process, develop database using Macro Excel and standardize document and form. The results are LBO reduced by 18, 15 % from 2,066 to 1,691 and the time saving by 80%.

Keywords: *Business Process, Process Flowchart, Document and Form, Macro Excel, quality, Torso Assembly, Quality Control process*

ACKNOWLEDGEMENT

In this opportunity, I would like to express my gratitude to all people who did give me support from the beginning of my thesis period until the completion of this thesis. They are:

1. God, who made everything possible. Thank you for your blessings.
2. My Family (Dad, Mom, Koko, Cici, Wiwi, and Giok).Thank you for your support. I love you all my endless love.
3. Mam Anas as my thesis advisor who has supports advices and guides me patiently during the thesis period.
4. Quality Control Department (Mba OC, MbaSa, Mba El, Pak AD, MbaTr and QC division). Thank you for the opportunity, integrity, honesty, and support for me. The lessons you gave to me every day were the most valuable.
5. Mas Wahyu, who always support and have my back. Thank you for helping me during this thesis and teach me about macro excel until now.
6. My lovely Lecturers (Mam Andira, Mr Burhan, Mr Herry, Mr Herwan and IE Lecturer) thank you for knowledge that you give to me and guides me.
7. My support system Zervi, my sister form different mother and dad. My junior high school who always heard my life full of drama and always help me during internship until thesis.
8. My ngenges girls, Thank you for the memory and your support. I could forget how hard this thesis if I'm with you guys especially our short quality time. My super busy girls.
9. My berang-berang who always help me when I confused with thesis and help me to find out the solutions. You can make me laugh until I forget this madness. You guys are my friends with benefit.
10. My WINJE, thanks for the time to share, discuss, laughter and support every day. Love you guys. My abnormal friends who always beside me through my thin and thick.
11. All of friends that I didn't mention. Thank you for your support and help.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF TERMINOLOGIES

Lot Buy Off	:	The number of defect in PT. X. The inspection in PT. X that focused inspects the package reliability and safety for customer and aim to control the quality of products.
Inspection Plan	:	A guidance of inspection. A document that provides all procedure of how to inspect at Company X.
Part Per Million	:	Part per Million is the number defect in Million.
Defect Per Million Opportunity	:	The number of defect's forecast in order to calculate the possibility of defect in million.
Open Package Inspection	:	The inspections in PT. X with open the packaging and see the part inside the packaging. The purpose is to make sure the quality is a high quality product through compare it with approved sample.
Business Process	:	A collection of activity or task that has purposes to achieve the goal or objective and depicted with flowchart to illustrate the sequence of task.
Process Flowchart	:	A schematic delegation of the continuity of all pertinent operations happening during a process and contains information considered desirable for analysis.
Macro	:	An automated input sequence that imitates keystrokes or mouse actions. A macro is typically used to replace a repetitive series of keyboard and mouse actions and is common in spreadsheet and word processing applications like MS Excel and MS Word.

ISO 9001	:	Standards for Quality Management Systems. It specifies requirements and recommendations for the design and assessment of management systems.
Quality Management System	:	A complex system consisting of all the parts and components of an organization dealing with the quality processes and products.
Inspection	:	A critical appraisal involving examination, measurement, testing, gauging, and comparison of materials or items. An inspection determines if the material or item is in proper quantity and condition, and if it conforms to the applicable or specified requirements.
Database	:	A collection of information that is organized so that it can easily be accessed, managed, and updated.
Software	:	A general term for the various kinds of programs used to operate computers and related devices.
Visual basic for application (VBA)	:	A programming environment from Microsoft in which a programmer uses a graphical user interface (GUI) to choose and modify preselected sections of code written in the BASIC programming language.
Torso Assembly	:	A process of joining body from upper torso and back torso with a leg and an arm.
Rotocast	:	A process of making a head.
Rooting	:	A process of making a head with a hair.
Grooming	:	A process of brushing and cleaning a hair.

CHAPTER 1
INTRODUCTION

1.1. Problem Background

Today, the company faces high competition. The competition for industry places is greater than ever this year. Every company competes to gain profit by minimizing the cost. This is basically the principle in Economy. They must deliver high quality product with low cost and on time to their customer. If the company does not follow it, they will gain loss.

Quality is one of the most important issues for the company. It is realized that quality regulation a considerable measure with a supposition of the client to our item. Based on that reason, quality conveys numerous effects to the business improvement or business development. The quality aspect is not only focused on the result of the product, but it also concerns with the process of production.

PT. X is a toy manufacturer that produces doll. PT. X has established over 50 years and led the toy manufacturing around the world. In the past year, the variation of the doll is little and the quantity is big. Now the condition has changed the variation of dolls increase and the quantity decrease. Because of this, PT. X needs to improve and review the quality control process. As the one of most influence in toy manufacturing, PT. X must develop and align with the rivals. Every company competes to make a high-quality product and satisfy the customer with low cost.

PT X has a Quality department. The task of Quality department is to assure the product meets with the quality standard. In order to ensure the product meet the quality standard, the quality management system must run properly. Quality Management System is used for enhancement at all level. Some of the examples Quality Management System are; it will prompt on changes, how to apply and give training, tools, and technique to enable other to achieve quality standard. PT. X has a problem to reduce defect. In the past years, the defect still high and did not achieve

company's target. Whereas the inspection has been tightened and renewed. Quality Assurance as a responsible division which has task to comprise the procedure of activity and administrative in quality system already regenerated it, so the product will fulfill the quality standard.

In addition, company X has been ISO 9001. ISO 9001 is one of the requirements that aims to meet the quality and customer standard. ISO 9001 certification will give maximum benefit to an organization if it approaches ISO 9001 implementation in practical way. Through ISO 9001, the Quality Management System could be adopted; the business work will improve and are not just a set of procedure. By adopting this, it will make organization more efficient and reach the organization's goal.

For the last three years, data of defect PT. X has been high. From the year 2013 until the middle of the year 2016, the number defect always above 2,000 Part Per Million (PPM). The actual defect is far from the company target of 1,000 Part Per Million. It shows the gap between target and actual of 1,000 PPM. From the year 2014-2016, the area of Assembly or known Torso Assembly (TA) is the top four highest. PT. X has inspection called Open Package Inspection (OPI) and for the last three years until now, Torso Assembly is the highest area that gives contributions for the last two years in a row. Since TA gave a high contribution to defect of PT. X, it was chosen to be improved. The improving comprises the flow of process inspection, the forms and document and the reporting system.

1.2. Problem Statement

The background of the problem leads into the statement below:

- How do the QC department reduce defect through alignment with the current condition of PT. X?
- How do QC department improve the system of reporting and database?
- How do QC department standardize the form and document and comply it with ISO 9001?

1.3. Research Objective

The main objectives of this report are:

- To reduce defect by improving of inspection plan using Process Flowchart.
- To improve the system of reporting and database using Macro Excel (Visual Basic for Application).
- To standardize the form and document for providing of ISO 9001 requirements.

1.4. Scope

Due to the limitation of resources and time in conducting this research, there will be some scope in this observation:

- The observation was conducted in Torso Assembly area.
- Data of defective product are collected based on historical data in January 2013 – July 2016.
- Improvement and implementation was conducted from August until December 2016.

1.5. Assumptions

Some assumptions must be made to run this research properly.

- The flow of process of Inspection plan will be related with the current condition and the current system.
- The new reporting system will be able to use by Inspector QC.
- All the Work in Process (WIP) comes in to Torso Assembly area is a good part.

1.6. Research Outline

The systematic way of this research is described as follow:

Chapter I Introduction

This chapter consists of problem background, problem statement, objective, scope as the limitation and assumption of the study.

Chapter II Literature Study

This chapter delivers the previous study about Business Process, ISO 9001, Quality, Process Flowchart, and Quality Management Systems (QMS).

Chapter III Research Methodology

This chapter contain about a detailed process flow and detail explanation of each phase procedure step by step used to conduct this research start from problem identification until the conclusion and also draw the research framework are described to provide clear understanding related the process flow.

Chapter IV Data Collections and Analysis

This chapter contain about the data that have been collected during the research. Its data will be processed as the result of this research in order to achieve the goals.

Chapter V Conclusion and Recommendation

This chapter contains the result of this research to answer the problem statement, to achieve the objective and conclusion from the analysis result of this project, and also recommendation for future research.

CHAPTER 2
LITERATURE STUDY

2.1. Business Process

Before executing an optimization, it is important to clearly introduce the business processes. Optimizing a mess is impossible. Already an implementation of several formal rules to the final results of the procedures is, in itself, an improvement, since it is a small step from mess to order. There are two major areas: reducing operations and improving business performance (Kovalev, 2015). There are a lot of techniques for modeling and optimizing business processes. Some of it is low-budget and immediately applicable.

Currently business process uses to design the fundamental of task such as activity of process and system. Business process has purpose to achieve the business goal or business objective of an organization. According to Joachim (2012), a business process comprises of an organized set of activities, which are executed by (potentially several) performer (humans, computers and/or machines) in an organization that aim to collaboratively accomplish a general business goal—the arrangement of a service or the production of a product for an internal or external client.

Business process is one of many methods that used to achieve the organization's goals. Van Deer Aalst and Van Hee (2012) has classified Business process into several schemes within a company for classification. It recognized into production, support and managerial processes. First is Production processes produce a company's products or services and, thus, make income for the company. Support processes has task to support the production processes. This classification involves maintenance processes for the production systems like personnel management processes such as recruitment and selection, training and payment. The last classification is managerial processes, directs and coordinates the production and support processes. Here, the goals and prerequisites for the managers of the other

processes are formulated, compulsory resources are allocated and contact is held with financiers and other stakeholders.

But there is another scheme of business process. This scheme created by Leymann and Roller. The classification scheme classifies processes based on the dimension business value and repetition (Leymann and Roller, 2000). Business value defines the significance of a process for an organization. A business process with high business value is a core competence of its organization such as a loan granting process for a bank or a motorcycle manufacturing process for a motorcycle manufacturer. Reiteration measures how many times a process is performed in the same manner. A process with high reiteration is an ideal candidate for modeling and execution with IT support. Both dimensions are divided into two value ranges—low and high—resulting in four process types: production, administrative, collaborative and ad hoc processes in Figure 2.1.

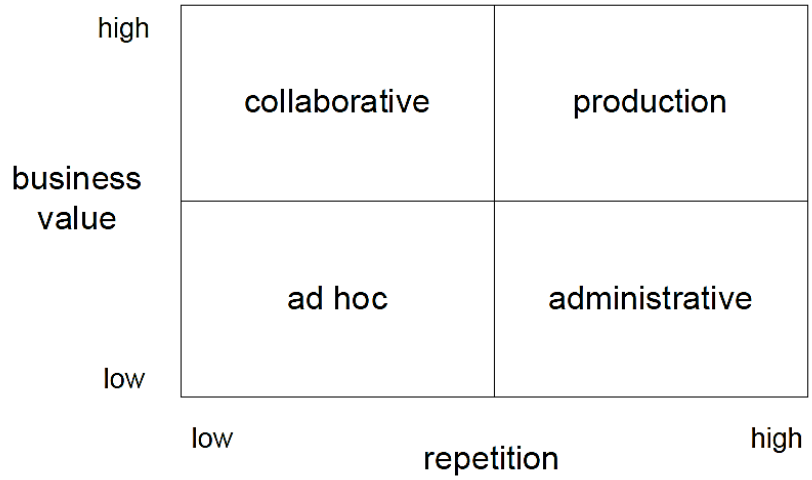


Figure 2.1 Business process classification scheme by Leymann and Roller (2000)

Production processes have a high business value and repetition. They constitute an organization's center business such as the giving credit process of a bank. The efficient Execution of these processes is a competitive advantage. Administrative processes are also highly repetitive, yet they have a lower business value. Typical examples are travel expense reports and purchase approvals. Collaborative processes are characterized by a high business value but a low repetition. They contain processes such as writing technical documentation or creating software. The

underlying process is rather complex and specifically made for the particular task—often by customizing a more general project plan. Changes to the initial process plan are also quite general. Finally, ad hoc processes have both low business value and low repetition. Regularly, they have no predefined structure however are built individually every time a series of activities shall be performed. Illustrations are for-your-information routing as well as review and approval processes.

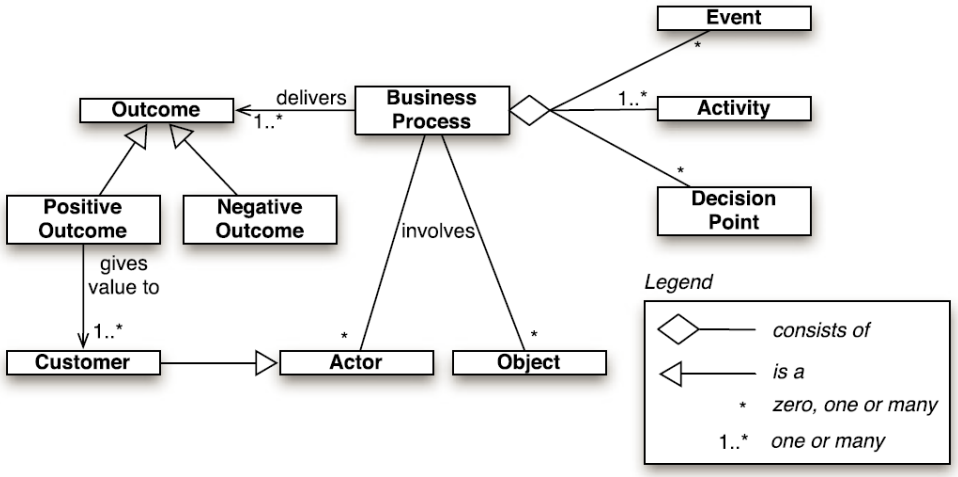


Figure 2.2 Ingredients of a Business Process

Since Business Process is a set activity it means there are several Ingredients of a Business Process. An Ingredient of a Business Process could be seen in Figure 2.1. Figure 2.1 show the main ingredients are Income (event, activity and decision point), outcome that separated into positive outcome and negative outcome, and the last is involves actor and object. A set activity will need a circumstance of a condition connected with or relevant to an event and actor.

2.2. ISO 9001

ISO 9001:2000 is a series of three International Standards for Quality Management Systems. It specifies requirements and recommendations for the design and assessment of management systems. ISO 9001 is not a product standard. None of the standards in the family contain requirements with which a product or service can comply. There are no product acceptance criteria in ISO 9001 so the actor (inspector) can't inspect a product against the standard. The aim itself is make sure the product met specified requirement and to improve the quality.

The purpose of these standards is to help organizations of all types to implement and operate effective Quality Management Systems (QMS). These standards give a vehicle for consolidating and communicating concepts in the field of quality management that have been agreed by an international committee of representatives from national standards formats. It is not their purpose to fuel the certification, consulting, training and publishing industries. The main users of the standards are expected to be organizations acting as either customers or suppliers.

ISO divided into three or known a family of ISO 9001, those are (Hoyle, 2001):

1. ISO 9001 Quality management systems – Fundamentals and vocabulary
2. ISO 9001 Quality management systems – Requirements
3. ISO 9004 Quality management systems – Guidelines for performance Improvements

ISO 9001 Quality Management System has aim to provide an appreciation of fundamental principle of quality management systems and an explanation of the terminology used in the family standards. This ISO 9001 contains the definition of terms used in the family of standards. Without understanding the term, the standard is prone to miss-interpretation. ISO 9001 also has content the general concepts and principle that practice to the quality management and quality system management in detail.

ISO 9001 has aim to provide requirement which if met will enable organization to demonstrate that have capability to constantly provide product that meets customer's standard and applicable regulatory requirements. ISO 9001 states that *the standard can be used to assess the organization's ability to meet customer, regulatory and the organization's own requirements*. ISO 9001 has content requirement for quality management system. This standard should be used in contractual situation where the customer requires its supplier to demonstrate it have the ability to consistently produce product that meets the requirement of customer. Within ISO 9001 only complying product will be shipped to the customers. But ISO 9001doesn't define everything an organization needs to do to satisfy customer.

ISO 9004 is the last member of ISO 9001 family. This ISO has purpose to provide guidance for improving the efficiency, effectiveness and overall performance of an organization. ISO 9001 and ISO 9004 have been developed as a permanent pair of standards that complement each other. They have a basic structure but can be used independently. ISO 9004 is not intended as a guide to ISO 9001. Although ISO 9004 includes the requirements of ISO 9001 it does not contain an explanation of these requirements or guidance in fulfilling them. In this ISO has content as guidance on developing and improving a Quality Management System.

This standard should be used as guidance in designing, operating and improving a management system. It is not intended for contractual or assessment purposes but when used internally there may be benefits in using the standard as a basis for assessing current capability. There is no doubt that if an organization were to follow the guidance given in ISO 9004, it would have no problem in demonstrating it had an effective management system. The ISO 9001 standard provides a framework of globally recognized principles of quality management, including: customer focus, leadership, involvement of people, process approach to management, continual improvement, factual approach to decision making and mutually beneficial supplier relationships. These are also known as the eight key principals of quality management.

2.3. Quality

Generally, people do not know the meaning of quality. Many people have a conceptual understanding of quality as relating to one or more desirable characteristics that a product or service should possess. Quality has become one of the most important consumer decision factors in the selection among competing products and services. The phenomenon is widespread, regardless of whether the consumer is an individual, an industrial organization, a retail store, a bank or financial institution, or a military defense program. Consequently, understanding and improving quality are key factors leading to business success, growth, and enhanced competitiveness. There is a substantial return on investment from improved quality and from successfully employing quality as an integral part of overall business strategy. Quality is the degree to which a set of inherent characteristics fulfils a need or expectation that is stated, general implied or obligatory.

Dimensions of quality are required. If it does not describe, how could define the quality of products. Garvin (1987) provides an excellent discussion of eight components or dimensions of quality, there are:

- Performance (Will the product do the intended job?) Potential customers usually evaluate a product to determine if it will perform certain specific functions and determine how well it performs them. For example, you could evaluate spreadsheet software packages for a PC to determine which data manipulation operations they perform. You may discover that one outperforms another with respect to the execution speed.
- Reliability (How often does the product fail?) Complex products, such as many appliances, automobiles, or airplanes, will usually require some repair over their service life. For example, you should expect that an automobile will require occasional repair, but if the car requires frequent repair, we say that it is unreliable. There are many industries in which the customer's view of quality is greatly impacted by the reliability dimension of quality.
- Durability (How long does the product last?) This is the effective service life of the product. Customers obviously want products that perform

satisfactorily over a long period of time. The automobile and major appliance industries are examples of businesses where this dimension of quality is very important to most customers.

- Serviceability (How easy is it to repair the product?) There are many industries in which the customer's view of quality is directly influenced by how quickly and economically a repair or routine maintenance activity can be accomplished. Examples include the appliance and automobile industries and many types of service industries (how long did it take a credit card company to correct an error in your bill?).
- Aesthetics (What does the product look like?) This is the visual appeal of the product, often taking into account factors such as style, color, shape, packaging alternatives, tactile characteristics, and other sensory features. For example, soft-drink beverage manufacturers have relied on the visual appeal of their packaging to differentiate their product from other competitors.
- Features (What does the product do?) Usually, customers associate high quality with products that have added features; that is, those that have features beyond the basic performance of the competition. For example, you might consider a spreadsheet software package to be of superior quality if it had built-in statistical analysis features while its competitors did not.
- Perceived Quality (What is the reputation of the company or its product?) In many cases, customers rely on the past reputation of the company concerning quality of its products. This reputation is directly influenced by failures of the product that are highly visible to the public or that require product recalls, and by how the customer is treated when a quality-related problem with the product is reported. Perceived quality, customer loyalty, and repeated business are closely interconnected. For example, if you make regular business trips using a particular airline, and the flight almost always arrives on time and the airline company does not lose or damage your luggage, you will probably prefer to fly on that carrier instead of its competitors.

- Conformance to Standards (Is the product made exactly as the designer intended?) We usually think of a high-quality product as one that exactly meets the requirements placed on it. For example, how well does the hood fit on a new car? Is it perfectly flush with the fender height, and is the gap exactly the same on all sides? Manufactured parts that do not exactly meet the designer's requirements can cause significant quality problems when they are used as the components of a more complex assembly. An automobile consists of several thousand parts. If each one is just slightly too big or too small, many of the components will not fit together properly, and the vehicle (or its major subsystems) may not perform as the designer intended.

According to Maslow (Maslow, 1998), man is a wanting being; there is always some need he wants to satisfy. Once this is accomplished, that particular need no longer motivates him and he turns to another, again seeking satisfaction. Everyone has basic physiological needs that are necessary to sustain life (Food, water, clothing, shelter). Maslow's research showed that once the physiological needs are fulfilled, the need for safety emerges. After safety come social needs followed by the need for esteem and finally the need for self-actualization or the need to realize ones full potential. Satisfaction of physiological needs is usually associated with money – not money itself but what it can buy. The hierarchy of needs is shown in Figure 2.3.

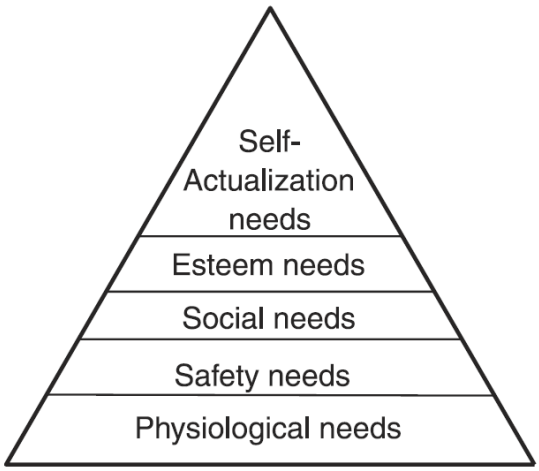


Figure 2.3 Hierarchy of Need

The word quality has many meanings:

- ✓ A degree of excellence
- ✓ Conformance with requirements
- ✓ The totality of characteristics of an entity that bear on its ability to satisfy
- ✓ stated or implied needs
- ✓ Fitness for use
- ✓ Fitness for purpose
- ✓ Freedom from defects imperfections or contamination
- ✓ Delighting customers

2.4. Quality Management System

A Quality Management System can be determined as a comp system consisting of all the parts and components of an organization dealing with the quality processes and products. A Quality Management System (QMS) can be described as the managing and controlling structure, responsibilities, procedures, processes, and management resources to implement the principles and action lines needed to reach the quality targets of a company. A good QMS is very useful; it can increase the profitability, efficiency and customer satisfaction. In ISO 9001 states: "The organization will establish, document, implement and maintain the quality management system and continually improve its effectiveness in accordance with the requirement of this International standard".

Based on ISO 9001:2008, it is said the organization shall:

- Determine the processes needed for the quality management system and their application throughout the organization
- Determine the sequence and interaction of these processes
- Determine criteria and methods needed to ensure that both the operation and control of these processes are effective
- Ensure all the availability of resources and information necessary to support the operation and monitoring of these processes
- Monitor, measure where applicable, and analyze the processes

- Implement actions necessary to achieve planned results and continual improvement of these processes

The objectives are:

- Customer focuses actively reviewing customer needs through dialogue: making customer aware of new products and service: ensuring the organization is aware of customer needs; corrective action when the service fails to meet expectation.
- Continual improvement- of products, service, working environment, staff development, and management and production processes.
- Reduced waste- a reduction in wasted products, repeated or corrective work and unnecessary processes.

The main components are:

- The active and positive commitment of senior management
- Good-two way communication throughout the organization that encourage the culture of initiative and improvement
- Simple, efficient monitoring system that enable all levels of management to identify bottleneck and waste
- Staff development that provides the correct level of competence for each job, and provides staff with opportunities to progress
- Documentation that support above

Quality management system or knows as QMS is a very important thing in continuous improvement. QMS is an important role in achieving organization goal. This method commonly use because it is very easy to applicant. In addition, the method called Plan-Do-Check-Act (PDCA) can be applied to all processes. From Figure 2.4 shows all aspect of applying PDCA method. Plan will be established the objective and process necessary to give results in accordance with customer requirement and organization policies. For Do is to implement the process. Check is to monitor and measure the processes and product against the policies, objectives, requirements for the product and report the result. Last is Act, take the actions to continuously improve process performance.

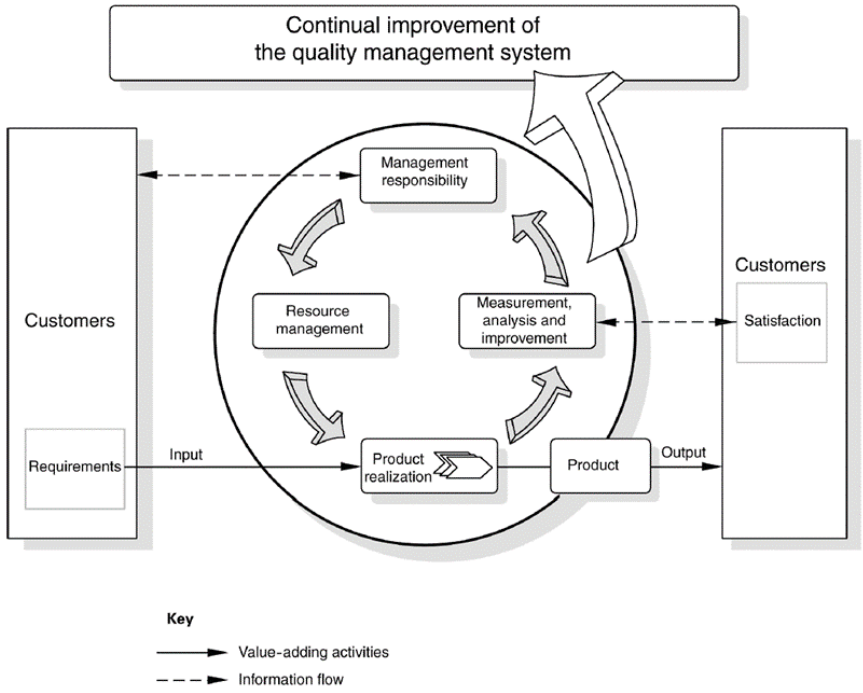


Figure 2.4 Model of a-Process based Quality Management System

2.5. Process Flowchart

Process Flowchart or known is a flow diagram which uses to make a visual of process. Process Flowchart commonly use in engineering process to describe the process as well. Process Flowchart is a schematic delegation of the continuity of all pertinent operations happening during a process and contains information considered desirable for analysis. It can be interpreted as an operation occurring when an object (or material) is intentionally changed in any of its physical or chemical characteristics, is assembled or disassembled from another object or is arranged or prepared for another operation, transportation, inspection or storage.

Process Flowchart shows the fundamental plant construction indicating feedstock, product and main streams flow rates and operating conditions. Process Flowcharts of multiple process units within a huge industrial plant will be composed lack of explanation and may be called Block Flow Diagrams (BFD) or Schematic Flow Diagrams.

A Process Flowchart should include:

- Process Piping
- Major equipment symbols, names and identification numbers
- Control, valves and valves that affect operation of the system
- Interconnection with other systems
- Major bypass and recirculation lines
- System ratings and operational values as minimum, normal and maximum flow, temperature and pressure
- Composition of fluids

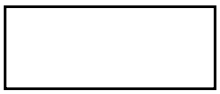
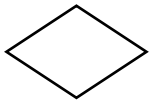
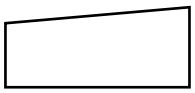
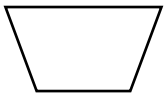
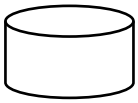
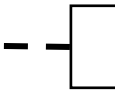
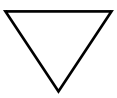
Process Flowchart generally do not include:

- Pipe classes or piping line numbers
- Process control instrumentation (sensors and final elements)
- Minor bypass lines
- Isolation and shutoff valves
- Maintenance vents and drains
- Relief and safety valves
- Flanges

Since Process Flowchart is a visualization of flow process, it means there are a plenty symbol to use. A symbol uses in Process Flowchart basically similar with other Flowchart such as Data Flow Diagram, Structured Analyze Data Technique, Control Flow Diagram, Warnier/Orr Diagram and many. Every symbol represents an activity or process. In Process Flowchart, the symbol is identical with other Flowchart but the different is a symbol Delay. Symbol Delay uses in Process Flow which can explain how long the duration of delay time of a processes.

Symbol in Process Flowchart:

Table 2.1 Process Flowchart Symbol

No	Symbol	Explanation
1		Process Any processing function
2		Terminator Indicates the beginning or end of a program flow in diagram
3		Decision Decision point between two of more paths in flowcharts
4		Document Data that can be read by people, such as printed output
5		Data (Input/Output) Can represents any type of data in a flowchart
6		Predefined Process A named process, such as a subroutine or a module
7		Delay A process of wasting time
8		Manual Input Data that is entered manually, such as with a keyboard or barcode reader
9		Manual Operation Any operation that is performed manually (by a person)
11		Database Indicated a list of information with standard structure that allows for searching and sorting
12		Flow Line A connector that shows relationship between the reprehensive shapes
13		Annotation A brief description or explanation of an activity
14		Temporary File A manual file which temporary

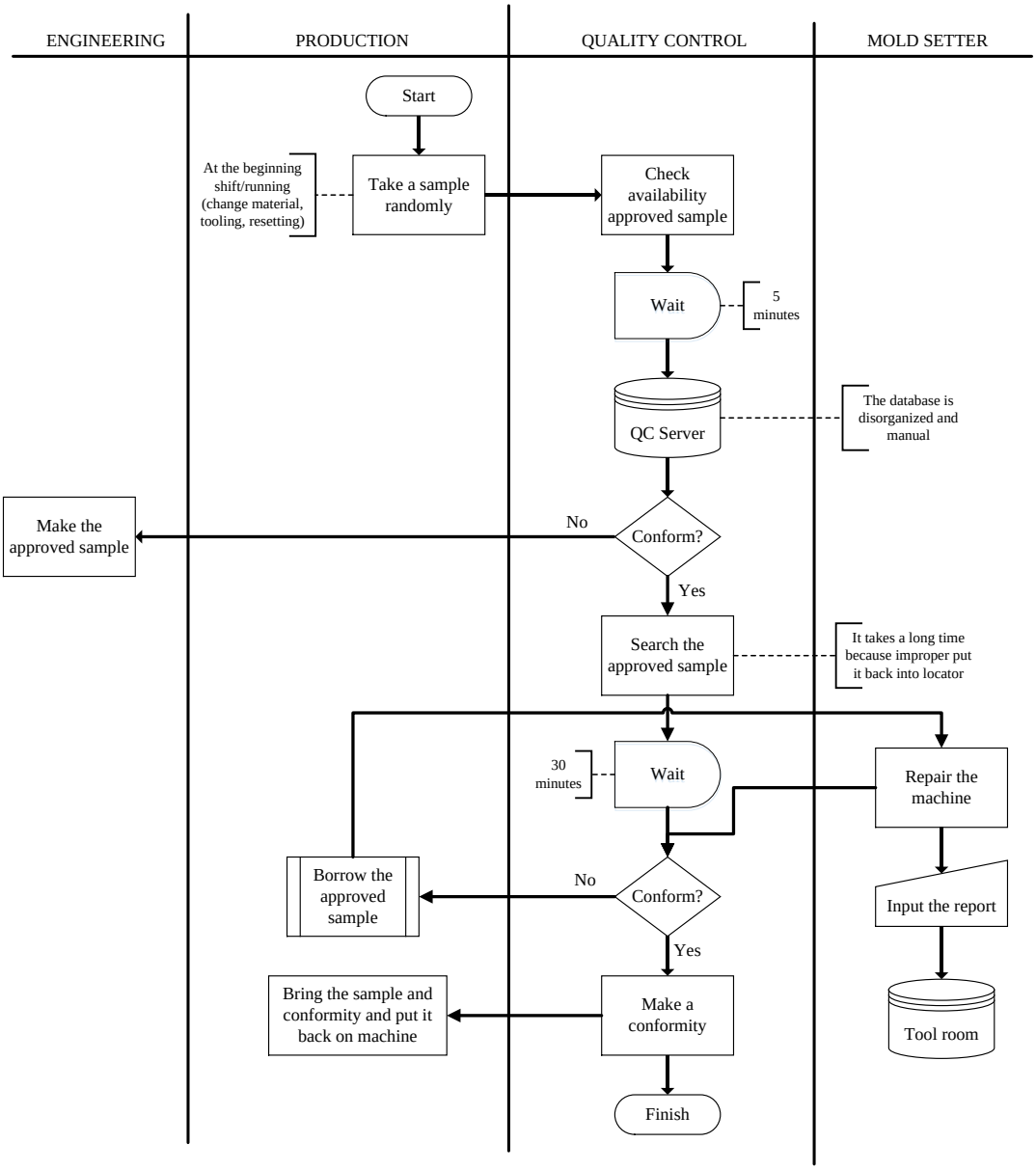


Figure 2.5 Process Flowchart

Figure 2.5 is a Process Flowchart of manufacturing. It shows the process starts from Production with start's symbol and ends to Quality Control with finish's symbol. At the bottom is the Subject which is Production, Engineering, Quality Control and Mold setter. Figure 2.5 is a Process Flowchart of First Piece Sample. First Piece Sample process has a plenty process with Quality Control as a main actor.

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Theoretical Framework

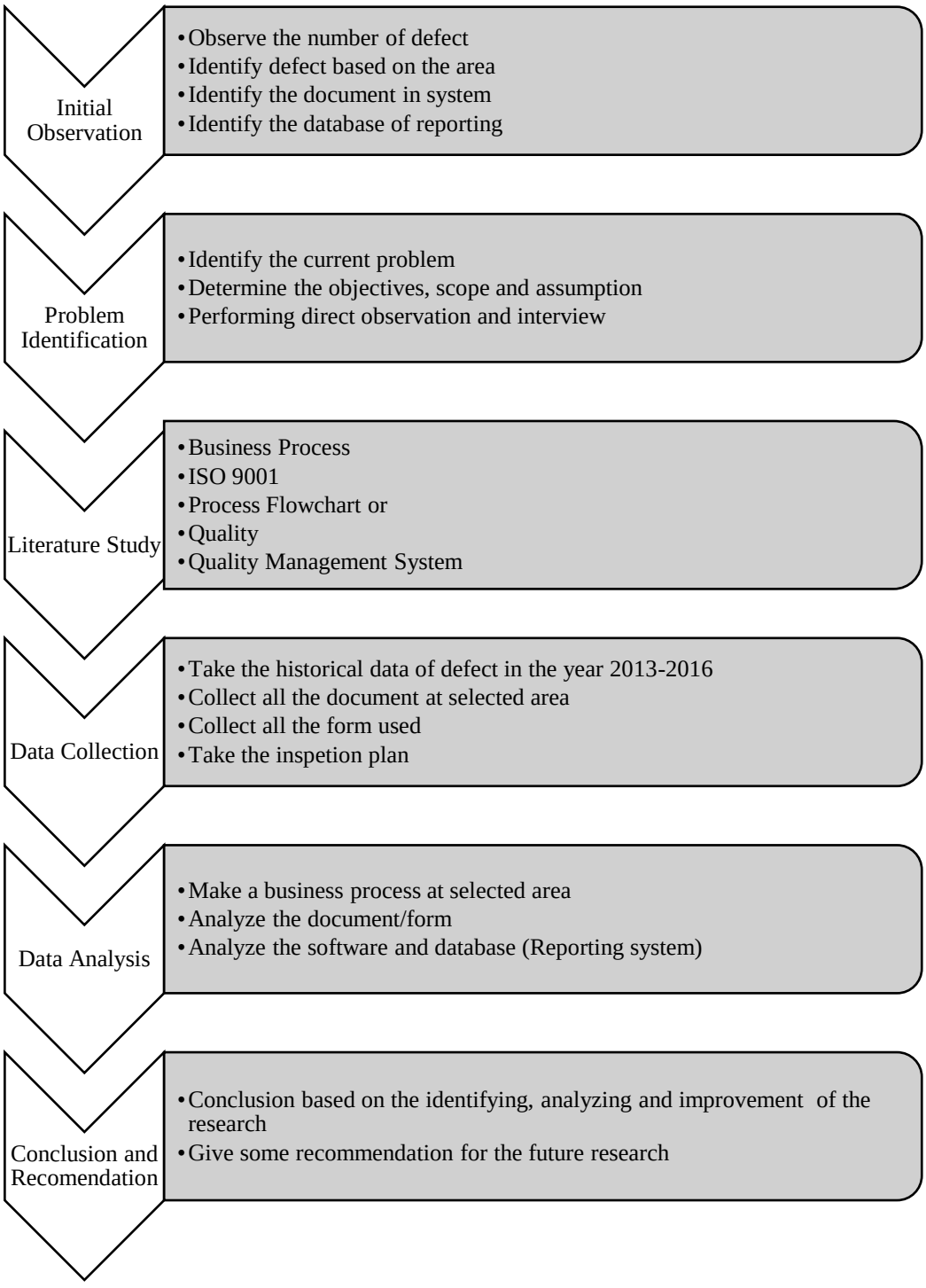


Figure 3.1 Theoretical Framework

3.1.1 Initial Observation

Initial observation is the first step in doing research. In this step, the researcher starts the observation with observe the data of defect and current situation. In this case, the observation starts with observe the number of defect of PT. X. Then continue with identify the highest defect in all area. In determining the highest defects, Pareto chart will be used to categorize and ranked it into several class. After identify the highest defect, next is identify the document and form in system. In identifying the form and document, the process will use ISO 9001 as guidance. All document and form must be registered and standardize. The last is identifying the database of reporting system. In this observation, the observation began with analyze and identify the database used of each inspection. Check and observe the obstacle of each database.

3.1.2 Problem Identification

After initial observation finish and continues to the next process is Problem Identification. Problem identification starts with the current problem that faced today at Toy Manufacturing. Nowadays, the current problem is why the defect is higher every year even the inspection already reviewed and renewed. PT. X has goal 1,000 Part Per Millions of defects. But the actual data shows above than 1,000 PPM. In the previous years, goal of defect has changed and PT. X never achieved or closes enough with the goal.

This year, PT.X has goal to achieve or close enough to the goal 1,000 PPM of defect. After identified current problem, then determine the research objective, scope and assumption. The objective of this research is reducing defect, standardizing the document/form and optimizing the process of inspection. In addition, scope and assumption are defined. Last steps are doing interview and direct observation. The purpose of the last stage is to see directly the process. Sometimes data that written with the actual is different. By performing direct observation at floor production and interview with Quality Control's inspector and Quality Control's leader, the problems will be revealed.

3.1.3 Literature Study

Literature study is done to suggest for problem solving to related issue faced by the company. Importance of study is also established to provide a strong basic for the project. The research is strengthening by several literatures as the references; these literatures are coming from Journal, Book, Website, or another Research that is related to the topics. Current situation on how common companies cope with the issue is captured as well. The methods are used in this research are explain in the previous chapter (Chapter 2).

3.1.4 Data Collection

In this process, all data is needed will be collected. Data collection aims to support of this research. Data that will be collected are historical data of defect all area in the year 2013-2016, document and form are used and inspection plan. The historical data of defect used for identify and analyze the defect and select the area. PT. X divided the process into two processes are Primary process and Secondary process. The historical data will be collected from Secondary area and it is Pack out area. At Pack out area have two inspections; those are Lot Buy Off (LBO) and Open Package Inspection (OPI). Each inspection will be used in order to identify and analyze the defect in detail. The ways to select the area are rank the area from the highest into lowest and interview with leader Quality Control. Selected area will be assessed from the process of inspection, document and form used and the database of reporting.

After the area already defined, next is collect the document, form and inspection plan. Inspection plan is guidance for Quality Control to do inspection. Inspection plan has aim to make sure all the inspection did and Quality Control's inspector do inspection based on the inspection plan. After inspection plan collected then is document and form. Every inspection has a document and form used and sometimes relate with other document. Such as in inspection first piece sample, this inspection relates with other process and need other form is first shot sample. PT. X is a toy manufacturing which produce a hundred types of toys. It makes the document and form used is many and hard to control it. So through the collect the document and form, it could see the obstacle of document and form.

3.1.5 Data Analysis

Data analysis is the next step after all data needed for research had been gathered, the data before will be analyzed. In analyzing the current system, there are three processes which are make a business process, analyze the document and form used and analyze the database of reporting system. First is business process, in this stage all the inspection at selected area will be drawn through flowchart and Business Process. Business process has purpose to design the activities efficiently and effectively to achieve the organization's objective. In this phase, it will be compared the actual and proposed documents. If there is an inspection which do not follow or comply the document, it will be drawn again and redesign again.

Next is to analyze the document and form. In analyzing the document and form used, it is compared with the current condition. Some of the forms used are expired but they are still in the system and become double documents. To implement the Quality Management System (QMS), all documents must be standardized, renewed, and revised if they are needed. Quality Management System is a system consists of all the parts and components of an organization dealing with the quality processes and products. Document as the one of the process must be assessed. In PT. X, an unregistered and unstandardized document is a common thing. Therefore, in this analysis, all documents should be standardized and form which expired will be reduced.

The last is analyzing the software and database. Quality Control is a division which has a lot of inspection. The data of inspection needed for other division such as production, engineering, finance and so on. Each division needs to support their needs. Due to organize the report and data, the database will be assessed to. Frequently, the finding of reporting is human error. Quality Control's inspectors need a database which can reduce the human error such as using the validation. So the objective of database and software is reducing the human error while input the data.

3.1.6 Conclusion and Recommendation

The final step of this research is to give conclusion and recommendation. The conclusion contains the summary of the whole process of research until the researcher accomplished the research objectives. In conclusion the problems stated before would be answered with the come up with defect decrease, document and form are register, standard and review, and develop the database using Macro Excel and validation method. When the researcher arrived to the conclusion part, it means that the research objectives had been achieved and this project successful.

The conclusion part also must be followed by the recommendation given by the researcher. The recommendation is the part where the suggestion and advice given for the readers or those who would like to do some kind of research with a similar topic with this research. This is proposed to the improvement of research in the future research.

3.2. Research Framework

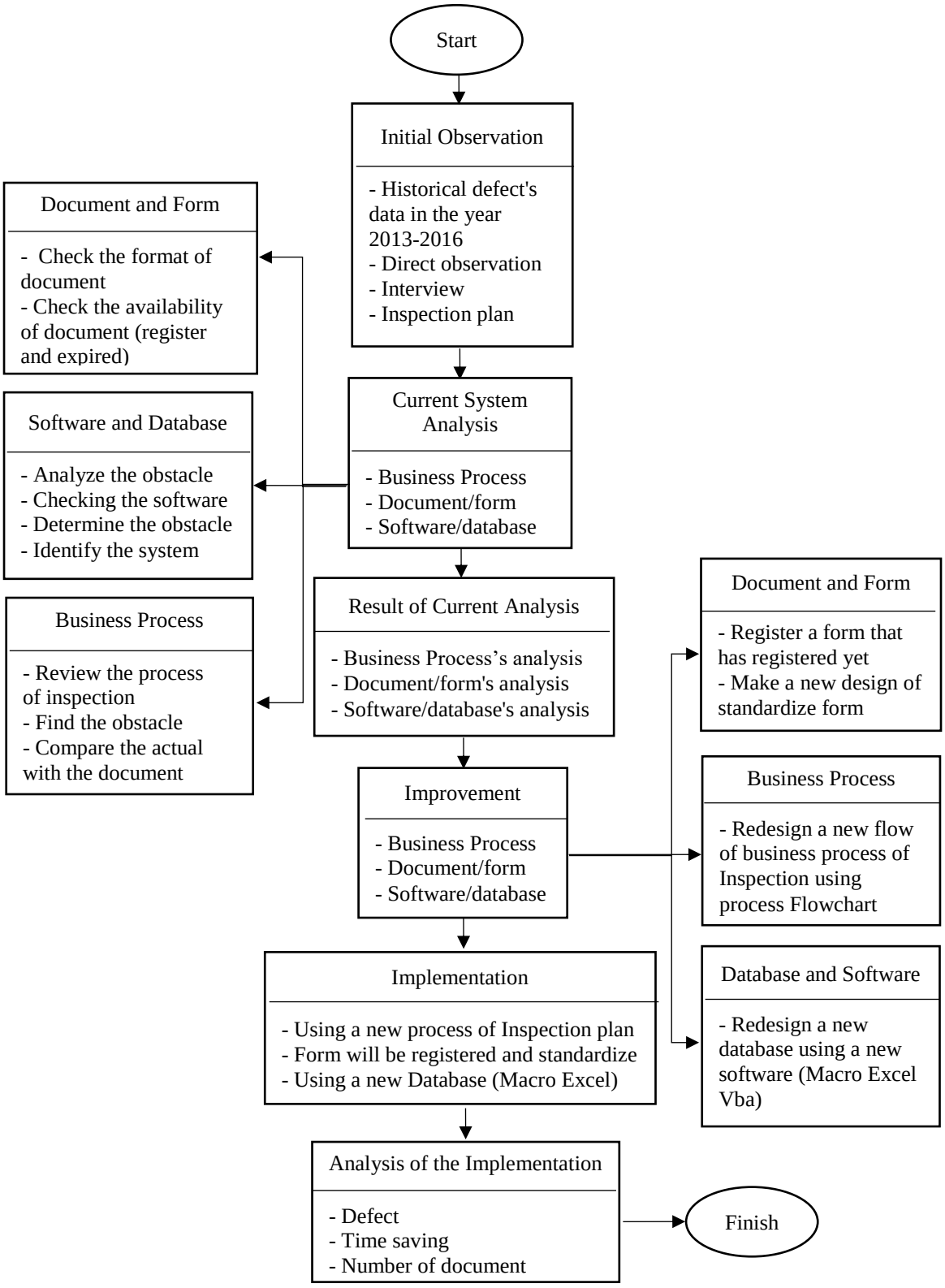


Figure 3.2 Research Framework

Figure 3.2 is a research framework of this research. Research framework is the flow of the observation. It explains from the first (problem) and the last (result). This project designed based on the business process and all the tools are needed such as, Macro Excel, Flowchart and Pareto chart. The steps are:

A. Initial Observation:

This research come up with identify the historical data of defect, direct observation and interview. In identifying the historical data of defect, the observation starts with analyze the highest defect by area. After that is direct observation, in this phase the observation began with see actual on the floor production. It started with the process of inspection by Quality Control's inspector until they record the data of inspection and how they inspect. Lastly is interview, the interview held with Quality Control division such as the leader, inspector and supervisor. It has aim to see the feedback of Quality Control division.

