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Improvement of Quality Control of Herbicide Products using the DMAIC Method Case Study in Chemical Companies in Merak- Banten

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Abstract:- In a situation of increasingly competitive global competition, the issue of product quality is a central issue for every company. The company's ability to provide quality products will be a weapon to win the competition, because by providing products the quality of customer satisfaction will be achieved.Therefore attention to a product quality can have a positive impact on the company itself, this condition requires that a company must process all of its resources optimally and carry out intensive improvements to the existing work system effectively and efficiently. This study uses the Six Sigma method which aims to identify all types of defects in herbicide products, This study uses the Six Sigma method which aims to identify CTQ (critical to quality) in the production process, Measuring DPMO, Level Six Sigma, After that analyzing the causes of defects using fishbone which consists of machine, material, method, human factors, then making proposed improvements by doing FMEA analysis, the company is expected to be able to find out the cause of disability companies and be able to take better corrective actions.

Keywords:- *Quality, Six Sigma, CTQ (critical to quality), Defect Per Million Opportunities (DPMO), Level Six sigma, Level fishbone, FMEA.*

I. INTRODUCTION

In a situation of increasingly competitive global competition, the issue of product quality is a central issue for every company. The company's ability to provide quality products will be a weapon to win the competition, because by providing quality products, customer satisfaction will be achieved. Moreover, supported by a good corporate management system, this requires companies to be more sensitive to market desires, so that companies can be more productive in carrying out the production process.

This company is a company that plays an important role in advancing the world of the pesticide industry in Indonesia. This company has several plants that produce several types of pesticides, one of which is a plant that produces herbicide products. At one plant in this company has problems in the production process to produce high-quality Herbicide products in large quantities and continuously. The biggest problem was found in many product defects in the results of the repacking process. In 2015 and 2016 there are a number of defects in 2015 of 12% and in 2017 of 14%.

II. LITERATURE REVIEW

Understanding quality according to ISO 8402 (Quality Vocabulary) in his book Vinzent Gaspert (2007), Quality is defined as the totality and characteristics of a product that supports its ability to support the ability to satisfy needs that are defined or defined. Quality is often interpreted as customer satisfaction or confirmation to needs or requirements.

Based on the above understanding of quality, it appears that quality always focus to customers. Therefore design products, manufactured as well as services provided to meet customer satisfaction. Because quality refers to everything that determines customer satisfaction, a new product can be said to be of quality if something with the customer's desires, can be utilized properly, and produced in the right way (Garpersz, 2007).

III. SIX SIGMA METHODOLOGY

DMIC consists of five stages, the stages used are:

- *Define:*

It is the first operational step in the Six Sigma quality improvement program. At this stage define the things related to: Six Sigma project selection criteria, roles and responsibilities of people who will be involved in Six Sigma projects, key processes in Six Sigma projects, customer specification requirements, and Six Sigma project goal statements.

- *Measure:*

It is the second operational step in the Six Sigma quality improvement program. There are three main things that must be done at this stage, namely: selecting or determining key quality characteristics or Critical To Quality, developing a data collection plan, and measuring performance now.

- *Analyze:*

It is the third operational step in the Six Sigma quality improvement program. At this stage, it will reduce the vulnerability of the process.

- *Improve:*

It is the fourth operational step in the Six Sigma quality improvement program. At this stage, identification of the causes of critical defects will be carried out, designing improvements according to the results of identification, then making improvements by implementing a design.

- *Control:*

It is the last operational step in the Six Sigma quality improvement program. At this stage make measurement standards to maintain process performance.

➢ *Fmea Definition*

FMEA is a structured procedure for identifying and preventing many possible failure modes. FMEA can be applied to all fields, both manufacturing and services, also on all types of products. However, the use of FMEA will be most effective when applied to new products or processes or products and processes that will undergo major changes that can affect the reliability of the product and process.

➢ *Framework*

The following is the framework that underlies the preparation of this research.

