

CHAPTER I

INTRODUCTION

The first chapter contains a section on the background of the research to be conducted, the formulation of the problem from the research, the objectives of the study, the constraints of the problem, the benefit of the problem, the assumptions required in the research and the systematics of research writing that can be described as follows:

1.1 Background

The industrial world is currently expanding towards a modern industry in both manufacturing and service industries. The manufacturing industry does not want to be left behind to develop the resulting product. One of the manufacturing industry in Indonesia is automotive manufacturing industry. Every year the number of motor vehicles in Indonesia has increased so it can be concluded that the need for products that make vehicles also increased. Table 1.1 is a recap of data on the number of vehicles in Indonesia from 2012 to 2016:

Table 1.1 Summary of the amount of vehicles in Indonesia (BPS, 2018)

Type of Motor Vehicle	Amount of Vehicles (Unit)				
	2012	2013	2014	2015	2016
Passenger Cars	10432259	11484514	12599038	13480973	14580666
Bus Cars	2273821	2286309	2398846	2420917	2486898
Freight Cars	5286061	5615494	6235136	6611028	7063433
Motorcycle	76381183	84732652	92976240	98881267	105150082
Total	94373324	104118969	114209260	121394185	129281079

Looking at the number of vehicles circulating in Indonesia, it can be concluded the company that produces the components that make up the motor vehicle has increased the demand of the product every year. From this company will compete in producing a product that will be purchased by the customer. One of the elements is used in attracting customer demand is quality. The definition of traditional quality is conformity with the use of a product. While the modern quality is the opposite of the comparison of variability (Montgomery, 2009). Product quality at the moment can show the face of the company. So the quality of the products is produced by the company is very important in today's free market competition. To that end, the company seeks to maintain and control the quality that will be generated by the company to shrink the variety of products produced. Similarly, PT. Indoprima

Gemilang who pays attention to the quality of the products. PT. Indoprima Gemilang is an automotive manufacturing that produces one of its products in the form of wiring harness.



Figure 1.1 Wiring harness motor model product
(Data source: QC Department PT. IPG)

Wiring harness is produced by the process of cutting the wire, crimping the wire and terminal, joint the scheme, sub assembly, assembly and final control. Now PT. IPG is still working to reduce the defects that occur in the production line. And still, the company finds the defects that occurs at the time of production that causes disruption of delivery schedules. In addition to defective products will cause repetitive work to improve the product and also increase production costs due to the cost to repair. Table 1.2 shows the internal failure cost in PT. IPG:

Table 1.2 Internal failure cost on wiring harness
(Data source: QC Department PT. IPG)

INTERNAL FAILURE COST	Rp/Hour/Man
1. Cost of Scrap and Rework	IDR 18,540
2. Cost of Part Damage (Defect) or Process Failure.	According to the purchase price part
3. Cost of Changes Design (rework due to design changes)	IDR 18,540

During this time PT. IPG still has a problem of complaints from customers of the products that has been received. This complaint issue must be considered by the company. Complaints like icebergs that look small but in fact it's big. If the longer the problem is not addressed soon, it will have an impact on the decreasing level of customer trust. The following data complaints owned by PT. IPG in 2017:

Table 1.3 Number of claims on wiring harness from PT. YIMM to PT. IPG (Data source: QC Department PT. IPG)

Month in 2017	January	February	March	April	May	June	July	August	September	October	November	December
Number of Claims	11	7	6	4	6	3	2	1	4	7	6	3
Number of Part NG	70	8	6	4	7	89	2	1	4	9	6	4

Table 1.3 shows the number of claims received by PT. IPG from customers of PT. YIMM during 2017. This shows that PT. IPG still has problems about the quality controls that exist in the production line. The type of disability is always the same so that the product piles up to wait for the repair process before delivery. Figure 1.2 is a recap of the number of disabilities that occurred during the year that exist in PT. IPG:

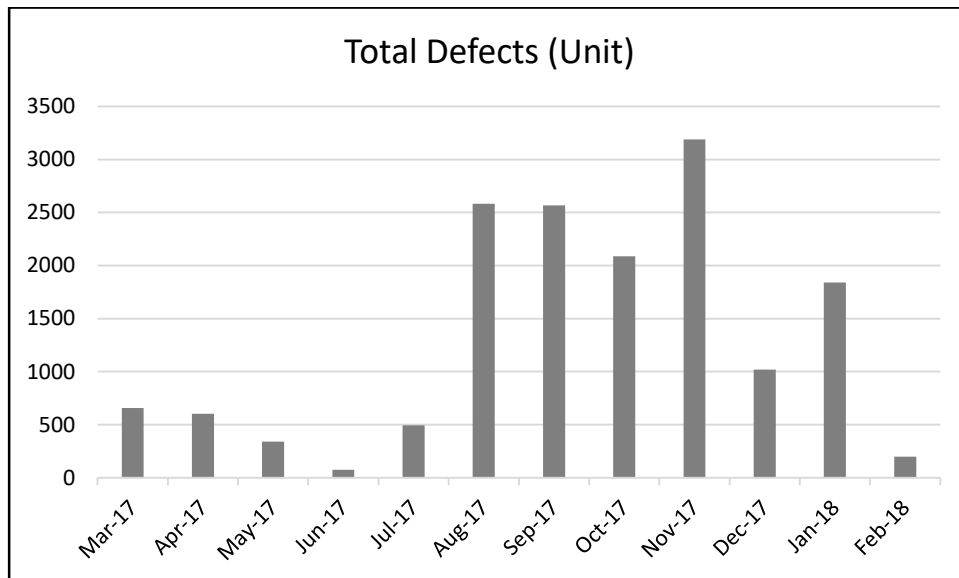


Figure 1.2 Defect production of motor wiring harness in PT. IPG for one year (Data source: QC Department PT. IPG)

Figure 1.2 shows the number of defects that occurred at PT. IPG for each month. The number of disabilities during the year is uncertain. This can be caused by the production quality control that is in the production line less than the maximum. To know what kind of defect that happened in production line can be seen in picture 1.3 below:

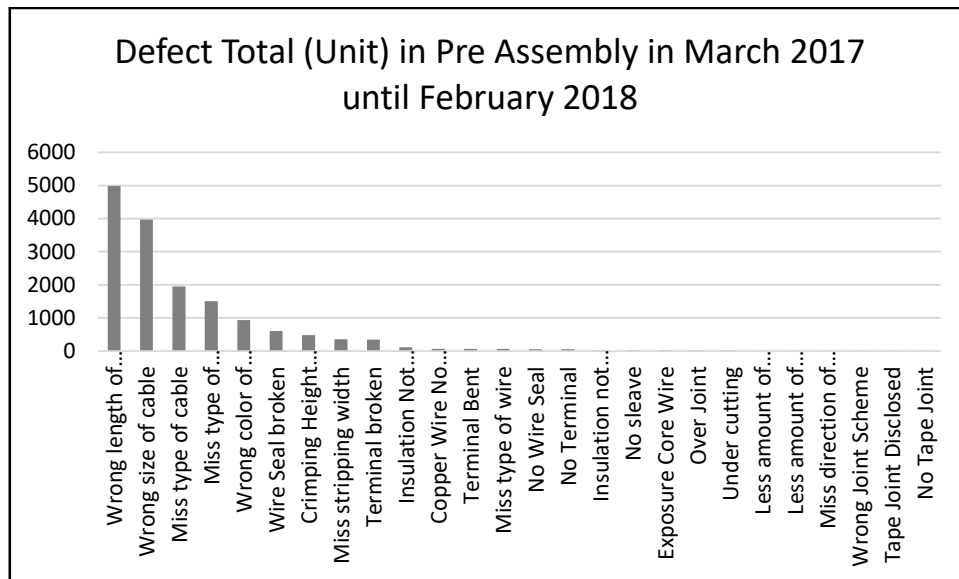


Figure 1.3 Total defects of motor wiring harness for one year
(Data source: QC Department PT. IPG)