Data is the primary needed of this research. The primary data of this observation are the historical defect's data in the year 2013-2016 and the inspection plan. The historical data of defect will be used to define the area. This research will assess the selected area which fulfils the criteria of problem identification. Pareto chart will be used to classify based on the area. Since the historical data used from January 2013 – July 2016, it shows the trend of defect by area in detail. Next is to collect inspection plan. After the area was selected then analyze the inspection plan. Inspection plan needed to see the process of inspection; document used and makes sure the inspection with actual will be same. PT. X is the one of company which under United Kingdom Accreditation Service (UKAS). All company under United Kingdom Accreditation Service must follow the standard of UKAS such as ISO. One of the ISO is ISO 9001; this ISO 9001 has benefit to meet the quality and customer satisfaction. So, the entire document must be same with the actual on the floor production.

B. Current System Analysis

Current system analysis has divided into three, there are business process, document and form, and software and database analysis. The analyzing and identifying will be explained into three sub sections as follows:

a. Business Process

After selecting the observed area is Torso Assembly, the identification process was conducted. The inspection plan was collected and compare with the actual inspection process. In comparing, the observation began with direct observation. Direct observation came up by understanding the process of QC inspection and finding the obstacles. In this phase, obstacles will be explored and used for finding the root cause of defect. For a several years, the defect at PT. X increased. But the inspection and audit already reviewed and renewed, because of this the process will be reviewed and assessed.

Torso Assembly is a process of making body from upper body, lower body, leg and arm, it is chosen as the critical process because it has the highest defect from all processes. The most found defect from Torso Assembly area mismatch color, gap, wrong part, solvent smear, improper function n Torso Assembly, there are nine inspections based on the Inspection Plan as it follows:

- First Piece Sample
- First Time Throughput
- LBO Aesthetic
- LBO Function
- Abuse Test
- Abuse Test Reliability
- Abuse Test Safety
- Life Test
- Sharp Tool control

After direct observation conducted, there are four inspections which not comply with the Working Instruction and need redesign. The inspections which not comply are **First Piece Sample, First Time Throughput, LBO Aesthetic and LBO Function**. The inspections which not comply with the standard has a role in QC department activity to reduce reject at PT. X. for example, LBO Aesthetic has part to reduce solvent smear, wrong part, mismatch color and gap and First Piece Sample can reduce reject in large quantity or before the Production make a large quantity of mismatch color.

Since there are four inspections are not complied with the document (SOP), the redesign is required. Standard Operating Procedure (SOP) is a set of step by step instruction complied by an organization to help workers carry out routine operations. SOP has function to make sure all activity is run correctly and consider about the safety and quality of a product or service. The main problem of inspection plan is the actual inspection plan and the document does not conform. The purpose is to ensure all inspection had made are run properly and conform to the SOP. So, the reject can be tracked and found before it became a finished product and arrived to customer. The redesign will draw using Process Flowchart. The proposed Business Process will draw and comply with the SOP.

b. Document and Form

Document and form that used will be collected. After the form and document gathered, then continue with identify. PT. X has a problem of documentation. Frequently, document and form are used is unstandardized, unregister, double document and expired document. Since this problem is often, so the document and form at selected area will be reviewed and checked.

c. Software and Database

Quality Control is the most important division of a company. Quality Control is a process to ensure that the product is a good product which is no defect and achieve the quality index/measure. All the process of ensuring the products must consider all aspect of produce the product. All the data of inspection will be recorded and reported. Nowadays, the database and software is very manual and lack of improvement. The most problem that faced is human error. Human error is a primary cause or contributing factor in disasters and accidents in industries especially in Quality Control department. Because of that, the database and software will be assessed.

C. Result of Current Analysis

After the analysis of current condition did, the next process is make a summary of it. The summary consists of the result of business process, document and form used and database and software of reporting. In business process, the finding is the process of inspect is not match with the document. For the document and form, there are a lot of expired form, unregister form and unstandardized. The last is database and software, PT. X has an old version of database and software. Actually the software already up to date but there is nobody can improve and make it advance.

D. Improvement

After the obstacle defined, the next stage is improvement. The improvement has a purpose to improve the current system. For this case, the improvement will separate into three based on the obstacle that already mentioned and explained. The explanations are:

a. Business Process

Improvement for business process of the flow process of inspection at selected area (Torso Assembly) is redesigning the new flow process. The obstacle found is the actual and written is not match. For example, there are nine inspections held but after identify and analyze, the result is four from nine is incorrect or not match. Because of this, the improvement is

redesigning the new flow of process using the flowchart. It has aims to make sure inspector do inspection properly and reduce defect.

b. Document and Form

After the document and form were identified and analyzed, there are several obstacles. The obstacles are unregistered form, unstandardized form and expired form. First is unregister, the unregister form will be registered to Document Control department. Document control has task to confirm all document and form used are register. So the unregister form will be registered. Next is unstandardized, the finding is form has a lot of format. The improvement of this is makes a new design of form to standardize it. A new format will use to make structure of form is standard. So all the data information will has a same format and structure. The last is availability form, the most problem of availability are double form, expired form and unrelated form. Regularly the form used is uncontrollable and rare to check it. So it make the availability form is not accurate and invalid. The improvement of availability is to make sure the availability is adjust with the current condition. For the expired form, unrelated form and double form will be deleted and reduce the number of form.

c. Software and Database

In PT. X, the database and software is lack of improvement. Quality Control department should give a data which reliable, valid and reasonable. In the current analysis, the database and file used have several problems and human error frequently occurs. Another problem is very manual. After analyzing the existing database and software, some obstacles will be found and the existing database will be improved using Macro Excel (VBA). For example, the unstructured format such as the inspector A write date with format DD/MM/YY and inspector B write the date with the format MM/DD/YY. Other problem is the inconsistent of write remarks Pass and Fail, sometimes the inspector write Pass or Passed and Fail or Failed. In order to mitigate the unstructured format, it will reduce using data validation. The data sheets are the main problem of database; the inspector and leader usually make a database and separate the data into several data

sheets. Because the data sheets are plenty, the improvement is reduces it and make it standard. It occurred because there is no rules and fix format of database. The improvements of data sheets are make a general database and all the data must be put in one data sheet.

E. Implementation

After the problem identified and improvement made, then continue to the next is implementation. The implementations are drawn into three parts; Business Process, Form used and database of reporting system. Business Process, Quality Control division will implement the new Process Flowchart. So the flow of how to inspection will be same with document and current condition. Document and Form used, all form will be standardized and registered. So Quality Control department will have a standard and register of form. The improved software and database, the Quality Control inspector will use the improved database and new software. In the new database, the modul training has been made to help inspector while using it. It expects to achieve the objective of each obstacle found.

F. Analysis of the Implementation

After implementation, the next step is analysis of the implementation. This stage has function to measure the accomplishment. In analyzing of the implementation, it will talk about the result and the percentage of success. There are three improvement and implementation. All aspect has own measurement. For the business process, the objective is reducing the defect of PT. X. For document and form, the number form which expired, double and unstandardized will reduce. Last is software and database, the target is saving time and number of file and data sheets.

CHAPTER 4
DATA COLLECTION AND ANALYSIS

4.1. Data Collection

Information and data are collected to support this project. Data are collected through discussion and interview several people with selected position in the related area in PT. X. The data collections are divided into three, there are; manufacturing process, defect's data and inspection plan. The explanation of data collection is as follow.

4.1.1 Manufacturing Process

Manufacturing process is an introducing before it turns into defect's data and inspection plan. Knowing the manufacturing process will help to start the observation of this project. Company X is a toy manufacturer which was established over fifty years. PT. X has a lot experience and implements automated manufacturing processes. From the first time until now, there are a lot of changes such as the process, the material, and the problem that faced. Through seeking deeper about manufacturing process of toy manufacturing, it aims to know the flow of process and the system inside the PT. X.

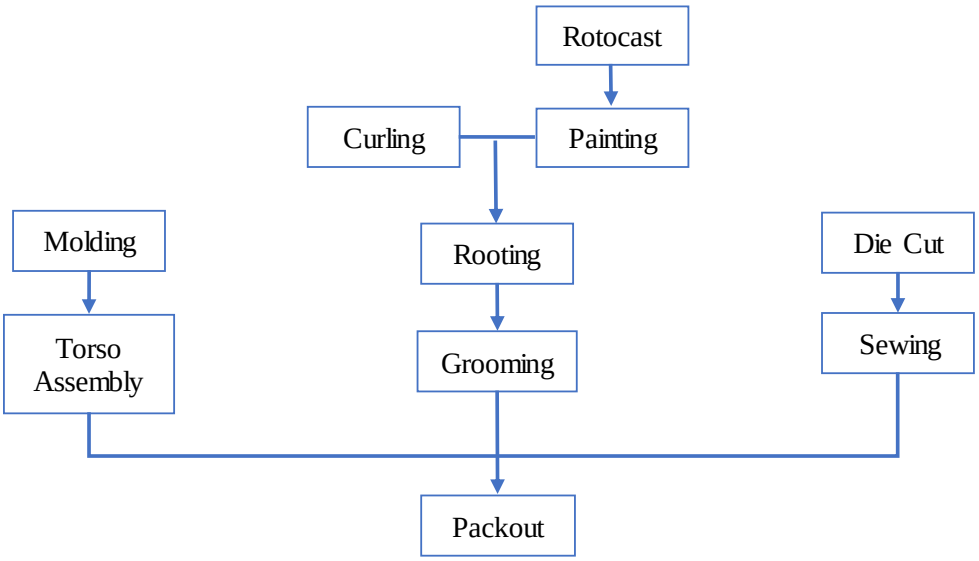


Figure 4.1 Manufacturing Process at PT. X

Figure 4.1 shows the production process of PT. X. In the middle, it shows the process of making a head with the hair. Rotocast is the process of making a plain head. After a plain head made, then it distributes to Painting. Head painting is the process of coloring eye, eye shadow, eye liner, eyebrow, lips, and cheek. After head painting finished, next is yarn curling. Yarn curling or known curling is the process of making hairstyle such as curly, straight, highlight and wavy. Rooting is the process after Yarn curling and Head painting done. At this process, a head will be rooted with the hair. Then, go to the next is grooming which is grooming the hair.

At the left side is the process of making the body or torso. First is Injection Molding. Raw material will be molded at Injection molding. At Injection Molding, the part will be produced are arm, leg, body, connector and accessories. After the main body produced such as body, arm, leg and connector, it will be sent to the Torso Assembly. For the rest part such as accessories will be sent to Packout. Torso assembly is the process of an assembly body that consists of arm, body, and leg using the connector.

After Torso and Head were done, then go to the right side. The right side is the costume's process. It divided into two which are Die cut and Sewing. Die cut is the process of cutting all the fabric. In this process, all the fabric will cut with pattern and design as requested. After it cut, then it will be sewed and become the costume. Since all the part finished, now go to Final assembly and Packaging. Final assembly is the process of assembly head into the torso and after it joined, the torso will be dressed up in the costume. Lastly, is put the doll into packaging and assembly it with the accessories if any.

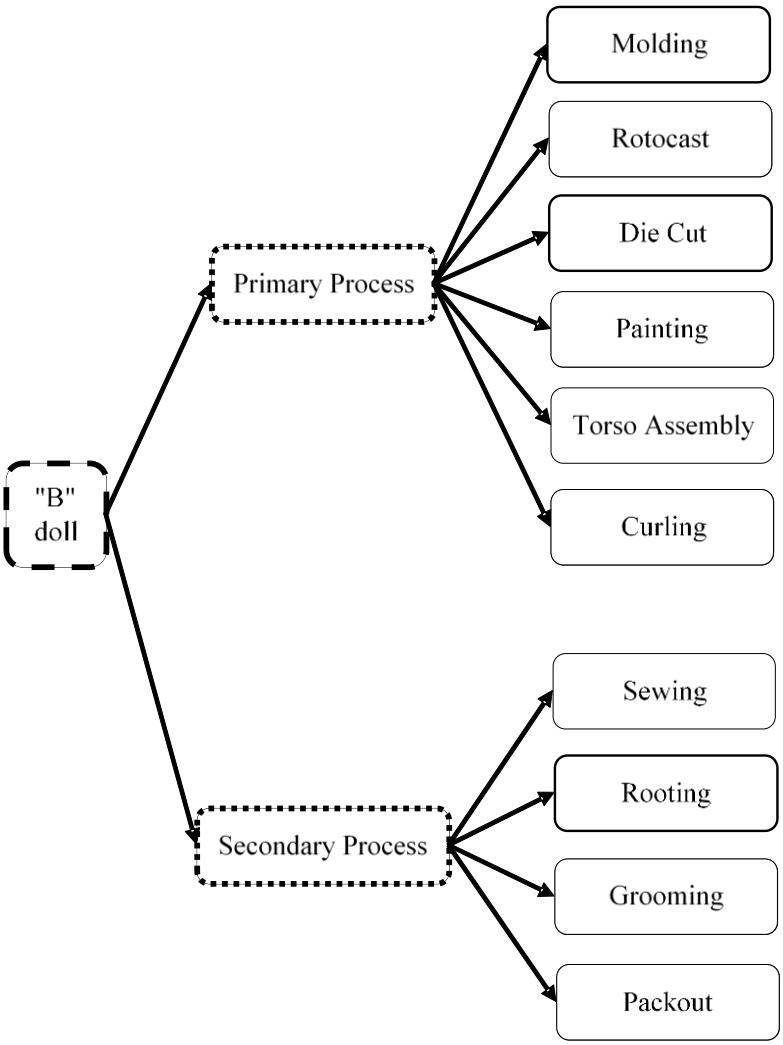


Figure 4.2 Area at PT. X

A manufacturing process runs in the production area at PT. X are classified into a primary process and a secondary process. Figure 4.2 explain more detail about the area. The primary process contains Molding, Rotocast, Die Cut, Painting, Torso Assembly and Curling. For the secondary process area are divided into Sewing, Rooting, Grooming and Packout. Primary has a bigger area than secondary area. All description of each area is exactly same with the Figure 4.1.

4.1.2 Torso Assembly Process

After knowing the Manufacturing Process at PT. X, now it will explain about the selected area or process. Torso Assembly chose as the selected area, for further explanation about the history will be explained at sub chapter 4.1.3 or the next section. After analyzing and direct observation, Torso Assembly has determined to be observing area. It will be better to explain more detail about Torso Assembly and the inspection before it turn into Business Process. In this section, it will explain the process Torso Assembly and Quality Control in detail.

Torso Assembly is a process of joining body with a leg and an arm. In Torso Assembly or known as TA, there are nine inspections. Those are First Piece Sample, First Time Throughput, LBO Aesthetic, LBO Function, Abuse Test, Abuse Test Reliability, Abuse Test Safety, Sharp Tool control and Life Test. Every inspection has a different sample size, frequency, and so on based on the Inspection Plan. The frequency of inspection divides into a once a week, once a shift and every two hour. It caused by the toy, is it a new toy or not. If it is a new toy, it will do Life Test. So the difference is Life Test. Because of this, Production must inform the Quality Control it is a new toy or not. Before production starts in TA, the Operator must check the schedule and type of toy (new toy or not).

After the schedule and type of toy knew, then Operator must make a First Piece Sample and Life Test. First Piece Sample is an inspection that holds every beginning shift or change over. The purpose is to make sure the part is same with the Approved Sample. Then continue with Life Test, it aim to check the durability. After the First Piece Sample and life test are conducted, then Production can produce or continue the process. The rest of inspection will hold every two hour and once a shift. The inspections that held every two hour are LBO Aesthetic and LBO Function. And the inspections hold once shifts are First Time Throughput, Abuse Test, Abuse Test Reliability, Abuse Test Safety and Sharp Tool Control.

Every two hour the Quality will conduct LBO Aesthetic and LBO Function. LBO Aesthetic and LBO Function are a new inspection. It aims to make sure the process is consistent and there is no defect while process. If it found reject, the production will stop. For inspection once a shift, it will conduct during the production. Abuse Test, Abuse Test Reliability and Abuse Test Safety, it conducts in the middle of shift. If it found reject, the part will audit. For Sharp Tool Control and First Time Throughput, it conducts at the end of shift. All the result of inspection is record in QC server.

Each inspection has a function for reduce reject. For example, the inspection Abuse test, Abuse test reliability and Abuse test safety have purpose to reduce broken and loose part. Broken and loose part is a reject because the method and/or the Production did not follow the SOP. Another example is LBO Aesthetic and LBO Function, it is used to mitigate reject from Torso Assembly area. Since LBO Aesthetic and LBO Function a role in reducing reject, this inspection must run properly. Sometimes, reject is found because QC department did not do inspection properly. In order to make sure reject does not caused by QC department, the review and renew of inspection plan are required. The general flowchart can be seen at APPENDIX 13.

4.1.3 Defect's Data

The defect's data are recorded and performed in all area. First, take the data of defect in year 2013 and middle of year 2016. After the data was collected, and then break down it based on the year. Find the area which has the highest defect in the period of year 2013-2016 and see the trend of the defect and the area of this period. After identify and analyze to find the area using Pareto chart. The data of defect is consist the defect per million opportunities, the contributor area and the percentage of the contributor area.

The collected data are Lot Buy Off (LBO) and Open Package Inspection (OPI). Lot Buy Off is the inspection which concern in checking aesthetic of toy and packaging. Open Package Inspection is the inspection which checking the function and

aesthetic. The difference is LBO check without open the packaging but OPI check the doll with open the package and more detail. Table 4.1 is the summary data of defect in the year 2013 – 2016 o PT. X. It shows the defects of LBO and OPI in Part Per Million.

Table 4.1 Data of Defect in the year 2013-2016

Year/Inspection	LBO	OPI
2013	2,480	7,468
2014	2,042	12,998
2015	2,184	9,828
2016	2,055	10,229

Table 4.1shows Lot Buy Off (LBO) in the year 2013 was 2,480 Part Per Million (PPM) and decreased in the year 2014 became 2,042 PPM. But the Open Package Inspection was increased, in the year 2013 was 7,468 PPM became 12,998 PPM. In the year 2014 was 2,042 PPM and increased in year 2015 become 2,184 PPM. The increase from year 2014 to 2015 is 142 PPM. OPI in the year 2015 has decreased from 12,998 PPM to 9,828 PPM. The data of middle of year 2016 is almost with LBO in the previous year (2014-2015). For Open Package Inspection (OPI), the data of defect is like LBO but in the year 2015, OPI has reduced. Even though in year 2016, OPI increase become 10,229 PPM. The data of LBO is around 2,000 PPM and OPI fluctuates around 7,468 to 10,229 PPM.

From Equation 4-1 shows the formula of Part Per Million. For formula of percentage Part Per Million shows in Equation 4-2. For the detail defect's data are presented as APPENDIX 3 to APPENDIX 6. In PT. X shows the defect's data in PPM.

Part Per Million is calculated using Equation 4-1

$$Part\ Per\ Million = \frac{Number\ of\ Defect}{Sample\ size} x1{,}000{,}000 \quad (4\text{-}1)$$

Percentage PPM is calculated using Equation 4-2

$$\%\ of\ PPM = \frac{PPM}{\Sigma PPM} \quad (4\text{-}2)$$

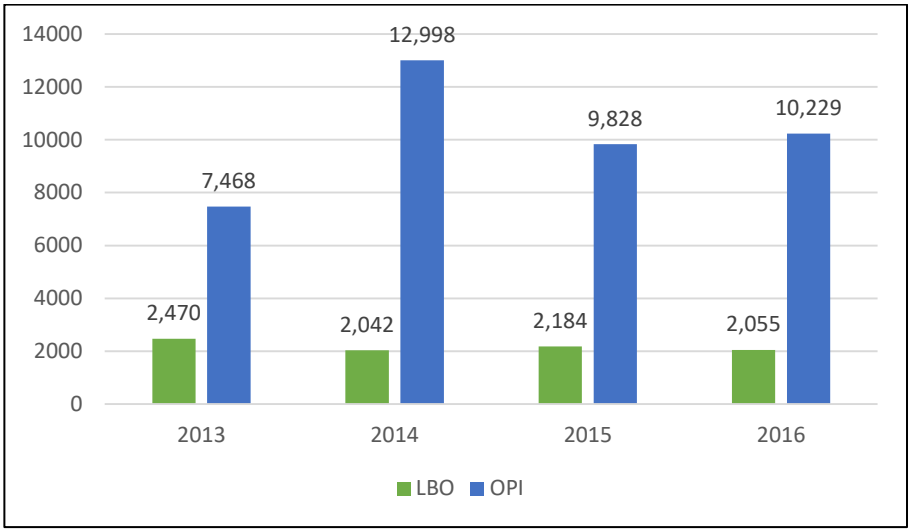


Figure 4.3 Defect Trend in the Year 2013-2016

Figure 4.3 shows data defect every year from year 2013 into 2016 of PT. X. The LBO decreased from year 2013 to 2014 but increased again from year 2014 to middle 2016. For OPI the defect in year 2015 decreased but in 2016 it increases again. Since every year the defect fluctuates and the number defect is still high. From the Figure 4.1, it shows the trend of chart LBO and OPI are increases every year. In the year 2016 started from January – July, the LBO was 2,055 and for OPI is 10,229.

From Table 4.2 shows Torso Assembly's percentage to LBO and OPI. Torso Assembly to LBO has ranked into the top five defects and for OPI has ranked top three defects. For LBO, Torso Assembly gives contribution around 10% from all process. In OPI, Torso Assembly gives a higher percentage than LBO. Torso Assembly give contribution around 20% - 50% from 100% to OPI.

Table 4.2 Percentage TA to LBO and OPI

YEAR\INSPECTION	LBO	OPI
2013	6%	13%
2014	9%	58%
2015	11%	37%
2016	9%	27%

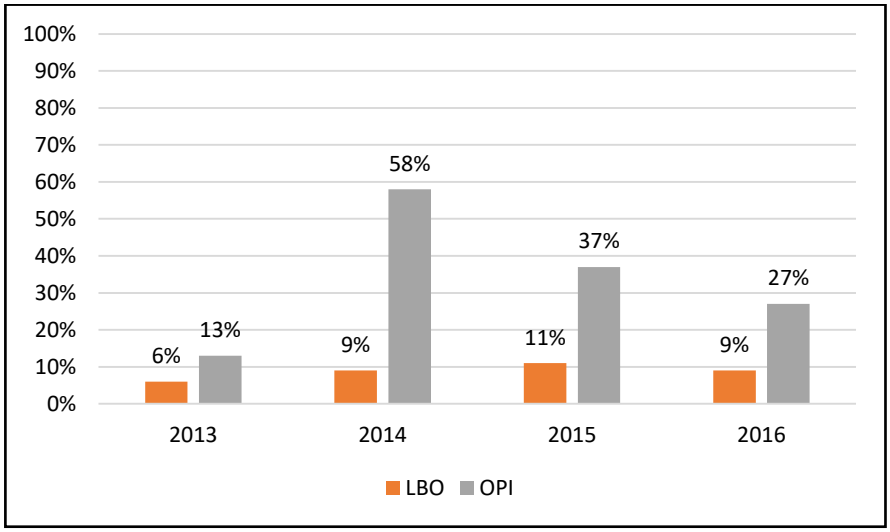


Figure 4.4 Number of LBO and OPI in Torso Assembly

Figure 4.4 shows the percentage Torso Assembly. The defect's data in detail are placed in APPENDIX 3 to APPENDIX 6. Lot Buf Off and Open Package Inspection in year the 2014, it shows Torso Assembly (TA) or known ASE ranked first at OPI with 58 % out of 100% and ranked fourth at LBO with 9% out of 100%. Torso Assembly is the process of assembly head and body. In year 2014, Torso Assembly was critical area because it gave a huge contributor defect in Company X especially for OPI.

Table 4.3 is a table of Torso Assembly's rank to LBO and OPI in the year 2013 until 2016. Table 4.3 shows Torso Assembly in the year 2016 ranked first at OPI and ranked third at LBO. In the last two years, Torso Assembly or ASE has ranked first. In year 2015, ASE ranked third at LBO, in the previous year 2015, ASE ranked fourth. It means Torso Assembly had risen from fourth into third.

Table 4.3 TA's Rank

YEAR\INSPECTION	LBO	OPI
2013	7	2
2014	4	1
2015	3	1
2016	3	1

Table 4.3, LBO and OPI in the year 2016 shows Torso Assembly rank first at OPI and rank third at LBO. For three years in a row, ASE has ranked first at Open

Package Inspection (OPI). It makes ASE or TA become the most critical area in Company X. In the last three years, Torso Assembly is the top four highest area where gives contribution for defect at PT. X. Since Torso Assembly dominant, the observation will be held at Torso Assembly or known as TA. Torso Assembly is the process of assembly the body with the head as it explained at the Manufacturing Process. As a critical area, TA already reviewed and renewed the method and the inspection in order to reduce the defect. But for over three years, the method and inspection still could not reduce the defect. It could be seen at APPENDIX 3 to APPENDIX 6. APPENDIX 3 to APPENDIX 6 present the defect's data of PT. X and it show the trend of TA in detail.

4.1.4 Inspection Plan

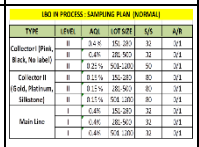
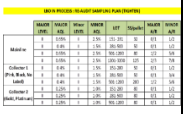
Inspection Plan is guidance for Quality Control to do inspection. All inspectors must follow and obey the procedure of how to inspect that written on Inspection Plan. In this stage, Inspection Plan that has made will be reviewed and identified. In process of review and identify, the method will be used is Business Process. Business Process chose because it represents the activity through flowchart and workflow which is purpose to achieve the goal. In this case, the goal of PT. X is 1,000 PPM of the year 2016.

The purpose is to make sure the inspector doing the inspection follows the instruction and procedure. The procedure had made has the aims such as to make sure the inspector will inspect correctly and make sure the inspector will maintain the quality. Quality is the most important aspect for Manufacturing. The customer will not buy the reject products. In order to produce high quality products, the company must fix the inside of company first. In checking the current procedure of Inspection Plan, it has to consider about Quality Management System (QMS).

The Table 4.4 is Inspection Plan at Torso Assembly area. In this area, there are nine inspections and all of it have purpose in mitigate the number of defect in PT. X. each inspection must be followed and all inspectors must obey it. This procedure made to make sure Quality Control has direction of how to inspect and All aspect

such as who did the inspection, where is the folder of database, limitation and related/reference document.

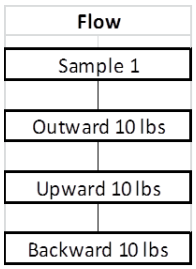
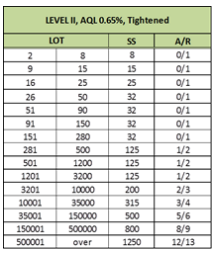
Table 4.4 The Current Inspection Plan

Part to be Inspected	Inspection Type	Reference/ Equipment	Sample Size	Minimum Frequency	Record	Remarks
All Part after Finish Assembly	First Piece Sample	Approved Sample	1 part#/ line	At beginning of shift or change over	Soft copy (server)	First piece sample doesn't change, if there aren't change over part, tool change or mold repair
All Part after Finish Assembly	FTT	By Engineering	100%	Shift	SSC report	Conducted by production
All torso	LBO: - aesthetic - function	• Approved Sample • DD&C	 Tighten SS for aesthetic re-audit after rework  **LBO in Process Function Normal** Tighten SS for function re-audit **LEVEL II, AQL 0.65%, Tightened**	Every 2 hours/shift	QC Server	• Use ANZI/ASQ Z1.4 • Product can be released if QC has put accepted tag or accepted stamp • Re-audit after rework: a. Defect aesthetic when LBO, re-audit LBO with tighten sample size (SS) b. Defect function when LBO, re-audit LBO aesthetic with normal sample size, and Containment Audit (CA) function and missing part with tighten sample size

Category	SS	Lot	A/R
Feature	6	2 hours	0/1
Non Feature	3	2 hours	0/1

LOT		SS	A/R
2	8	8	0/1
9	15	15	0/1
16	25	25	0/1
26	50	32	0/1
51	90	32	0/1
91	150	32	0/1
151	280	32	0/1
281	500	125	1/2
501	1200	125	1/2
1201	3200	125	1/2
3201	10000	200	2/3
10001	35000	315	3/4
35001	150000	500	5/6
150001	500000	800	8/9
500001	over	1250	12/13

Table 4.4 The Current Inspection Plan (continued)

Part to be Inspected	Inspection Type	Reference/ Equipment	Sample Size	Minimum Frequency	Record	Remarks
Accessories Assembly	Abuse Test	• Digital Force Gauge • Inspection Plan • SQT	6 pcs/part#	1 time/part #/shift	QC Server	• Take sample after cleaning and relax the samples for minimum 4 hours before perform abuse test • Sampling system will follow QA/PP/049-abuse and life test Sampling Plan • Sample size can reduce to 3 pcs/part# if no failure 2 weeks consecutive
Complete Torso	Abuse Test Reliability	• Digital Force Gauge • Inspection Plan • SQT	6 pcs/line Sample size change to 3 samples per shift, if continue passed after 10 days	1 time/shift	QC Server	Flow for abuse test (Reliability):  Sample size for re-audit: 

LEVEL II, AQL 0.65%, Tightened			
LOT		SS	A/R
2	8	8	0/1
9	15	15	0/1
16	25	25	0/1
26	50	32	0/1
51	90	32	0/1
91	150	32	0/1
151	280	32	0/1
281	500	125	1/2
501	1200	125	1/2
1201	3200	125	1/2
3201	10000	200	2/3
10001	35000	315	3/4
35001	150000	500	5/6
150001	500000	800	8/9
500001	over	1250	12/13

Table 4.4 The Current Inspection Plan (continued)

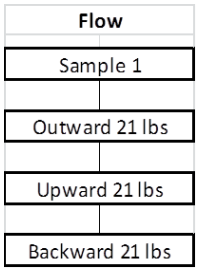
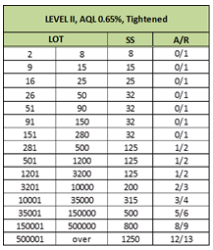
Part to be Inspected	Inspection Type	Reference/ Equipment	Sample Size	Minimum Frequency	Record	Remarks
Complete Torso	Abuse Test Safety	• Digital Force Gauge • Inspection Plan • SQT	6 pcs/line Sample size change to 3 samples per shift, if continue passed after 10 days	1 time/shift	QC Server	Flow for abuse test (safety):  Sample size for re-audit: 
Complete Torso/Accessories Assembly	Life Test	• Inspection Plan	6 pcs / Part#	1 time/part #/week	QC Server	Sampling system will follow QA/PP/049-abuse and life test Sampling Plan
Sharp tool	Sharp tool control	4 Question of sharp tool	5 machine	Shift	QC server	Answer according to the standard in question

Table 4.4 is the current Inspection plan. The old inspection plan (APPENDIX 1) has five inspections at TA but in the current/new has nine inspections. The new inspections are First Time Throughput (FTT) which changed the First Pass Yield (FPY), Abuse test until failure changed into Safety and Reliability, LBO divided into LBO Aesthetic and LBO Function and the last is sharp tool control. All inspection has mentioned in current Inspection plan (Table 4.4) will draw into Business Process and then will analyze.

4.2. Current System Analysis

After the data were collected and problem was identified, the next step is analysis. The analysis of current system and current condition is divided into three parts. Those parts are Business Process analysis, analysis on document and form used and analysis on database and software of reporting. The method used will be considered with Quality Management System (QMS) and workflow management. In this analyzing, the tools used are Pareto chart, Flowchart and Process Flowchart. For the developing software, the software used is Macro Excel and Visual Basic (VBA). The explanation will divide into three parts and it starts with Business Process, Document and Form and the last is Database and Software as it follows:

4.2.1 Business Process

Business Process is a method use to redesign system that aims to achieve organization goals. Business process or business method is a collection of related, structured activities or tasks which produce a products and/or service for customers. Business process known as flowcharts and often is visualized. Hopefully using Business Process could support the quality control process and support the production processes and then the organization's goal of LBO 1,000 PPM could be achieved.

In this project, Business Process had chosen because it is the best method in order to redesign system. Business Process is a complex method but has a best result. In redesign system, it will be better to begins with mission objective and end with achieve the objective. Company X has system is not Up-to-date. Using Business Process, it could achieve the objective of this research and make efficiency of PT. X growing up. In Torso Assembly area there are nine inspections and will be drawn into Business Process, as it follows:

1. First Time Throughput
2. First Piece Sample
3. LBO Aesthetic
4. LBO Function
5. Abuse Test

6. Abuse Test Reliability
7. Abuse Test Safety
8. Life Test
9. Sharp Tool Control

From the nine inspections, all inspections will be drawn into flowchart in general then continue with the explanation of every inspection briefly and Process Flowchart in detail. Process Flowchart will be used in analyzing. Every inspection will have a brief explanation, general flowchart and process flowchart in detail. All explanation will be explained as it follows:

1. First Piece Sample

   First Piece Sample is an inspection that checks the aesthetic of all part after finished assembly. First Piece Sample conducts by Production. It starts at beginning shift or change over, the purpose is to detect the defect at beginning shift or change over. Through First Piece Sample, the defect could be avoided before Production make a defect in large quantity. So every day the production must makes the First Piece Sample. The sample size is one part/line. The purpose is to make sure all the part is exactly same with the approved sample. Approved sample as a reference of every part which is running. So the aesthetic defect such as wrong color, improper assembly, mismatch color and so on can be reduced.

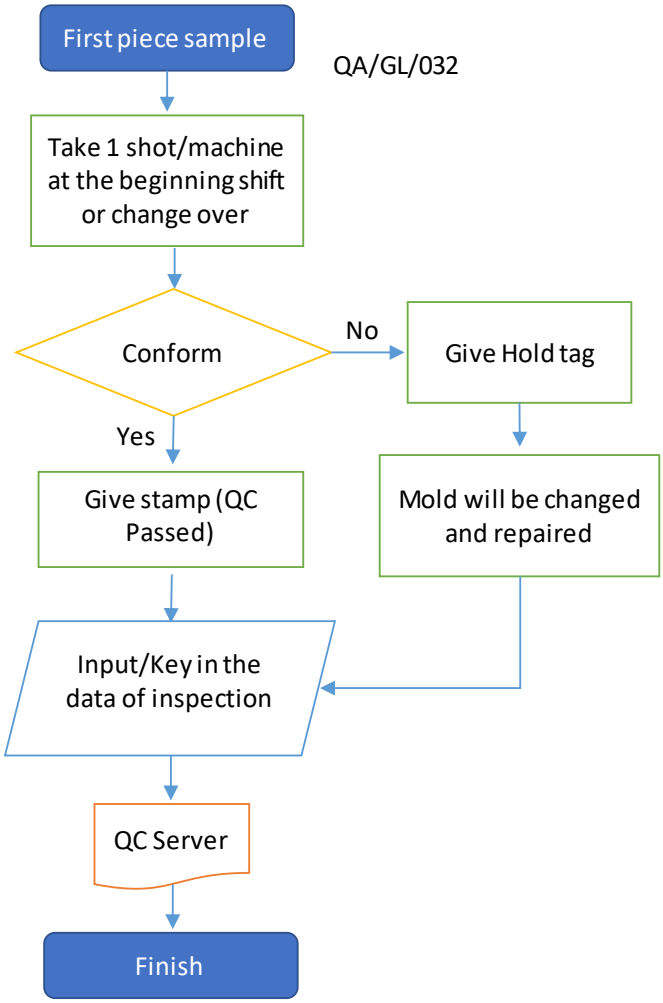


Figure 4.5 Current Flowchart of First Piece Sample Test

For clarity of the process facts, the explanations are intentionally as follows:

1. Production (Operator) takes 1 shot/machine sample randomly at the beginning shift or the first running (material change, tool change, repair tools and resetting machine) and brings it into Quality Control's desk or called Modul Quality Control.
2. The Operator will ask the availability approved sample of part.
3. Quality Control (Inspector) will check the part with the database and find where the locator is. After the locator found, the Production or Quality Control department will take the approved sample.

4. After the approved sample of part before is found by Operator or Inspector, then the Inspector will check it. The Inspector will check the aesthetic of all part after finished assembly.
5. The results:
   - If the First Piece sample matches with the approved sample, then Operator will fill the form of First piece sample and get stamp QC PASSED.
   - If the First Piece sample does not match with the approved sample, Operator will back to the machine, stop the machine and call Mechanical Engineer (Mold setter) to reset the machine. After resetting machine, then Production (Operator) will do it again/repeat the process from Point number 1.
6. After get stamp QC PASSED, the Operator will package the part and form confirmation into polybag or plastic bag, then bring it to the machine and put it on box of first shot sample. Operator can continue the production. First piece sample must be renewed every day, changeover (mold, tool, and part) or first running.

Figure 4.6 is a current Process Flowchart of First Piece Sample. In this diagram, it shows the flow from start to finish. First Piece Sample is the inspection check aesthetic every beginning shift or changeover (mold, tool, and part). In this process, the Production takes one shot sample randomly and brings it into QC. QC will check the aesthetic. In this inspection, the obstacle is database used is not accurate and the data in system and actual don't match. The main problem is the system of approved sample.

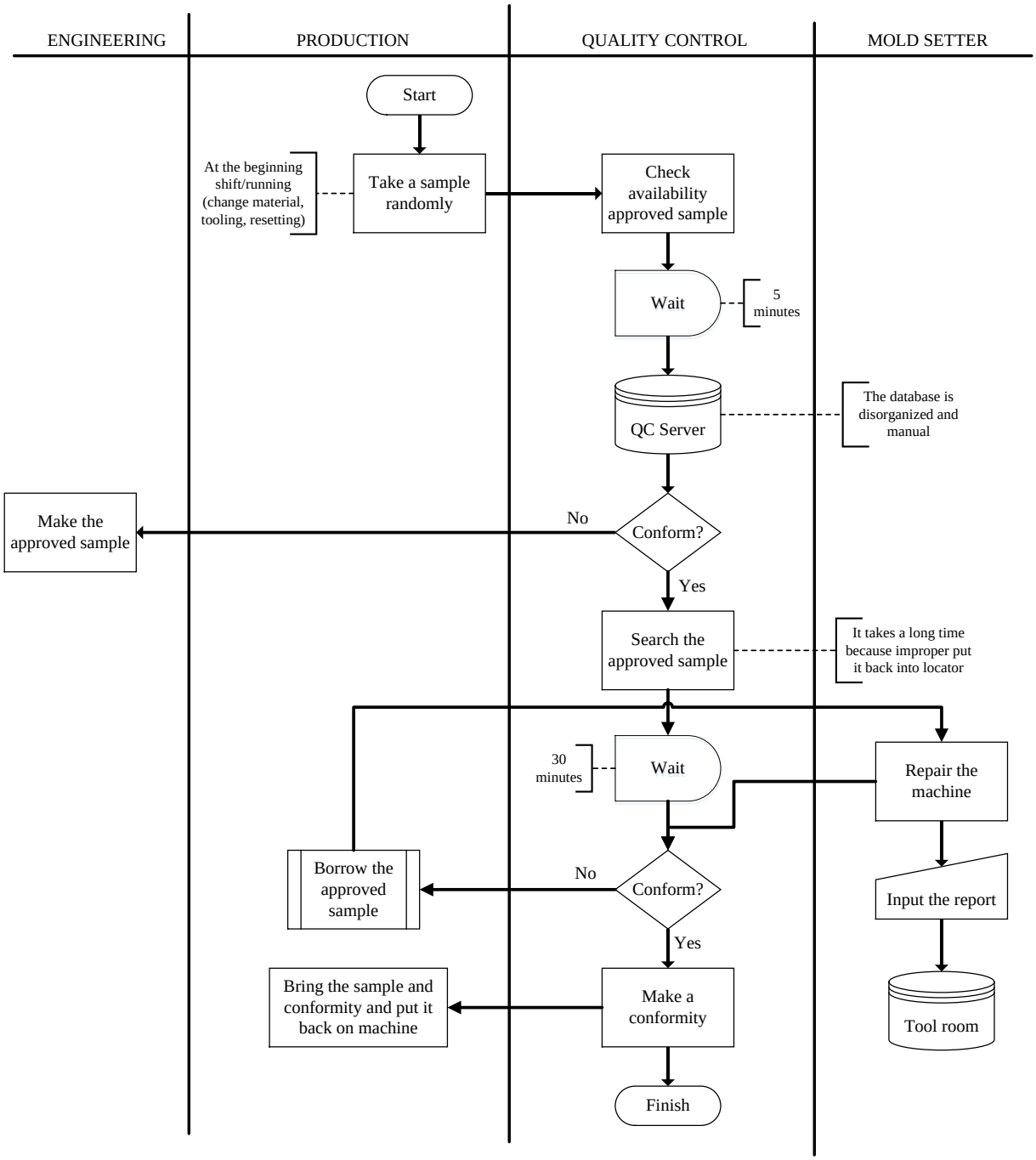


Figure 4.6 Current Process Flowchart of First Piece Sample

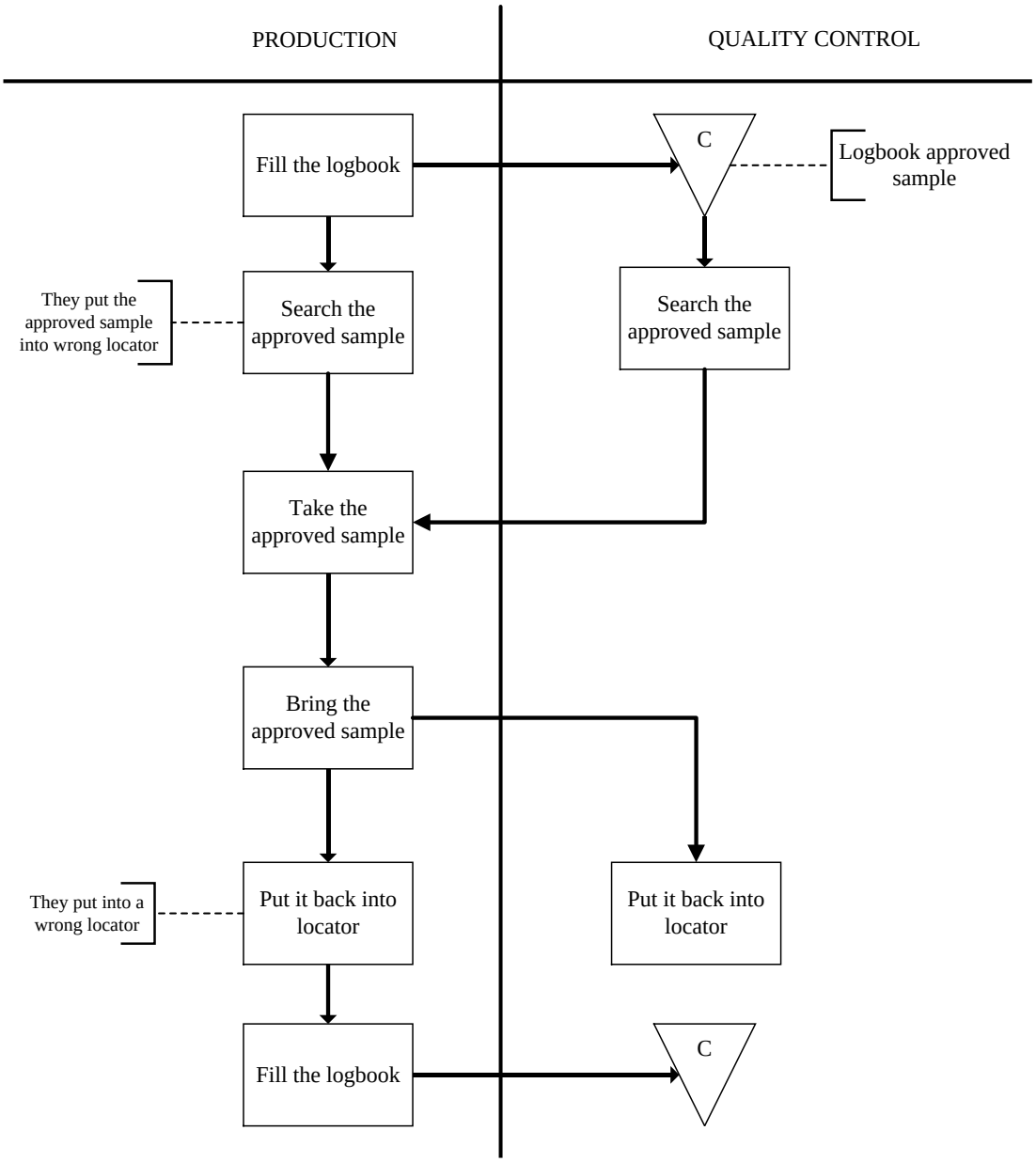


Figure 4.7 Current Predefined Process of Borrow Approved Sample

Figure 4.7 is a current predefined process of Borrow the approved sample. It shows the process of search Approved sample at locator and the process of put it back the approved sample into a locator after borrow it. Figure 4.7 shows the process of search could be done by production and quality control. Today, the most problem is the production put it into a wrong locator. It ruined the data of approved sample. It happened in the process of returning the approved sample, the production put it into a wrong locator.

2. First Time Throughput

First Time Throughput is a new inspection. It replaced First Pass Yield (FPY). It conducts by Production. First Time Throughput is a percentage of good products that meet the quality. A hundred percent FTT means a zero defect. All part that already checked must be record in document called Shift Schedule Control (SSC). So all part such as reject and good part can be tracked and known.

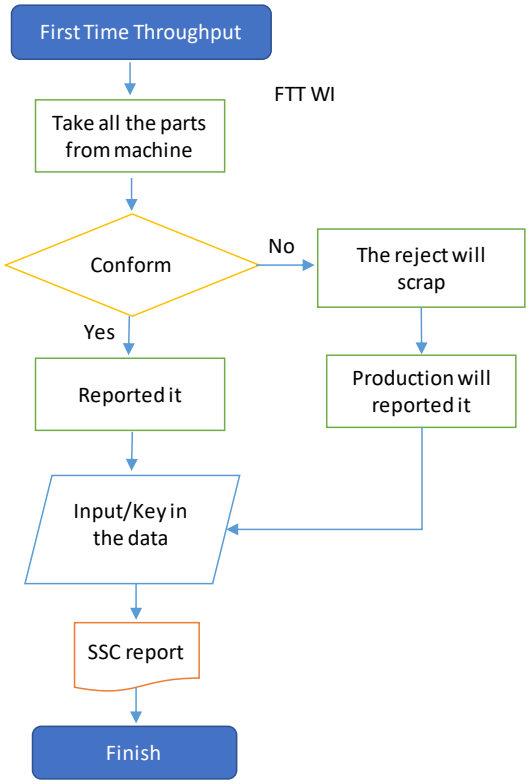


Figure 4.8 Current Flowchart First Time Throughput

For clarity of the process facts, the explanations are intentionally as follows:

1. Production (Operator) must record all the throughput data such as good product quantity, defect quantity, defect name and miss schedule from the machine in Shift Schedule Control and called as SSC. The throughput data needed to calculate the First Time Throughput Percentage.
2. The defect will be destroyed or called scrap by Production.
3. Every shift, a Production (Leader) will collect the SSC and record it into Daily Schedule Adherence (DSA) database.