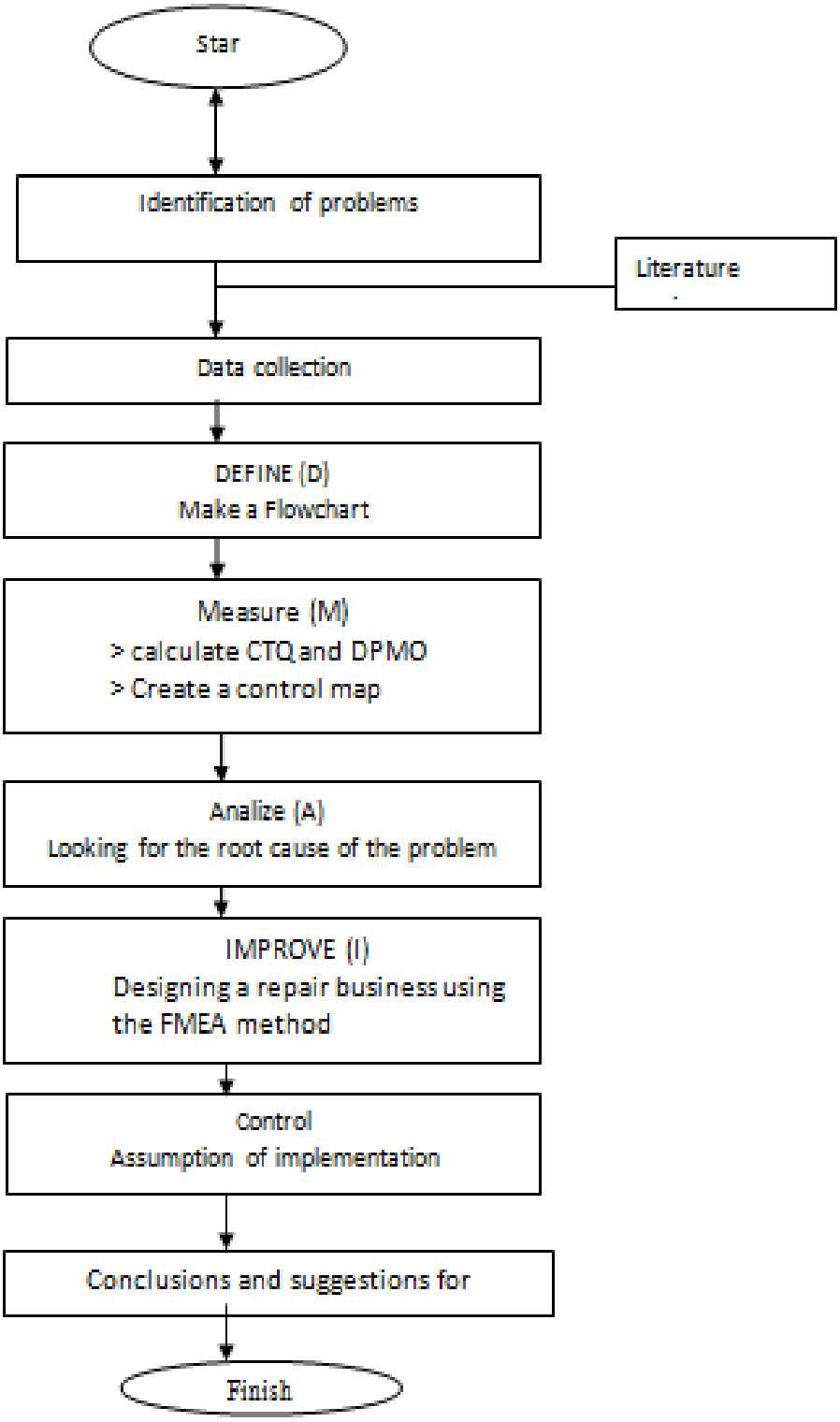

Fig 1:- Framework

IV. RESEARCH METHODS

➢ *Research Design*

This research method is carried out by using quantitative research on a production process in the manufacturing industry. Quantitative data is obtained from measurements of the results of the production process. The results of data collection are presented by tabulation. This study focuses on a selected case study based on the problems set out in the introduction to this thesis. The variables in this study are product conformance, these variables are factors that form the basis for achieving production targets in the production process of Herbicide products.