From the data above can be seen that there are still many defects that occur in the production line of PT. IPG. To reduce the defects that occurs in the production process required quality control. Quality control is an activity that aims to ensure that production activities and operations are carried out in accordance with the planned and if the occurrence of irregularities can be done immediately so that what is expected to be achieved (Ekawati & Rachman, 2017). Quality control can be used with some tools of statistical quality control, total quality management and six sigma. Looking at the condition of the company that has applied the method of statistical quality control and total quality management, the researcher tries to control the product quality by using DMAI methodology which will assist in controlling the quality of wiring harness product of motor model in PT. IPG and FMEA method. The DMAI methodology stands for Define, Measure, Analyze, and Improve (Rampersad & Narasimhan, 2005). However, in this research, the researcher only discusses until the early step of the improvement that is by giving a suggestion of improvement which later may be able to minimize defect of product and because of time which is not possible to apply control phase at PT. IPG that will switch locations with different operators. To assist in providing quality improvement advice, researcher uses FMEA method. The FMEA method is an analytical technique that combines one's technology and experience in identifying the form of failure that occurs in a product or process and planning to reduce the

failure. FMEA is used to reduce disability and prevent the same failure by using RPN as the main focus in solving the problem. (Besterfield, et al., 2003). The FMEA method is used because of the many defects that occur repeatedly and the occurrence of a disability that once occurred but caused a fatal defect for the product to be investigated. FMEA considers Severity, occurrence, and detection in providing handicap handling so that later will be obtained a solution to reduce and prevent disability. Based on the background above the researcher's research is entitled "DMAI and FMEA Concept Approach on Wiring Harness Motor Model Products in PT. IPG 1st Plant".

1.2 Problem Formulation

The formulation of the problem of the research can be explained as follows:

1. What types of defects occur in wiring harness products for motor models?
2. What disability should be prioritized for immediate management by the company on wiring harness products for motor models?
3. What factors can affect the occurrence of defects in wiring harness products for motor models?
4. How to overcome the improvements in minimizing the defects that occur in the company on wiring harness products for motor models?

1.3 Research Objectives

The aims of the research can be explained as follows:

1. Know the type of disability that occurs in wiring harness products for motor models.
2. Know the defects that must be prioritized to be immediately handled by the company on wiring harness products for motor models.
3. Know the factors that may affect the occurrence of defects in wiring harness products for motor models.
4. Provide alternative improvements that may provide a good effect in minimizing defects that occur in the company on wiring harness products for motor models.

1.4 Advantages

The advantages of the research have two sides coming from academia and companies that can be explained as follows:

a. Academics

The advantages to be obtained for academics working on this research can be explained as follows:

1. Can apply the existing sciences to the world of education with the problems that exist in the world of work directly.
2. Foster good cooperation between education environment and work environment.

b. Company

The advantages to be obtained for the company working of this research can be explained as follows:

1. Provide disability information that is common in wiring harness products for motor models.
2. Provide information on the DPOM and sigma level values available to the company for wiring harness models of motor models.
3. Provide information of dominant factors that can cause defects that occur in the wiring harness model motor model to the company so it can be a consideration in determining the policies to be taken to minimize the existing disability.

1.5 Limitations

Limitations of the problem of research can be explained as follows:

1. This research focuses only on wiring harness products for motor models.
2. This research does not address the costs involved in the repair process.
3. Application of DMAI cycle only on the scope of work station cutting, crimping, and joint.
4. Use only three sigma to calculate process capability.
5. The improve stage is only at the beginning of the process by proposing improvement of the FMEA method.

1.6 Assumptions

The assumption of the research can be explained as follows:

1. The existing production line at the company is in ideal condition.
2. Data of disability production is homogeneous.
3. No change in the policies is adopted by the company during the research.

1.7 Writing Systematics

Systematics of writing is used by the authors in this study can be explained as follows:

CHAPTER I INTRODUCTION

In this chapter describes the background research conducted, the problem formulation that became the basis of the problem, the purpose of the study, the limitations of existing problems in research, the benefits to be achieved with the research and assumptions inherent in research to be done.

CHAPTER II LITERATURE REVIEW

In this chapter describes the theories that become the basis in conducting research and preparing reports and provide an overview of research that will be implemented in contextual terms.

CHAPTER III RESEARCH METHODOLOGY

In this chapter describes the methodology to be used in research such as the tools and materials needed, the procedures in research, and the research flowchart.

CHAPTER IV RESULTS AND DISCUSSION

In this chapter describes the results and discussion that has been done on research in the form of data processing and analyze the results of data processing.

CHAPTER V CONCLUSIONS AND SUGGESTIONS

In this chapter describes the conclusions that can be taken by researchers to the results of data processing and provide advice for further research.