4. Quality (Clerk) will copy the data from DSA and make report of First Time Throughput (FTT), after that the report will be saved into QC Server and sends to Production Department every week.

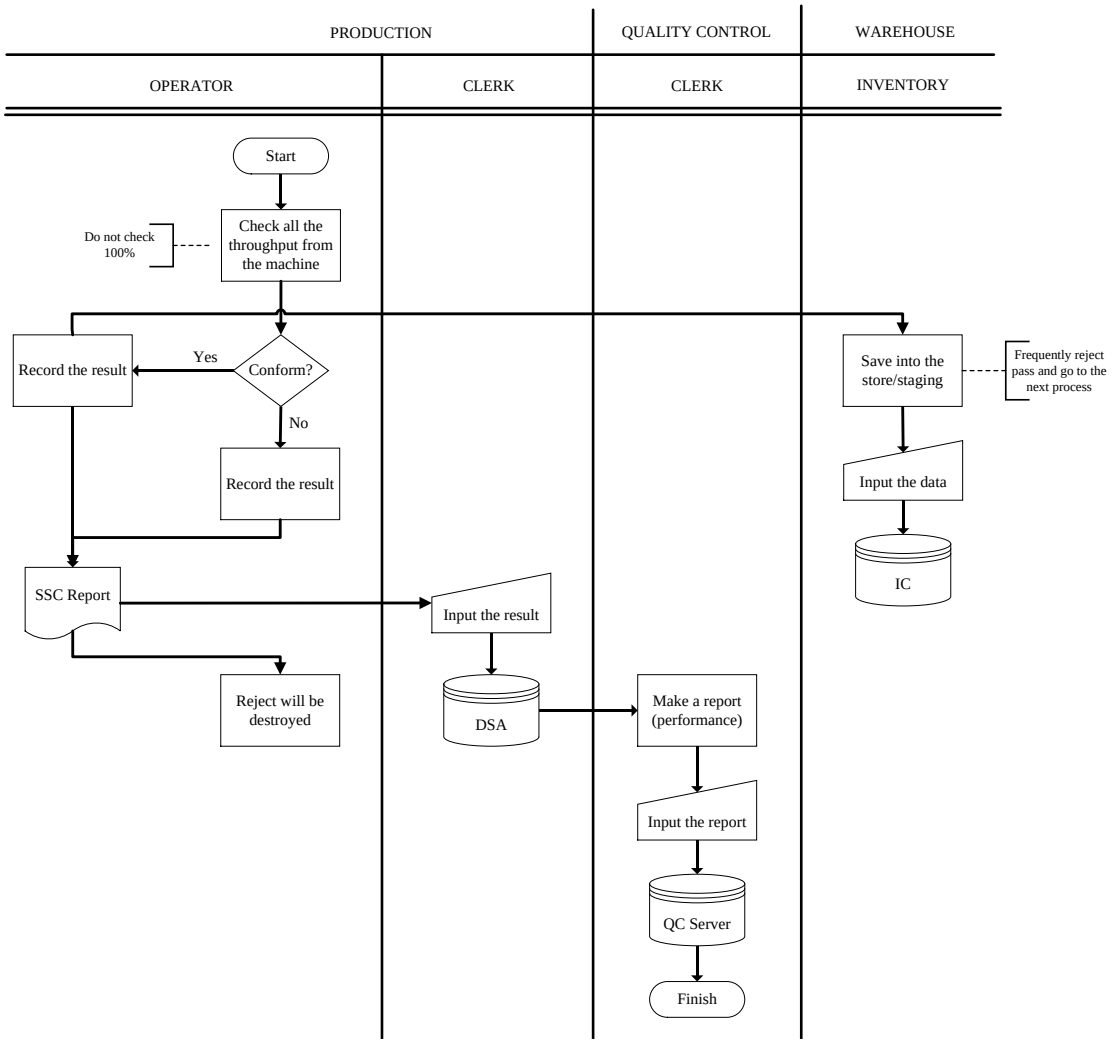


Figure 4.9 Current Process Flowchart of First Time Throughput

Figure 4.9 is a current Process Flowchart of First Time Throughput. The document said, production (operator) must check 100% and record it into Shift Schedule Control (SSC). But the actual the operator didn't check all output. It caused the defect pass through the next process. It causes the LBO high and PT. X cannot achieve the LBO goal which is 1,000 PPM. For this inspection, the major problem is not follow the Working Instruction (WI) of First Time Throughput.

3. Lot Buy Off (Aesthetic)

Lot Buy Off Aesthetic is an inspection of checking the aesthetic of finished part or called complete torso. Production will prepare a finished part called complete torso and Quality Control (Inspector) will audit. It will be said good if there is no aesthetic defect such as contamination paint, wrong color, asymmetrical eye and others. The frequency of this inspection is every two hours/shift with sample size based on the type of toy that written on Inspection Plan.

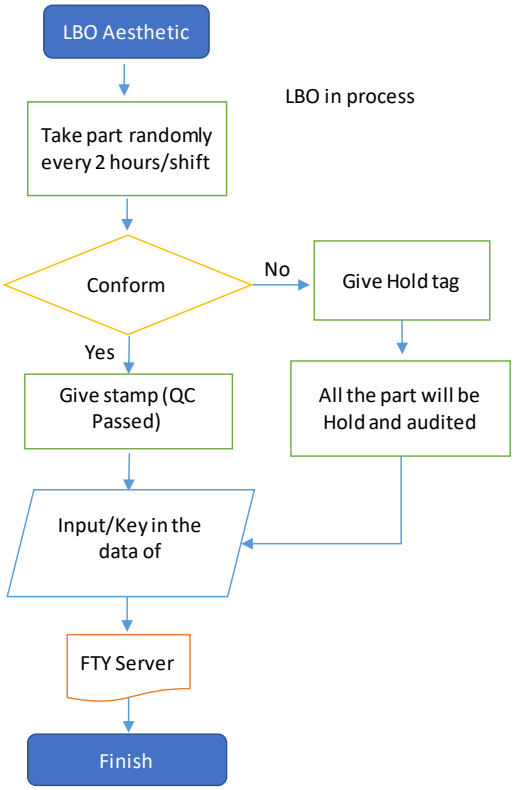


Figure 4.10 Current Flowchart Lot Buy Off Aesthetic

For clarity of the process facts, the explanations are intentionally simplistic;

1. Inspector Quality Control takes 32samples each machine randomly every two hours/shift.
2. The Inspector will check the aesthetic based on the Approved Sample and Summary Quality Testing (SQT) of toy.
3. If the result:
   - The part Pass the inspection which means OK, the part will be sent to next process.

- The part Fail the inspection which means NOT OK, inspector will give hold tag and all the part will be audited. The inspector will take part based on the sampling plan and check it again. If the result of reaudit Pass or OK, the part will release and send to next process. But if the result of reaudit is Fail or NOT OK, all the part will scrap.

4. All the results will be recorded into First Time Yield (FTY) server using Portable Data Terminal (PDT).

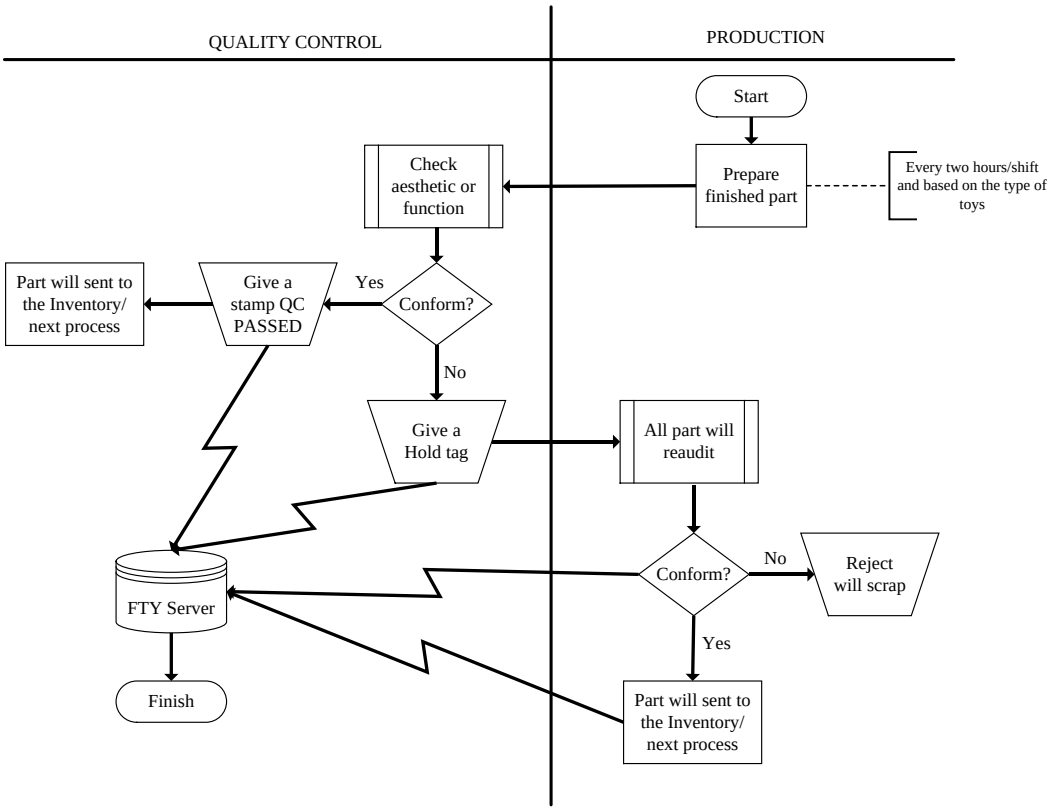


Figure 4.11 Current Process Flowchart of LBO Aesthetic

Figure 4.11 is the current Process Flowchart of Lot Buy Off Aesthetic. In the old inspection plan, LBO just one but today it divided into two, such as LBO Aesthetic and LBO Function. In this new inspection plan, the sample size changes and the flow process of reaudit changes too. Because the current inspection of LBO is complex, it is confusing the inspector. Sometimes Inspector use the old one because too complex and there is no flowchart yet. Because of this, the new inspection of LBO will draw with the newest current condition.

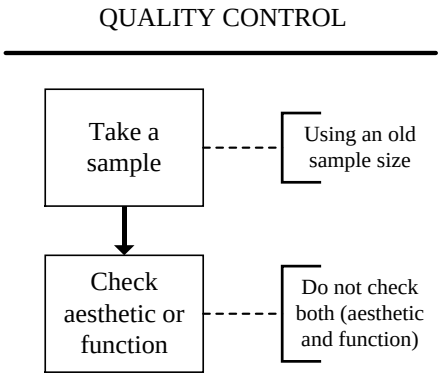


Figure 4.12 Current Predefined Process of Check

Figure 4.12 shows the predefined process of Check currently. The last inspection plan wrote Quality Control check aesthetic or function. But with the new inspection plan, it said must check both. In order to convince the actual and document is same, the redesign process needed.

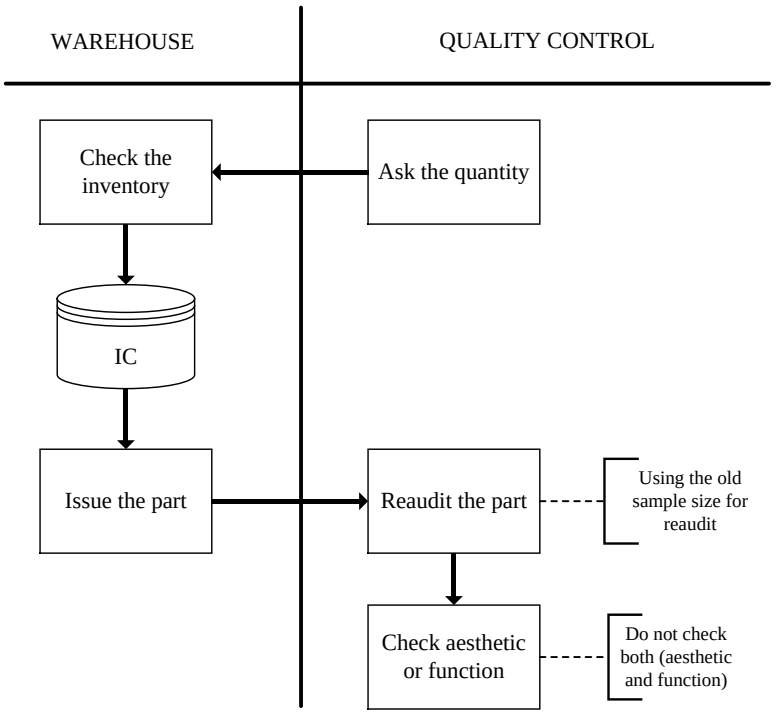


Figure 4.13 Current Predefined Process of Part Reaudit

Figure 4.13 is a current predefined process of reaudit. The current process still uses the old procedure. In the new procedure, it is used the new flow and new sample size of reaudit. Because the document of reaudit has own procedure called In-process and Final Inspection and Test, so the inspector should read it. In PT. X, the procedure has an applicable document, form and reference and

sometimes it must be done by checking the reference documents. In-process and Final Inspection and Test have been revised too.

4. Lot Buy Off (Function)

   Lot Buy Off Function is an inspection of checking the function of part. Production will prepare a finished part called torso and QC will audit. It will be said good if there is no function defect such as improper function, unfunction/not function, wrong assembly and others. The frequency of this inspection is every two hours/shift with sample size based on the type of toy that written on Inspection Plan.

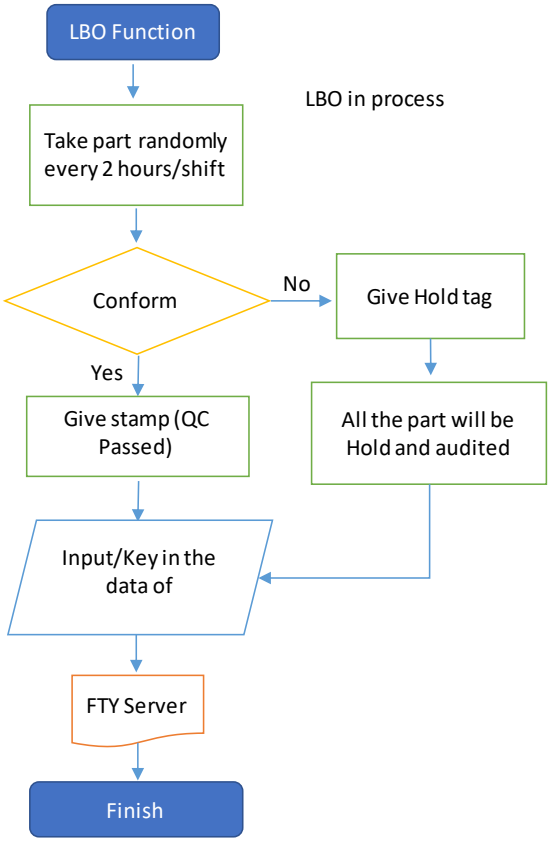


Figure 4.14 Current Flowchart Lot Buy Off Function

For clarity of the process facts, the explanations are intentionally as follows;

1. Inspector Quality Control takes 32samples each machine randomly every two hours/shift.

2. The Inspector will check the function of sample based on the Approved Sample and Summary Quality Testing (SQT) of toy.
3. If the result:

- The part Pass the inspection which means OK, the part will be sent to next process.
- The part Fail the inspection or NOT OK, inspector will give hold tag and all the part will be audited. The inspector will take part based on the sampling plan and check it again. If the result of reaudit is Pass or OK, the part will release and send to next process. But if the result of reaudit is Fail or NOT OK, all the part will be destroyed.

4. All the results will be recorded into First Time Yield (FTY) server using Portable Data Terminal (PDT).

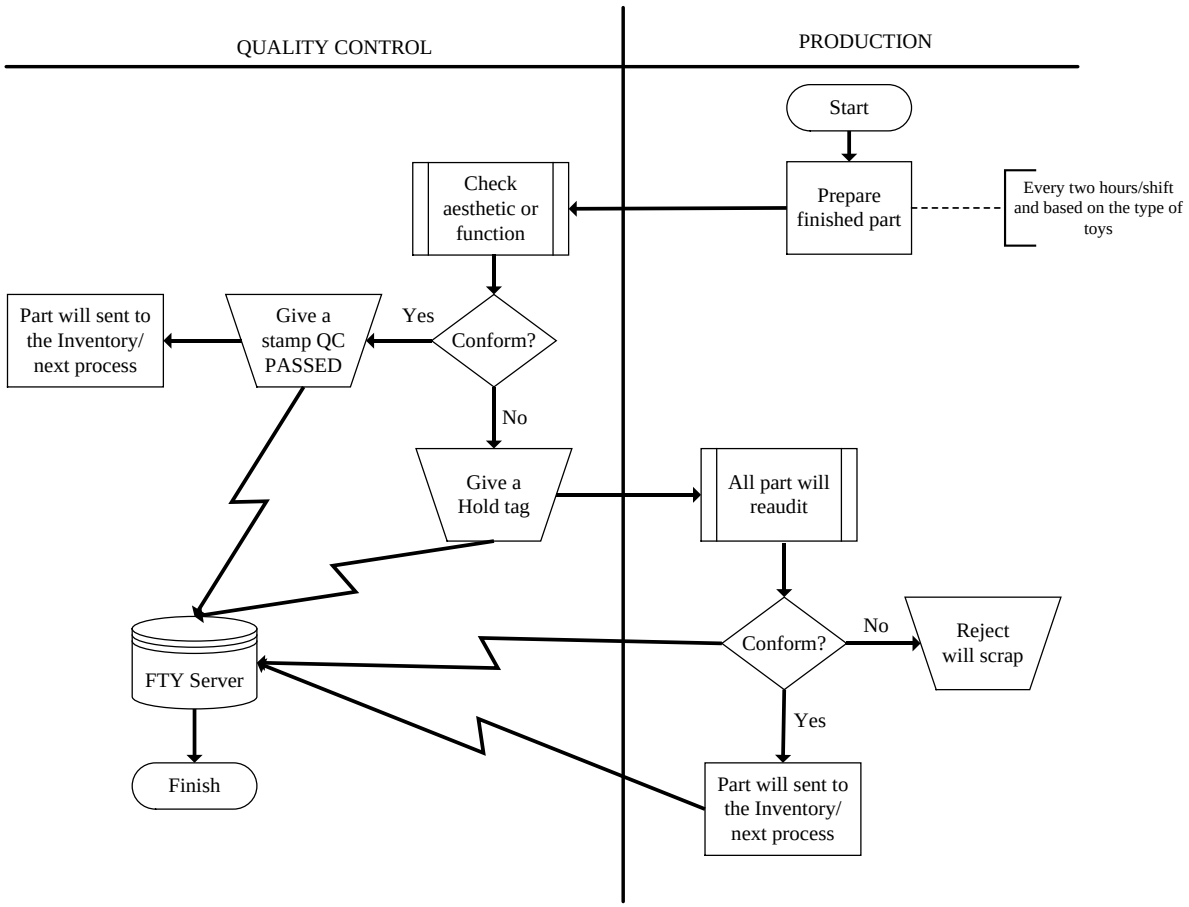


Figure 4.15 Current Process Flowchart of LBO Function

Figure 4.15 is the Process Flowchart of Lot Buy Off Function currently. In the old inspection plan, of LBO, there was one type of inspection. In the current system, it is divided into two, LBO Aesthetic and LBO Function. In this new inspection plan, the sample size changed and the flow process of reaudit change too. Because the current inspection of LBO is complex, it is confusing the inspector. Sometimes Inspector use the old inspection because too complex and there is no flowchart yet. Because of this, the new inspection of LBO will draw with the newest current condition.

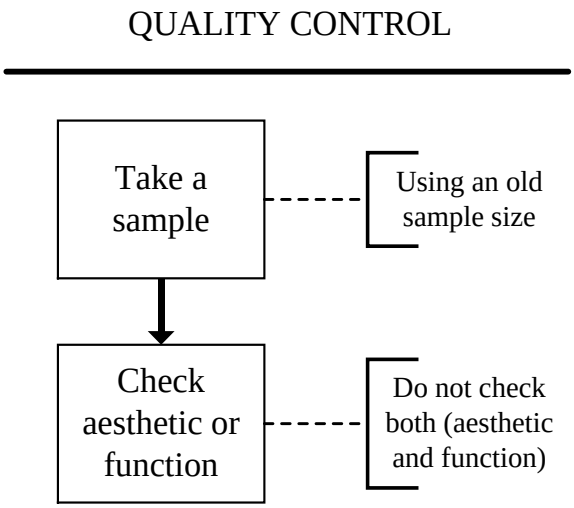


Figure 4.16 Current Predefined Process of Check

Figure 4.16 shows the current predefined process of Check. The latest inspection said Quality Control check aesthetic or function. But with the new system it said must check both. In order to convince the actual and document is same, the redesign process needed.

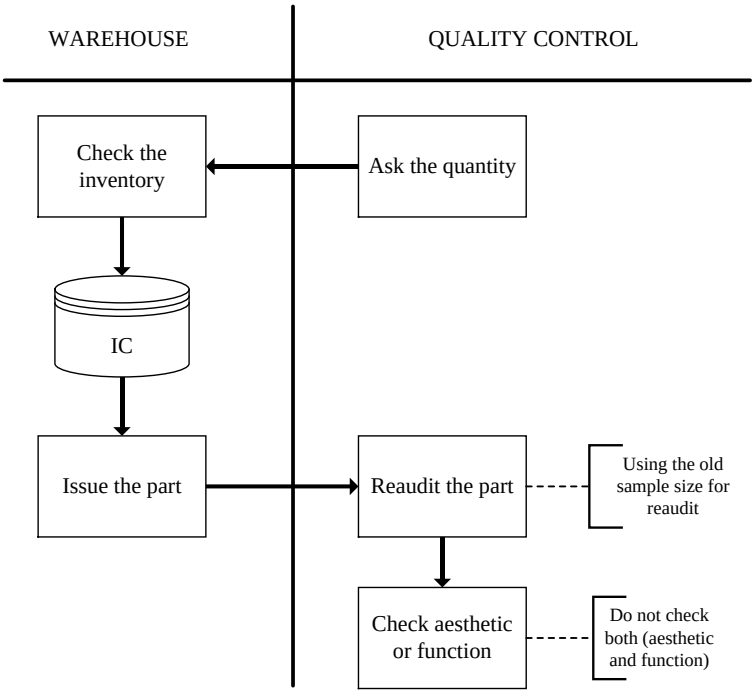


Figure 4.17 Current Predefined Process of Part Reaudit

Figure 4.17 is a current predefined process of All part will reaudit. The current process still uses the old procedure. In the new procedure, it use the new flow and new sample size of reaudit. Because the document of reaudit has own procedure called In-process and Final Inspection and Test, so the inspector should read it. In PT. X, the procedure has applicable document, form and reference and sometimes it must be done through consider with the reference document. In-process and Final Inspection and Test document as the reference document has revised so redesign process needed to align with the current condition.

5. Abuse Test

   Abuse test is a testing of abusing the accessories assembly. It uses a digital force gauge to measure the force. Production takes a sample after cleaning and relax it for four hours before it will be abused. After it relax for four hours, QC will take a sample six pieces for new toy and reduce three pieces after two weeks never fail the abuse test. The specification measurement based on the Summary Quality Testing (SQT).

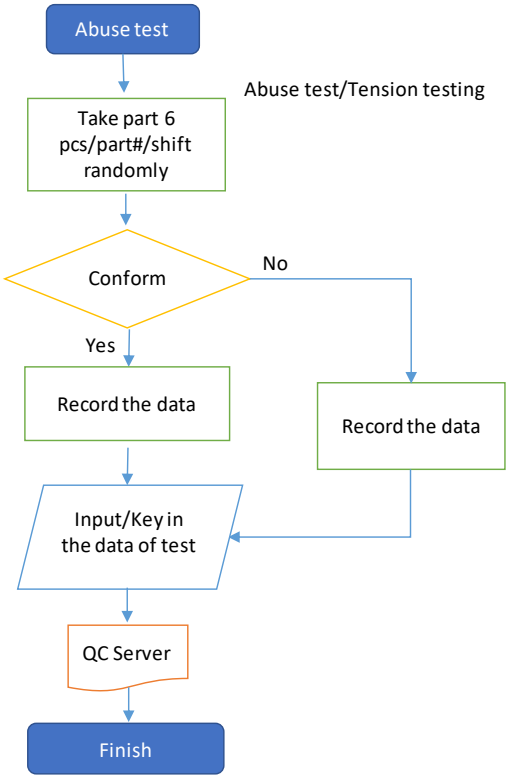


Figure 4.18 Current Flowchart Abuse Test

For clarity of the process facts, the explanations are intentionally simplistic;

1. Inspector Quality Control takes accessories 6 pieces/part# randomly every two hours/shift.
2. The part will bring to the abuse test's spot (modul Quality Control) and after that the part will be tested with requirement based on the Summary Quality Testing (SQT).
3. If the result:
   - The part PASSED the test, the part (Lot) will send to staging (inventory) or next process.
   - The part FAILED the test, it will get hold tag. All the part will reaudit. If the result of reaudit is Pass which means OK, the part can be released but if the result is Fail means NOT OK, the part will be destroyed.
4. All the results will be recorded into QC server.

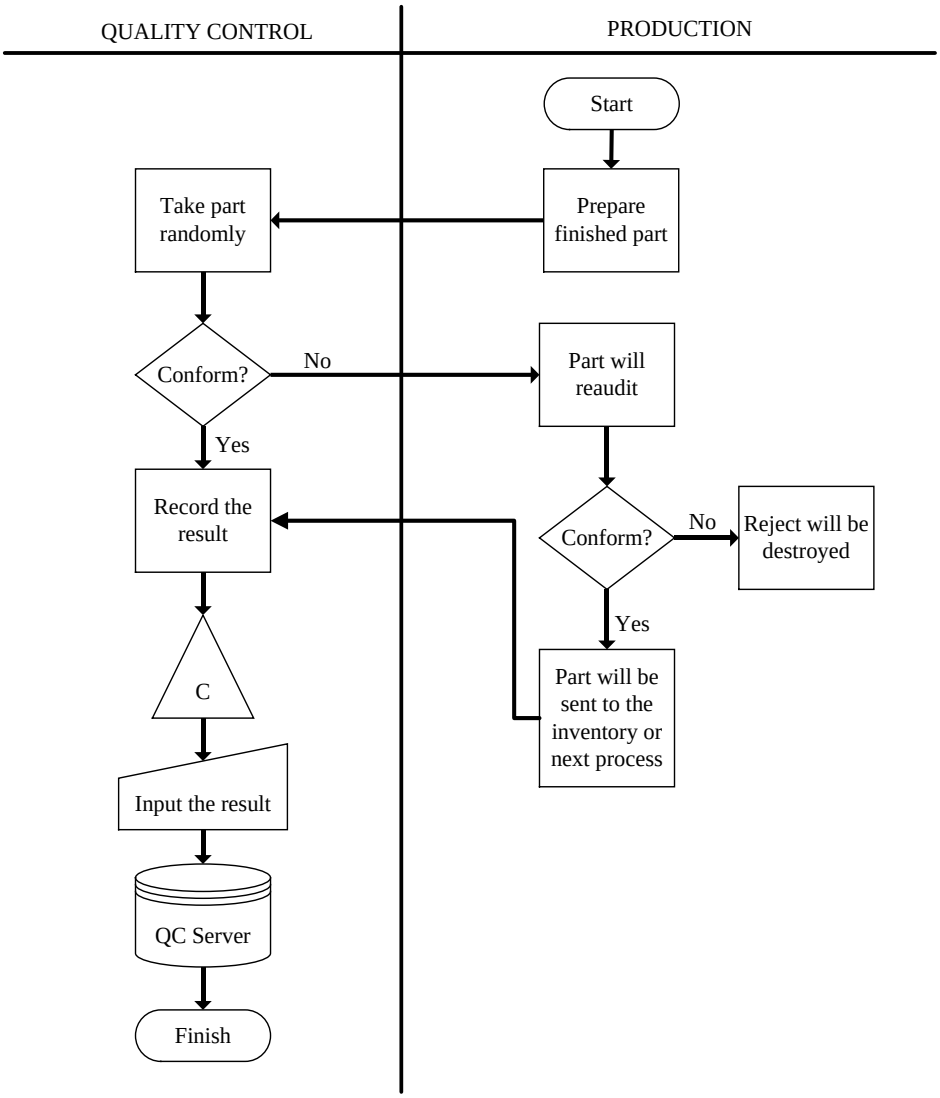


Figure 4.19 Current Process Flowchart of Abuse Test

Figure 4.19 is a current Process Flowchart of Abuse test. Abuse test is divided into three, the first one is Abuse test, Abuse Reliability test and Abuse Safety test. Abuse test is the inspection of abusing the accessories. Before perform abuse test, the sample must be cleaned and relaxed for four hours and then, it is called as finished part. In this process, there is no obstacle about flow of inspection.

6. Abuse Test (Reliability)

   Abuse test reliability is abuse part like Abuse Test. The difference is the specification used. In Abuse Test, the specification based on the SQT but for Abuse Test Reliability, the specification is 10 lb. It uses a digital force gauge to

measure the force. Production takes one sample after cleaning and relaxed it for four hours before it will be abused. After it relax for four hours, QC will take a sample six pieces for new toy and reduce three pieces after two weeks never fail the abuse test.

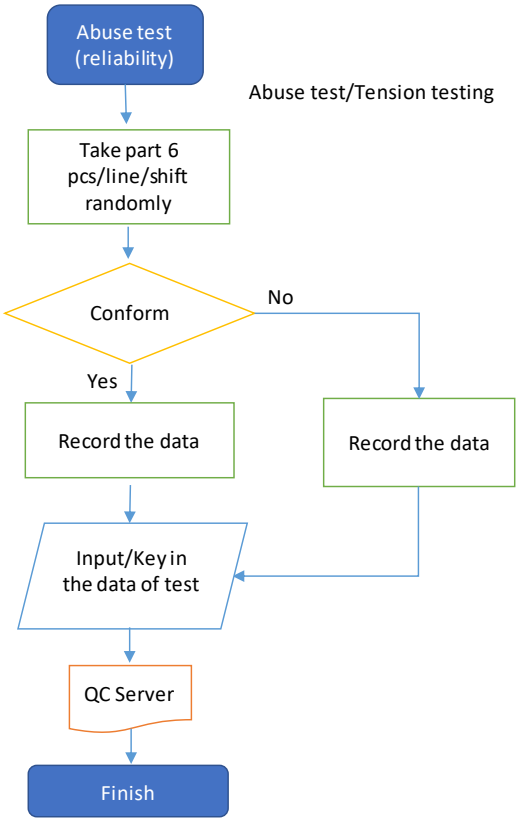


Figure 4.20 Current Flowchart Abuse Test Reliability

For clarity of the process facts, the explanations are intentionally simplistic;

1. Inspector Quality Control takes sample 6 pieces/line randomly every two hours/shift.
2. The part will bring to the abuse test's spot (Quality Control module) and after that the part will be tested with requirement 10 lbs.
3. If the result:
   - The part PASSED the test 10 lbs, the part (Lot) will send to staging (inventory) or next process.

- The part FAILED the test 10 lbs, it will get hold tag. All the part will reaudit. If the result of reaudit is Pass or OK, the part can be released but if the result is Fail or NOT OK, the part will be destroyed.

4. All the results will be recorded into QC server.

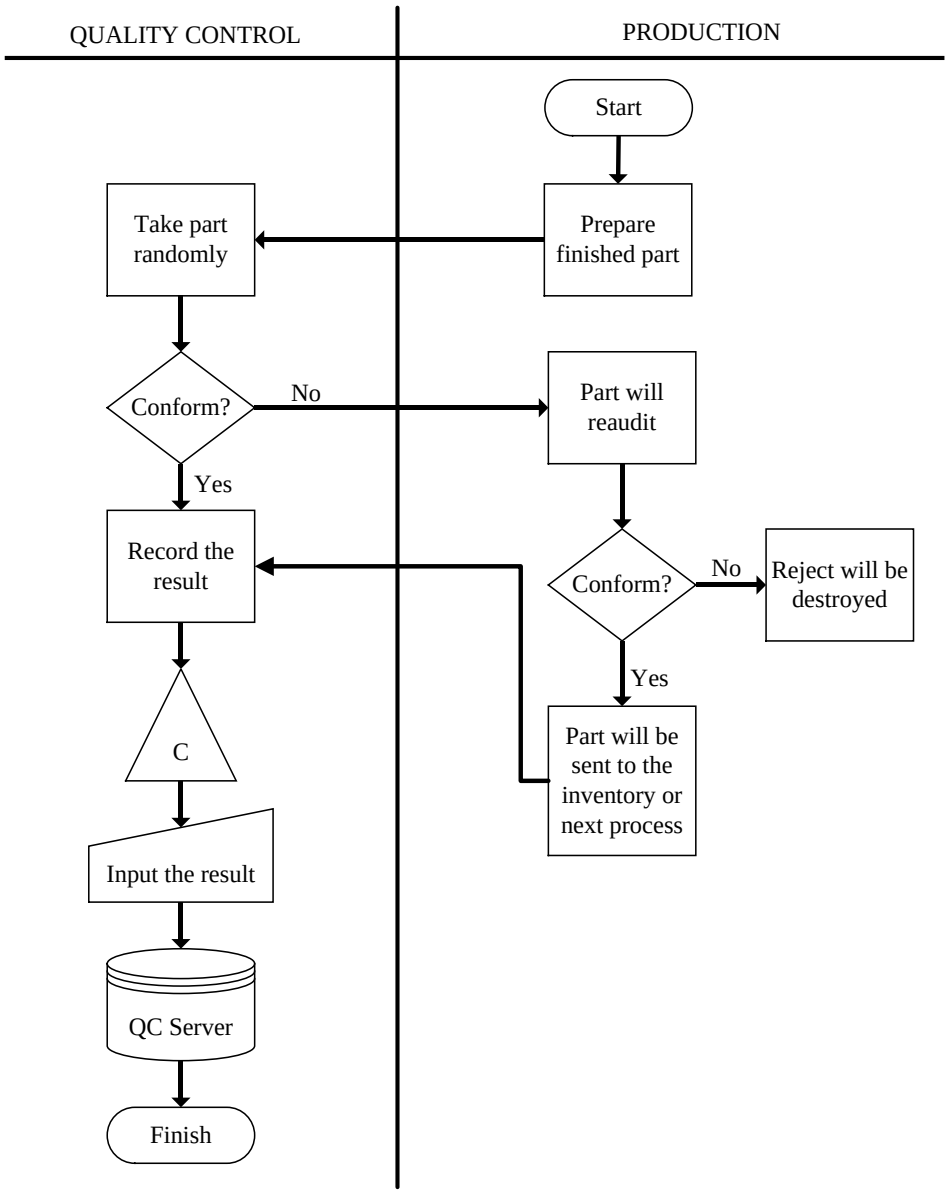


Figure 4.21 Current Process Flowchart of Abuse Test Reliability

Figure 4.21 shows the current Process Flow of Abuse test reliability. The latest inspection has two abuse test which are Abuse test and Abuse test until failure. In the new inspection plan, abuse test until failure changed became Abuse test Reliability and Abuse test Safety. The purpose is align with the current

condition and align with the other plant. It like Abuse test, there is no obstacle of process. All inspector has no problem and follow the document.

7. Abuse test (Safety)

   Abuse test safety is abuse part like the previous Abuse Test. The difference is the specification used. In Abuse Test, the specification based on the SQT but for Abuse Test Reliability, the specification is 21 lb. It uses a digital force gauge to measure the force. Production takes a sample after cleaning and relax it for four hours before it will be abused. After it relax for four hours, QC will take a sample six pieces for new toy and reduce three pieces after two weeks never fail the abuse test.

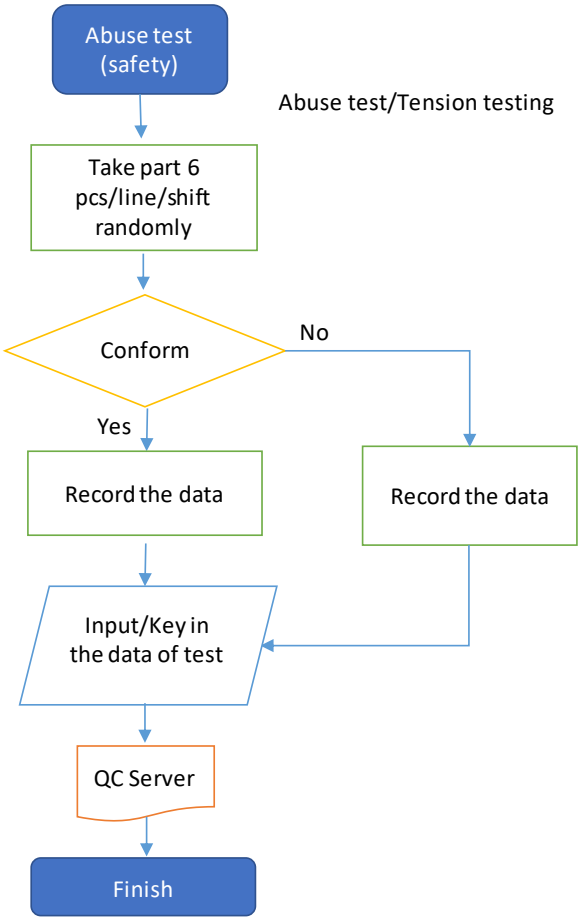


Figure 4.22 Current Flowchart Abuse Safety Test

For clarity of the process facts, the explanations are intentionally simplistic;

1. Inspector Quality Control takes sample 6 pieces/line randomly every two hours/shift.
2. The part will bring to the abuse test's spot (modul Quality Control) and after that the part will be tested with requirement 21 lbs.
3. If the result:
    - The part PASSED the test 21 lbs, the part (Lot) will send to staging (inventory) or next process.
    - The part FAILED the test 21 lbs, it will get hold tag. All the part will reaudit. If the result of reaudit is Pass which means OK, the part can be released but if the result is Fail which means NOT OK, the part will be destroyed.
4. All the results will be recorded into QC server.

Figure 4.23 is a current Process Flowchartof Abuse test Safety. The purpose of changed the inspection plan is consider with the ISO 9001. In ISO 9001 said safety is the dirst and always as a vision of PT. X. therefore, Abuse test Safety conducted. It similar with the Abuse test Reliability. The differences is the standard of abuse test, for safety the standard is 21 lbs and for reliablity is 10 lbs. for the problem, the inspector already understood and follow the instruction that written on document.

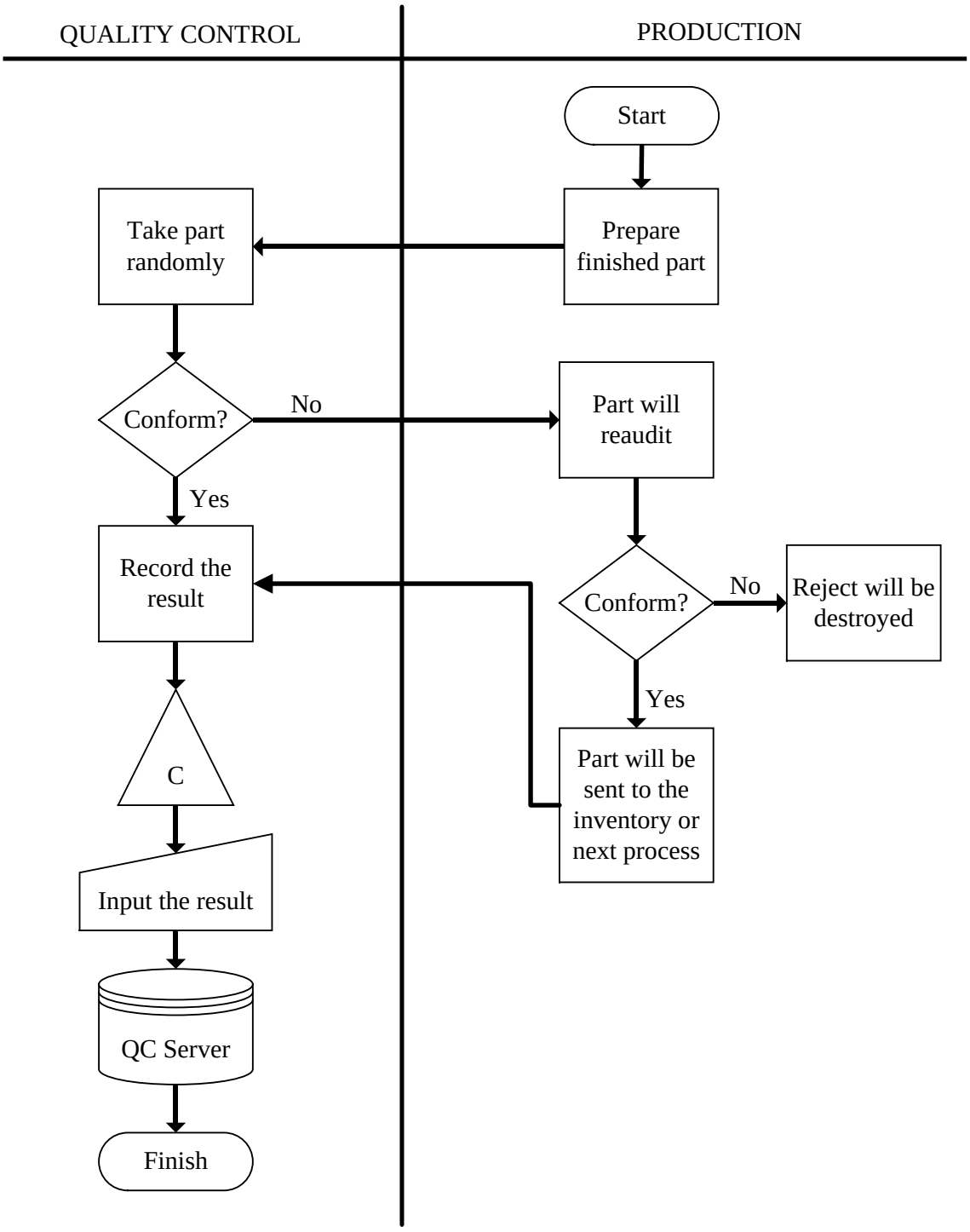


Figure 4.23 Current Process Flowchart of Abuse Test Safety

8. Life Test

Life test is an inspection to measure the durability or called life test. The part will be tested is complete torso and accessories assembly. The sample size is six pieces/line and conduct once a week. One sampe will be tested for a thousand times. This test will reference to sampling system; abuse and life test sampling plan.

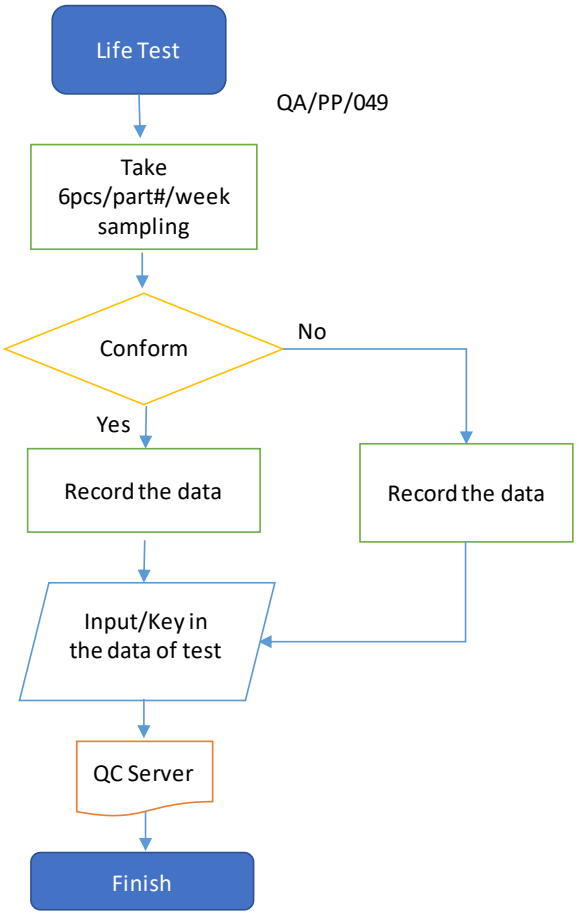


Figure 4.24 Current Flowchart Life Test

For clarity of the process facts, the explanations are intentionally simplistic;

1. Inspector Quality Control takes sample 6 pieces/part# randomly. The sample takes one time/part# for a week.
2. The part will bring to the modul Quality Control and after that the part will be tested.

3. If the result:
    - The part PASSED the test, the part (Lot) will send to staging (inventory) or next process.
    - The part FAILED the test, it will get hold tag. All the part will reaudit. If the result of reaudit is Pass or OK, the part can be released but if the result is Fail NOT OK, the part will be destroyed.
4. All the results will be recorded into QC server.

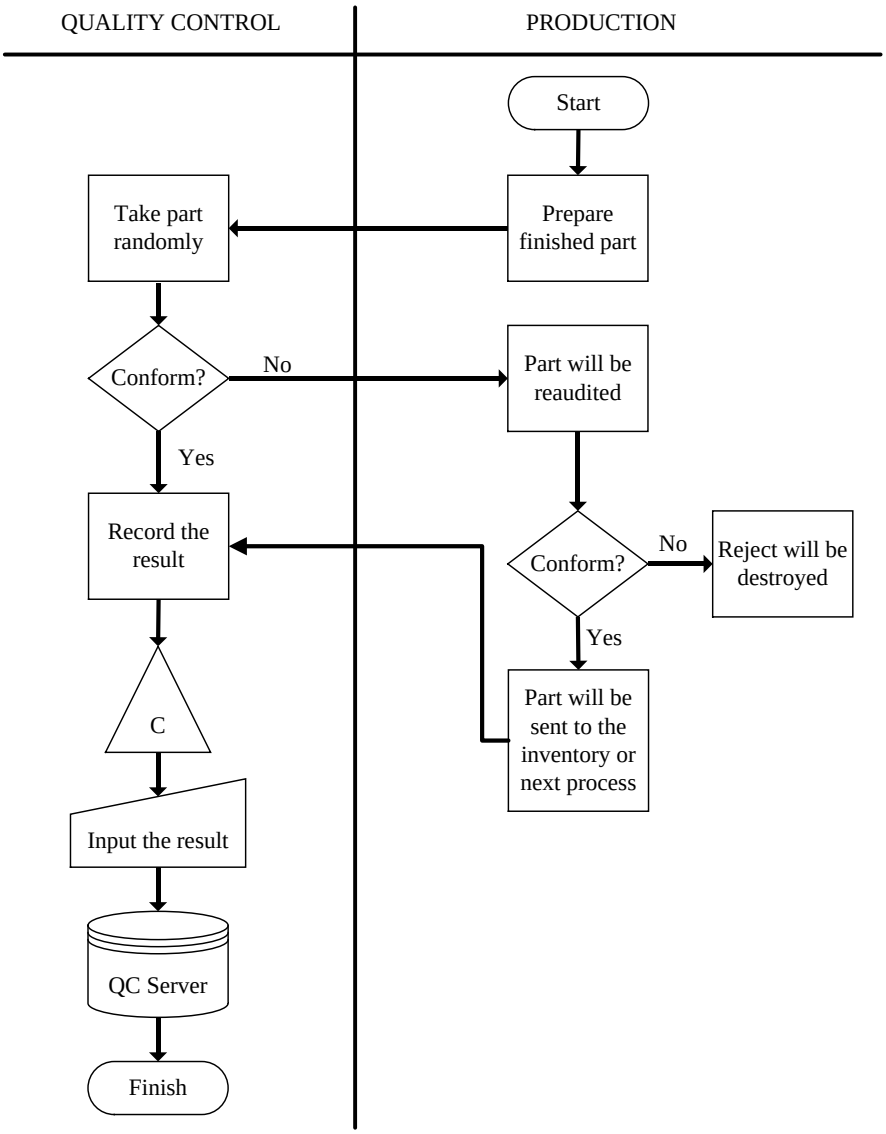


Figure 4.25 Current Process Flowchart of Life Test

Current Process Flowchartof Life test could be seen in Figure 4.25. It is the flowchart of Life test. Life test is the inspection of testing the durability of product. The part is complete torso and accessories assembly. Both will be tested with considered Summary Quality Testing (SQT). The direction based on the SQT but the frequency of testing is 1000 times. Since it exactly same and there is no change, so there is no obstacle of this.