➢ *Types and Data Sources*

Data collected are primary and secondary data. The primary data in this study are interviews to determine the conditions and work environment while the Secondary Data in this study are data products that are produced and in data reject, secondary data comes from the Manual Report, Daily Report, System Report and Monthly Report from the production process in the plant. Herbicide.

➢ *Data Analysis Technique*

From the measurement results obtained, the initial data processing will be carried out using several approaches, Using the Six Sigma DMAIC method with the steps and tools used for each stage. After the analysis is done, conclusions will be obtained and in the end it raises recommendations for improvements to the production process with efforts to improve performance so that production targets can be achieved with quality that is in accordance with the standards. The stages are as follows:

1. Define (Stages of formulation)
   The steps used in this study are understanding the products to be studied, in the flow of the production process through flow charts.
2. Measure (Measurement stage)
   At this stage the definition of CTQ (critical to quality), map control, work processes, calculation of DPMO and Six Sigma values of the process and attribute data are performed. Then create a chat control that aims to control the level of product suitability to be within the specifications.
3. Analyze *(*Stage of analysis)
   At this stage, it will be analyzed from the calculations that have been done before. The next step can be an analysis of the root causes of the smooth production process and product incompatibility using fishbone diagrams so that corrective actions can be taken. This diagram is also called a cause-effect diagram that has a shape like a fish bone. This diagram is used to analyze and determine the factors that influence significantly in shaping the characteristics of the quality of work output, looking for the real causes of a problem. Fishbone diagrams or causal diagrams are used to analyze what factors are causing damage to the product. The factors that cause product damage generally are analyzed by 4M, as follows:
   1) Man that is factors caused by operators and experts.
   2) Methode that is factors caused by the method used in the production process.
   3) Material That is factors caused by components and raw materials.
   4) Machine That is factors that are caused by the engine used.
4. Improve (Stage of Improve)
   At this stage action is taken to discuss ideas to improve the system based on the results of the analysis. The repair step is intended to resolve the problem that has been defined in the define, measure and analiyze steps. In the Improve phase, analysis is done using the FMEA method. From the fishbone diagram, the peak analysis will be carried out using the FMEA method. In analyzing the problem using FMEA (Failure Mode And Effect Analiysis) we can identify the potential failure modes and their effects by applying a labeling method to help the thinking process. FMEA is a technique for evaluating the reliability of a system to determine the effect of a failure of the system. Failure is classified based on the impact given to the success of a mission from a system.
   In problem analysis using FMEA (Failure Mode And Effect Analysis) which consists of several stages, that is:.

a) Conduct a review of the process. The FMEA team conducts a field review of the ongoing process and analyzes the production process can add insight into the obstacles that occur in the field.
b) Identify potential failure modes in the process. From the production trial data obtained, the analysis and grouping and management of the data are obtained so that some groupings are the cause of errors from process failure.
c) Make a list of potential effects (potential consequences) of each failure mode. After the data is processed, we know the list of errors that might occur, then it starts to compile the impact of several errors that occur. All impacts on the process are recorded because the analysis process must be carried out carefully and thoroughly. The criteria scale for when this type of assessment must be the same is on a scale that is the lowest scale 1 and the highest 10 scale, the assessment of the three variables will be agreed by the team members.
d) Determine warnings of severity for each defect that occurs. An assessment of the level of effect is an estimate of the magnitude of the negative consequences caused if an error occurs.
e) Determine the insurance rating for each failure mode. An assessment of the level of probability or frequency of the error occurs.
f) Determine the ranking of detection for each failure mode and / or effect. Assessment of the level of possibility of detection of each error and its impact.
g) Calculate the Risk Priority Number (RPN) value for each defect. Calculating the priority level of the

RPN value is obtained from the severity x occurance x detection.

h) Prioritize the failure mode based on the value of the RPN for repairs. Arrange the priority level from the calculation of the RPN.