9. Sharp tool control

Sharp Toll control is a new inspection in Quality Control. QC will ask four questions to Production and the question about the sharp or dangerous tool which is used in. The purpose is to make sure the safety at workplace. PT. X has a motto; Safety and Quality all the way. Because of this, the unsafe condition as consideration at workplace.

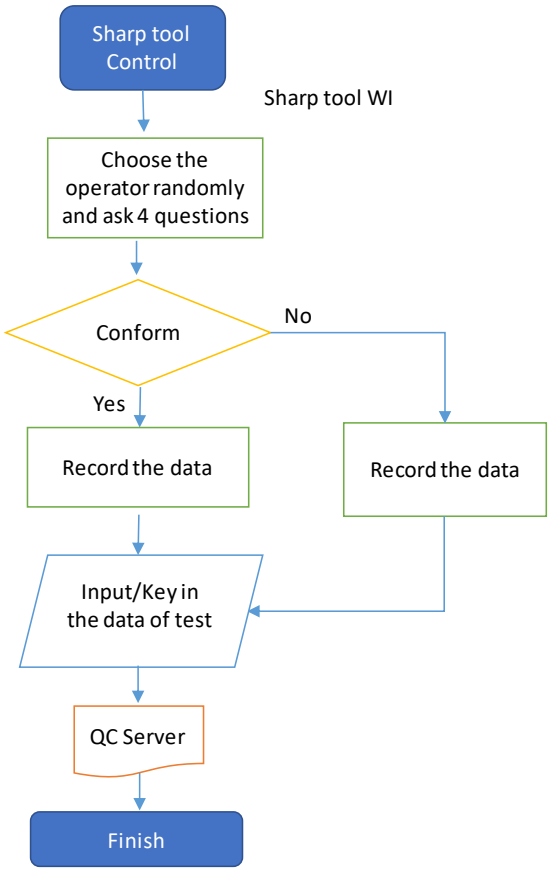


Figure 4.26 Current Flowchart Sharp Tool Control

For clarity of the process facts, the explanations are intentionally simplistic;

1. Inspector Quality Control asks four questions about sharp tool to the production.
2. The inspector will ask five people with different machine and it audit five machine/week.
3. All the results will be recorded into QC server.

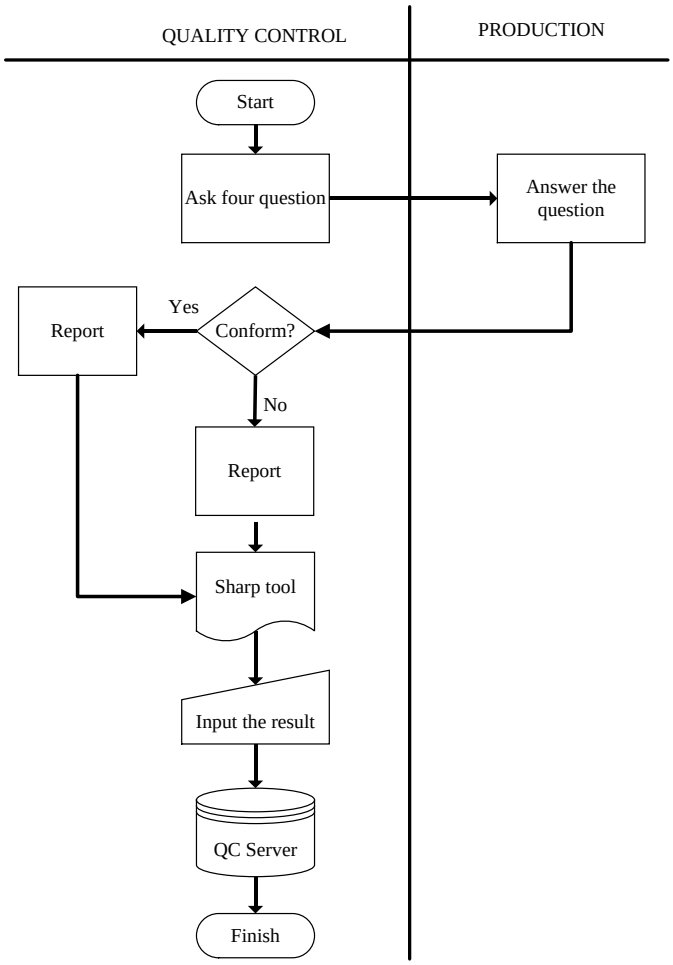


Figure 4.27 Current Process Flowchart of Sharp Tool Control

Figure 4.27 is a current Process Flowchart of Sharp tool control, shows the flow of how to do sharp tool control. It is a new inspection and consider with the ISO 9001. The reason is for considering employee's safety, sharp tool control held. PT. X must consider the safety of employee and customer. The safety workplace is the one of aspect ISO 9001. Even it is a new inspection but the obstacle of how to do or process is not at all. The inspector does this inspection correctly and smoothly.

After the business process on current system made, next is identify the system of each inspection which inspection doesn't meet the standard of procedure. In order to identify the process of each inspection, Business Process has chosen to make a flow of process of inspection. In this stage, the inspections which doesn't meet and match with the standard of procedure will be redesign. In redesign, it hopeful will meet the requirement that written on SOP and suitable with the current condition. Redesign has aim to make inspection plan more suitable with the current condition of Company X.

Table 4.5 Result of Business Process

No	Inspection	Remarks
1	First piece sample	X
2	First Time Throughput	X
3	LBO Aesthetic	X
4	LBO Function	X
5	Abuse Test	V
6	Abuse Test Reliability	V
7	Abuse Test Safety	V
8	Life test	V
9	Sharp tool control	V

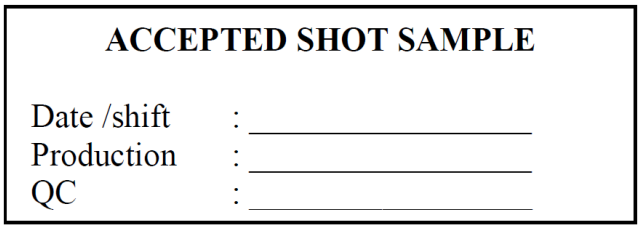
Table 4.5 is a result of Business Process analyze, it shows from nine inspection plan that conduct at Torso Assembly area, there are four inspections don't fulfil, meet, and suit with the current condition of PT. X. From nine inspection plan, there are four which don't conformable. The inspections don't suit represent 44% of failure and mistake. The percentage is quite high. In order to reduce and align the inspection plan, redesign will be required. The inspections that need redesign and analyze are First piece sample, First time throughput, LBO Aesthetic and LBO function. Each inspection will be designed use Business Process; Process Flowchart.

4.2.2 Document and Form

All the procedures and documents of PT. X are unstandardized and unorganized. In order to standardized and organized it, Improvement is the best way. The objective of this project is to generalize the form used at Torso Assembly which chosen as the critical area. Since in Torso Assembly or known TA has nine inspections and it makes the form used is a lot. In Torso Assembly area the common problem related with form are unstandardized, unregistered and number of availability. The explanations are;

4.2.2.1 Unregistered form

PT. X has a certified of ISO 9001 which means all the document, procedure, forms must be document well. According ISO 9001, the document and form used must be assessed too. In this process, it started with check one by one the document. The documentation of saving form is uncoordinated. After identify and analysis, there are two forms that haven't register yet.


ACCEPTED SHOT SAMPLE

Date /shift : _____
Production : _____
QC : _____

Figure 4.28 Form of First Piece Sample

Figure 4.28 is a form used for First Piece sample. It mentioned before, after the production get a stamp PASSED from Quality Control, they will get the form of approval with the stamp. For several years this form has been using but never register. In this form, the information is date/shift to make sure every day the first piece sample renew every day or changeover, on production it will be filled with the name of an actor who did this and the last is QC which will fill with the name inspector or leader who give the stamp, the purpose is if the first piece sample didn't match, the QC will be a responsible person.

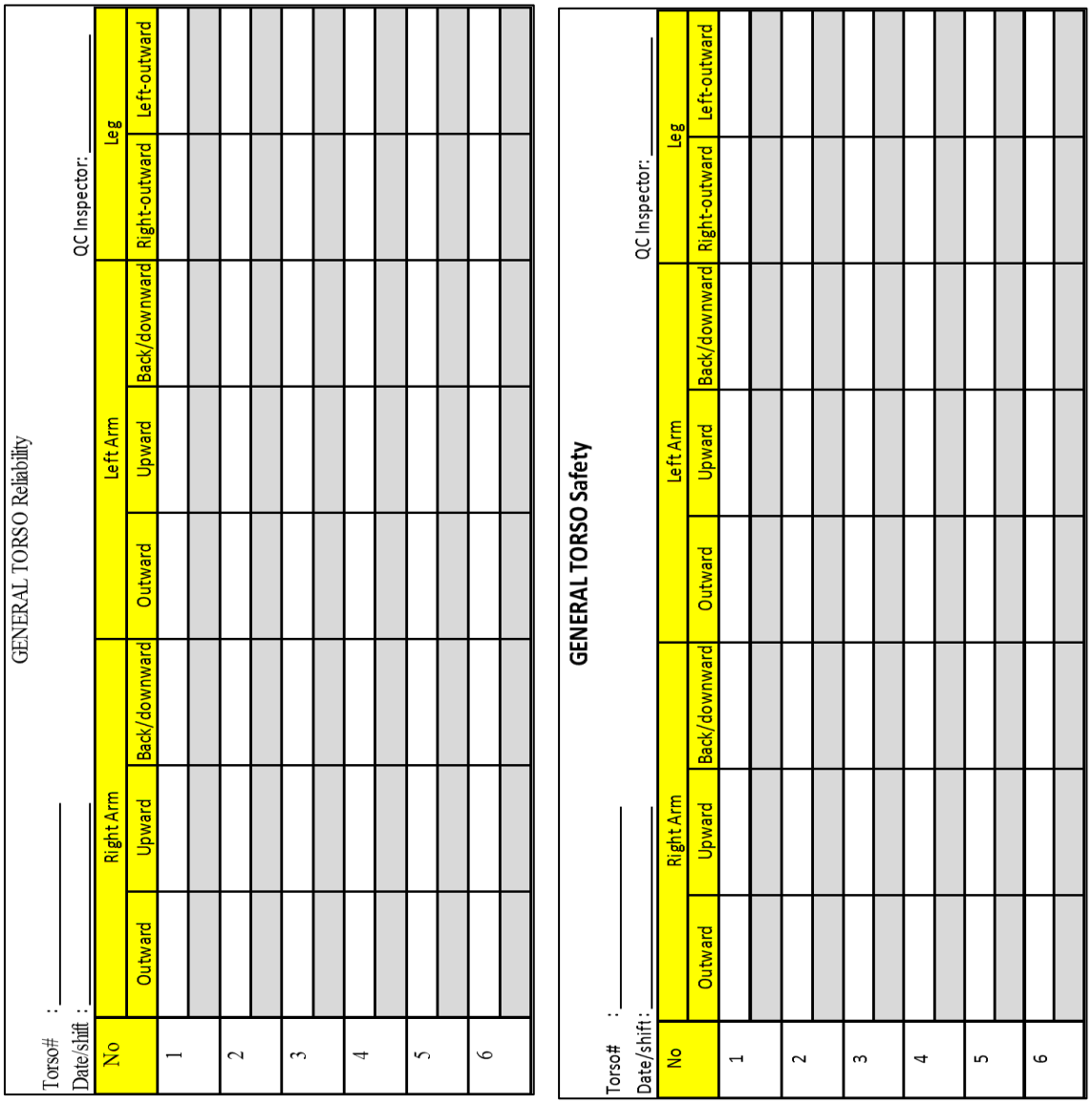


Figure 4.29 Form of Abuse Safety and Reliability Test

Figure 4.29 is the form used for Abuse test safety and reliability. One sample of toy can be used for abuse test safety and abuse test reliability. It helps inspector while abuse, reduce cost of sample and saving time of inspect. So first the inspector do abuse test reliability then continue with abuse test safety. Abuse test reliability and safety are a new inspection and started in the middle of year 2016. However the form didn't register yet.

4.2.2.2 Unstandardized Form

In PT. X, the form used is unstandardized. For Abuse test, there are several document found. PT. X has a hundred types of toys and all of it has own requirement. Because of this, the form is suitable with the toy's requirement such as Summary Quality Testing and Critical To Quality. PT. X has not a standard form yet. It could be seen in the Figure 4.30 and Figure 4.31.

INSPECTOR CHR73
DATE/SHIF

Sample#	Posisi	Pull Dress 10LBS	Pull TAIL 10 LBS	TORQUE CHEST	CHEST 15 lbs				ARM		
					OUT	BACK	SIDE	FORD	OUT	UP	BACK
1	RIGHT										
2											
3											
4											
5											
6											
7	LEFT										
8											
9											
10											
11											
12											

Figure 4.30 Format of Toy A

Figure 4.30 is an Abuse form of toy A. toy A has a specific requirement based on the Summary Quality Testing. It could be seen the information of this form are inspector, date/shift, and name of toy. The structure was made by Leader.

TOY BJR42 Date : Inspector :

POSISI	ELBOW		WRIST		ARM			STAND UP 3 < LB		FIN ON REAR TORSO 10 LB		WAIST 10 LB			FIN 10 LB		
								ATTACH	DETACH	OUTWARD	RPENDICUL	OUTWARD	BACKWARD	SIDEWARD	OUTWARD	BACKWARD	SIDEWARD
RIGHT																	
LEFT																	

Figure 4.31 Format of Toy B

Figure 4.31 is an Abuse form of toy B. Toy B has own requirement of abuse testing that written on Summary Quality Testing and QC cannot change it. The structure of this form was made by Leader. It could be seen the information and the format

is not standardized. In toy B, the information is inspector, date and name of toy. The significant different are the structure and in toy B there is no shift. It happened all form used for Abuse test.

4.2.2.3 Checking the availability

It has mentioned that the documentation of form and document are unstandardized, disorganized and uncontrollable. In identifying, there are several problems found such as the folder of saving a form used is separate into two folder, the first name Form-Form and the second FORM QC PRIMARY EAST FOR PULL TEST. After it analyze, there are an expired form, double document, and not related document. For example, in FORM QC PRIMARY EAST FOR PULL TEST there is form from other area and other inspection. It could be seen from the name, it supposed to for pull test but there is another form inside.

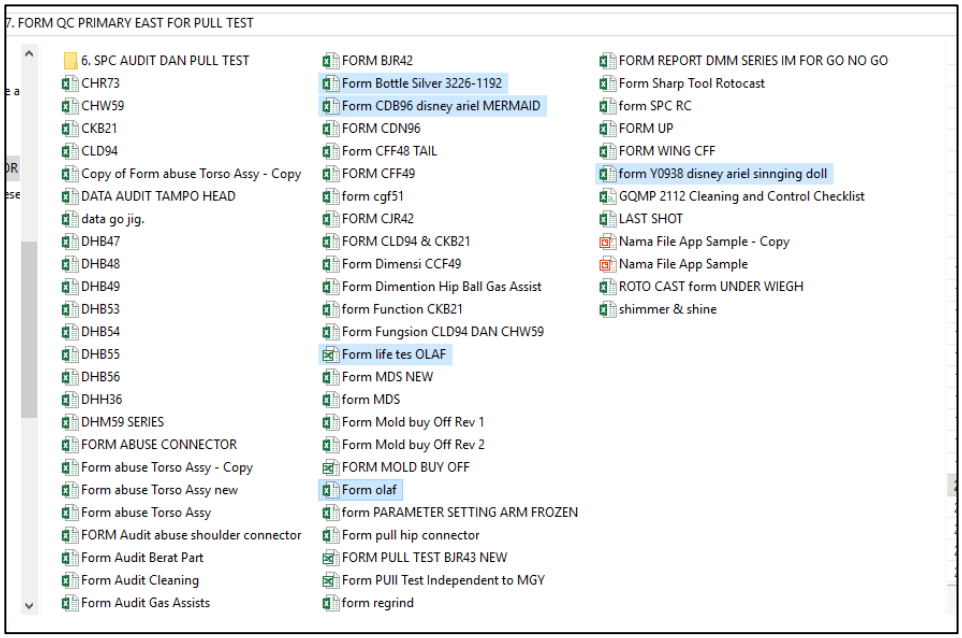


Figure 4.32 Folder Form QC

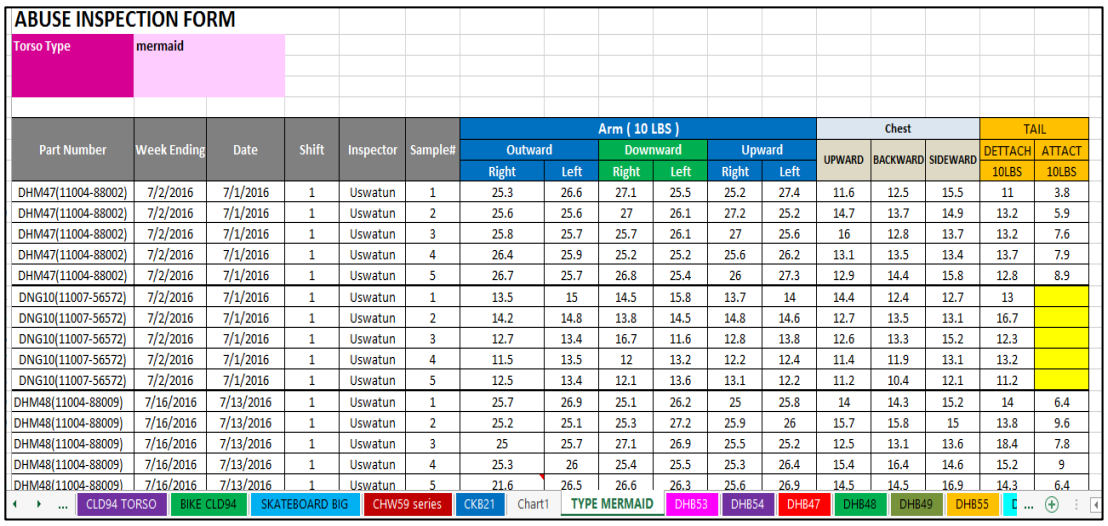
Figure 4.32 shows folder name FORM QC PRIMARY EAST FOR PULL TEST. It could be seen there is form from other area such as last shot which from Injection Molding area, Rotocast, Form audit gas assist from Injection Molding and data audit tampo from Painting area. It could be seen from the marked the expired form but still in the QC server.

4.2.3 Software and Database

Quality Management System is a complex system include all the part and component of an organization dealing with process and product. A good Quality Management System will reflect inside the company. So the better Quality Management System will make the greater the efficiency and productivity of an organization. Through the QMS, it can increase the profit and reduce the loss of its organization.

Every company try to make the efficiency and productivity is 100%. But there are some rocks and then make the company fail to reach the goals. In PT. X, the system of documentation report is uncontrollable and lack of improvement. PT. X still has rocks of this problem such as unregistered form and unstandardized form as it mentioned at the Chapter 1. It could be seen in the next section.

The system of reporting at PT. X is unstable and lack of efficiency. For example, at Torso Assembly there is an inspection called Abuse test. Abuse test divided into Abuse test general and Abuse test non-general. The database is inefficient. The human error frequently found and it made the data unreliable.



ABUSE INSPECTION FORM

Torso Type: mermaid

Part Number	Week Ending	Date	Shift	Inspector	Sample#	Arm (10 LBS)						Chest			TAIL	
						Outward		Downward		Upward		UPWARD	BACKWARD	SIDEWARD	DETTACH	ATTACT
						Right	Left	Right	Left	Right	Left				10LBS	10LBS
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	1	25.3	26.6	27.1	25.5	25.2	27.4	11.6	12.5	15.5	11	3.8
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	2	25.6	25.6	27	26.1	27.2	25.2	14.7	13.7	14.9	13.2	5.9
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	3	25.8	25.7	25.7	26.1	27	25.6	16	12.8	13.7	13.2	7.6
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	4	26.4	25.9	25.2	25.2	25.6	26.2	13.1	13.5	13.4	13.7	7.9
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	5	26.7	25.7	26.8	25.4	26	27.3	12.9	14.4	15.8	12.8	8.9
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	1	13.5	15	14.5	15.8	13.7	14	14.4	12.4	12.7	13	
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	2	14.2	14.8	13.8	14.5	14.8	14.6	12.7	13.5	13.1	16.7	
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	3	12.7	13.4	16.7	11.6	12.8	13.8	12.6	13.3	15.2	12.3	
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	4	11.5	13.5	12	13.2	12.2	12.4	11.4	11.9	13.1	13.2	
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	5	12.5	13.4	12.1	13.6	13.1	12.2	11.2	10.4	12.1	11.2	
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	1	25.7	26.9	25.1	26.2	25	25.8	14	14.3	15.2	14	6.4
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	2	25.2	25.1	25.3	27.2	25.9	26	15.7	15.8	15	13.8	9.6
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	3	25	25.7	27.1	26.9	25.5	25.2	12.5	13.1	13.6	18.4	7.8
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	4	25.3	26	25.4	25.5	25.3	26.4	15.4	16.4	14.6	15.2	9
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	5	21.6	26.5	26.6	26.3	25.6	26.9	14.5	14.5	16.9	14.3	6.4

CLD94 TORSO | BIKE CLD94 | SKATEBOARD BIG | CHW59 series | CKB21 | Chart1 | TYPE MERMAID | DHB53 | DHB54 | DHB47 | DHB48 | DHB49 | DHB55

Figure 4.33 Current Database of Abuse Test Non-general

Figure 4.33 is the current database of Abuse test. Abuse test divide into two, abuse test general and abuse test non-general. In Abuse test general used for Abuse test Reliability and Safety, Abuse test non-general for Abuse test. In the current database of Abuse test, because the toys around hundred so the sheet will be same. In the process of key in or input the result, it takes a long time. For key in one toy takes 5-10 minutes because they have to find the sheet first then input the result. The format each sheets are unstandardized. While QC make a weekly summary, it needs a long time. The inspector must check sheets and calculate the number of PASSED and FAILED. The old database didn't use formula so they have to check manually. It could be seen from Figure 4.33, how many sheets and how may time needed for key in and make a weekly summary. Weekly summary is a routine agenda of PT.X, it aims to report to other division and report it to headquarter or known corporate.

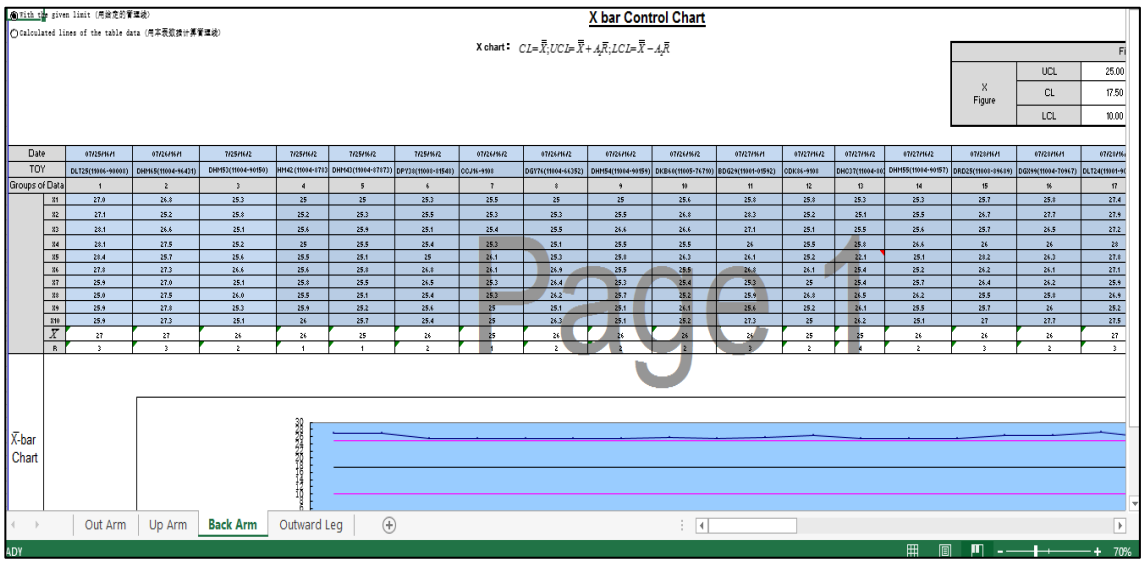
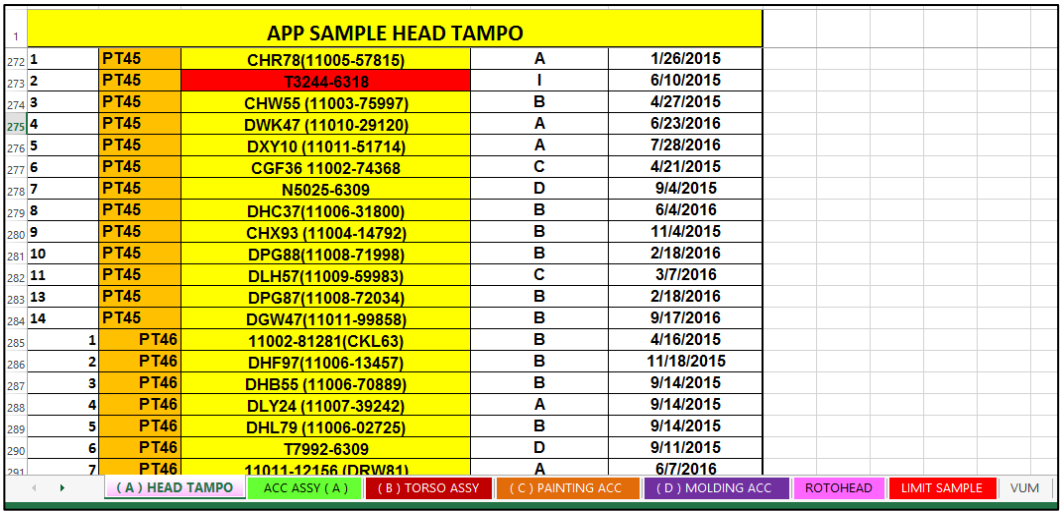


Figure 4.34 Current Database of Abuse Test General

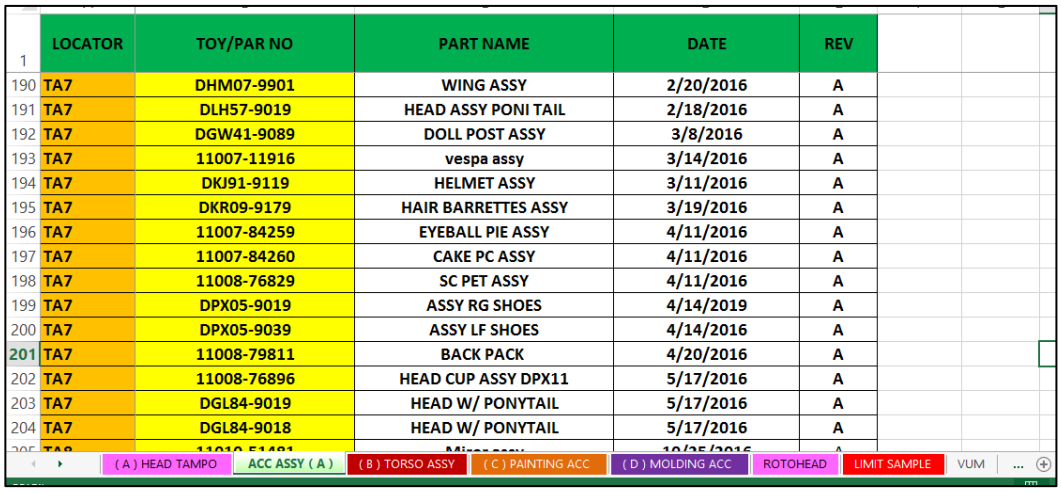
Figure 4.34 is database of Abuse test general. The old database used the format from other plant. In identifying the database, the problems are human error such as wrong key in, too many sheets and waste time. The problem of abuse test general is similar with Abuse test non-general. But Abuse test non-general more complex than Abuse test general.Non general used for toy which has a specific requirement such as has a wing, tail, waist, chest and others. General is a toy has not specific requirement.



	APP SAMPLE HEAD TAMPO				
272	1	PT45	CHR78(11005-57815)	A	1/26/2015
273	2	PT45	T3244-6318	I	6/10/2015
274	3	PT45	CHW55 (11003-75997)	B	4/27/2015
275	4	PT45	DWK47 (11010-29120)	A	6/23/2016
276	5	PT45	DXY10 (11011-51714)	A	7/28/2016
277	6	PT45	CGF36 11002-74368	C	4/21/2015
278	7	PT45	N5025-6309	D	9/4/2015
279	8	PT45	DHC37(11006-31800)	B	6/4/2016
280	9	PT45	CHX93 (11004-14792)	B	11/4/2015
281	10	PT45	DPG88(11008-71998)	B	2/18/2016
282	11	PT45	DLH57(11009-59983)	C	3/7/2016
283	13	PT45	DPG87(11008-72034)	B	2/18/2016
284	14	PT45	DGW47(11011-99858)	B	9/17/2016
285	1	PT46	11002-81281(CKL63)	B	4/16/2015
286	2	PT46	DHF97(11006-13457)	B	11/18/2015
287	3	PT46	DHB55 (11006-70889)	B	9/14/2015
288	4	PT46	DLY24 (11007-39242)	A	9/14/2015
289	5	PT46	DHL79 (11006-02725)	B	9/14/2015
290	6	PT46	T7992-6309	D	9/11/2015
291	7	PT46	11011-12156 (DRW81)	A	6/7/2016

Figure 4.35 Current Database of Approved Sample (Head Tampo)

Figure 4.35 is the database of Approved sample. It could be seen the format used. The format was made by Leader and it used for over 5 years. Figure 4.35 is the approved sample of Head Tampo. In Head Tampo the information are locator, part number, revision and date coming.



	LOCATOR	TOY/PAR NO	PART NAME	DATE	REV
190	TA7	DHM07-9901	WING ASSY	2/20/2016	A
191	TA7	DLH57-9019	HEAD ASSY PONI TAIL	2/18/2016	A
192	TA7	DGW41-9089	DOLL POST ASSY	3/8/2016	A
193	TA7	11007-11916	vespa assy	3/14/2016	A
194	TA7	DKJ91-9119	HELMET ASSY	3/11/2016	A
195	TA7	DKR09-9179	HAIR BARRETTES ASSY	3/19/2016	A
196	TA7	11007-84259	EYEBALL PIE ASSY	4/11/2016	A
197	TA7	11007-84260	CAKE PC ASSY	4/11/2016	A
198	TA7	11008-76829	SC PET ASSY	4/11/2016	A
199	TA7	DPX05-9019	ASSY RG SHOES	4/14/2019	A
200	TA7	DPX05-9039	ASSY LF SHOES	4/14/2016	A
201	TA7	11008-79811	BACK PACK	4/20/2016	A
202	TA7	11008-76896	HEAD CUP ASSY DPX11	5/17/2016	A
203	TA7	DGL84-9019	HEAD W/ PONYTAIL	5/17/2016	A
204	TA7	DGL84-9018	HEAD W/ PONYTAIL	5/17/2016	A

Figure 4.36 Current Database of Approved Sample (Accessories)

Figure 4.36 is database of Approved sample and same with Figure 4.35. The differences is Figure 4.35 shows Head Tampo and Figure 4.36 shows Accessories assembly. It could be seen the format is different and information. In accessories assembly the information are locator, part number, part name, date coming and revision. In Figure 4.35 there is no part name, actually in approved sample from Engineering has the same form and paper. It is a significant differences.

4.2.4 The result of current system analysis

After the current analysis has conducted, then it is needed to make a summarize of the current system analysis. In the previous section, the current system analysis separated into three major parts, those are; Business Process, Document and Form and Software and Database. The explanation as it follows:

4.2.4.1 Business Process

After the process flowchart drawn then compare it with the document. From nine inspections, there are four inspections are not complied. The inspections do not comply are; First Time Throughput (FTT), First Piece Sample, LBO Aesthetic and LBO Function. For FTT, the problem is the production especially operator did not record and check the part. The document said, Production must check 100% sample size and record it. But the actual is the operator did not check 100% and not record properly. Sometimes operator just report the major defect and the quantity of defect and the defect's name did not write down. Because of this, the reject could pass to the next process and wrong in reporting of FTT Performance.

Second is First Piece Sample. The obstacle of this inspection is the production (operator) didn't do and follow the guideline. The document said, every beginning shift or change over must conduct First Piece Sample. But the actual, the production didn't do because the time. The problem is the system of approved sample is inefficient. Currently, the process of searching approved sample need 15-30 minutes. It has recorded the time needed to find the approved sample was one hour. Because this problem, the Kaizen conducted. The title is Kaizen Approved Sample Management. In this Kaizen found several problems such as the database of Approved sample is unstandardized, the flow process of borrowing approved sample is wrong and the data in the system with actual don't match. For the database, it will be explained at section Software and Database.

The last is Lot Buy Off. Lot Buy Off (LBO) is an inspection to check the quality of part assembly, sub assembly or finished product from the output. The purpose is check there is no defect and all part will go to the next process if they pass the LBO.

Previously, LBO is check aesthetic or function but today LBO must check both (aesthetic and function). There are some changes such as a new sample size of inspect and a new flow process of reaudit or find reject. But today, the inspector didn't know and still use the last inspection. In order to align the process with the document, a Business Process will be drawn so the inspector know the process flowchart in detail.

Table 4.6 Summary of Business Process

No	Process	Problem	Proposed Improvement
1.	First Piece Sample	Process of search and put an Approved Sample at locator	Redesign a proposed Business Process of search and put the Approved Sample
2.	First Time Throughput	The Operator do not check 100% and do not record properly	Redesign the proposed Business Process. In the proposed Business Process, the Leader must inspect before Operator record and send to the next process/inventory.
3.	LBO Aesthetic and Function	There are changes such as how to reaudit and the sample size inspection. The older inspection plan checks aesthetic or function.	Redesign the proposed Business process that has align with the current condition and using a newest revision of procedure.

Table 4.6 is a summary of current Business process. It explain the process that has a problem and the proposed improvement. In the current analysis of Business Process, there are four process which has a problem. All the process in Table 4.6 will be drawn in proposed Business Process. The objective of every proposed Business Process has determined in Table 4.6.

4.2.4.2 Document and Form

By analyzing the documents and forms in Torso Assembly area, there are three major problems related with document and form. The first one is unregistered forms, the second is unstandardized forms and last is availability of form used in Quality Control especially in Torso Assembly. After identified and checked, two formshave not been registered yet. For the unstandardized, there is no format. So the data will vary and confusing. If there is an audit related with ISO, PT. X will

have a problem. The last is availability, in checking the all form in Torso Assembly area there are a lot form such as expired form, double and the folder of saving form is need improvement.

Table 4.7 Summary of Document and Form

No	Problem	Improvement
1.	Unregister form	The unregister form will be registered to get a number.
2.	Unstandardized form	The unstandardized form will be made a new format.
3.	The availability form	The number form of expired and double will reduce.

Table 4.7 is a summary of current analysis of Document and Form. The major problem of Document and Form are separated into three, those are unregister form, unstandardized form and the availability form. The improvement already define and designed for every problem. For unregister form, it will register to Document Control. Document Control is a department of controlling the form in PT. X. all document must be registered to Document Control. Every revision, expired and new of form, must be recorded and registered. The unstandardized form, in PT. X the number of unstandardized is numerous. In order to make a fix and formatted form, the new format will create. For availability form, the number of availability will align with the current condition.

4.2.4.3 Software and Database

In the current system analysis of database and software, the major problems are human error and manually operated. It causes waste time while key in and make a weekly summary and an inaccurate data. For example, the approved sample, if the production searches the approved sample and takes time around 5-10 minutes to search the availability and the locator. If the production who search approved sample comes together, it will waste of time.

In Abuse test database has a similar problem. Time needed for input the result of test is around one hour and a half until two hours. For make a weekly summary is same, it takes one hour for clerk to summarize. The old database there is no formula to check if it Passed or Failed, so clerk struggle to summarize it.

Table 4.8 Summary of Software and Database

No	Database	Problem	Improvement
1.	Abuse non general	Too many data sheets and human error	Reduce the data sheets into five and using data validation to reduce the human error
2.	Abuse general	Too many data sheets and human error	Reduce the data sheets into one and using data validation to reduce the human error
3.	Approved sample	The unstandardized format, human error and many data sheets	Reduce the data sheets into one, using data validation to reduce the human error and make a standardized format.

Table 4.8 is the summary of analysis of current database and software. The problems are plenty data sheets, human error, and unstandardized format. Because in the current analysis of Database and Software is waste of time, so the improvement designed using a new software which is using Macro Excel.

4.3. Improvement

The improvement design for a better process inside PT. X. in this section, the improvement has divided into three and same with the current system analysis. It is a proposed for a betterment of Company X. the improvement as it follows:

4.3.1 Proposed Business Process

In proposed of Business Process, Process Flowchart has been used for redesign the new process. There are four Processes which drawn. The improvements of Processes are drawn as below;

1. First Piece Sample

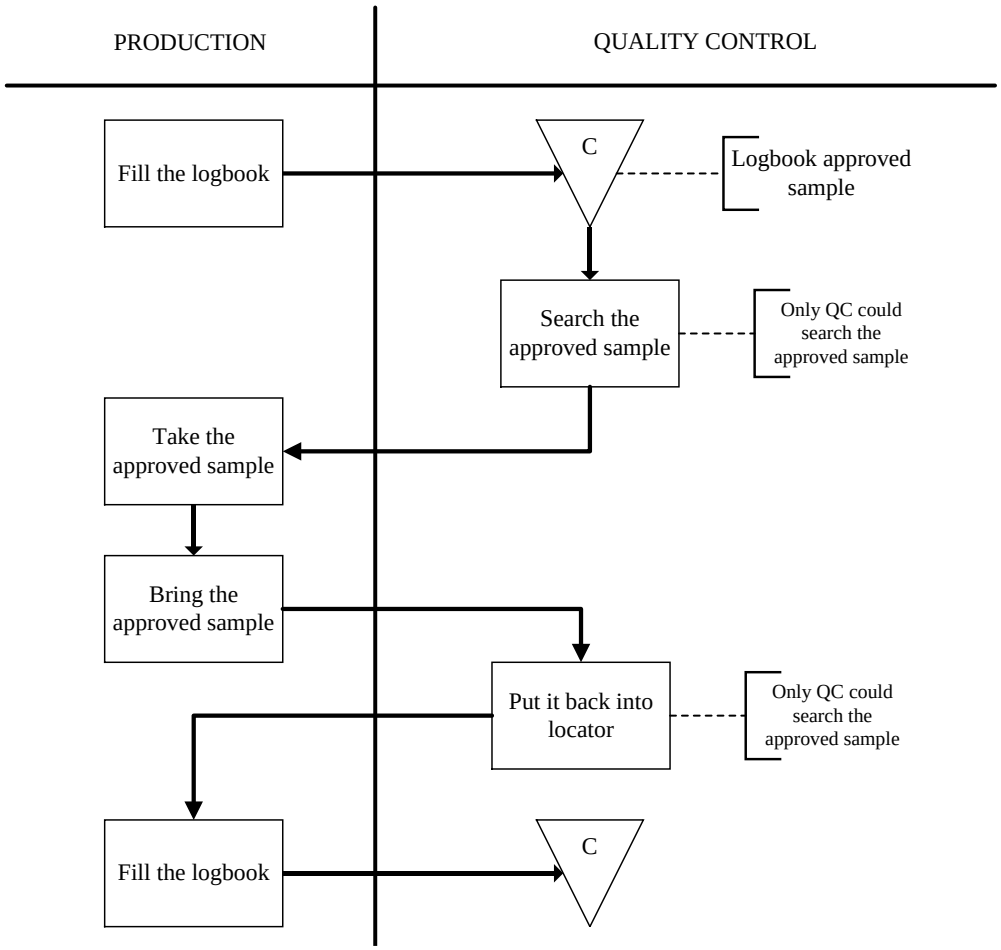


Figure 4.37 Improvement of Predefined Process Borrow Approved Sample

Figure 4.37 is a Proposed Business Process of Approved sample management. It mentioned that the main problem of first piece sample is the approved sample management. Kaizen has conducted to improve to a betterment. Kaizen Approved Sample Management held with related division such as production and engineering as a maker of approved sample. In Kaizen, it has determined the process of borrowing approved sample. The old process, the production could search the part and put it back but the new rule is only QC can search part and put it back into locator. In will reduce the potential wrong locator that happened. In addition, the database has develop use Macro Excel to reduce the delay time while search the availability and search the locator of approved sample.

2. First Time Throughput

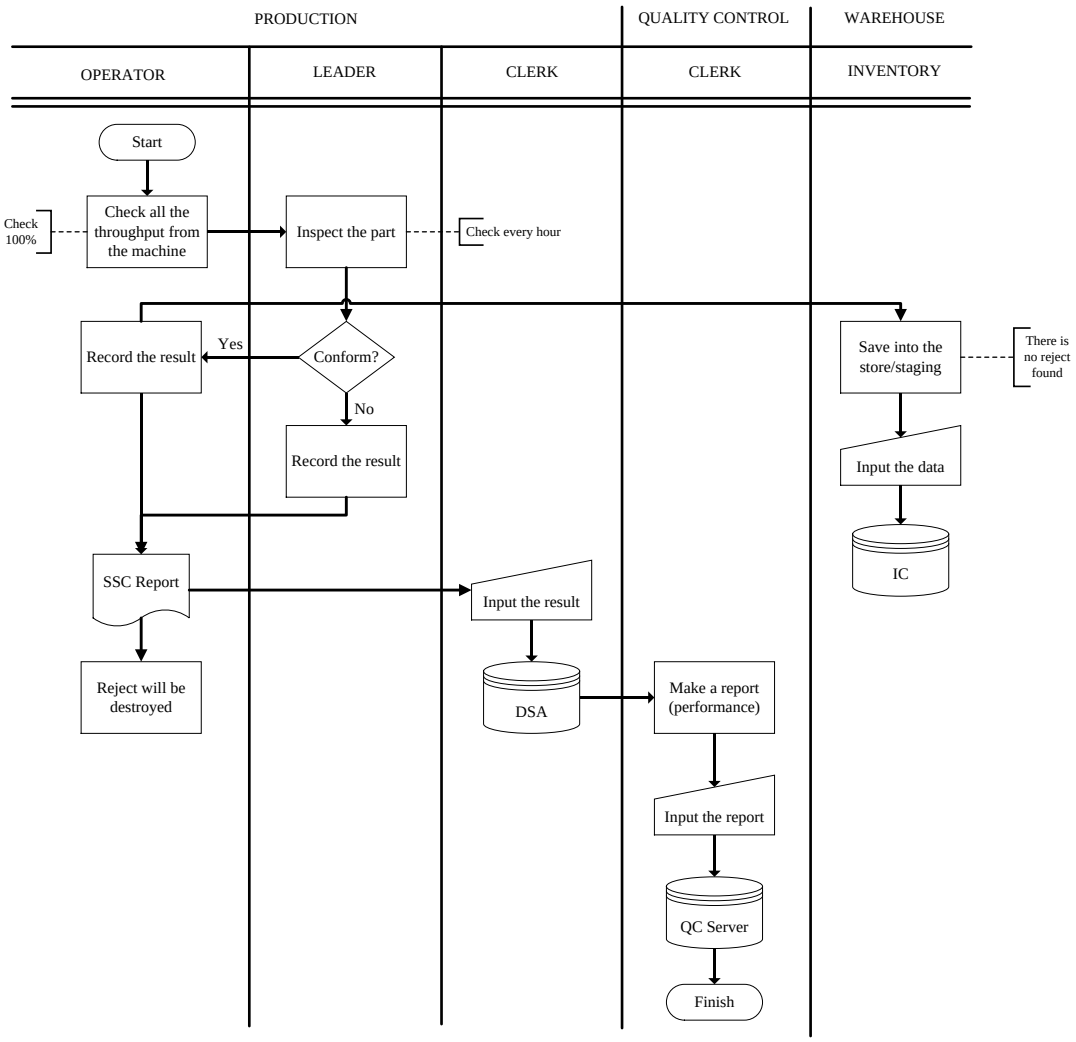


Figure 4.38 Improvement of First Time Throughput

Figure 4.38 is a Proposed Business Process of First Time Throughput. The main problem of First Time Throughput is the production didn't follow the procedure. In advancement, the Quality Control conducted training which attended by Leader of production. The Training is FTT Refreshment, it has purpose to make sure all Leader reminds their child (operator) to check 100% output and record it correctly. After the Training, the process has added a new process is Leader must inspect the part before it was recorder by operator. So the Leader will walk around to make sure the operator follows the procedure. This process has agreement with the Production's Director. So the Production has a role to make sure there is no reject.

3. LBO Aesthetic and Function

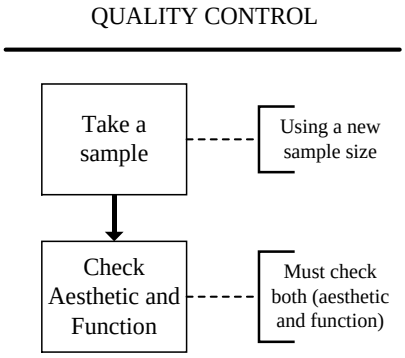


Figure 4.39 Improvement of Predefined Process Check

In the Process Flowchart of Figure 4.39 shows a Proposed predefined process of check. Figure 4.39 is the Proposed predefined process of LBO Aesthetic and LBO Function. Basically the new process of LBO Aesthetic and LBO Function is similar and the different is the checking, LBO Function will check function and LBO Aesthetic will check function. Today the new process must check both (aesthetic and function). The purpose is to reduce the defect that frequently found the last year which relate with the aesthetic and function.

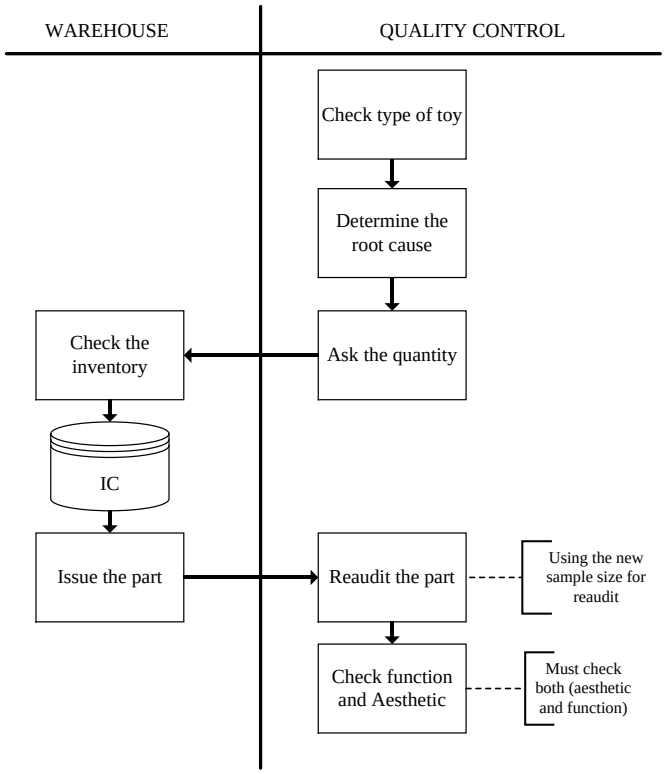


Figure 4.40 Improvement of Predefined Process Part Reaudit

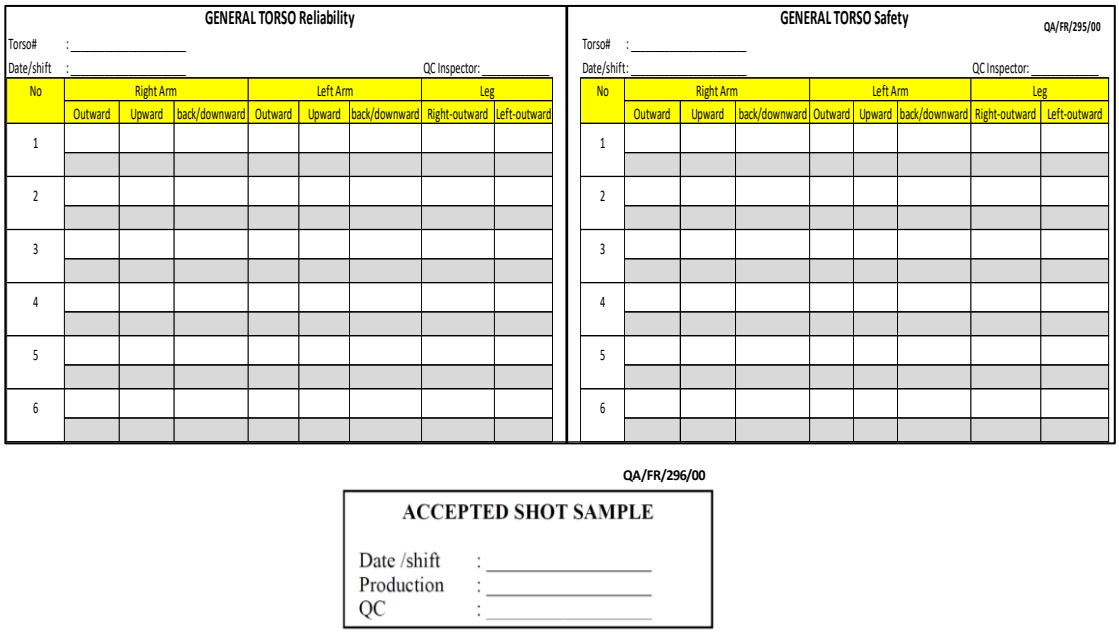
Figure 4.40 is the Proposed Process Flowchart of predefined process all part will reaudit. In the Proposed Process Flowchart, the flow has added some activities such as check type of toy and determines the root cause. This new process has aligned with the current condition. The oldest process is not relevant with the current condition and need improve of how to determine the process of reaudit. The aim is to define the quantity of part will be reaudited. As it mentioned before, the oldest process is not efficient.

4.3.2 Document and Form

The improvement for Document and Form are made and improved. The improvement of Document and Form will be explained into three parts, the improvements are:

1. Unregister Form

For unregister form, the form hasn't register yet already register and get number from Document Control. Document Control is a division which has occupation to check and register the form and document of PT. X.



GENERAL TORSO Reliability

Torso# : _____

Date/shift : _____ QC Inspector: _____

No	Right Arm			Left Arm			Leg	
	Outward	Upward	back/downward	Outward	Upward	back/downward	Right-outward	Left-outward
1								
2								
3								
4								
5								
6								

GENERAL TORSO Safety QA/FR/295/00

Torso# : _____

Date/shift: _____ QC Inspector: _____

No	Right Arm			Left Arm			Leg	
	Outward	Upward	back/downward	Outward	Upward	back/downward	Right-outward	Left-outward
1								
2								
3								
4								
5								
6								

QA/FR/296/00

ACCEPTED SHOT SAMPLE

Date /shift : _____

Production : _____

QC : _____

Figure 4.41 Improvement of Unregister Form

Figure 4.41 is the form that has registered. For Abuse test safety and reliability has number QA/FR/295/00 and Accepted shot sample has number QA/FR/296/00. In the first QA represent Department belong, second is means Form, third is number of form and the last is revision.

2. Unstandardized Form

Because there is no fix format, the improvement of unstandardized form is design the fix format. It is a proposed design was made. The information made in detail so there is no missing information and the format has drawn to make sure the structure is identical or similar.

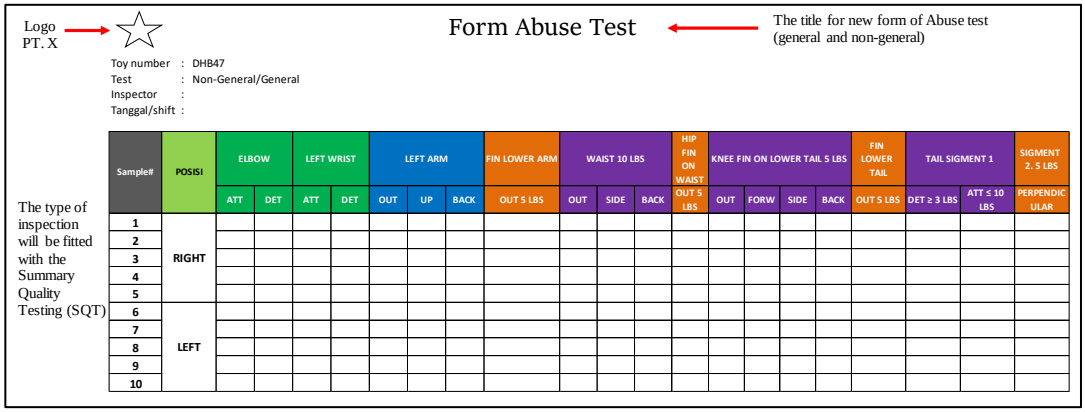


Figure 4.42 Improvement to Standardize Form

Figure 4.42 is a Proposed Format for Abuse test form. In a proposed form, it has log pf PT. X in the corner above left, a title in the top middle; Form Abuse Test, the information such as; toy number, test; general or non-general, inspector and date/shift. The design of information must be drawn up like Figure 4.40. For the type of testing, it based on the Summary Quality Testing.

3. Availability

After checking one by one, ask with the inspector and Leader to check the actual of availability form such as the active form, expired form, unrelated form and double form, the conclusion are:

Table 4.9Availability Form 1

Total	Active	Expired	Double	Unrelated
86	50	19	5	12

Table 4.9 is the result of checking and identifying from two folders. This folder hasn't updated from two years ago. For the expired why the number is high because last year there is one brand which chosen PT. X as a vendor but in the year 2016, that brand cut off the contract with PT. X. Today, the folder of saving form will be combined and made a new folder and named FORM FOR TA. The new folder based on the area and all Leader must check the expired form. So in the new folder based on the area and it fill with the active form. The expired and double will be deleted.

4.3.3 Software and Database

The proposed of software is using Macro Excel. The aim of using this new software is to reduce the human error and saving time. Using the new software, it separates into two, the first is to key in and the second is database. The purpose is the process of key in could be did by two or more at the same time. If the process of input data is high, it could be done with other and there is no overtime. Overtime caused input data is the common problem.

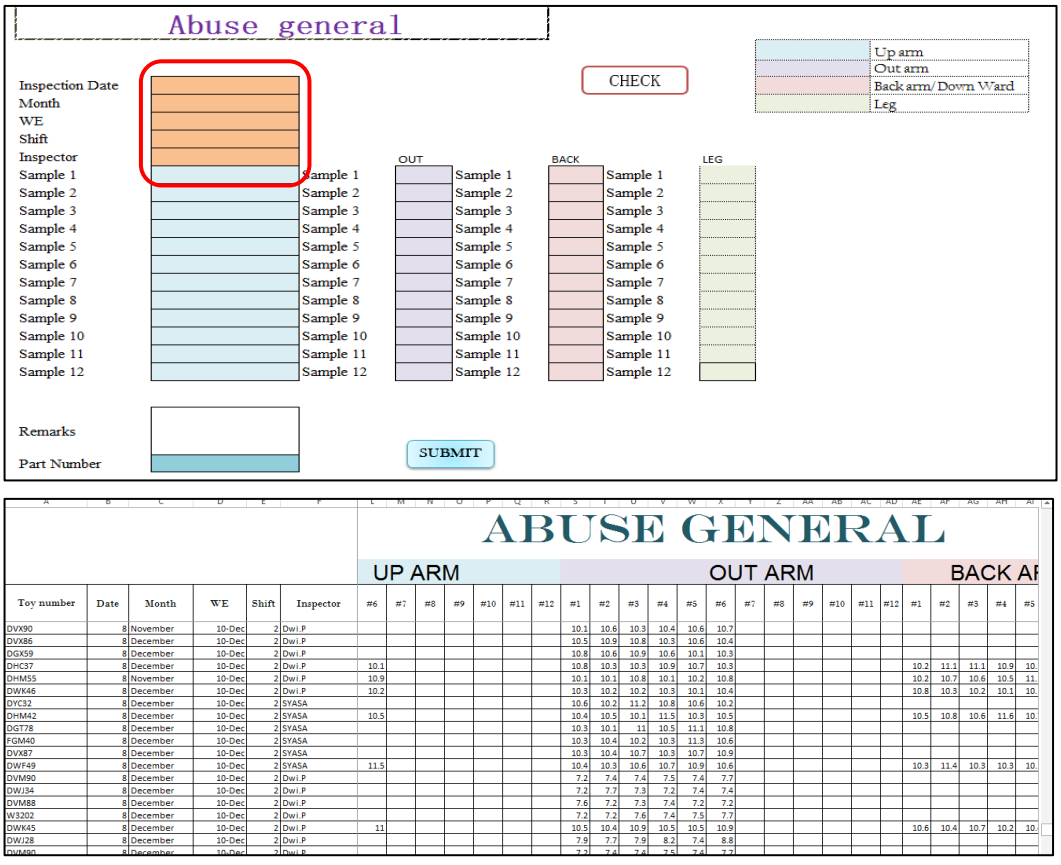
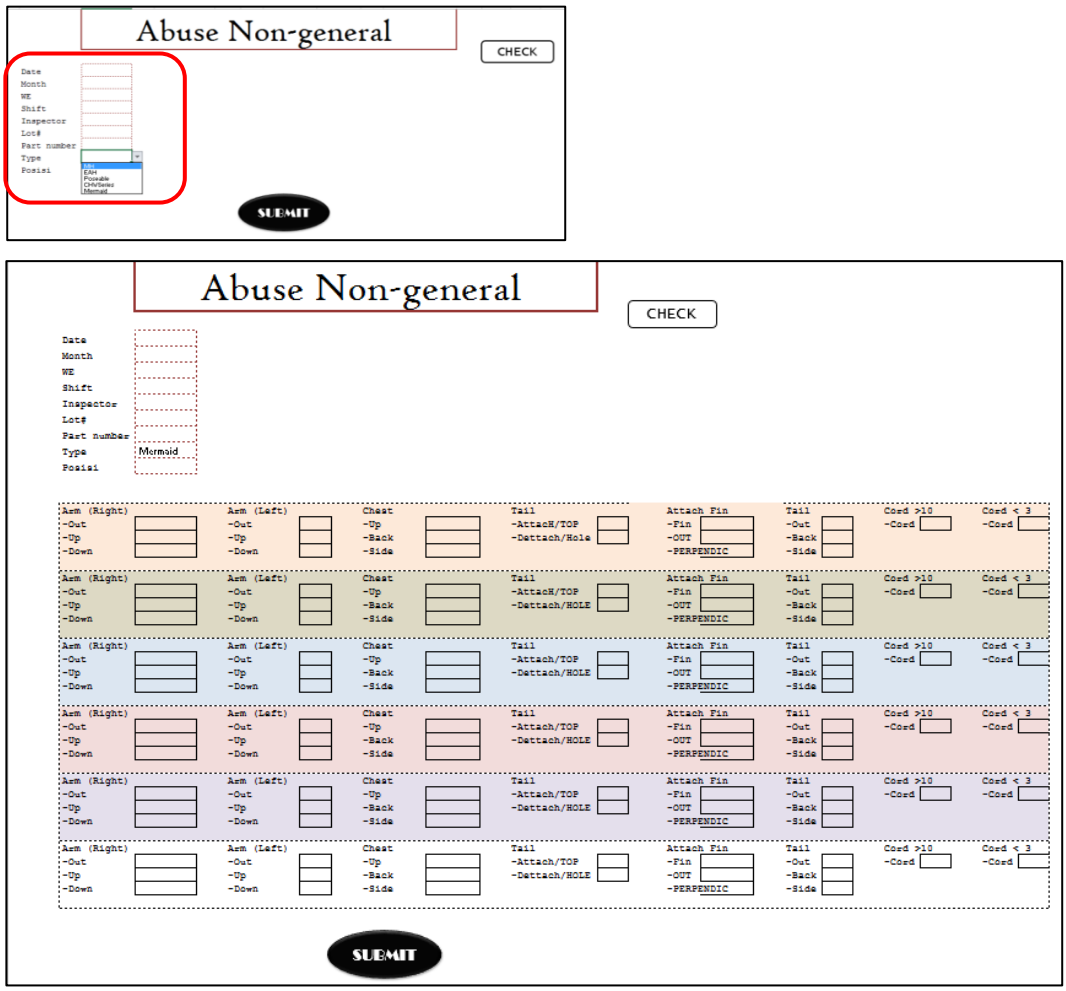


Figure 4.43 Improvement Abuse Test General

Figure 4.43 is the Proposed Database of Abuse test general which is using Macro Excel (Vba). In the first picture is an excel for input and second is a database. In the first picture, the red border is the data which is using data validation. The purpose using data validation is to reduce the human error. Prior, the data had a lot of human error such as wrong in date, name, and month. Thus, data validation has been chosen to reduce human error.



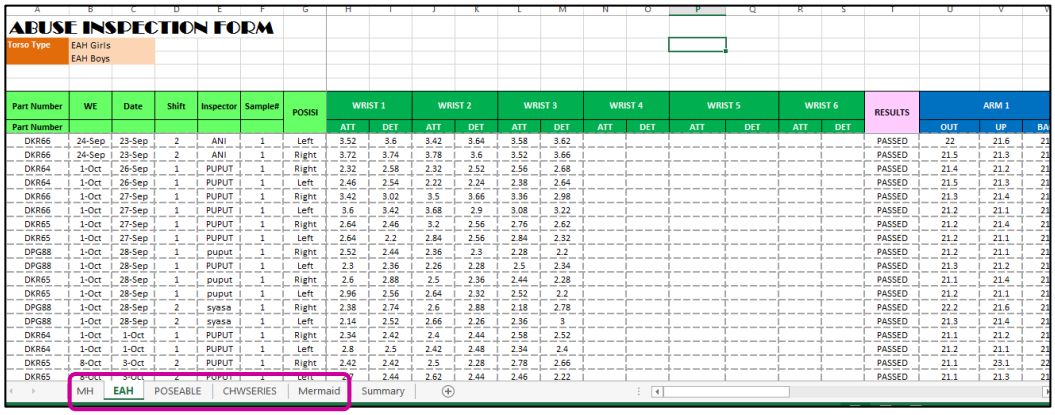
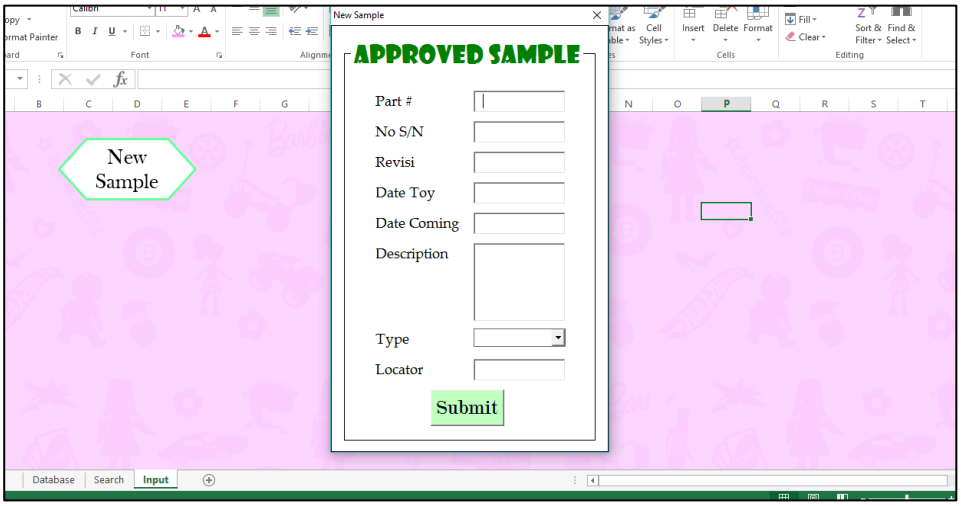
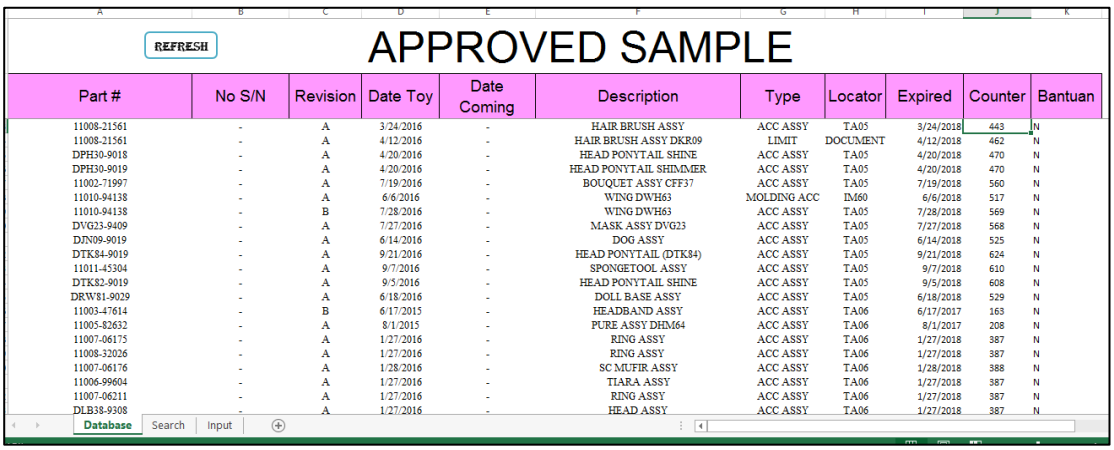


Figure 4.44 Improvement Abuse Test Non-general

Figure 4.44 is a Proposed Database Abuse test non-general. The latest database has a lot problem such as too many sheets and human error. Since the latest has a lot sheets, the new Abuse test non-general has classified into five types. The process of classification based on the similarity of toy. The data has been chosen to reduce the human error like it was happened in the Abuse test general.





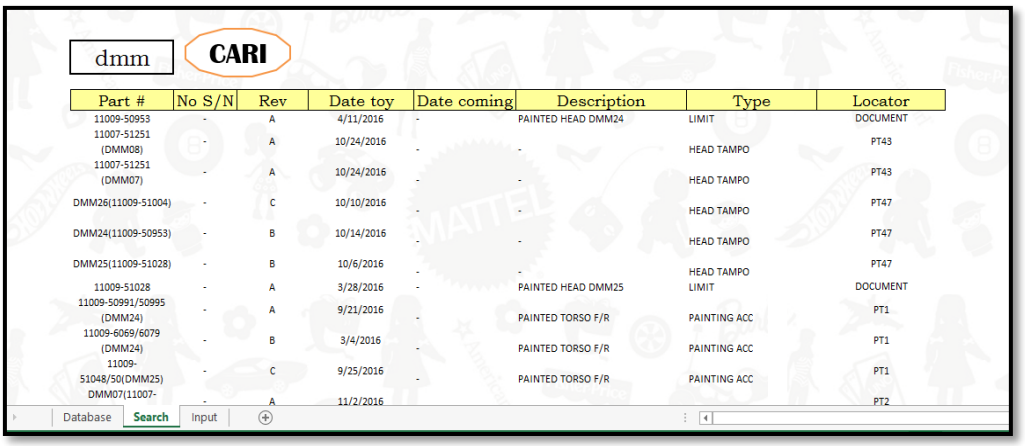


Figure 4.45 Improvement Approved Sample

Figure 4.45 is the interface of a Proposed Approved sample. All process of input the new approved sample, search the approved sample using Macro Excel (Vba). The latest problem is the data in database with the actual is not match. After Kaizen, the data of approved sample will be updated and renewed. Leader, inspector and clerk check one by one the data in system and actual. It must be done because it is one of the ways to achieve the goal of Kaizen. The new database will be saved into one sheet, the purpose to consolidate the data.

4.3.4 The summary of Improvement

After the improvement are designed and made, next is make a summarize of it. In this section, it will explain the differences between current and improvement in detail. It will show the differences in detail and give a brief explanation of it. This section will separate into three parts; Business Process, Document and Form and Database and Software. The explanation as it follows:

1. Business Process

   After the new Business Process are drawn and complied with the standard (SOP). There are four inspections which has drawn through Business Process. The inspections are First Time Throughput, First Piece Sample, LBO Aesthetic and LBO Function. For the detail comparison in bigger size are presented as APPENDIX 12. The differences are explained as it follows:

Table 4.10 The Comparison of Business Process

No	Process	Current	Proposed Improvement	Figure
1.	First Piece Sample	- Predefined Process of Borrow Approved Sample: Process of search and put an Approved Sample at locator did by Production and Quality Control. Sometimes the Production did not put the approved sample to the locator and put into a wrong locator.	- In the new Business Process of Borrow Approved Sample; Process of search and out the approved sample at locator does by Quality Control. It aim to make sure the approved sample put in the right locator. After the Production borrow the approved sample, they put it in box and Quality Control will put it back into a locator.	- Current: 4.6, 4.7, 4.8 - Improvement: 4.37

Table 4.10 The Comparison of Business Process (continued)

No	Process	Current	Proposed Improvement	Figure
2.	First Time Throughput	- The Operator do not check 100% of part - The operator did not record properly such as did not record the quantity of reject and name of reject part. - It supposed to be the reject part cannot be transferred to the next process but today the reject found regularly. It indicates the Production did not follow the SOP of First Time Throughput.	- In the new Business Process, it added a new process: Inspect by Leader. The purpose is ensure the Operator check 100% and all data is valid and accurate. The Production Leader will check randomly every hour the part after Operator checked. If the part are good, then the Operator can record all the data. After check and record, the part will send to the next process or inventory.	- Current: 4.9 - Improvement: 4.38
3.	LBO Aesthetic and Function	- On the old Inspection Plan, it is written the Inspector check Aesthetic or Function. - The old Business Process, it use the old sample size. - The current Business Process of Predefined Process Reaudit Part, it is written the process of reaudit part started with check the quantity of part at Warehouse.	- In the new Business process that has align with the current condition and using a newest revision of procedure, it said the inspector must check both Aesthetic and Function. All Part will be checked the Aesthetic and Function. - The improvement of Business Process, the Quality Control will use the new sample size (Military Standard). - The new Business Process of Predefined Process Reaudit Part, it added a new process such as check type of toy and the root cause. So before the Quality Control go to Warehouse to check the quantity, the Quality Control must determine the type of toy and the root cause.	- Current: 4.11 – 4.13 and 4.15 – 4.17 - Improvement: 4.39 and 4.40

Table 4.10 is a table comparison between current and improvement of Business Process. Since there are four inspection which not comply, all the explanation will explain in Table 4.10. For LBO Aesthetic and LBO Function, it combines into one because it has a similar Business Process. The Current column is for the old Business Process and the problem found in. For the Proposed Improvement column is the new Business Process. In the new Business Process, it considers with the SOP and the current condition of PT. X.

2. Document and Form

   All the procedures and documents of PT. X are unstandardized and unorganized. In order to standardized and organized it, improving is the best way. The objective of this project is to generalize the form used at Torso Assembly which chosen as the critical area. In this section, it will explain the current and the improvement of the document and form.

Table 4.11 The comparison of Document and Form

No	Form	Problem	Improvement
1.	- Abuse test safety - Abuse test reliability - First shot sample (First Piece sample)	- Unregister form	- Abuse test safety and Abuse test reliability combined into one form register. It registered and get numbers from Document Control. - First shot sample which is used for First Piece Sample has registered and numbered.
2.	Abuse test	- Unstandardized form and the data information such as date, shift, inspector and part number are unstructured.	- Make a new format of Abuse test form. All the data information will be same and use the fix structure.
3.	- Abuse test - Abuse test reliability - Abuse test safety	- Availability form	- All the expired, double and unrelated form, will be deleted. So the number of form will accurate and relate with the availability form today.

Table 4.11 is the table comparison between current and improvement of Document and Form. The problem of document and form are unregister, unstandardized and availability form. All the improvement has finished design and analyze. For unregister, form abuse test safety and abuse test reliability has registered. For the unstandardized form, the new format has designed. The last is availability form, is reduce and the expired, double and unrelated form deleted.

3. Software and Database

For the improvement of Database and Software, there are several improvements drawn to make sure the reporting system is improve. In the new Database and Software, Macro Excel and data validation have been used to reduce the human error. The differences of current and improvement are list below:

Table 4.12 The comparison of Database and Software

No	Database	Problem	Improvement
1.	Abuse non general	- The database made in a month, so in one year there are twelve database. - The data sheets around fifty. Because the data sheets made by the part number. - Human error cause the data cannot be summarize, unstructured data, and very manual.	- The new database is gathered into one year. So the database of abuse test for one year is only one database. - The data sheets reduce into five. All the toy has classified into five type. - Using Macro Excel and data validation, the problem such as human error and unstructured are reduced. All data use formula so to determine result Pass and Fail are integrated using a formula.

Table 4.12 The comparison of Database and Software (continued)

No	Process	Current	Proposed Improvement
2.	Abuse general	- The database made in a month, so in one year there are twelve database. - The data sheets around four. Because the data sheets made by the part number. - Human error cause the data cannot be summarize, unstructured data, and very manual. - Use format from other plant. The current format is very complicate (hard to see the result Pass and Fail) and need a more space in server.	- The new database is gathered into one year. So the database of abuse test for one year is only one database. - The data sheets reduce into five. All the toy has classified into five type. - Using Macro Excel and data validation, the problem such as human error and unstructured are reduced.All data use formula so to determine result Pass and Fail are integrated using a formula. - The new database using a new format. A new database using a small space and easy to read for the reader.
3.	Approved sample	- The data sheets are separates into seven. - The process of search locator is very manual, it uses CTRL + F.	- All the expired, double and unrelated form, will be deleted. So the number of form will accurate and relate with the availability form today.

Table 4.12 is a comparison between current and improvement. At the Database column, it shows the database which need improvement. In the Database and Software, there are three database that need improvement, there are Abuse non general, Abuse general and Approved Sample. In Problem column, it tells the problem of every database and for Improvement, it tells the new database and the solution for each Problem found.

4.4. Implementation

After the improvements have designed, then next step is to implement of the proposed improvements. The implementation run smoothly for Business Process and Document and Form but has a new obstacle for database and software. For implement of a new Process Flowchart, training was conducted to introduce the improved Business Process which are First Piece Sample, First Time Throughput and LBO Aesthetic and LBO Function.

For the implementation of Document and Form, the obstacle is the Leader already printed the old form and there is an old form. So in the first time, they still used the old but today they already use the new. The audit was held to control the QC use the new the document and form. Lastly is Database and Software, the first time was a hard time. Because inspector and leader have a lot of questions and they never use Macro Excel. Lack of knowledge and experience is the one root cause. Sometimes they changed the format, moved and add a cell or column, change the name file.

To handle the obstacle of Database and Software, training the user and made a modul training was the answer. Modul training is a presentation about how to using the Macro Excel, the rule and step of using it. So before they use, they must read the modul training. Training was held to reduce the potential as it mentioned before. Sometimes the audit was conducted to control and see the obstacle. The interview held to see the feedback. After using the new Database which using Macro Excel, it has revised several times because they gave a feedback. Interview is the one way of process implementation.

4.5. Analysis of the Implementation

After the implementation, the analysis was held to see the result of implementation. The analysis are as follows:

1. After using a new Business Process, the result has shown and it still increasing. The process that using a new Business Process has divided into four. There are First Piece Sample, First Time Throughput, LBO Function and LBO Aesthetic. The differences are:

- First Piece Sample

  The main problem from elder Business Process First Piece Sample is Approved sample. In the elder Business Process, the process of searching and put the approved sample into a locator could be did by Production (Operator) and Quality Control (Inspector and Leader). Sometimes the Production put the Approved sample at wrong locator. Therefore, when another user search the Approved sample takes a long time because the data in system and actual did not match. It causes the Production did not make First Piece Sample because it needed long time. To give a solution of this problem, the redesign Business Process needed. The old Business Process First Piece Sample is in Figure 4.46.

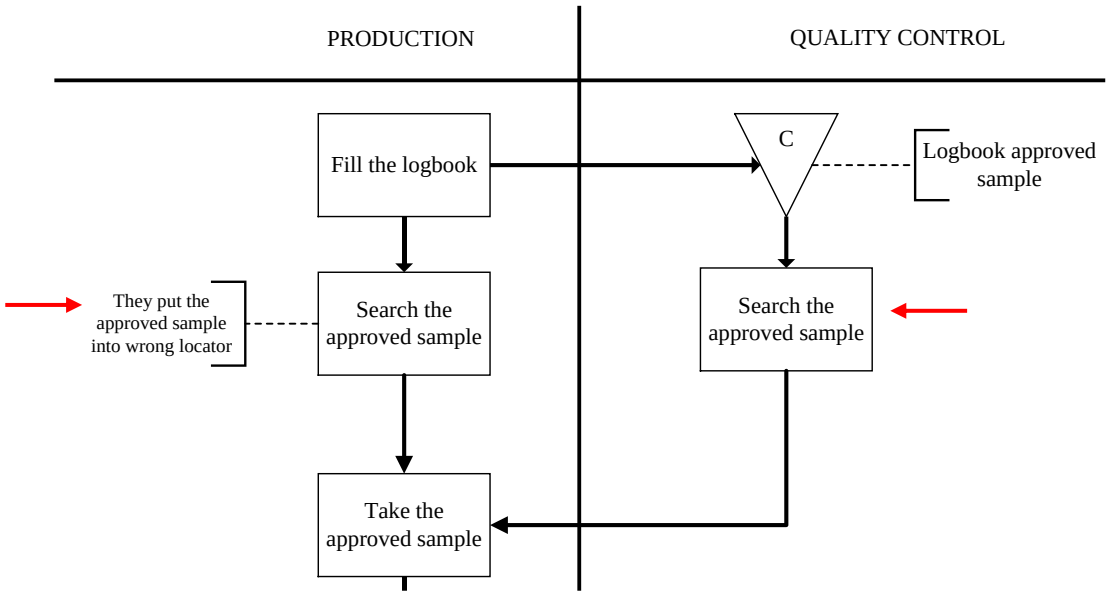


Figure 4.46 The Current Business Process First Piece Sample

In the new process of First Piece Sample, the process of search and put the approved sample will do by Quality Control (Inspector and Leader), it can be seen at Figure 4.47. So the potential of wrong locator can be reduced. If the wrong locator found, the Quality Control Leader and Inspector will get a consequence. After implementing an improved Business Process of First Piece Sample, the Production routine make a First Piece Sample.

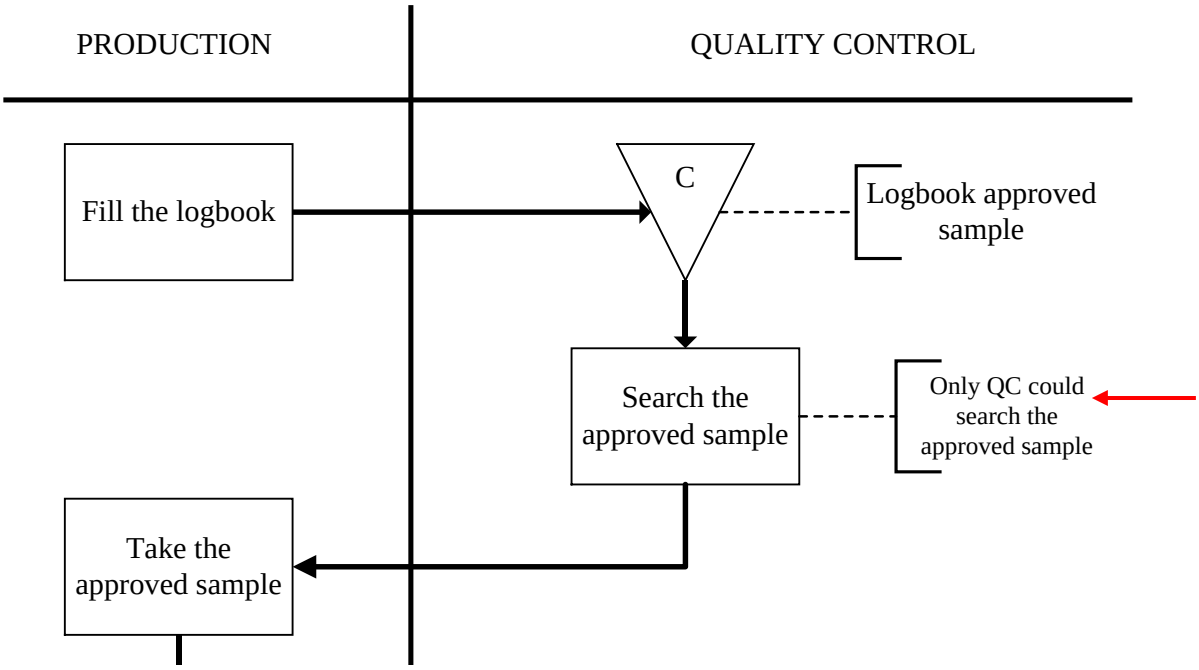


Figure 4.47 The New Business Process First Piece Sample

- First Time Throughput

  Figure 4.48 is the old Business Process of First Time Throughput. The problem of First Time Throughput is the document does not match with the actual. In the document, it wrote the Production (Operator) must check 100% of output from machine and record it into Shift Schedule Control (SSC). But in the analysis, the Production did not check 100% and did not record correctly. The Production wrote the quantity of good part, name of reject part and the quantity of reject, but the data in SSC did not match with the actual. It causes the reject go to the next process and the FTT percentage invalid.

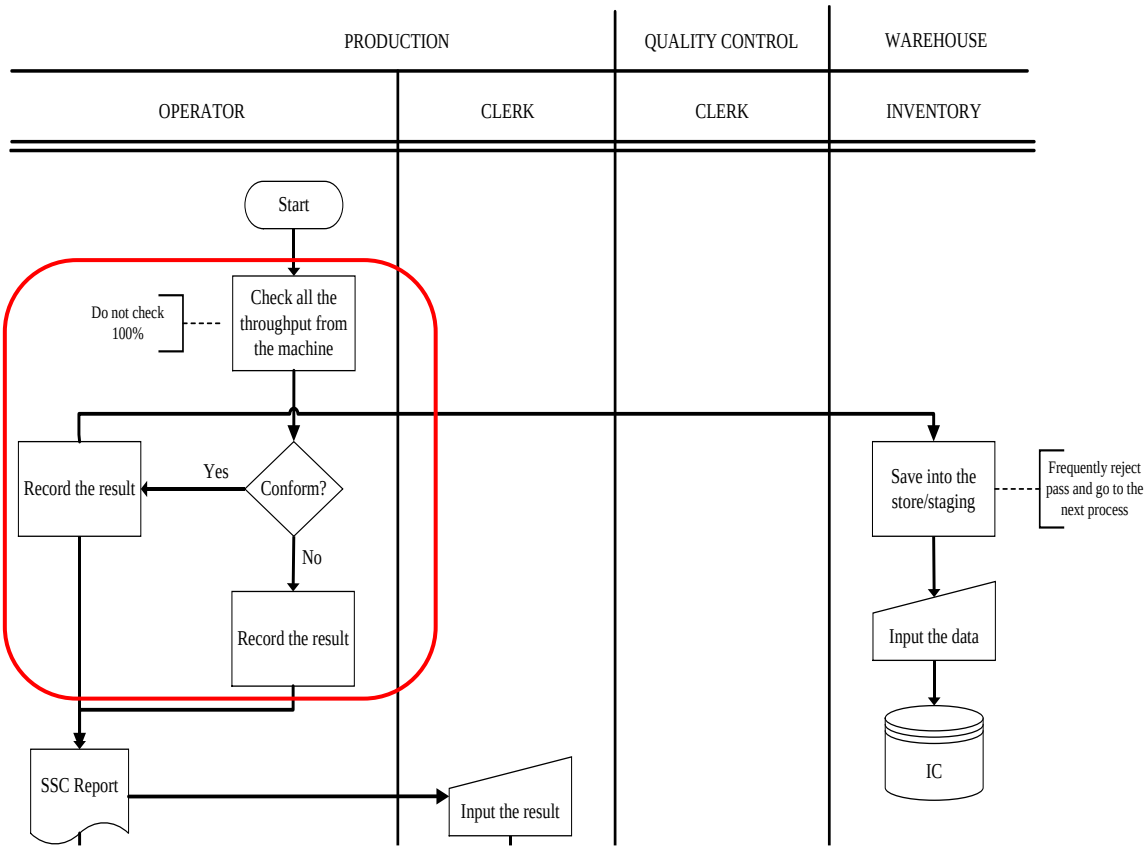


Figure 4.48 The current Business Process First Time Throughput

Because of this, the LBO at PT. X is higher than before. In order to reduce the LBO at PT. X, the training refreshment conducted. In a new Business Process, after the Production check 100% of output from machine, the Leader must inspect it before go to the next process and it shows in Figure 4.49. So the potential of reject can pass to the next process will be reduced. The Leader has a responsibility of their Operator. The data of First Time Throughput is valid and reliable and the reject cannot go to the next process.

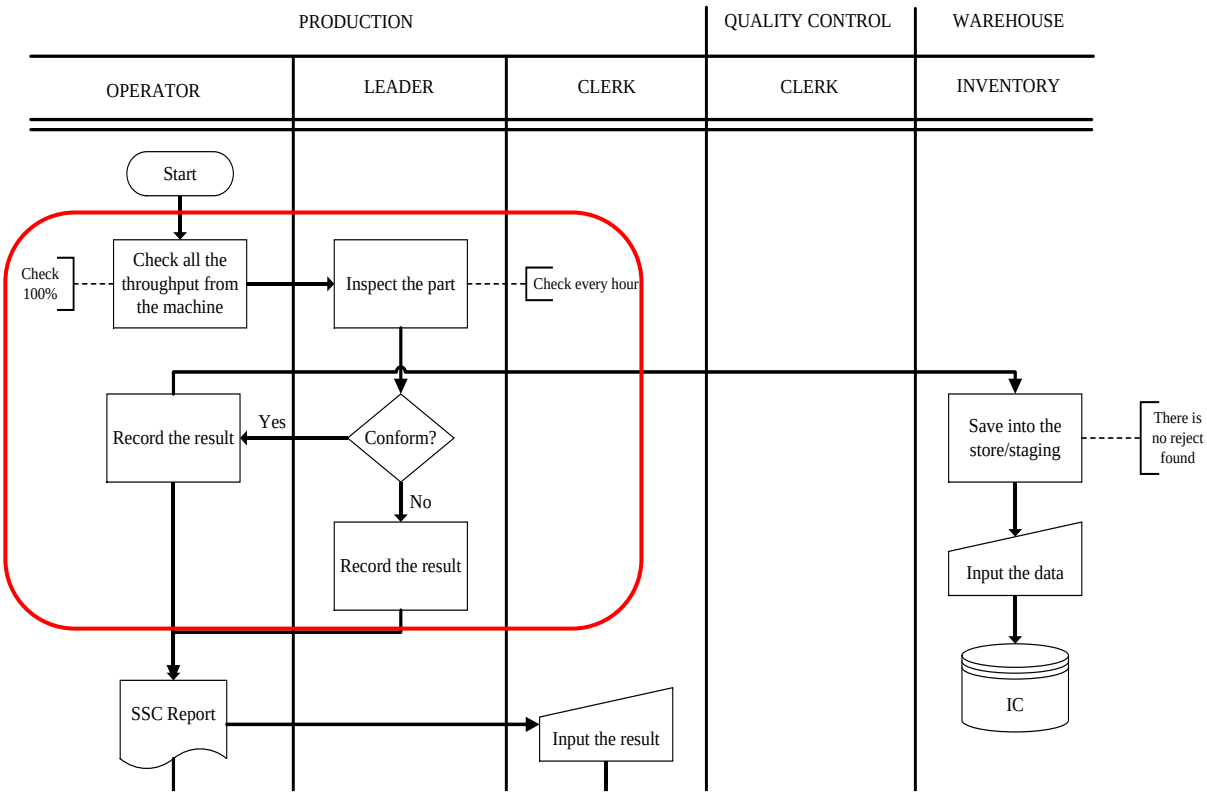


Figure 4.49 The new Business Process First Time Throughput

- LBO Aesthetic and LBO Function

  In the older Inspection Plan, the LBO inspection had mixed the Aesthetic and Function and it can be seen at Figure 4.50. The Quality Control Inspector will check Aesthetic or Function using the old sample size. But in the current Inspection Plan, LBO has separated into LBO Aesthetic and LBO Function. In the old Inspection Plan, the process of reaudit part changed and aligned with the current condition and other plant. From the old process of reaudit part, if the Inspector find reject, they will go to warehouse to check a Work In Process (WIP) before reaudit. Because there are some changes, redesign Business Process needed.

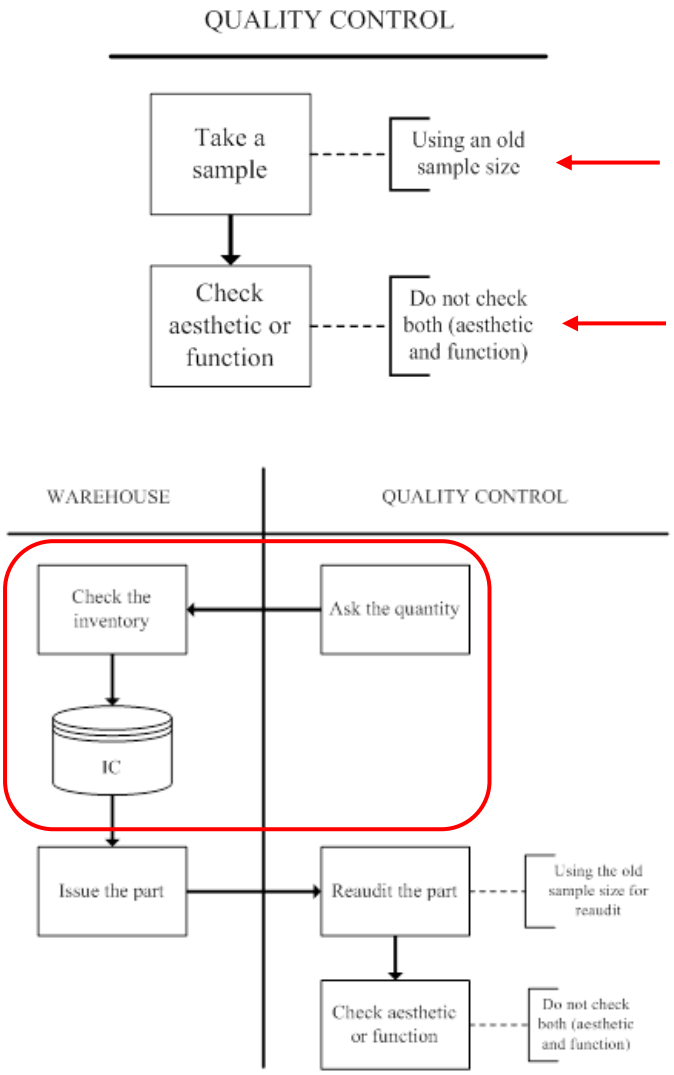


Figure 4.50 The current Business Process of LBO Aesthetic and Function

Figure 4.51 is the improved Business Process has separated the LBO Aesthetic and LBO Function and using the new sample size. In the old process, the Inspector will check Aesthetic or Function. But today the Inspector must check both the Aesthetic and Function using a new sample size. Another change is the process of reaudit part. The improved Business Process of reaudit part has some changes. In the new Business Process, the Inspector must define the root cause and type of toy before go to warehouse to check the Work In Process (WIP). The purpose of define root cause and type of toy is to determine quantity of reaudit part. After implement an improved Business Process of LBO Aesthetic and LBO Function, the defect reduced.

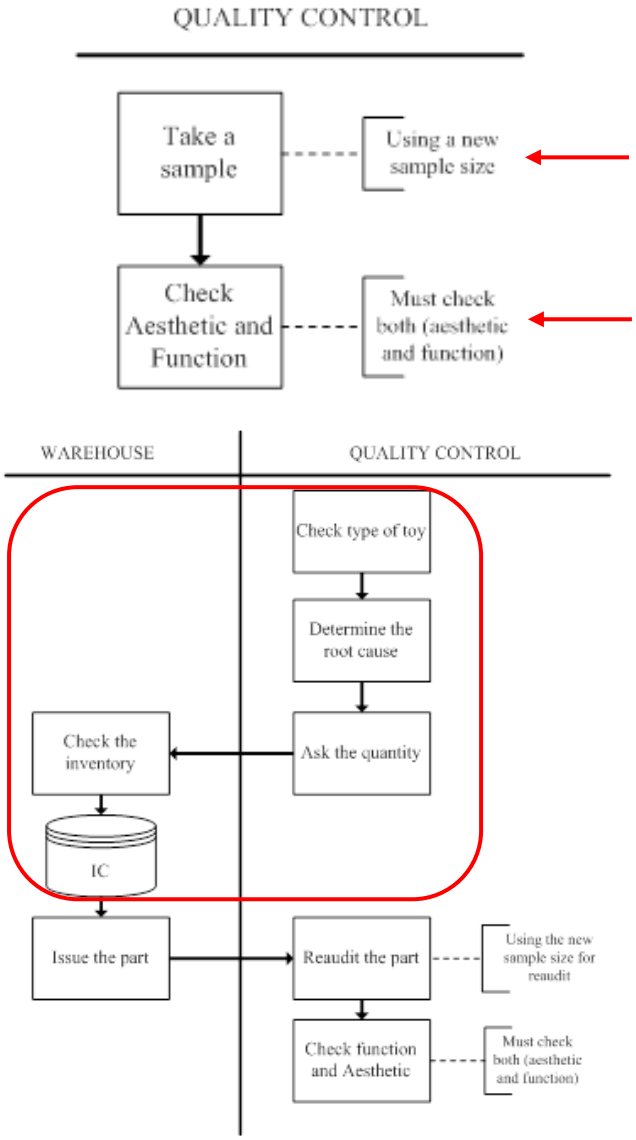


Figure 4.51 The new Business Process of LBO Aesthetic and Function

In Figure 4.51, it shows a new Predefined Process of Check and Reaudit Part. In the new Business Process of LBO Aesthetic and LBO Function, it shows the Business Process is identical but there is one different. The different is LBO Aesthetic will check Aesthetic and LBO Function will check Function. The red arrow show the different of a new Business Process and red border shows the different and new Business Process.

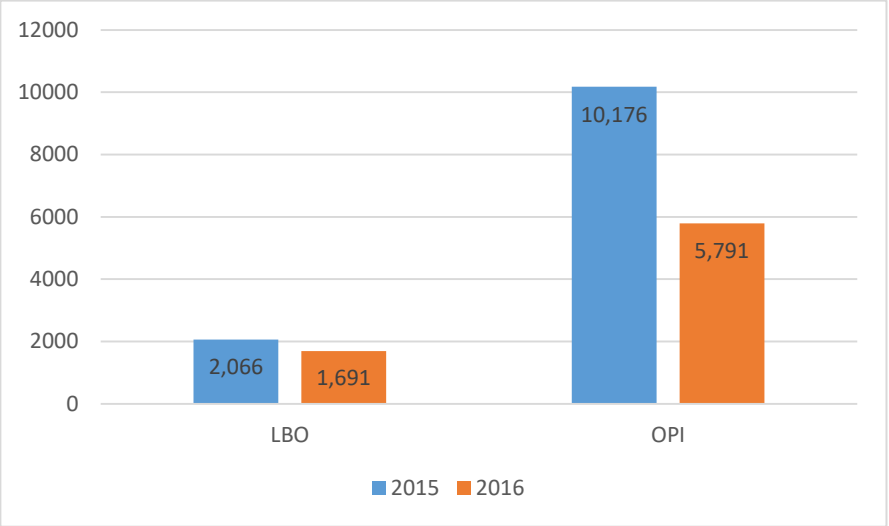


Figure 4.52 The result of Business Process

Figure 4.52 is the result after implementation an improved Business Process. Using the new Process Flowchart of how to inspect, the defect reduced by 1,691 Part Per Million. In the year 2015, the LBO was 2,066 PPM. It reduced by 18,15% from the last year. For OPI, in the year 2015 was 10,176 PPM and reduced to 5,791 PPM. It reduced by 43%.

2. After standardizing and checking all Documents and Forms, the number of available document and form is reduced from 86 forms to 50 forms or reduced by 42,5%. All the expired, double and unrelated form have been deleted. Another improvement of Form is the new format of standardized form. Figure 4.53 is the old form. This is an Abuse test form of PT. X.

INSPECTOR					CHR73						
DATE/SHIF											
Sample#	Posisi	Pull Dress 10LBS	Pull TAIL 10 LBS	TORQUE CHEST	CHEST 15 lbs				ARM		
					OUT	BACK	SIDE	FORD	OUT	UP	BACK
1	RIGHT										
2											
3											
4											
5											
6											
7	LEFT										
8											
9											
10											
11											
12											

Figure 4.53 The old Abuse Test Form

Figure 4.53 is the unstandardized form. It can be seen the format is unstandardized. In the old Abuse test form, the data information of inspector, date, shift and so on are unstructured. Because of this, the new format needed to solve the problem unstandardized form.

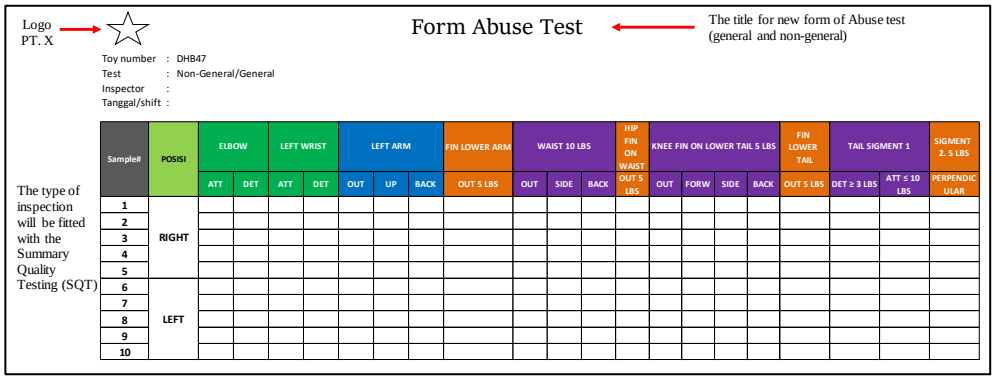


Figure 4.54 The new Abuse test form

Figure 4.54 a new Format of Abuse test form. In the new format, a form has a title “Form Abuse Test”. In the left corner, there is a symbol of PT. X. the information such as toy number, type of test, name of inspector and date are placed under symbol of PT. X

3. After implementing the new database, it reduced the number of file and the data sheets. For Abuse test non-general reduced around 90% the sheets used. In the last database, the sheets were 50 but today only five after it classified. The new database using a yearly database, it means the folder gathered into one (yearly). Before it used monthly database. It reduced by 91,67% from twelve databases into one database.

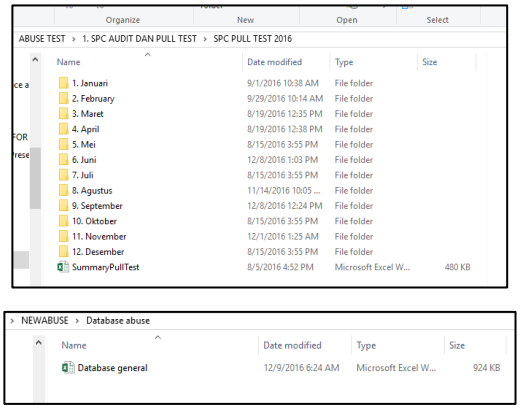
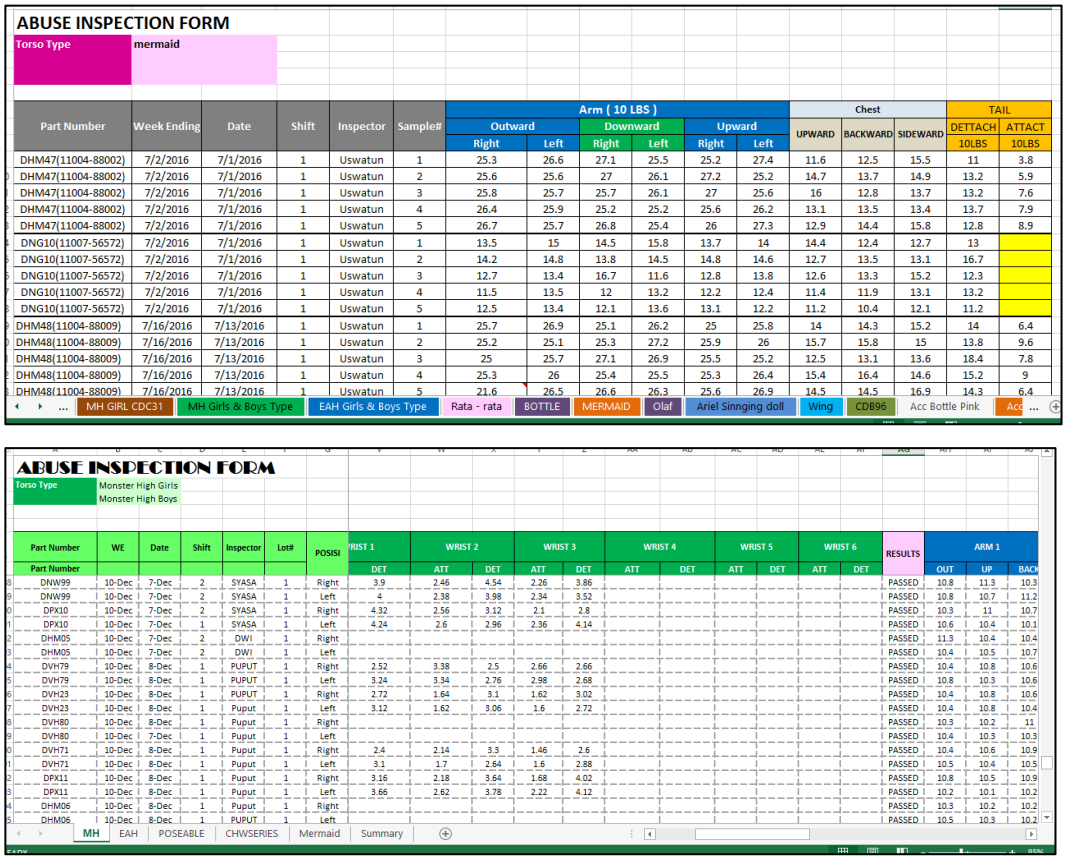


Figure 4.55 The file comparison

Figure 4.55 shows the comparison database of Abuse general. Before the database made every month and the total of database was twelve. Today the database reduced into one. The improved database made by yearly. So the database reduce form twelve into one. It improves searching the specific toy's data because they don't need open twelve databases.



ABUSE INSPECTION FORM

Torso Type: mermaid

Part Number	Week Ending	Date	Shift	Inspector	Sample#	Arm (10 LBS)						Chest			TAIL	
						Outward		Downward		Upward					DETTACH	ATTACT
						Right	Left	Right	Left	Right	Left	UPWARD	BACKWARD	SIDEWARD	10LBS	10LBS
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	1	25.3	26.6	27.1	25.5	25.2	27.4	11.6	12.5	15.5	11	3.8
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	2	25.6	25.6	27	26.1	27.2	25.2	14.7	13.7	14.9	13.2	5.9
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	3	25.8	25.7	25.7	26.1	27	25.6	16	12.8	13.7	13.2	7.6
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	4	26.4	25.9	25.2	25.2	25.6	26.2	13.1	13.5	13.4	13.7	7.9
DHM47(11004-88002)	7/2/2016	7/1/2016	1	Uswatun	5	26.7	25.7	26.8	25.4	26	27.3	12.9	14.4	15.8	12.8	8.9
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	1	13.5	15	14.5	15.8	13.7	14	14.4	12.4	12.7	13	
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	2	14.2	14.8	13.8	14.5	14.8	14.6	12.7	13.5	13.1	16.7	
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	3	12.7	13.4	16.7	11.6	12.8	13.8	12.6	13.3	15.2	12.3	
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	4	11.5	13.5	12	13.2	12.2	12.4	11.4	11.9	13.1	13.2	
DNG10(11007-56572)	7/2/2016	7/1/2016	1	Uswatun	5	12.5	13.4	12.1	13.6	13.1	12.2	11.2	10.4	12.1	11.2	
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	1	25.7	26.9	25.1	26.2	25	25.8	14	14.3	15.2	14	6.4
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	2	25.2	25.1	25.3	27.2	25.9	26	15.7	15.8	15	13.8	9.6
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	3	25	25.7	27.1	26.9	25.5	25.2	12.5	13.1	13.6	18.4	7.8
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	4	25.3	26	25.4	25.5	25.3	26.4	15.4	16.4	14.6	15.2	9
DHM48(11004-88009)	7/16/2016	7/13/2016	1	Uswatun	5	21.6	26.5	26.6	26.3	25.6	26.9	14.5	14.5	16.9	14.3	6.4

MH GIRL CDC31 | MH Girls & Boys Type | EAH Girls & Boys Type | Rata - rata | BOTTLE | MERMAID | Olaf | Ariel Sinnging doll | Wing | CDB96 | Acc Bottle Pink

ABUSE INSPECTION FORM

Torso Type: Monster High Girls / Monster High Boys

Part Number	WE	Date	Shift	Inspector	Lot#	POSISI	WRIST 1	WRIST 2		WRIST 3		WRIST 4		WRIST 5		WRIST 6		RESULTS	ARM 1		
Part Number							DET	ATT	DET	ATT	DET	ATT	DET	ATT	DET	ATT	DET		OUT	UP	BACK
DNW99	10-Dec	7-Dec	2	SYASA	1	Right	3.9	2.46	4.54	2.26	3.86							PASSED	10.8	11.3	10.3
DNW99	10-Dec	7-Dec	2	SYASA	1	Left	4	2.38	3.98	2.34	3.52							PASSED	10.8	10.7	11.2
DPX10	10-Dec	7-Dec	2	SYASA	1	Right	4.32	2.56	3.12	2.1	2.8							PASSED	10.3	11	10.7
DPX10	10-Dec	7-Dec	1	SYASA	1	Left	4.24	2.6	2.96	2.36	4.14							PASSED	10.6	10.4	10.1
DHM05	10-Dec	7-Dec	2	DWI	1	Right												PASSED	11.3	10.4	10.4
DHM05	10-Dec	7-Dec	2	DWI	1	Left												PASSED	10.4	10.5	10.7
DVH79	10-Dec	8-Dec	1	PUPUT	1	Right	2.52	3.38	2.5	2.66	2.66							PASSED	10.4	10.8	10.6
DVH79	10-Dec	8-Dec	1	PUPUT	1	Left	3.24	3.34	2.76	2.98	2.68							PASSED	10.8	10.3	10.6
DVH23	10-Dec	8-Dec	1	PUPUT	1	Right	2.72	1.64	3.1	1.62	3.02							PASSED	10.4	10.8	10.6
DVH23	10-Dec	8-Dec	1	Puput	1	Left	3.12	1.62	3.06	1.6	2.72							PASSED	10.4	10.8	10.4
DVH80	10-Dec	8-Dec	1	Puput	1	Right												PASSED	10.3	10.2	11
DVH80	10-Dec	7-Dec	1	Puput	1	Left												PASSED	10.4	10.3	10.3
DVH71	10-Dec	8-Dec	1	Puput	1	Right	2.4	2.14	3.3	1.46	2.6							PASSED	10.4	10.6	10.9
DVH71	10-Dec	8-Dec	1	Puput	1	Left	3.1	1.7	2.64	1.6	2.88							PASSED	10.5	10.4	10.5
DPX11	10-Dec	8-Dec	1	Puput	1	Right	3.16	2.18	3.64	1.68	4.02							PASSED	10.8	10.5	10.9
DPX11	10-Dec	8-Dec	1	Puput	1	Left	3.66	2.62	3.78	2.22	4.12							PASSED	10.2	10.1	10.2
DHM06	10-Dec	8-Dec	1	Puput	1	Right												PASSED	10.3	10.2	10.2
DHM06	10-Dec	8-Dec	1	PUPUT	1	Left												PASSED	10.5	10.3	10.2

MH | EAH | POSEABLE | CHWSERIES | Mermaid | Summary

Figure 4.56 The data sheets comparison

Figure 4.56 is the database Abuse non general. Before, the data sheets of Abuse general consist fifty data sheets. Because the data sheets too many, it takes a long time to input the result. Using the improved database, Abuse general has five data sheets. It classified by type and similarity.

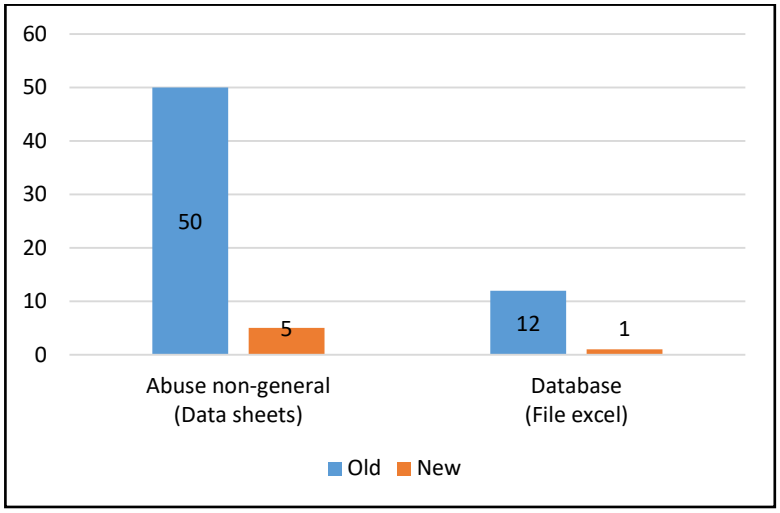


Figure 4.57 The result of Database

Figure 4.57 is the percentage of result after implementation of an improved Database. It shows the data sheets of Abuse non general decreased significantly. For the database of Abuse general and Abuse non general are decreased, from twelve databases into one database.

4. The result after implement the new software is reducing the waste of time. Figure 4.58 is the result of analysis of implementation. In Abuse test non-general, the time reduced by 80% from 10 minutes key in and now only 2 minutes. Abuse test general reduce 80% from 5 minutes of key in one-part number into 1 minutes using Macro Excel. For Approved sample, the process of search the availability and locator now reduced by 90%. The last time needed for search availability was 5 minutes but today only 30 seconds.

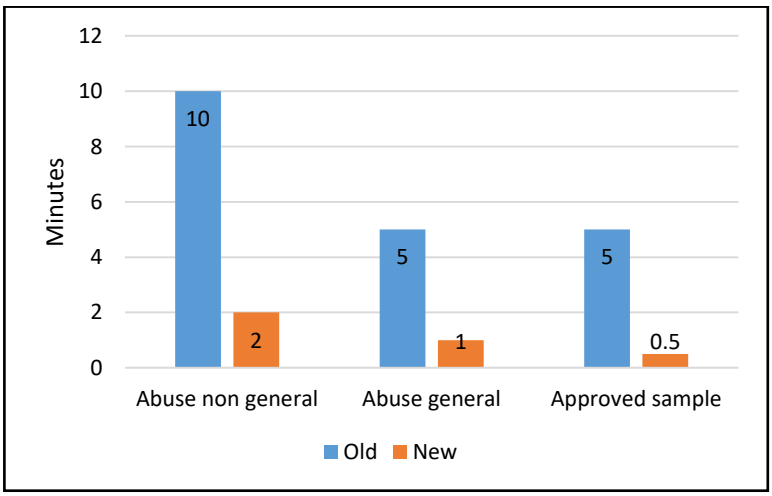


Figure 4.58 The result of Software

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1.Conclusion

Based on the identifying and analyzing of the observation, there are several conclusions that can be drawn to achieve the objectives of the observation. The conclusions are described as follows:

1. The defect number reduced after implement the improved process. The improved process is an inspection that has not align with the current condition and not suitable with the current system. Improved processes are First Piece Sample, First Time Throughput, LBO Aesthetic and LBO Function. The redesign processes used Business Process; Process Flowchart. Defect number reduced 18,15% from 2,066 PPM to 1,691 PPM. In the past years, the defect number never turn into 1,000 PPM but with implementation the improved process it turns with 1,691%. Torso Area also reduced the PPM at LBO.
2. Document and Form that uses in PT. X has several problems and it divided into three major topics such as Unregister form, Unstandardized form and the availability. An unregister form already registered and numbered. For the unstandardized form, new format/design of form already designed and standardizes the format. The last is checking the availability. In this improvement, the number availability document expired, double will reduce and the accuracy of document will align with the current condition of PT. X. To fulfill the requirement of ISO 9001 (Quality Management System), all document must be standardized and registered. The document which old, new and revise must be controlled with quality policy.
3. Reporting and recording system of PT. X is very manual. There are a lot of potential of human error while reporting system, so develop software will solve this problem. Redesign will use Macro excel and data validation. The aims are to reduce the human error and validate the data it into improve system. For Quality Control's inspector will use the improved reporting

system. After implementation, the improve database using Macro Excel, it will reduce human error and saving time which the problem of reporting system at PT. X.

5.2.Recommendation

Due to limitation time in this research, some recommendations are provided for further research. These recommendations might be as considerations in order reduce numbers of defects and improve the documentation system, the recommendations are:

1. This research is successful by reducing number of defect to1,691 PPM, the further research should be conducted to reduce the number of defects until meets the objective of defective product of the company (1,000 PPM)
2. The further software development is about how to solve the error and called debug. Macro excel has a rule and sometime it against with Microsoft Excel rule. For example is move cell, move column, rename a data sheet, rename the file data and move the file into different folder. Another case about Macro Excel and Microsoft Excel is the protection of excel that could make a Macro does not work. Other problem is about the user. Since it is a new software and the user never been used it so they do not know what is allowed and not. In order to mitigate the problem, the further research about develop software are required and training the user.

REFERENCES

A. Ziya Aktas. Structured Analysis and Design of Information Systems. Prentice Hall, 1987.

Aalst, Wil van der and Hee, Kees van. Workflow Management: Models, Methods, and Systems. Cooperative Information Systems. MIT Press, 2002.

D. Martin and G. Estrin. "Models of Computations and Systems Evaluations of Vertex Probabilities in Graph Models of Computations". Journal of the ACM, Vol. 14, No. 2, April 1967.

Frank Leymann and Dieter Roller. Production Workflow: Concepts and Techniques. Prentice Hall PTR, 2000.

Hall, James A. Information Technology Auditing (with ACL CD-ROM).3rd ed. Wadsworth Publishing Co Inc, 2013

Hammer, Michael and Champy, James. Reengineering the Corporation: A Manifesto for Business Revolution. HarperBusiness, 1993.

Hoyle, David. ISO 9000 Quality Systems Handbook 4th ed. A division of Reed Education and Professional Publishing Ltd, 2001.

International Organization for Standardization 2008, ISO 9001:2008: Quality Management Systems–Requirements. 4th ed. International Organization for Standardization, Switzerland, 2008

Ko, Ryan K. L..A computer scientist's introductory guide to business process management (BPM). Crossroads, 15(4):11–18, 2009.

Kolmetz, Karl. Kolmetz Handbook of Process Equipment Design: PROCESS FLOW SHEET (ENGINEERING DESIGN GUIDELINE), 2015

Kovalev, S., & Kovalev Valerii. Director's consultunt. Получено из, retrieved from http://www.betec.ru/index.php?id=6&sid=52 on December 2016

M, Jogiyanto H. Analisis & Desain Sistem Informasi: Pendekatan Terstruktur, Teori dan Praktik Aplikasi Bisnis. 3rd ed. Yogyakarta: ANDI, 2005.

Maslow, Abraham. *Towards a Psychology of Being*. Wiley; 3rd edition, 1998.

Melcher, Joachim. Process Measurement in Business Process Management: Theoretical Framework and Analysis of Several Aspects. KIT Scientific Publishing, 2012.

Vivek, Nanda. *Quality Management System Handbook for Product Development Companies.* CRC Press, 2005.

APPENDICES

APPENDIX 1 Inspection Plan - OLD

<table>
<tr><th>Part to be Inspected</th><th>Inspection Type</th><th>Reference/ Equipment</th><th>Sample Size</th><th>Minimum Frequency</th><th>Record</th><th>Remarks</th></tr>
<tr><td>All Part after Finish Assembly</td><td>First Piece
Sample</td><td>Approved Sample</td><td>1 part#/ line</td><td>At beginning of shift or change over</td><td>Soft copy (server)</td><td>First piece sample doesn’t change, if there aren’t change over part, tool change or mold repair</td></tr>
<tr><td>All Part after Finish Assembly</td><td>FPY</td><td>• Approved Sample
• DD&C</td><td>10 pcs/index</td><td>If a part# runs until end of shift, then check
2 times/shift/line. But if part# doesn’t run until end of shift because change to another part#, then check each part# minimum 1 time/shift/line</td><td>FTY server</td><td>Take samples randomly from basket after inspected by Production</td></tr>
<tr><td>Silkstone Torso, Collector Torso, Dependent Demand Part and Feature Torso or Accessories</td><td>LBO</td><td>• Approved Sample
• DD&C</td><td><table>
<tr><th>TYPE</th><th>LEVEL</th><th>AQL</th><th>LOT SIZE</th><th>CODE LETTER</th><th>S/S</th><th>Ac/Rj</th></tr>
<tr><td rowspan="2">Collector I (Pink, Black, No label)</td><td>II</td><td>0.40</td><td>151-280</td><td>G</td><td>32</td><td>0/1</td></tr>
<tr><td>II</td><td>0.40</td><td>281-500</td><td>H</td><td>32</td><td>0/1</td></tr>
<tr><td rowspan="3">Collector II (Gold, Platinum, Silkstone)</td><td>II</td><td>0.25</td><td>501-1200</td><td>J</td><td>50</td><td>0/1</td></tr>
<tr><td>II</td><td>0.15</td><td>151-280</td><td>G</td><td>80</td><td>0/1</td></tr>
<tr><td>II</td><td>0.15</td><td>281-500</td><td>H</td><td>80</td><td>0/1</td></tr>
<tr><td rowspan="3">Main Line</td><td>II</td><td>0.15</td><td>501-1200</td><td>J</td><td>80</td><td>0/1</td></tr>
<tr><td>I</td><td>0.40</td><td>151-280</td><td>E</td><td>32</td><td>0/1</td></tr>
<tr><td>I</td><td>0.40</td><td>281-500</td><td>F</td><td>32</td><td>0/1</td></tr>
<tr><td>I</td><td>0.40</td><td>501-1200</td><td>G</td><td>32</td><td>0/1</td></tr>
</table></td><td>Every 2 hours/shift</td><td>QC Server</td><td>• Use ANZI/ASQ Z1.4
• Product can be released if QC has put accepted tag or accepted stamp</td></tr>
</table>

Part to be Inspected	Inspection Type	Reference/ Equipment	Sample Size	Minimum Frequency	Record	Remarks
Accessories Assembly	Abuse Test	• Digital Force Gauge • Inspection Plan • SQT	6 pcs/part#	1 time/part #/shift	QC Server	• Take sample after cleaning and relax the samples for minimum 4 hours before perform abuse test • Sampling system will follow QA/PP/049-abuse and life test Sampling Plan
Complete Torso	Abuse Test Until Failure	• Digital Force Gauge • Inspection Plan • SQT	5 pcs/part#	1 time/part #/week	QC Server	• Take sample after cleaning and relax the samples for minimum 4 hours before perform abuse test
Complete Torso/Accessories Assembly	Life Test	• Inspection Plan	6 pcs / Part#	1 time/part #/week	QC Server	Sampling system will follow QA/PP/049-abuse and life test Sampling Plan

APPENDIX 2 Category of defect

Raw Def. Category	Def. Category
ASE	Assembly East
ASX	Assembly West
GO	Grooming
IME	Molding East
IMW	Molding West
PKG	Packaging
PO	Packout
PTE	Painting East
PTW	Painting West
RO	Rooting
RM	Rooting Manual
RCE	Rotocast
SWA	Sewing PTAG
SWM	Sewing PTMI
SPLR	Supplier
TAE	Tampo East
TAW	Tampo West
VFE	Vacuum forming
VUMW	VUM West

APPENDIX 3 Defect's data in the year 2013

LBO

WTD	:	28 DESEMBER 2013
Def	:	4354
S/S	:	1755461
PPM	:	2.480

PPM By Area LBO

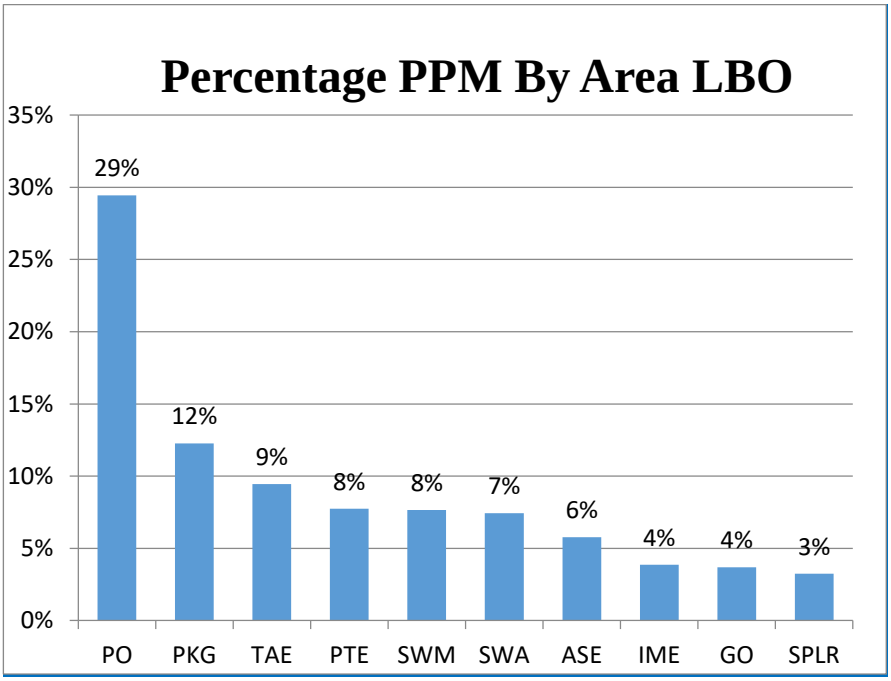
Def. Category	Def	PPM	%
PO	1282	730	29%
PKG	534	304	12%
TAE	411	234	9%
PTE	337	192	8%
SWM	333	190	8%
SWA	324	185	7%
ASE	251	143	6%
IME	168	96	4%
GO	161	92	4%
SPLR	141	80	3%
RCE	91	52	2%
PTW	71	40	2%
IMW	70	40	2%
RO	51	29	1%
VFE	45	26	1%
TAW	29	17	1%
VUMW	24	14	1%
RM	15	9	0%
ASW	9	5	0%
ASC	5	3	0%
ASX	2	1	0%
		2,480	

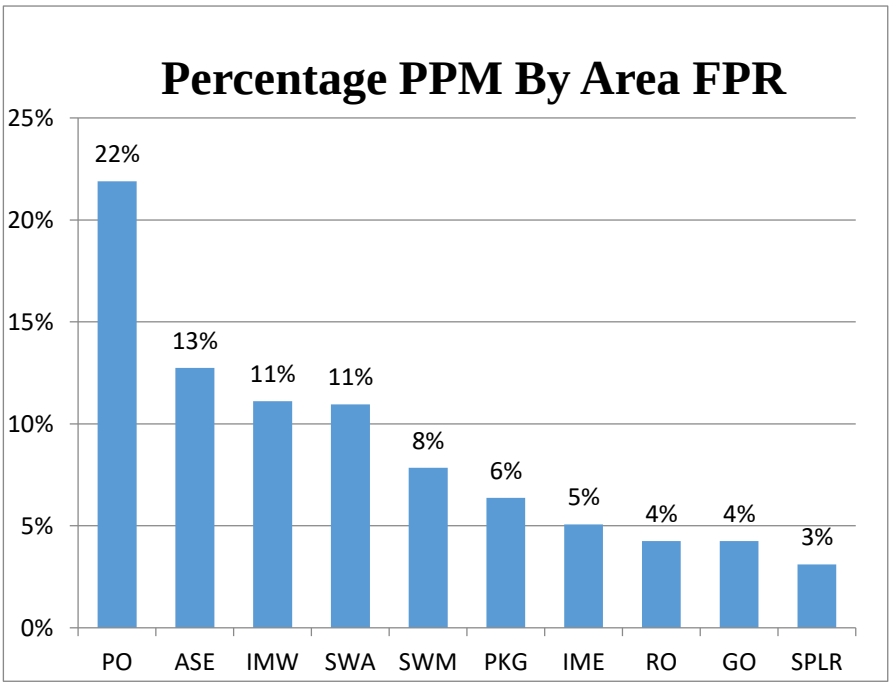
FPR

WTD	:	28 DESEMBER 2013
Def	:	612
S/S	:	81949
PPM	:	7.468

PPM By Area FPR

Def. Category	Def	PPM	%
PO	134	1,635	22%
ASE	78	952	13%
IMW	68	830	11%
SWA	67	818	11%
SWM	48	586	8%
PKG	39	476	6%
IME	31	378	5%
RO	26	317	4%
GO	26	317	4%
SPLR	19	232	3%
RCE	17	207	3%
TAE	16	195	3%
PTE	16	195	3%
RM	10	122	2%
ASW	8	98	1%
DC	3	37	0%
TAW	2	24	0%
ASX	2	24	0%
PTW	2	24	0%
		7,468	


Percentage PPM By Area LBO
35%
30%
25%
20%
15%
10%
5%
0%
29%
12%
9%
8%
8%
7%
6%
4%
4%
3%
PO
PKG
TAE
PTE
SWM
SWA
ASE
IME
GO
SPLR


Percentage PPM By Area FPR
25%
20%
15%
10%
5%
0%
22%
13%
11%
11%
8%
6%
5%
4%
4%
3%
PO
ASE
IMW
SWA
SWM
PKG
IME
RO
GO
SPLR

APPENDIX 4 Defect's data in the year 2014

LBO
WTD : 27 DESEMBER 2014
Def : 3471
S/S : 1,699,399
PPM : 2,042

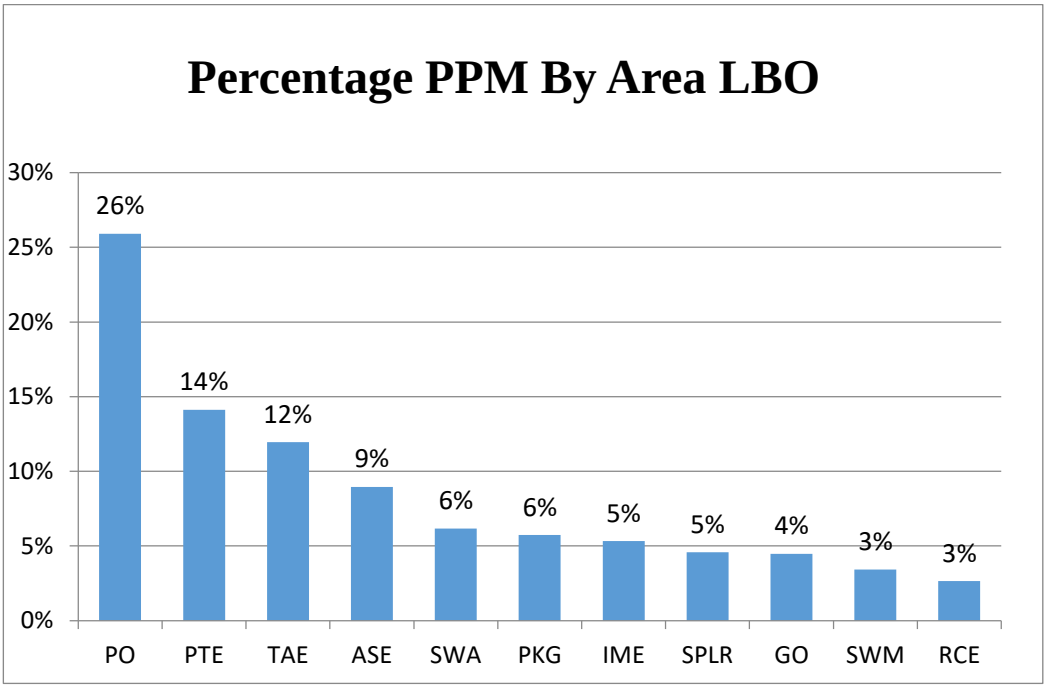
PPM By Area LBO

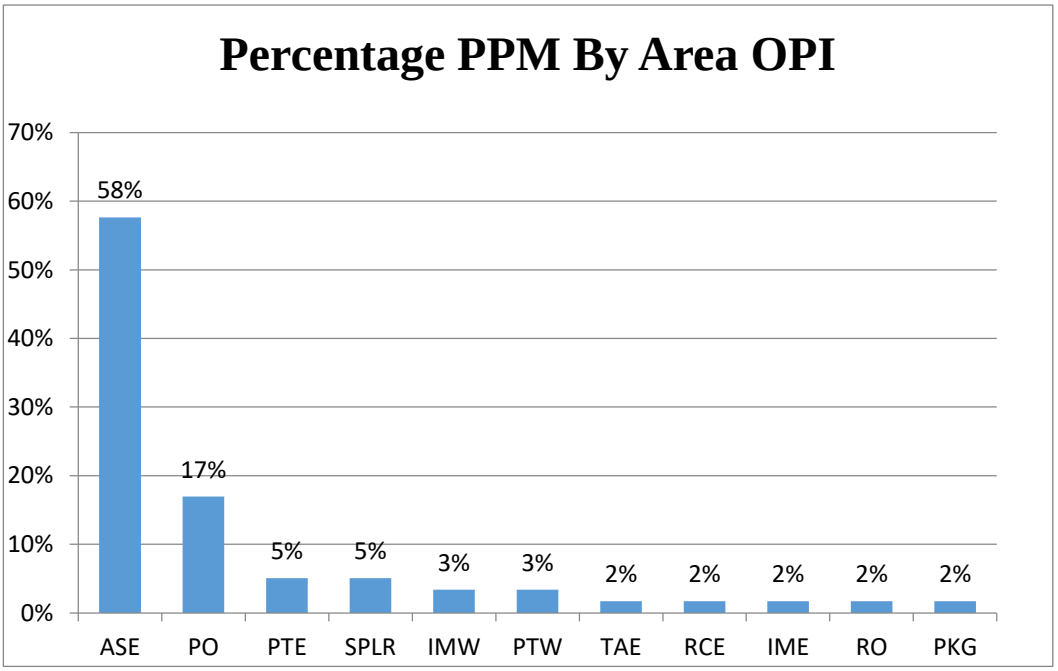
Def. Category	Def	PPM	%
PO	899	529	26%
PTE	490	288	14%
TAE	415	244	12%
ASE	311	183	9%
SWA	214	126	6%
PKG	199	117	6%
IME	185	109	5%
SPLR	159	94	5%
GO	155	91	4%
SWM	119	70	3%
RCE	92	54	3%
RO	83	49	2%
PTW	42	25	1%
IMW	39	23	1%
VFE	30	18	1%
RM	16	9	0%
VUMW	11	6	0%
ASX	8	5	0%
TAW	4	2	0%
		2,042	

OPI
WTD : 27 DESEMBER 2014
Def : 59
S/S : 4,539
PPM : 12,998

PPM By Area OPI

Def. Category	Def	PPM	%
ASE	34	7,491	58%
PO	10	2,203	17%
PTE	3	661	5%
SPLR	3	661	5%
IMW	2	441	3%
PTW	2	1	3%
TAE	1	1	2%
RCE	1	1	2%
IME	1	1	2%
RO	1	1	2%
PKG	1	1	2%
		12,998	


Percentage PPM By Area LBO
30%
25%
20%
15%
10%
5%
0%
26%
14%
12%
9%
6%
6%
5%
5%
4%
3%
3%
PO
PTE
TAE
ASE
SWA
PKG
IME
SPLR
GO
SWM
RCE


Percentage PPM By Area OPI
70%
60%
50%
40%
30%
20%
10%
0%
58%
17%
5%
5%
3%
3%
2%
2%
2%
2%
2%
ASE
PO
PTE
SPLR
IMW
PTW
TAE
RCE
IME
RO
PKG

APPENDIX 5 Defect's data in the year 2015

LBO

		26 DESEMBER
WTD	:	2015
Def	:	3205
S/S	:	1,457,082
PPM	:	2,200

PPM By Area
LBO

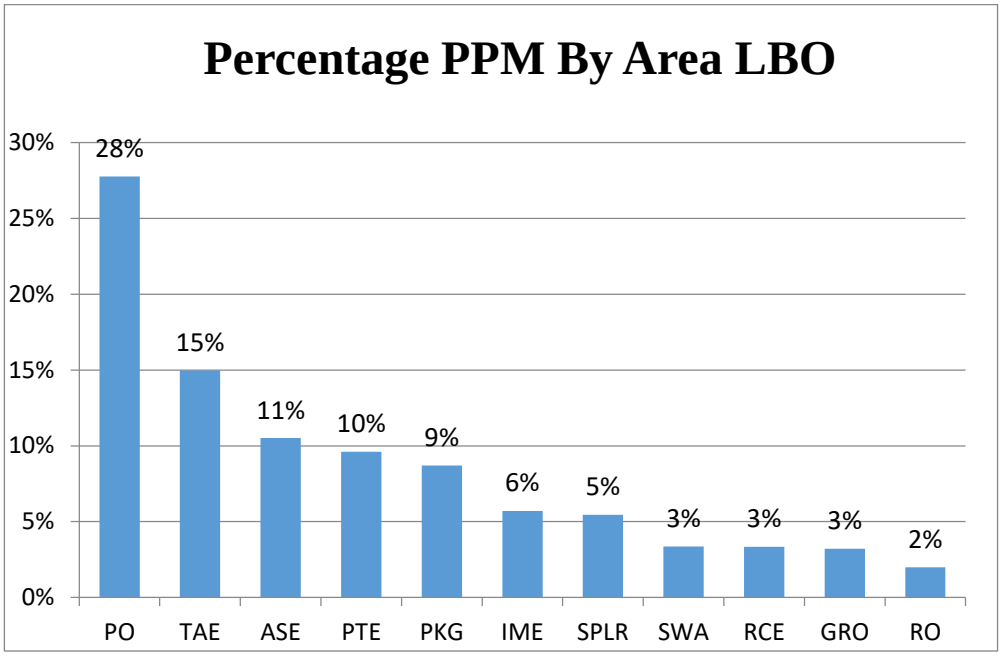
Def. Category	Def	PPM	%
PO	890	611	28%
TAE	480	329	15%
ASE	337	231	11%
PTE	308	211	10%
PKG	279	191	9%
IME	183	126	6%
SPLR	175	120	5%
SWA	108	74	3%
RCE	107	73	3%
GRO	103	71	3%
RO	64	44	2%
PTW	62	43	2%
SWM	40	27	1%
IMW	29	20	1%
VFE	11	8	0%
RM	10	7	0%
ASX	9	6	0%
TAW	6	4	0%
VUMW	4	3	0%
		2,200	

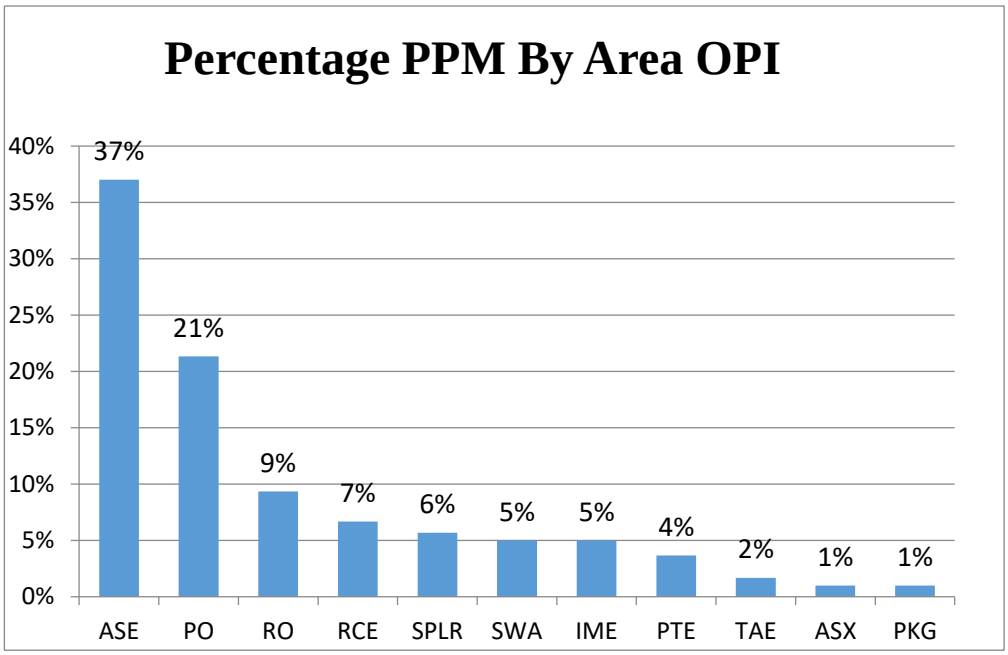
OPI

		26 DESEMBER
WTD	:	2015
Def	:	300
S/S	:	30,422
PPM	:	9,861

PPM By Area
OPI

Def. Category	Def	PPM	%
ASE	111	3,649	37%
PO	64	2,104	21%
RO	28	920	9%
RCE	20	657	7%
SPLR	17	559	6%
SWA	15	493	5%
IME	15	493	5%
PTE	11	362	4%
TAE	5	164	2%
ASX	3	99	1%
PKG	3	99	1%
GO	2	66	1%
IMW	2	66	1%
PTW	2	66	1%
SWM	1	33	0%
RM	1	33	0%
		9,861	


Percentage PPM By Area LBO
30%
25%
20%
15%
10%
5%
0%
28%
15%
11%
10%
9%
6%
5%
3%
3%
3%
2%
PO
TAE
ASE
PTE
PKG
IME
SPLR
SWA
RCE
GRO
RO


Percentage PPM By Area OPI
40%
35%
30%
25%
20%
15%
10%
5%
0%
37%
21%
9%
7%
6%
5%
5%
4%
2%
1%
1%
ASE
PO
RO
RCE
SPLR
SWA
IME
PTE
TAE
ASX
PKG

APPENDIX 6 Defect's data in the middle of year 2016

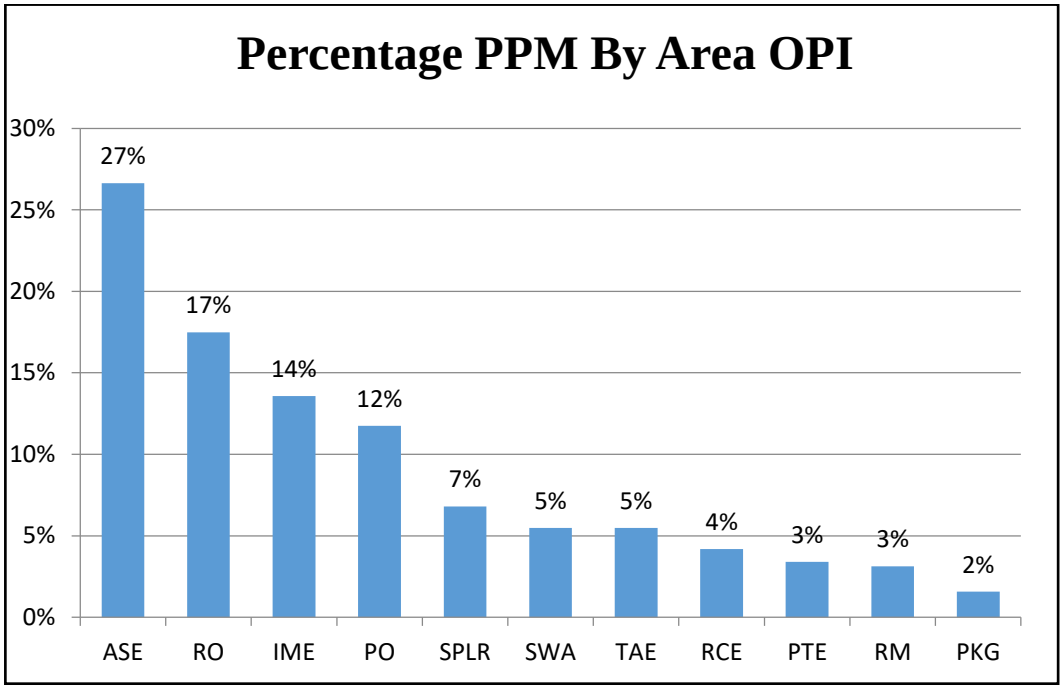
LBO				OPI			
WTD :	:	23-Jul-16		WTD :	:	23-Jul-16	
Def	:	1,708		Def	:	383	
S/S	:		826,690	S/S	:	37,637	
PPM	:	2,066		PPM	:	10,176	

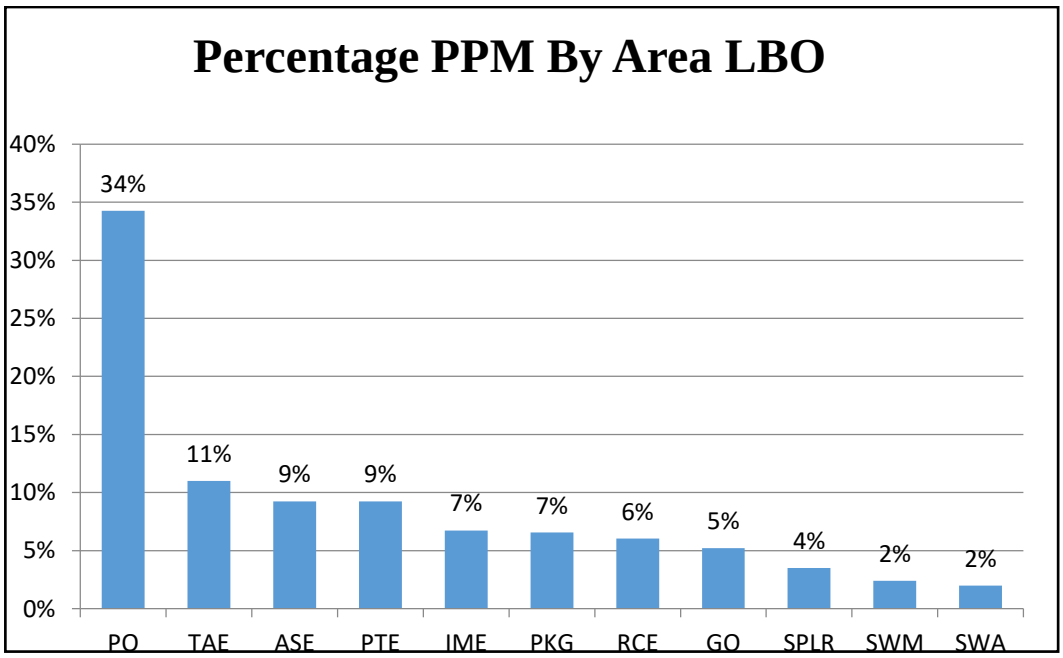
PPM By Area LBO

Def. Category	Def	PPM	%
PO	585	708	34%
TAE	188	227	11%
ASE	158	191	9%
PTE	158	191	9%
IME	115	139	7%
PKG	112	135	7%
RCE	103	125	6%
GO	89	108	5%
SPLR	60	73	4%
SWM	41	50	2%
SWA	34	41	2%
RO	27	33	2%
VUMW	19	23	1%
RM	14	17	1%
ASX	5	6	0%
		2,066	

PPM By Area OPI

Def. Category	Def	PPM	%
ASE	102	2,710	27%
RO	67	1,780	17%
IME	52	1,382	14%
PO	45	1,196	12%
SPLR	26	691	7%
SWA	21	558	5%
TAE	21	558	5%
RCE	16	425	4%
PTE	13	345	3%
RM	12	319	3%
PKG	6	159	2%
GO	1	27	0%
VUMW	1	27	0%
		10,176	


Percentage PPM By Area OPI
30%
25%
20%
15%
10%
5%
0%
27%
17%
14%
12%
7%
5%
5%
4%
3%
3%
2%
ASE
RO
IME
PO
SPLR
SWA
TAE
RCE
PTE
RM
PKG


Percentage PPM By Area LBO
40%
35%
30%
25%
20%
15%
10%
5%
0%
34%
11%
9%
9%
7%
7%
6%
5%
4%
2%
2%
PO
TAE
ASE
PTE
IME
PKG
RCE
GO
SPLR
SWM
SWA

APPENDIX 7 Defect's data after improvement

LBO		
WTD	:	31-Dec
Def	:	3,524
S/S	:	2,083,766
PPM	:	1,691

OPI		
WTD	:	31-Dec
Def	:	540
S/S	:	94,417
PPM	:	5,719

PPM By Area LBO

Def. Category	Def	PPM	%
PO	1050	504	30%
TAE	503	241	14%
PTE	374	179	11%
ASE	365	175	10%
PKG	317	152	9%
IME	267	128	8%
RCE	187	90	5%
SPLR	148	71	4%
SWM	114	55	3%
GO	114	55	3%
SWA	110	53	3%
RO	75	36	2%
RM	19	9	1%
VUMW	19	9	1%
ASX	5	2	0%
IMW	1	0	0%
		1,691	

PPM By Area OPI

Def. Category	Def	PPM	%
ASE	102	1,080	18.9%
IME	23	244	4.3%
PO	22	233	4.1%
RCE	9	95	1.7%
RO	3	32	0.6%
SWA	1	11	0.2%
		5,719	

APPENDIX 8 Coding of Software and Database Improvement

1. Approved sample

    a. Input new approved sample

```
Private Sub cmbsubmitn_Click()

If txbpart.Value = "" Then
MsgBox "Part# belum diisi"
Exit Sub
ElseIf txbsn.Value = "" Then
MsgBox "No S/N belum diisi"
Exit Sub
ElseIf txbrev.Value = "" Then
MsgBox "Revisi belum diisi"
Exit Sub
ElseIf txbdatetoy.Value = "" Then
MsgBox "Date toy belum diisi"
Exit Sub
ElseIf txbdatecoming.Value = "" Then
MsgBox "Date coming belum diisi"
Exit Sub
ElseIf txbdesc.Value = "" Then
MsgBox "Description belum diisi"
Exit Sub
ElseIf cmbtype.Value = "" Then
MsgBox "Type belum diisi"
Exit Sub
ElseIf txblocator.Value = "" Then
MsgBox "Locator belum diisi"
Exit Sub
End If

Set mydata = Workbooks.Open("\\apckrm06a\QA\81_QC\QC_Outgoing\6.
PERSONAL\NATALI\Database app sample.xlsx")
Worksheets("Data").Select
Worksheets("Data").Range("A4").Select
RowCount                                                    =
Worksheets("Data").Range("A4").CurrentRegion.Rows.Count

With Worksheets("Data").Range("A1")
.Offset(RowCount, 0) = txbpart.Value
.Offset(RowCount, 1) = txbsn.Value
.Offset(RowCount, 2) = txbrev.Value
.Offset(RowCount, 3) = txbdatetoy.Value
```

```
.Offset(RowCount, 4) = txbdatecoming.Value
.Offset(RowCount, 5) = txbdesc.Value
.Offset(RowCount, 6) = cmbtype.Value
.Offset(RowCount, 7) = txblocator.Value
End With

mydata.Save
mydata.Close

txbpart.Value = ""
txbsn.Value = ""
txbrev.Value = ""
txbdatetoy.Value = ""
txbdatecoming.Value = ""
txbdesc.Value = ""
txblocator.Value = ""
cmbtype.Value = ""

Unload Me

MsgBox ("Data sudah masuk di database"), vbInformation, "HAII"

End Sub
```

b. Finding

```
Sub cari()

Application.Calculation = xlCalculationManual
Application.ScreenUpdating = False

Range("c8:h500").ClearContents

Dim part As String

With Worksheets("Search")
part = Range("c5")

Dim cel As Range
Dim rng As Range

dbrow = Sheets("Database").Range("a1048576").End(xlUp).Row
Set rng = Sheets("Database").Range("a3:f" & dbrow)

lrow = 8
```

```
For Each cel In rng
If InStr(1, cel, part, vbTextCompare) > 0 Then
   Worksheets("Search").Range("c" & lrow & ":h" & lrow).Value =
Worksheets("Database").Range("a" & cel.Row & ":f" & cel.Row).Value

   lrow = lrow + 1
   drow = cel.Row

End If
If lrow = 30 Then Exit For

Next
Exit Sub

End With

Application.Calculation = xlCalculationAutomatic
Application.ScreenUpdating = True

End Sub
```

c. Import data from databse to Interface

```
Sub refresh()

Application.DisplayAlerts = False

'ambil data dari excel lain (DATABASE) dan copy
Workbooks.Open ("\\apckrm06a\QA\81_QC\QC_Outgoing\6.
PERSONAL\NATALI\Database app sample.xlsx")
Worksheets("Data").Select
Range("A3").Select
Range(Selection, Selection.End(xlToRight)).Select
Range(Selection, Selection.End(xlDown)).Select
Selection.Copy
Windows("APPROVED SAMPLE NEW.xlsm").Activate
Worksheets("backup").Visible = True
Worksheets("backup").Select
Range("A3").Select
ActiveSheet.Paste
Windows("Database app sample.xlsx").Activate
ActiveWindow.Close
'End With

'setelah data di copy, pivort akan automatically change source datanya
(UPDATE)
With Worksheets("backup")
.Activate
```

```
.Select
Range("k22").Select
ActiveSheet.PivotTables("PivotTable2").PivotCache.refresh

'setelah pivort diupdate, lalu di copy dan paste as value di sheet database
(TAMPILAN)
Worksheets("backup").Select
Range("M4").Select
Range(Selection, Selection.End(xlToRight)).Select
Range(Selection, Selection.End(xlDown)).Select
Selection.Copy
Sheets("Database").Select
Range("a3").Select
Selection.PasteSpecial xlPasteValues
Worksheets("backup").Visible = False
End With

Application.DisplayAlerts = True

End Sub
```

d. Reminder for expired approved sample

```
Sub poh()

Dim coba As Range
Set coba = Worksheets("Database").Range("j:j")

coba.Select

If Application.WorksheetFunction.CountIf(coba, "<7") > 0 Then
   MsgBox "Ada toy yang akan expired", vbInformation, "HAII"
End If

Rows("2:2").Select
Range("C2").Activate
Selection.AutoFilter
Selection.AutoFilter
ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 3
Range("K2").Select
ActiveSheet.Range("$A$2:$L$3717").AutoFilter Field:=11,
Criteria1:="Y"
MsgBox "Ini adalah data toy yang akan expired", vbInformation, "HAII"
Rows("2:2").Select
Range("C2").Activate
ActiveSheet.ShowAllData
End Sub
```

2. Abuse General

a. Input the data into the database

```
Sub test_hahaha()

Dim inspectiondate As String, month As String
Dim we As String, shift As String
Dim sample1(12) As String, sample2(12) As String, sample3(12) As
String, sample4(12) As String, remarks As String
Dim partnumber As String, inspector As String

With Worksheets("Abuse general")
inspectiondate = Range("c4")
month = Range("c5")
we = Range("c6")
shift = Range("c7")
inspector = Range("c8")

For i = 1 To 12
   sample1(i) = Range("c" & 8 + i)
   sample2(i) = Range("e" & 8 + i)
   sample3(i) = Range("g" & 8 + i)
   sample4(i) = Range("i" & 8 + i)
Next i
remarks = Range("c22")
partnumber = Range("c23")
End With

If Range("c4") = "" Then
MsgBox "Inspection Date belum diisi"
Exit Sub
ElseIf Range("c5") = "" Then
MsgBox "Month belum diisi"
Exit Sub
ElseIf Range("c6") = "" Then
MsgBox "WE belum diisi"
Exit Sub
ElseIf Range("c7") = "" Then
MsgBox "Shift belum diisi"
Exit Sub
ElseIf Range("c8") = "" Then
MsgBox "Inspector belum diisi"
Exit Sub
ElseIf Range("c23") = "" Then
MsgBox "Part Number belum diisi"
Exit Sub
End If
```

```
Set mydatabase =
Workbooks.Open("\\apckrm06a\qa\81_QC\QC_Outgoing\1.
PRIMARY\NEWABUSE\Database abuse\Database general.xlsx")
Worksheets("Abuse general").Select
Worksheets("Abuse general").Range("a4").Select
RowCount = Worksheets("Abuse
general").Range("a4").CurrentRegion.Rows.Count

With Worksheets("Abuse general").Range("a3")
.Offset(RowCount, 0) = partnumber
.Offset(RowCount, 1) = inspectiondate
.Offset(RowCount, 2) = month
.Offset(RowCount, 3) = we
.Offset(RowCount, 4) = shift
.Offset(RowCount, 5) = inspector
For i = 1 To 12
   .Offset(RowCount, 5 + i) = sample1(i)
   .Offset(RowCount, 17 + i) = sample2(i)
   .Offset(RowCount, 29 + i) = sample3(i)
   .Offset(RowCount, 41 + i) = sample4(i)
Next i

.Offset(RowCount, 54) = remarks

End With

mydatabase.Save
mydatabase.Close

Range("c4:c24").ClearContents
Range("e9:e21").ClearContents
Range("g9:g21").ClearContents
Range("i9:i21").ClearContents

End Sub
```

b. Check file database

```
Sub TestFileOpen()

    ' Test to see if the file is open.

    If isfileopen("\\apckrm06a\qa\81_QC\QC_Outgoing\1.
PRIMARY\NEWABUSE\Database abuse\Database general.xlsx")
Then
        ' Display a message stating the file in use.
MsgBox "Maaf belum bisa key in, mohon tunggu sebentar lagi",
vbInformation, "HAI"
```

```
'
        ' Add code here to handle case where file is open by another
        ' user.
        '
    Else
        ' Display a message stating the file is not in use.
MsgBox "E-Form sudah aktif", vbInformation, "HAI"
'
        ' Add code here to handle case where file is NOT open by
        ' another user.
        '
    End If

  End Sub

  ' This function checks to see if a file is open or not. If the file is
  ' already open, it returns True. If the file is not open, it returns
  ' False. Otherwise, a run-time error will occur because there is
  ' some other problem accessing the file.

  Function isfileopen(filename As String)
    Dim filenum As Integer, errnum As Integer

    On Error Resume Next   ' Turn error checking off.
    filenum = FreeFile()   ' Get a free file number.
    ' Attempt to open the file and close it.
    Open filename For Input Lock Read As #filenum
    Close filenum          ' Close the file.
    errnum = Err           ' Save the error number that occurred.
    On Error GoTo 0        ' Turn error checking back on.

    ' Check to see which error occurred.
    Select Case errnum

      ' No error occurred.
      ' File is NOT already open by another user.
      Case 0
        isfileopen = False
```

3. Abuse Non General

   a. Input the data into database

```
Sub emma()

'Option Explicit

Dim dte As String, month As String, we As String, shift As String, posisi As String
Dim Inspector As String, sample As String, partnumber As String, tipe As String, attemh(6) As String, detemh(6) As String
Dim outanmh(6) As String, upanmh(6) As String, downanmh(6) As String
Dim attwmh(6) As String, detwmh(6) As String, outamh(6) As String, upamh(6) As String
Dim backamh(6) As String, outkmh(6) As String, backkmh(6) As String, forkmh(6) As String
Dim uppumh(6) As String, abuamh(6) As String, ribrmh(6) As String, attwe(6) As String, detwe(6) As String, outae(6) As String, upae(6) As String
Dim backae(6) As String, outle(6) As String, backle(6) As String, forle(6) As String, outlle(6) As String, backlle(6) As String, forlle(6) As String
Dim uppue(6) As String, outwp(6) As String, backwp(6) As String, sidewp(6) As String, outup(6) As String, upup(6) As String, attwp(6) As String, detwp(6) As String
Dim rrmp(6) As String, rlmp(6) As String, attwc(6) As String, detwc(6) As String, outac(6) As String, sideac(6) As String, backac(6) As String
Dim outuc(6) As String, upuc(6) As String, backuc(6) As String, outcc(6) As String, backcc(6) As String, forcc(6) As String, sidecc(6) As String
Dim outlc(6) As String, up1lc(6) As String, up2lc(6) As String, outkc(6) As String, forkc(6) As String, sidekc(6) As String, attmc(6) As String, detmc(6) As String
Dim outrm(6) As String, uprm(6) As String, downrm(6) As String, outlm(6) As String, uplm(6) As String, downlm(6) As String
Dim upcm(6) As String, backcm(6) As String, sidecm(6) As String, atttm(6) As String, dettm(6) As String, outfm(6) As String, perfm(6) As String
Dim outap(6) As String, upap(6) As String, backap(6) As String, outlp(6) As String, outkp(6) As String, backkp(6) As String, forkp(6) As String
Dim finam(6) As String, outtm(6) As String, backtm(6) As String, sidetm(6) As String, cord10m(6) As String, cord3m(6) As String
```

```
With Worksheets("Abuse non-general")
dte = Range("c3")
month = Range("c4")
we = Range("c5")
shift = Range("c6")
Inspector = Range("c7")
sample = Range("c8")
partnumber = Range("c9")
tipe = Range("c10")
posisi = Range("c11")

For i = 1 To 6
attemh(i) = Range("c" & 9 * i + 6)
detemh(i) = Range("c" & 9 * i + 7)
attwmh(i) = Range("f" & 9 * i + 6)
detwmh(i) = Range("f" & 9 * i + 7)
outamh(i) = Range("i" & 9 * i + 6)
upamh(i) = Range("i" & 9 * i + 7)
backamh(i) = Range("i" & 9 * i + 8)
outkmh(i) = Range("l" & 9 * i + 6)
backkmh(i) = Range("l" & 9 * i + 7)
forkmh(i) = Range("l" & 9 * i + 8)
uppumh(i) = Range("c" & 9 * i + 11)
abuamh(i) = Range("f" & 9 * i + 11)
ribrmh(i) = Range("i" & 9 * i + 11)
outanmh(i) = Range("l" & 9 * i + 11)
upanmh(i) = Range("l" & 9 * i + 12)
downanmh(i) = Range("l" & 9 * i + 13)
attwe(i) = Range("c" & 8 * i + 63)
detwe(i) = Range("c" & 8 * i + 64)
outae(i) = Range("f" & 8 * i + 63)
backae(i) = Range("f" & 8 * i + 65)
outle(i) = Range("i" & 8 * i + 63)
backle(i) = Range("i" & 8 * i + 64)
forle(i) = Range("i" & 8 * i + 65)
outlle(i) = Range("l" & 8 * i + 63)
backlle(i) = Range("l" & 8 * i + 64)
forlle(i) = Range("l" & 8 * i + 65)
uppue(i) = Range("c" & 8 * i + 68)
outwp(i) = Range("c" & 10 * i + 111)
backwp(i) = Range("c" & 10 * i + 112)
sidewp(i) = Range("c" & 10 * i + 113)
outup(i) = Range("f" & 10 * i + 111)
upup(i) = Range("f" & 10 * i + 112)
attwp(i) = Range("i" & 10 * i + 111)
detwp(i) = Range("i" & 10 * i + 111)
rrmp(i) = Range("l" & 10 * i + 111)
rlmp(i) = Range("l" & 10 * i + 112)
```

```
outap(i) = Range("c" & 10 * i + 116)
upap(i) = Range("c" & 10 * i + 117)
backap(i) = Range("c" & 10 * i + 118)
outlp(i) = Range("f" & 10 * i + 116)
outkp(i) = Range("i" & 10 * i + 116)
backkp(i) = Range("i" & 10 * i + 117)
forkp(i) = Range("i" & 10 * i + 118)
attwc(i) = Range("c" & 10 * i + 173)
detwc(i) = Range("c" & 10 * i + 174)
outac(i) = Range("f" & 10 * i + 173)
sideac(i) = Range("f" & 10 * i + 174)
backac(i) = Range("f" & 10 * i + 175)
outuc(i) = Range("i" & 10 * i + 173)
upuc(i) = Range("i" & 10 * i + 174)
backuc(i) = Range("i" & 10 * i + 175)
outcc(i) = Range("l" & 10 * i + 173)
backcc(i) = Range("l" & 10 * i + 174)
forcc(i) = Range("l" & 10 * i + 175)
sidecc(i) = Range("l" & 10 * i + 176)
outlc(i) = Range("c" & 10 * i + 178)
up1lc(i) = Range("c" & 10 * i + 179)
up2lc(i) = Range("c" & 10 * i + 180)
outkc(i) = Range("f" & 10 * i + 178)
forkc(i) = Range("f" & 10 * i + 179)
sidekc(i) = Range("f" & 10 * i + 180)
attmc(i) = Range("i" & 10 * i + 178)
detmc(i) = Range("i" & 10 * i + 179)
outrm(i) = Range("c" & 5 * i + 240)
uprm(i) = Range("c" & 5 * i + 241)
downrm(i) = Range("c" & 5 * i + 242)
outlm(i) = Range("f" & 5 * i + 240)
uplm(i) = Range("f" & 5 * i + 241)
downlm(i) = Range("f" & 5 * i + 242)
upcm(i) = Range("i" & 5 * i + 240)
backcm(i) = Range("i" & 5 * i + 241)
sidecm(i) = Range("i" & 5 * i + 242)
atttm(i) = Range("l" & 5 * i + 240)
dettm(i) = Range("l" & 5 * i + 241)
finam(i) = Range("o" & 5 * i + 240)
outfm(i) = Range("o" & 5 * i + 241)
perfm(i) = Range("o" & 5 * i + 242)
outtm(i) = Range("r" & 5 * i + 240)
backtm(i) = Range("r" & 5 * i + 241)
sidetm(i) = Range("r" & 5 * i + 242)
cord10m(i) = Range("u" & 5 * i + 240)
cord3m(i) = Range("x" & 5 * i + 240)
Next i
End With
```

```
If Range("c3") = "" Then
MsgBox "Date belum diisi"
Exit Sub
ElseIf Range("c4") = "" Then
MsgBox "Month belum diisi"
Exit Sub
ElseIf Range("c5") = "" Then
MsgBox "WE belum diisi"
Exit Sub
ElseIf Range("c6") = "" Then
MsgBox "Shift belum diisi"
Exit Sub
ElseIf Range("c7") = "" Then
MsgBox "Inspector belum diisi"
Exit Sub
ElseIf Range("c8") = "" Then
MsgBox "Sample belum diisi"
Exit Sub
ElseIf Range("c9") = "" Then
MsgBox "Part Number belum diisi"
Exit Sub
ElseIf Range("c10") = "" Then
MsgBox "Type belum diisi"
Exit Sub
End If

Set myData =
Workbooks.Open("\\apckrm06a\qa\81_QC\QC_Outgoing\1.
PRIMARY\NEWABUSE\Database abuse\Database non-general.xlsx")
'Worksheets(tipe).Select
'Worksheets(tipe).Range("a8").Select
'RowCount =
Worksheets(tipe).Range("a8").CurrentRegion.Rows.Count
lastrow = Worksheets(tipe).Range("A1048576").End(xlUp).Row + 1
'lastrow = Range("b5").Value

With Worksheets(tipe).Cells(lastrow, 1) 'Range("a8")
.Offset(RowCount, 0) = partnumber
.Offset(RowCount, 1) = we
.Offset(RowCount, 2) = dte & month
.Offset(RowCount, 3) = shift
.Offset(RowCount, 4) = Inspector
.Offset(RowCount, 5) = sample
.Offset(RowCount, 6) = posisi
End With
```

```
If tipe = "MH" Then
With Worksheets("MH").Cells(lastrow, 1)
For i = 1 To 6
.Offset(RowCount, 2 * i + 5) = attemh(i)
.Offset(RowCount, 2 * i + 6) = detemh(i)
.Offset(RowCount, 2 * i + 18) = attwmh(i)
.Offset(RowCount, 2 * i + 19) = detwmh(i)
.Offset(RowCount, 3 * i + 30) = outamh(i)
.Offset(RowCount, 3 * i + 31) = upamh(i)
.Offset(RowCount, 3 * i + 32) = backamh(i)
.Offset(RowCount, 3 * i + 49) = outkmh(i)
.Offset(RowCount, 3 * i + 50) = backkmh(i)
.Offset(RowCount, 3 * i + 51) = forkmh(i)
.Offset(RowCount, i + 70) = uppumh(i)
.Offset(RowCount, i + 77) = abuamh(i)
.Offset(RowCount, i + 83) = ribrmh(i)
.Offset(RowCount, i + 90) = outanmh(i)
.Offset(RowCount, i + 96) = upanmh(i)
.Offset(RowCount, i + 102) = downanmh(i)

Next i
End With
End If

If tipe = "EAH" Then
With Worksheets("EAH").Cells(lastrow, 1)
For i = 1 To 6
.Offset(RowCount, 2 * i + 5) = attwe(i)
.Offset(RowCount, 2 * i + 6) = detwe(i)
.Offset(RowCount, 3 * i + 17) = outae(i)
.Offset(RowCount, 3 * i + 18) = upae(i)
.Offset(RowCount, 3 * i + 19) = backae(i)
.Offset(RowCount, 3 * i + 36) = outle(i)
.Offset(RowCount, 3 * i + 37) = backle(i)
.Offset(RowCount, 3 * i + 38) = forle(i)
.Offset(RowCount, 3 * i + 55) = outlle(i)
.Offset(RowCount, 3 * i + 56) = backlle(i)
.Offset(RowCount, 3 * i + 57) = forlle(i)
.Offset(RowCount, i + 76) = uppue(i)
Next i
End With
End If
```

```
If tipe = "Poseable" Then
With Worksheets("Poseable").Cells(lastrow, 1)
For i = 1 To 6
.Offset(RowCount, 3 * i + 4) = outwp(i)
.Offset(RowCount, 3 * i + 5) = backwp(i)
.Offset(RowCount, 3 * i + 6) = sidewp(i)
.Offset(RowCount, 2 * i + 24) = outup(i)
.Offset(RowCount, 2 * i + 25) = upup(i)
.Offset(RowCount, 2 * i + 37) = attwp(i)
.Offset(RowCount, 2 * i + 38) = detwp(i)
.Offset(RowCount, 2 * i + 50) = rrmp(i)
.Offset(RowCount, 2 * i + 51) = rlmp(i)
.Offset(RowCount, 3 * i + 62) = outap(i)
.Offset(RowCount, 3 * i + 63) = upap(i)
.Offset(RowCount, 3 * i + 64) = backap(i)
.Offset(RowCount, i + 83) = outlp(i)
.Offset(RowCount, 3 * i + 88) = outkp(i)
.Offset(RowCount, 3 * i + 89) = backkp(i)
.Offset(RowCount, 3 * i + 90) = forkp(i)
Next i
End With
End If

If tipe = "CHWSeries" Then
With Worksheets("CHWSeries").Cells(lastrow, 1)
For i = 1 To 6
.Offset(RowCount, 2 * i + 5) = attwc(i)
.Offset(RowCount, 2 * i + 6) = detwc(i)
.Offset(RowCount, 3 * i + 17) = outac(i)
.Offset(RowCount, 3 * i + 18) = sideac(i)
.Offset(RowCount, 3 * i + 19) = backac(i)
.Offset(RowCount, 3 * i + 36) = outuc(i)
.Offset(RowCount, 3 * i + 37) = upuc(i)
.Offset(RowCount, 3 * i + 38) = backuc(i)
.Offset(RowCount, 4 * i + 54) = outcc(i)
.Offset(RowCount, 4 * i + 55) = backcc(i)
.Offset(RowCount, 4 * i + 56) = forcc(i)
.Offset(RowCount, 4 * i + 57) = sidecc(i)
.Offset(RowCount, 3 * i + 80) = outlc(i)
.Offset(RowCount, 3 * i + 81) = up1lc(i)
.Offset(RowCount, 3 * i + 82) = up2lc(i)
.Offset(RowCount, 3 * i + 100) = forkc(i)
.Offset(RowCount, 3 * i + 101) = sidekc(i)
.Offset(RowCount, 2 * i + 119) = attmc(i)
.Offset(RowCount, 2 * i + 120) = detmc(i)
Next i
End With
End If
```

```
If tipe = "Mermaid" Then
With Worksheets("Mermaid").Cells(lastrow, 1)
For i = 1 To 6
.Offset(RowCount, 3 * i + 3) = outrm(i)
.Offset(RowCount, 3 * i + 4) = uprm(i)
.Offset(RowCount, 3 * i + 5) = downrm(i)
.Offset(RowCount, 3 * i + 21) = outlm(i)
.Offset(RowCount, 3 * i + 22) = uplm(i)
.Offset(RowCount, 3 * i + 23) = downlm(i)
.Offset(RowCount, 3 * i + 40) = upcm(i)
.Offset(RowCount, 3 * i + 41) = backcm(i)
.Offset(RowCount, 3 * i + 42) = sidecm(i)
.Offset(RowCount, 2 * i + 60) = atttm(i)
.Offset(RowCount, 2 * i + 61) = dettm(i)
.Offset(RowCount, i + 74) = finam(i)
.Offset(RowCount, i + 80) = outfm(i)
.Offset(RowCount, i + 86) = perfm(i)
.Offset(RowCount, 3 * i + 91) = outtm(i)
.Offset(RowCount, 3 * i + 92) = backtm(i)
.Offset(RowCount, 3 * i + 93) = sidetm(i)
.Offset(RowCount, i + 112) = cord10m(i)
.Offset(RowCount, i + 119) = cord3m(i)
Next i
End With
End If

myData.Save
myData.Close

Range("c3:c273").ClearContents
Range("f15:f273").ClearContents
Range("i15:i273").ClearContents
Range("l15:l273").ClearContents
Range("o15:o273").ClearContents
Range("r15:r273").ClearContents
Range("u15:u273").ClearContents
Range("x15:x273").ClearContents

Rows("13:274").Select
Selection.EntireRow.Hidden = True

End Sub
```

b. Hide and unhide interface

```
Private Sub Worksheet_Change(ByVal Target As Range)

If Target.Address <> Range("c10").Address Then Exit Sub
```

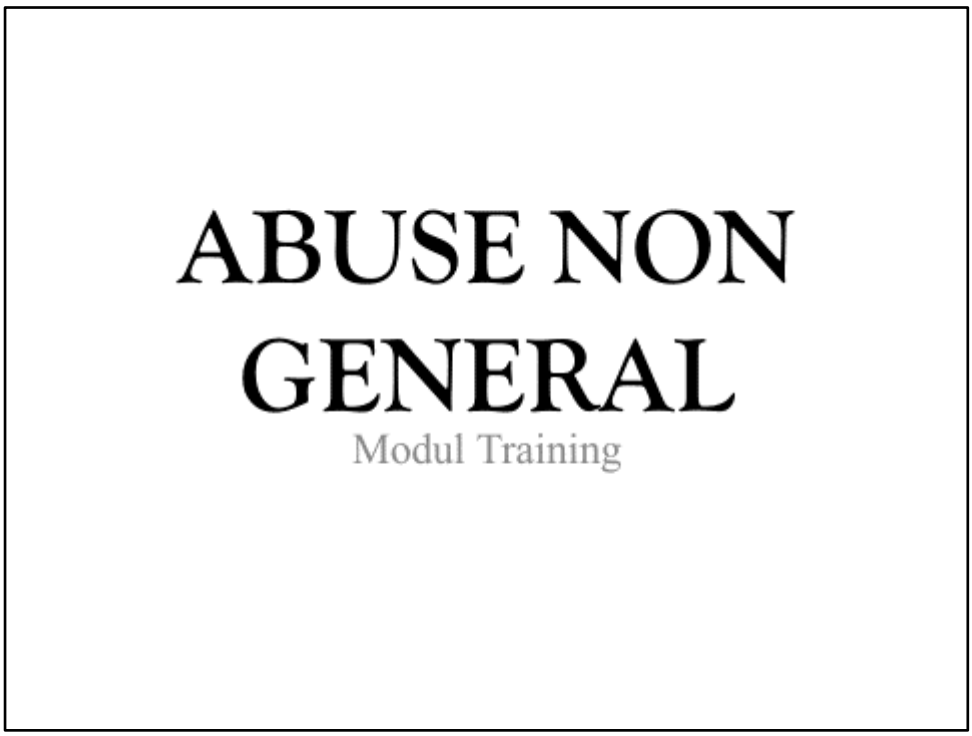
```
Dim Status As String

   If Range("C10") = "" Then
   Rows("13:274").Select
   Selection.EntireRow.Hidden = True
   ElseIf Range("c10") = "MH" Then
   Rows("13:274").Select
   Selection.EntireRow.Hidden = True
   Rows("13:67").Select
   Selection.EntireRow.Hidden = False
   ElseIf Range("C10") = "EAH" Then
   Rows("13:274").Select
   Selection.EntireRow.Hidden = True
   Rows("69:117").Select
   Selection.EntireRow.Hidden = False
   ElseIf Range("C10") = "Poseable" Then
   Rows("13:274").Select
   Selection.EntireRow.Hidden = True
   Rows("119:179").Select
   Selection.EntireRow.Hidden = False
   ElseIf Range("C10") = "CHWSeries" Then
   Rows("13:274").Select
   Selection.EntireRow.Hidden = True
   Rows("181:241").Select
   Selection.EntireRow.Hidden = False
   ElseIf Range("C10") = "Mermaid" Then
   Rows("13:274").Select
   Selection.EntireRow.Hidden = True
   Rows("243:274").Select
   Selection.EntireRow.Hidden = False
   End If

End Sub
```

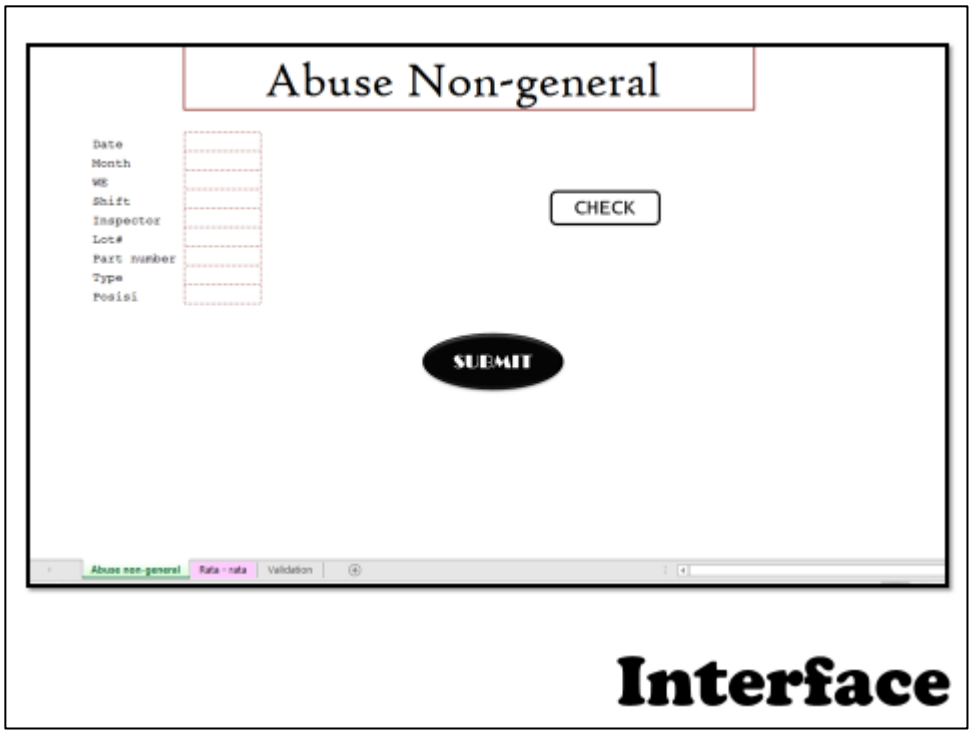
c. Check file database

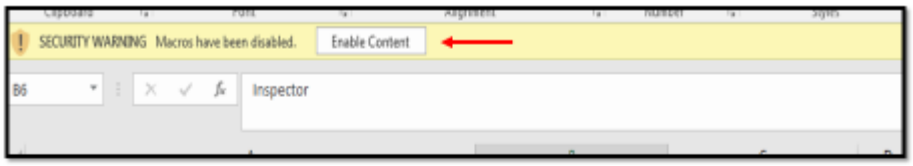
```
Sub TestFileOpen()

    ' Test to see if the file is open.

    If isfileopen("\\apckrm06a\qa\81_QC\QC_Outgoing\1.
PRIMARY\NEWABUSE\Database abuse\Database non-general.xlsx")
Then
        ' Display a message stating the file in use.
MsgBox "Maaf belum bisa key in, mohon tunggu sebentar lagi",
vbInformation, "HAI"
'
        ' Add code here to handle case where file is open by another
```

```
        ' user.
        '
    Else
        ' Display a message stating the file is not in use.
MsgBox "E-Form sudah aktif", vbInformation, "HAI"
'
        ' Add code here to handle case where file is NOT open by
        ' another user.
        '
    End If

End Sub

' This function checks to see if a file is open or not. If the file is
' already open, it returns True. If the file is not open, it returns
' False. Otherwise, a run-time error will occur because there is
' some other problem accessing the file.

Function isfileopen(filename As String)
    Dim filenum As Integer, errnum As Integer

    On Error Resume Next   ' Turn error checking off.
    filenum = FreeFile()   ' Get a free file number.
    ' Attempt to open the file and close it.
    Open filename For Input Lock Read As #filenum
    Close filenum          ' Close the file.
    errnum = Err           ' Save the error number that occurred.
    On Error GoTo 0        ' Turn error checking back on.

    ' Check to see which error occurred.
    Select Case errnum

        ' No error occurred.
        ' File is NOT already open by another user.
        Case 0
            isfileopen = False

        ' Error number for "Permission Denied."
        ' File is already opened by another user.
        Case 70
            isfileopen = True

        ' Another error occurred.
        Case Else
            Error errnum
    End Select

End Function
```

APPENDIX 9 Modul Training

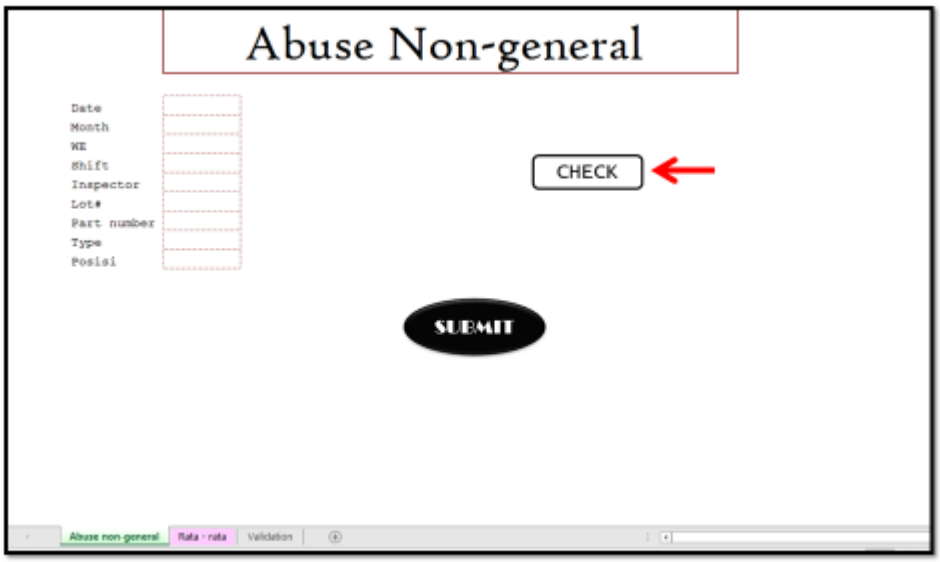






Regularly, when you open the Ms. Excel that using Macro Excel, the security warning will show up. You must ENABLE it, if you forget to ENABLE, the Macro will not work. So don't forget to click ENABLE CONTENT.

NOTE:
If you forget click ENABLE, you must close the excel and open it again, after that click ENABLE CONTENT.

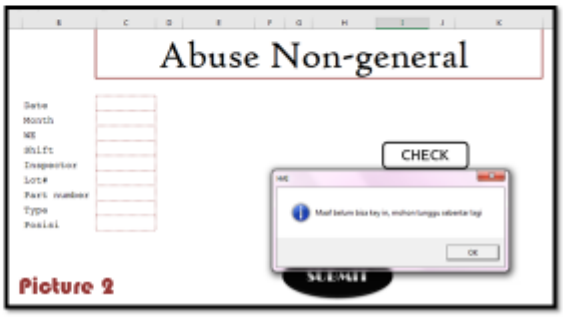


Before you input the result Abuse, you must check it. Click button CHECK and the explanation in the next slide.

CHECK

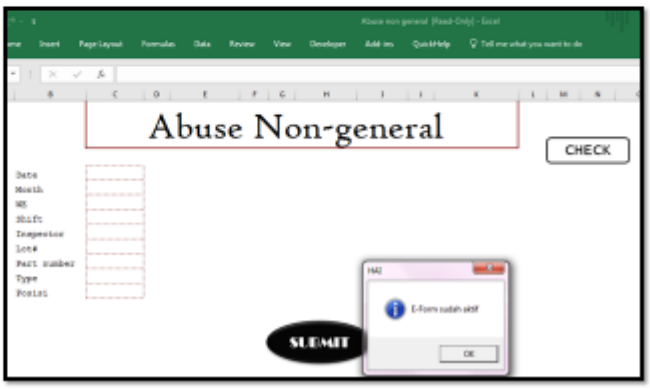
Picture 1, the message box said "E-Form sudah aktif" and means the inspector can input the result Abuse test.

Picture 2, the message box said "Maf belum bisa key in, mohon tunggu sebentar lagi" and means the inspector cannot input the result because someone open the database.



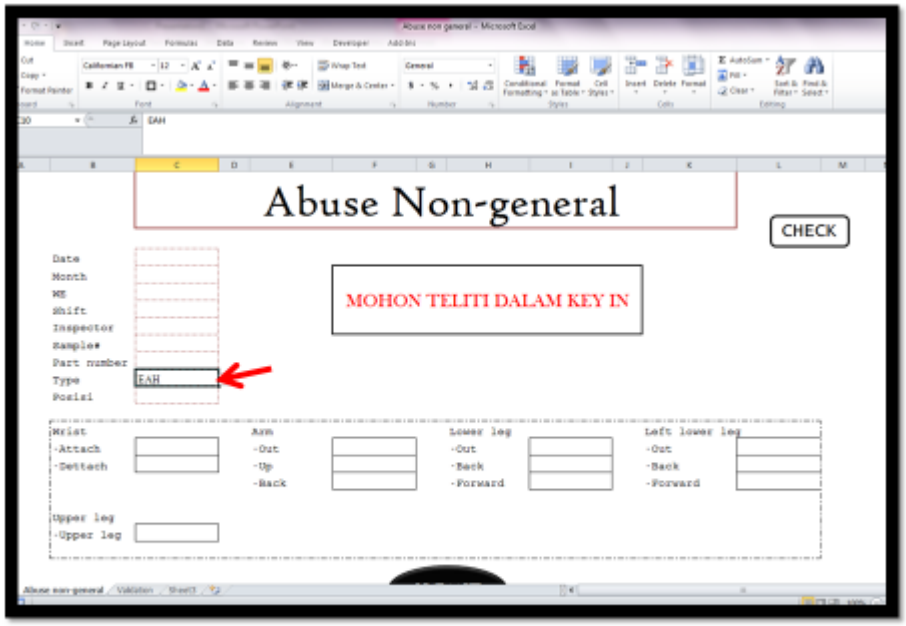
READ ONLY

If you open File Abuse but it said **Read Only**, you still can input the result. With the provision after you check and the message box said E-Form is active and can input.

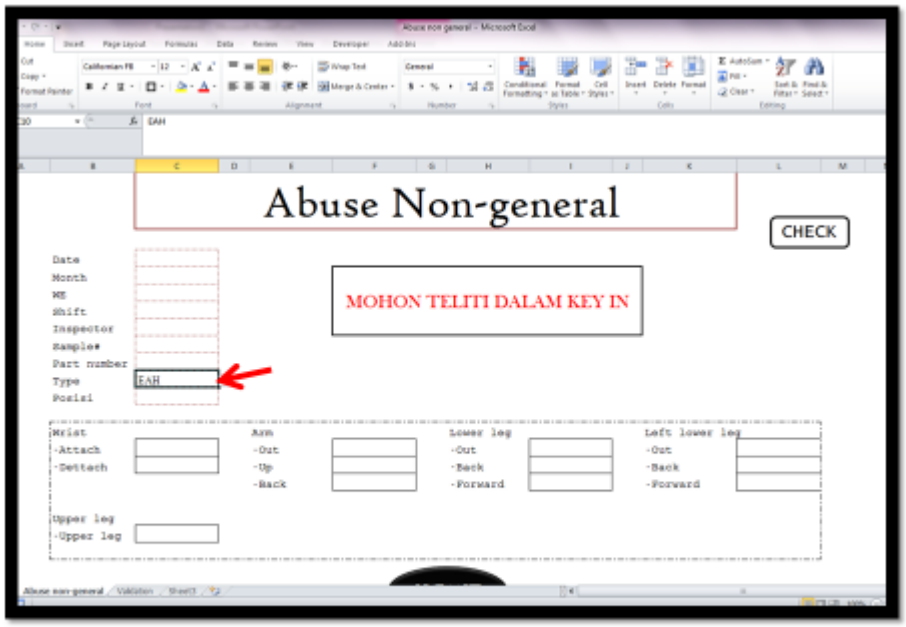


How to input the result/Key in

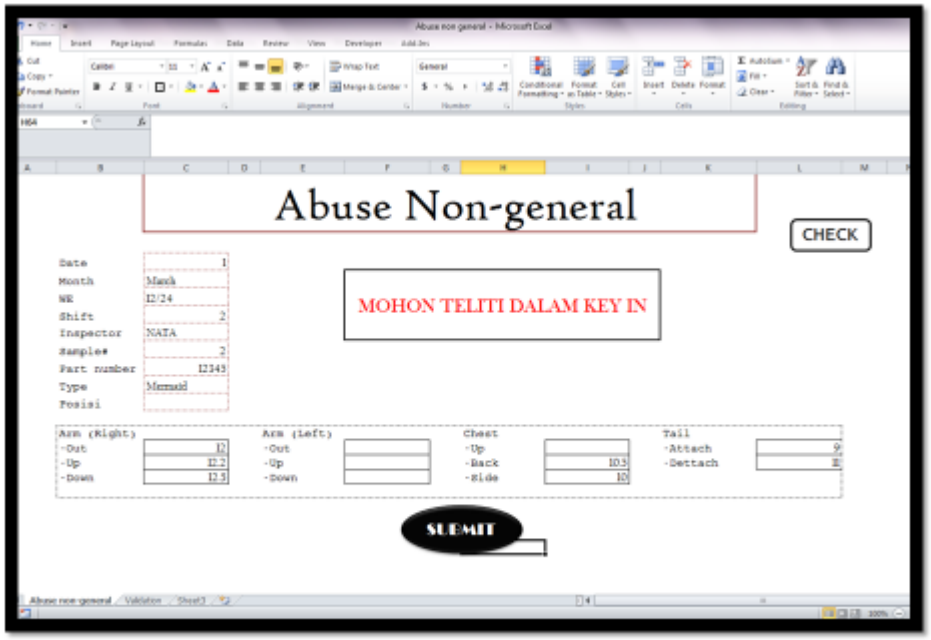
- Basically, the process of input Abuse non general is same with the previous. The differences are (next slide)



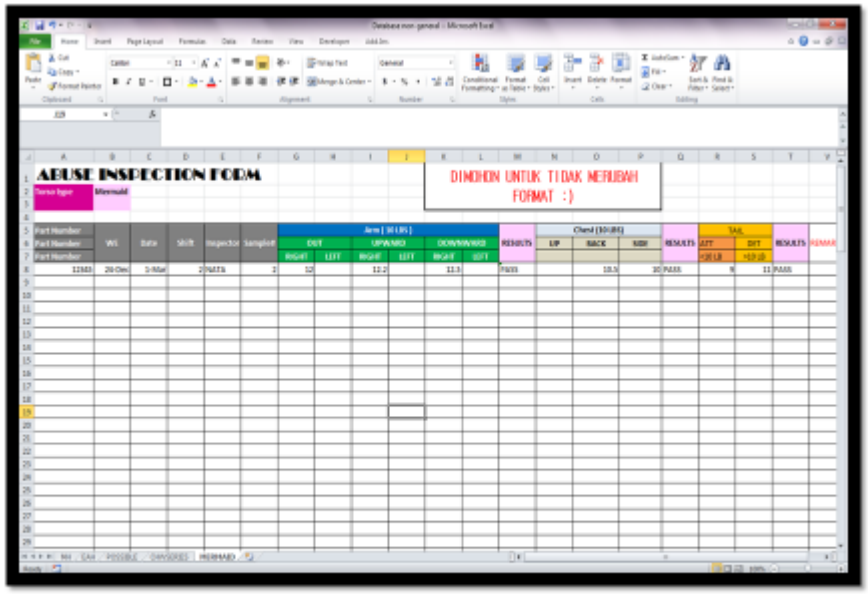
If you click on TYPE and choose the type of toy that has done, then the interface will change based on the TYPE. After the interface changed, you can fill with your result.



If you click on TYPE and choose the type of toy that has done, then the interface will change based on the TYPE. After the interface changed, you can fill with your result.



If you finish the input don't forget to click SUBMIT. After you click SUBMIT, the data will transfer to a database.



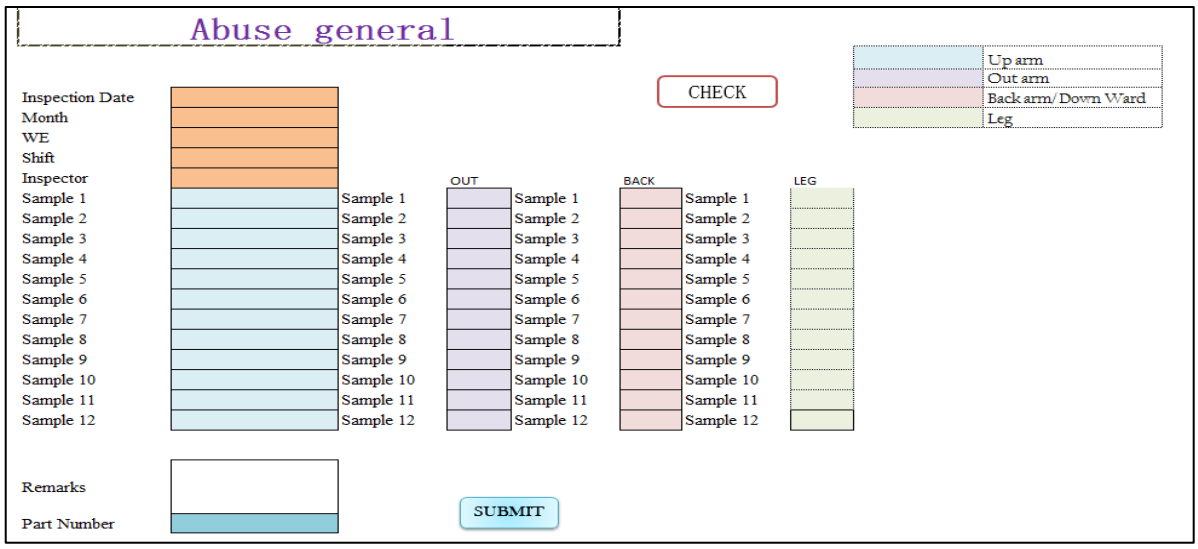
After you click SUBMIT, the data will transfer automatically to database and you can open the database to ensure your data has been transferred and save into a database. After you open the database, DON'T FORGET TO CLOSE IT! So other user can use the Macro Abuse.

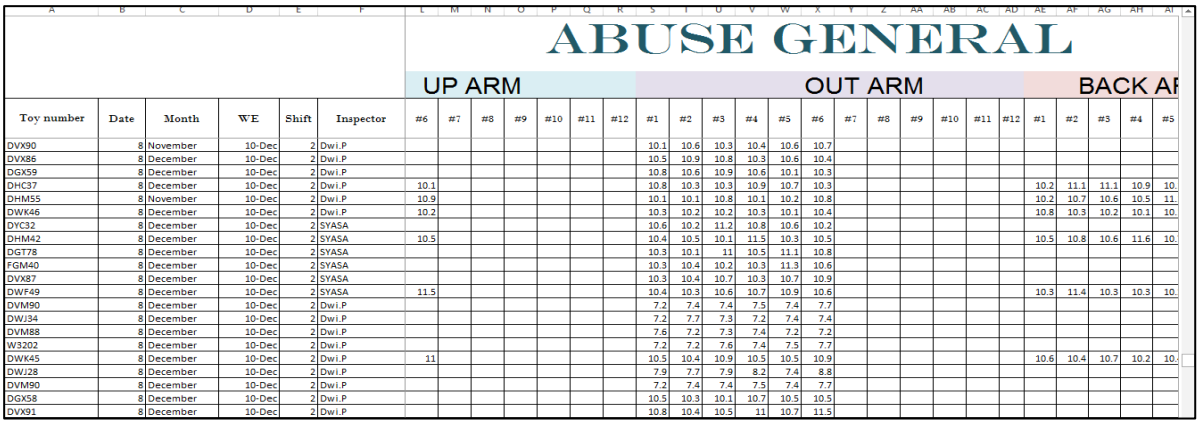
If you have a question or still confuse, you can contact me through email or directly.

-NATALI-

APPENDIX 10 Interface A New Reporting System

1. Abuse general

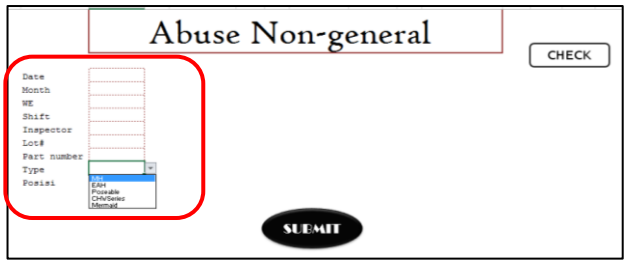


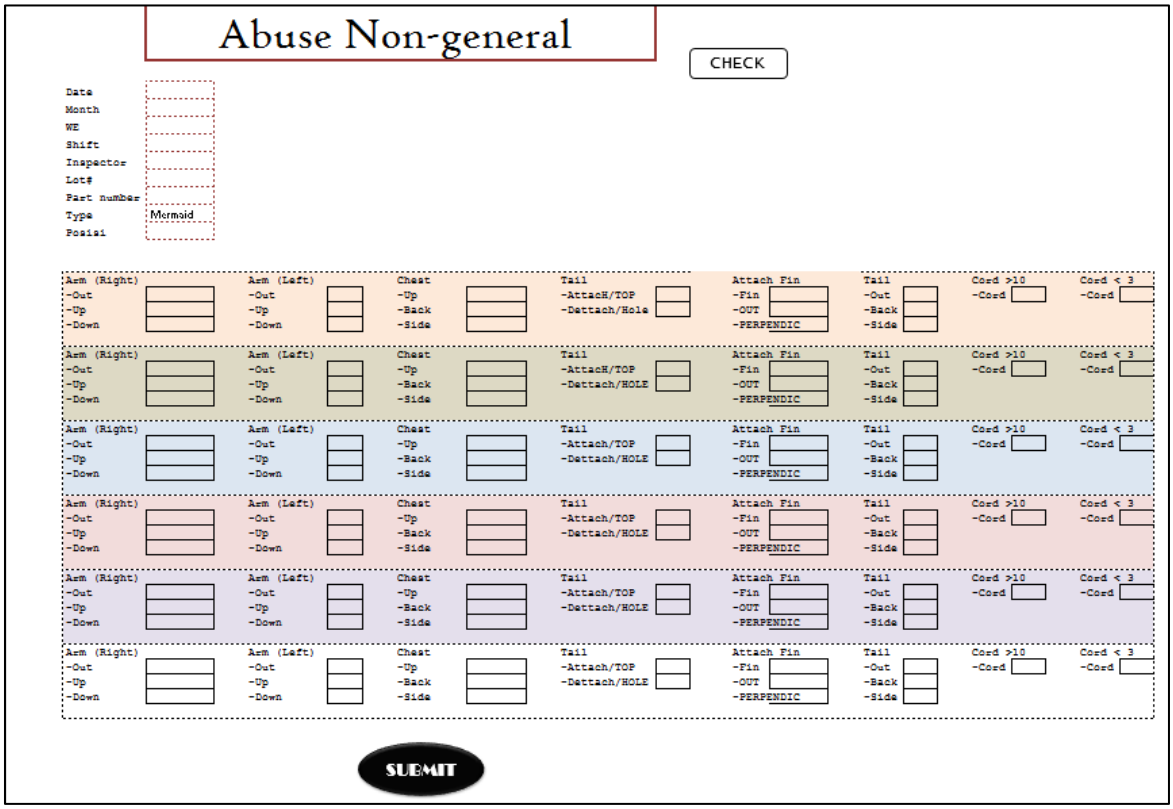


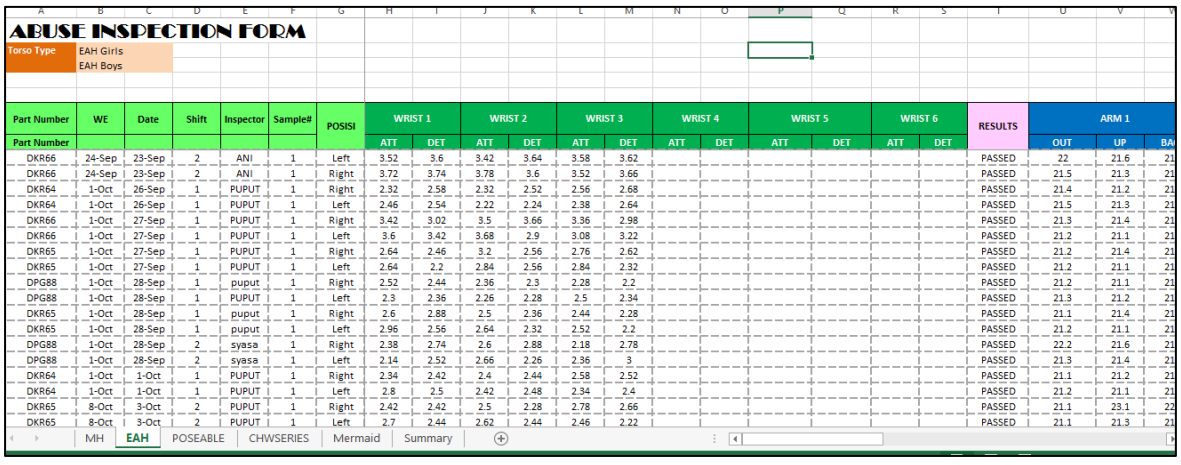
ABUSE GENERAL

						UP ARM							OUT ARM											BACK AR				
Toy number	Date	Month	WE	Shift	Inspector	#6	#7	#8	#9	#10	#11	#12	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#1	#2	#3	#4	#5
DVX90	8	November	10-Dec	2	Dwi.P								10.1	10.6	10.3	10.4	10.6	10.7											
DVX86	8	December	10-Dec	2	Dwi.P								10.5	10.9	10.8	10.3	10.6	10.4											
DGX59	8	December	10-Dec	2	Dwi.P								10.8	10.6	10.9	10.6	10.1	10.3											
DHC37	8	December	10-Dec	2	Dwi.P	10.1							10.8	10.3	10.3	10.9	10.7	10.3							10.2	11.1	11.1	10.9	10.
DHM55	8	November	10-Dec	2	Dwi.P	10.9							10.1	10.1	10.8	10.1	10.2	10.8							10.2	10.7	10.6	10.5	11.
DWK46	8	December	10-Dec	2	Dwi.P	10.2							10.3	10.2	10.2	10.3	10.1	10.4							10.8	10.3	10.2	10.1	10.
DYC32	8	December	10-Dec	2	SYASA								10.6	10.2	11.2	10.8	10.6	10.2											
DHM42	8	December	10-Dec	2	SYASA	10.5							10.4	10.5	10.1	11.5	10.3	10.5							10.5	10.8	10.6	11.6	10.
DGT78	8	December	10-Dec	2	SYASA								10.3	10.1	11	10.5	11.1	10.8											
FGM40	8	December	10-Dec	2	SYASA								10.3	10.4	10.2	10.3	11.3	10.6											
DVX87	8	December	10-Dec	2	SYASA								10.3	10.4	10.7	10.3	10.7	10.9											
DWF49	8	December	10-Dec	2	SYASA	11.5							10.4	10.3	10.6	10.7	10.9	10.6							10.3	11.4	10.3	10.3	10.
DVM90	8	December	10-Dec	2	Dwi.P								7.2	7.4	7.4	7.5	7.4	7.7											
DWJ34	8	December	10-Dec	2	Dwi.P								7.2	7.7	7.3	7.2	7.4	7.4											
DVM88	8	December	10-Dec	2	Dwi.P								7.6	7.2	7.3	7.4	7.2	7.2											
W3202	8	December	10-Dec	2	Dwi.P								7.2	7.2	7.6	7.4	7.5	7.7											
DWK45	8	December	10-Dec	2	Dwi.P	11							10.5	10.4	10.9	10.5	10.5	10.9							10.6	10.4	10.7	10.2	10.
DWJ28	8	December	10-Dec	2	Dwi.P								7.9	7.7	7.9	8.2	7.4	8.8											
DVM90	8	December	10-Dec	2	Dwi.P								7.2	7.4	7.4	7.5	7.4	7.7											
DGX58	8	December	10-Dec	2	Dwi.P								10.5	10.3	10.1	10.7	10.5	10.5											
DVX91	8	December	10-Dec	2	Dwi.P								10.8	10.4	10.5	11	10.7	11.5											

2. Abuse non-general







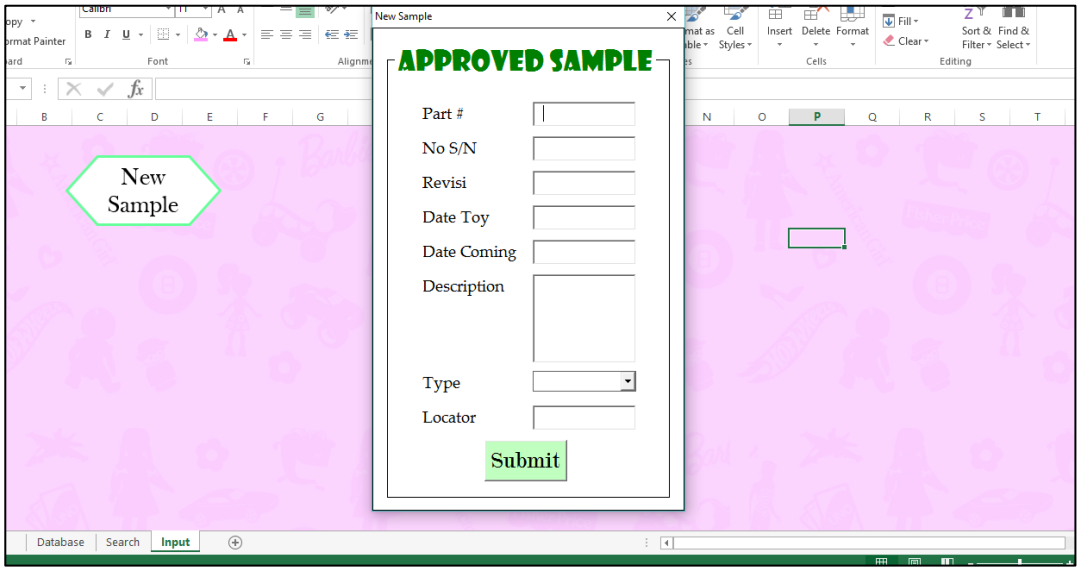
ABUSE INSPECTION FORM

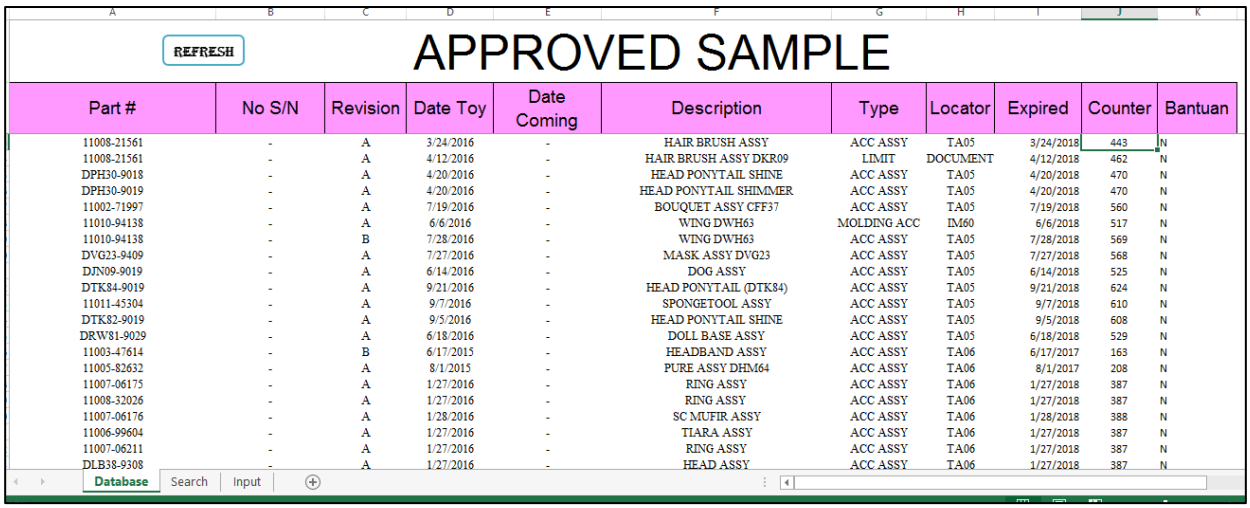
Torso Type: EAH Girls, EAH Boys

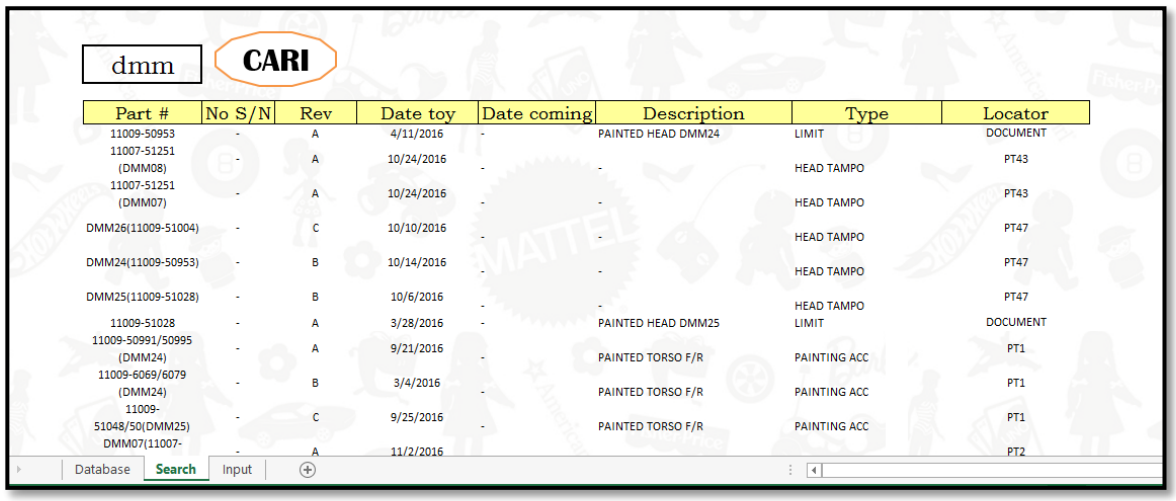
Part Number	WE	Date	Shift	Inspector	Sample#	POSISI	WRIST 1		WRIST 2		WRIST 3		WRIST 4		WRIST 5		WRIST 6		RESULTS	ARM 1		
Part Number							ATT	DET	ATT	DET	ATT	DET	ATT	DET	ATT	DET	ATT	DET		OUT	UP	BA
DKR66	24-Sep	23-Sep	2	ANI	1	Left	3.52	3.6	3.42	3.64	3.58	3.62							PASSED	22	21.6	21
DKR66	24-Sep	23-Sep	2	ANI	1	Right	3.72	3.74	3.78	3.6	3.52	3.66							PASSED	21.5	21.3	21
DKR64	1-Oct	26-Sep	1	PUPUT	1	Right	2.32	2.58	2.32	2.52	2.56	2.68							PASSED	21.4	21.2	21
DKR64	1-Oct	26-Sep	1	PUPUT	1	Left	2.46	2.54	2.22	2.24	2.38	2.64							PASSED	21.5	21.3	21
DKR66	1-Oct	27-Sep	1	PUPUT	1	Right	3.42	3.02	3.5	3.66	3.36	2.98							PASSED	21.3	21.4	21
DKR66	1-Oct	27-Sep	1	PUPUT	1	Left	3.6	3.42	3.68	2.9	3.08	3.22							PASSED	21.2	21.1	21
DKR65	1-Oct	27-Sep	1	PUPUT	1	Right	2.64	2.46	3.2	2.56	2.76	2.62							PASSED	21.2	21.4	21
DKR65	1-Oct	27-Sep	1	PUPUT	1	Left	2.64	2.2	2.84	2.56	2.84	2.32							PASSED	21.2	21.1	21
DPG88	1-Oct	28-Sep	1	puput	1	Right	2.52	2.44	2.36	2.3	2.28	2.2							PASSED	21.2	21.1	21
DPG88	1-Oct	28-Sep	1	PUPUT	1	Left	2.3	2.36	2.26	2.28	2.5	2.34							PASSED	21.3	21.2	21
DKR65	1-Oct	28-Sep	1	puput	1	Right	2.6	2.88	2.5	2.36	2.44	2.28							PASSED	21.1	21.4	21
DKR65	1-Oct	28-Sep	1	puput	1	Left	2.96	2.56	2.64	2.32	2.52	2.2							PASSED	21.2	21.1	21
DPG88	1-Oct	28-Sep	2	syasa	1	Right	2.38	2.74	2.6	2.88	2.18	2.78							PASSED	22.2	21.6	21
DPG88	1-Oct	28-Sep	2	syasa	1	Left	2.14	2.52	2.66	2.26	2.36	3							PASSED	21.3	21.4	21
DKR64	1-Oct	1-Oct	1	PUPUT	1	Right	2.34	2.42	2.4	2.44	2.58	2.52							PASSED	21.1	21.2	21
DKR64	1-Oct	1-Oct	1	PUPUT	1	Left	2.8	2.5	2.42	2.48	2.34	2.4							PASSED	21.2	21.1	21
DKR65	8-Oct	3-Oct	2	PUPUT	1	Right	2.42	2.42	2.5	2.28	2.78	2.66							PASSED	21.1	23.1	22
DKR65	8-Oct	3-Oct	2	PUPUT	1	Left	2.7	2.44	2.62	2.44	2.46	2.22							PASSED	21.1	21.3	21

MH | EAH | POSEABLE | CHWSERIES | Mermaid | Summary

3. Approved sample







APPENDIX 11 New Abuse Test's Form

Logo
PT. X

Form Abuse Test

The title for new form of Abuse test (general and non-general)

Toy number : DHB47
Test : Non-General/General
Inspector :
Tanggal/shift :

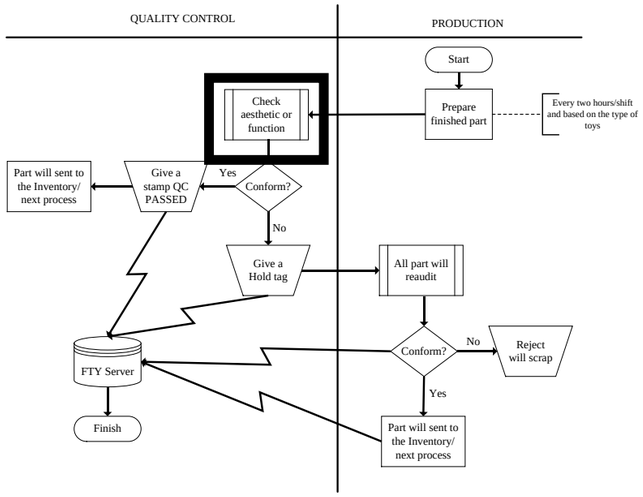
The type of inspection will be fitted with the Summary Quality Testing (SQT)

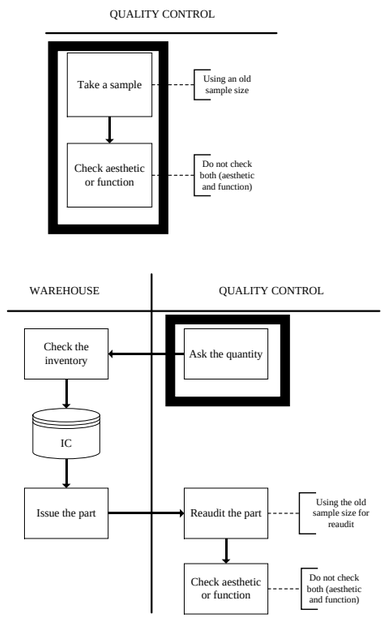
Sample#	POSISI	ELBOW		LEFT WRIST			LEFT ARM			FIN LOWER ARM	WAIST 10 LBS			HIP FIN ON WAIST	KNEE FIN ON LOWER TAIL 5 LBS				FIN LOWER TAIL	TAIL SIGMENT 1		SIGMENT 2. 5 LBS
		ATT	DET	ATT	DET	OUT	UP	BACK	OUT 5 LBS	OUT	SIDE	BACK	OUT 5 LBS	OUT	FORW	SIDE	BACK	OUT 5 LBS	DET ≥ 3 LBS	ATT ≤ 10 LBS	PERPENDICULAR
1																					
2																					
3	RIGHT																				
4																					
5																					
6																					
7																					
8	LEFT																				
9																					
10																					

APPENDIX 12 Document Flow Current and Proposed

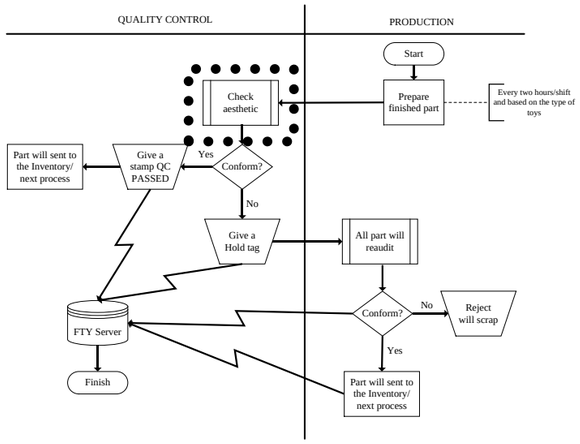
LBO AESTHETIC

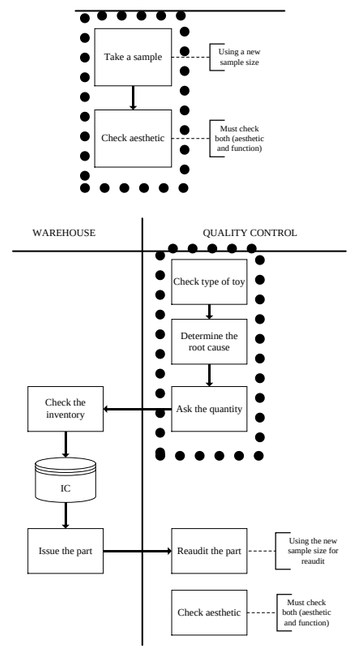
CURRENT





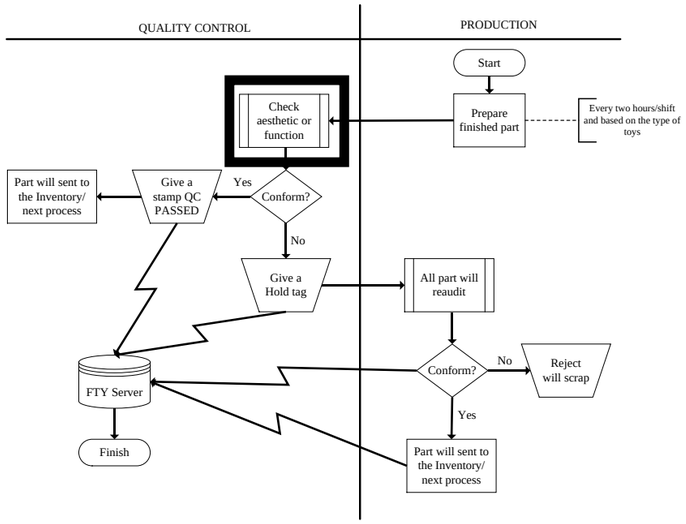
IMPROVE

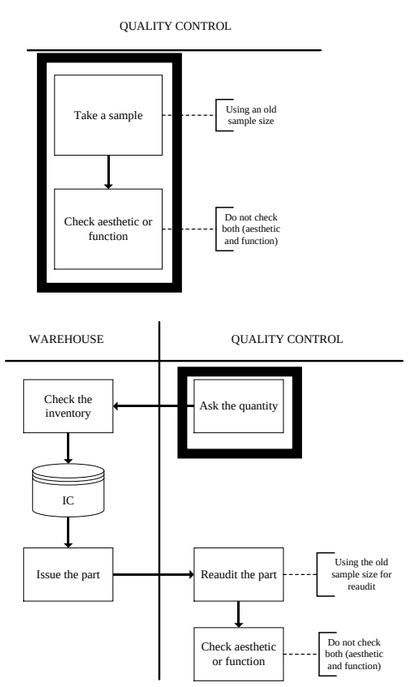




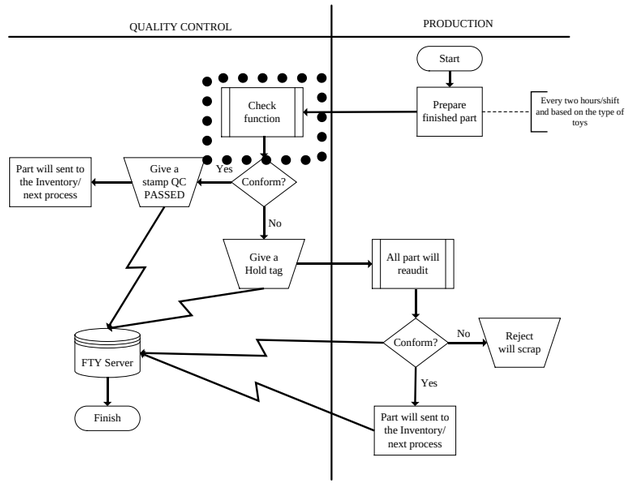
LBO FUNCTION

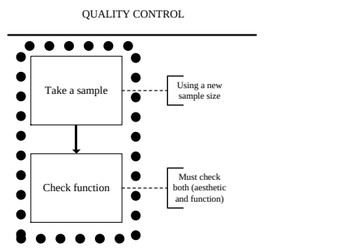
CURRENT

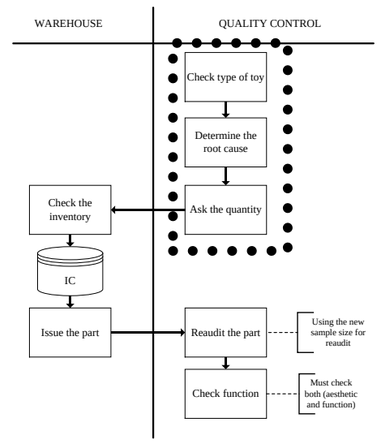




IMPROVE

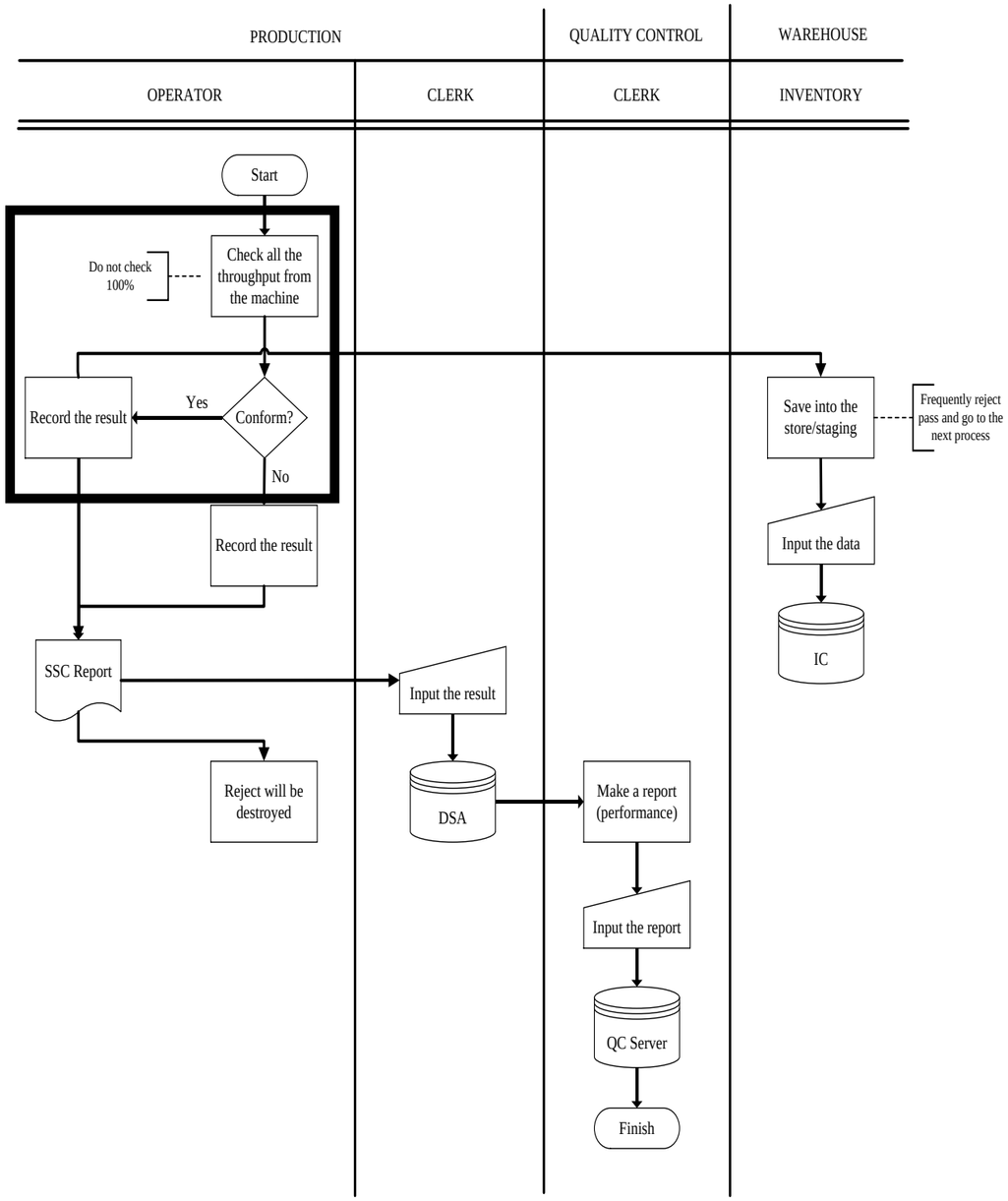




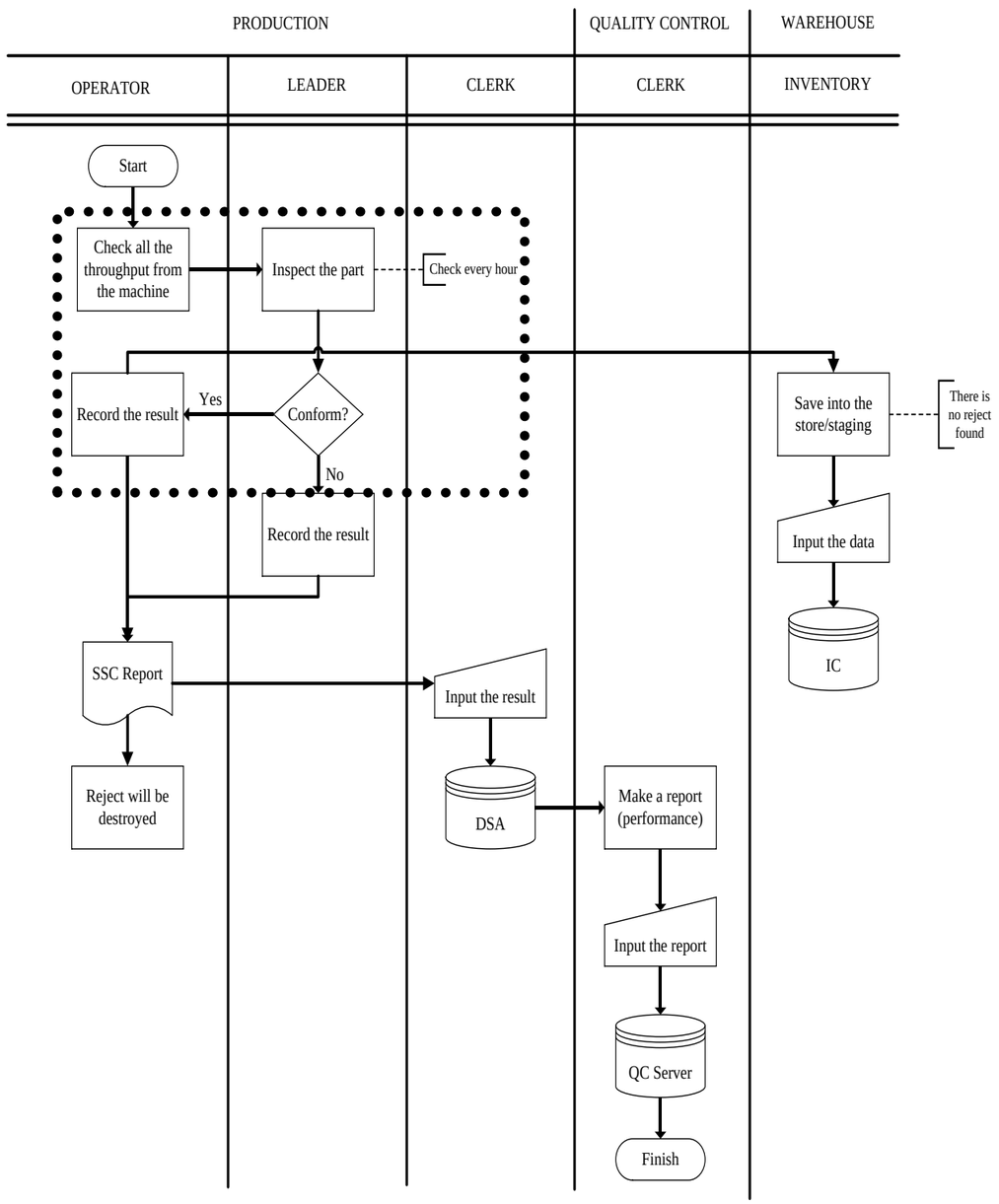


FIRST TIME THROUGHPUT

CURRENT

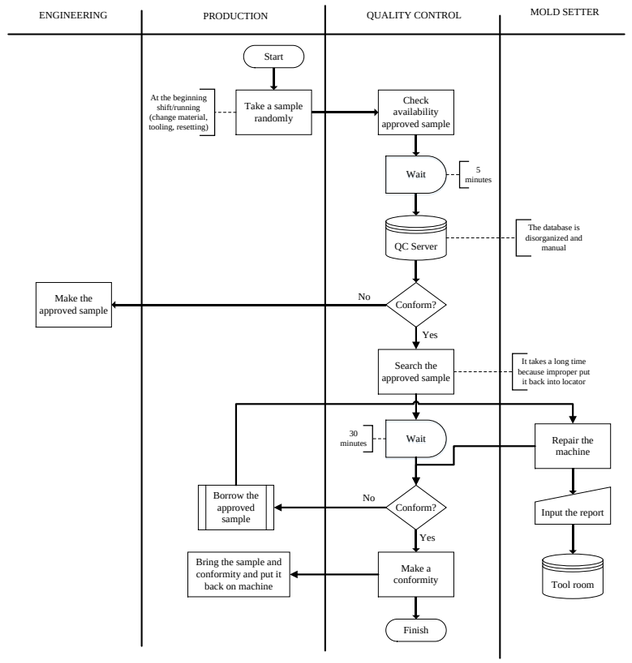


IMPROVE

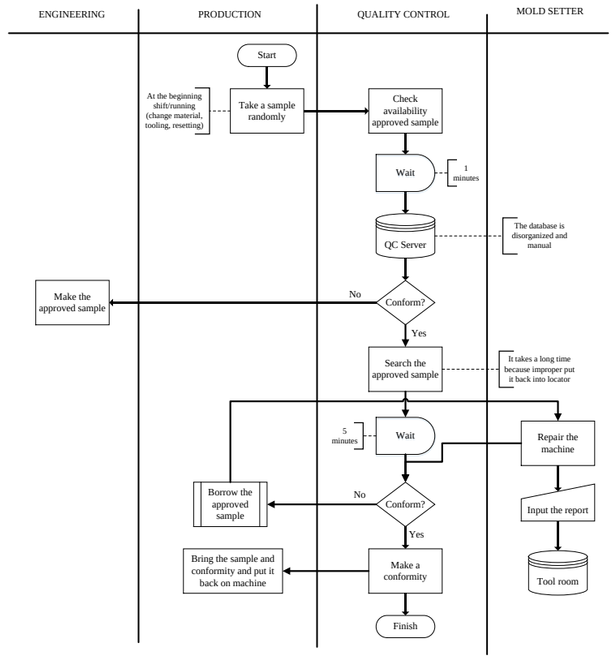


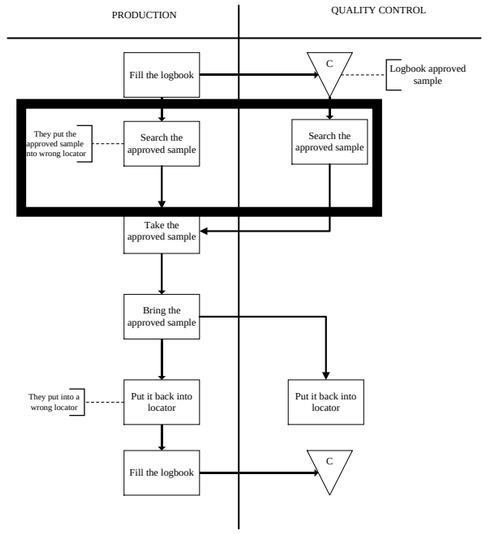
FIRST PIECE SAMPLE

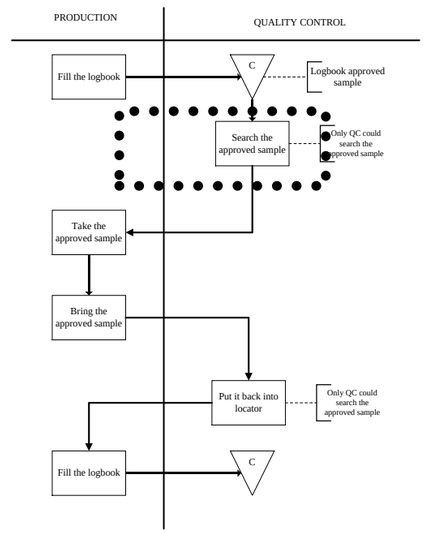
CURRENT



IMPROVE







APPENDIX 13 General Flowchart Torso