5. Control (Stages of Control)
After improvement (improvement) on existing problems, then the next step is the stage of control. At this stage monitoring is carried out on business processes so that the repair conditions that have been carried out do not return to the initial conditions before repairs. The main thing that must be monitored is the production process in the production process of products and herbicides.

V. RESEARCH RESULTS AND DISCUSSION

➢ *Define Stage*

This stage is the first step to be carried out in the Six Sigma methodology with the DMAIC model towards continuous quality improvement towards the Six Sigma target. The production process is a major activity in an industry. In the stages of the production process discussed are all stages of the process carried out on the process of herbicide products. The tool used in this process is a flow diagram. From this stage it will be known how the process flow is So that it will produce production output that is in accordance with the standard.

Type of defect	Total defect
Shrink Bottle	5318
The bottle label is damaged or torn	12289
The bottle cap is broken	20459
Dirty	40207
There is no label box	689
Total	78962

Table 1:- Characteristics of Critical To Quality (CTQ) Types of Defects of Herbicide Products

➢ *Measure Stage*

This measure stage is carried out in the six sigma quality improvement program using the DMAIC model which aims to validate problems, collect data needed for analysis, and measure problems from existing data. These data will produce useful information as knowledge for management to improve quality. This data is used to take corrective steps. The things that will be done in the measure stage are including the determination of CTQ (critical to quality), creating a control chart, and calculating Defect Per Million Opportunities (DPMO) and Six Sigma levels.

Type of defect	Description
1. Shrink Bottle	In this defect there is a bottle that shrinks due to pressure or falls from the packaging machine and presser on the machine that does not fit because of pulls or scratches resulting in the bottle not tidy and shrink.
2. The bottle label is damaged or torn	In this defect there is a label on the bottle that is torn or damaged
3. The bottle cap is broken	Defects that occur because the bottle cap is damaged during the capping process
4. Dirty	This defect is due to the presence of impurities in the bottle or packaging so that there is dirt or color that is not suitable for the packaging.
5. There is no label box	This defect occurs because there is no label / wrong label box contained in the box so it does not match the box.

Table 2:- Frequency of Disability of Herbicide Products January-November

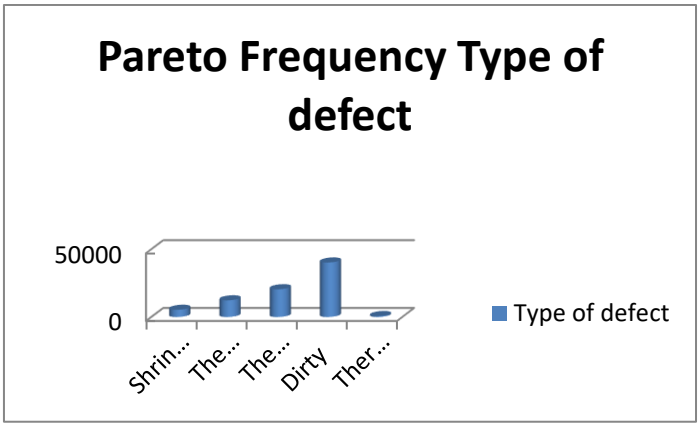

Fig 2:- Pareto Frequency Type of defect

Based on the cumulative percentage in the Pareto diagram above, the type of defect that has the highest number of defects is the type of defective dirty.

Measurements are made to determine the capability of the process. Process capability is defined as the ability of the production process to carry out a load or meet specific specified criteria. This measurement uses data for the period of January 2017 up to the period of December 2017. The sigma level value is obtained by looking at the DPMO conversion table to the sigma value in the attachment listed.

No	Period	Total Production	Total *Defect*	DPMO	*Level Sigma*
1	January	193200	18714	7451	4
2	February	183540	19238	8063	4
3	March	212520	21759	7876	4
4	April	202860	20398	7735	4
5	May	183540	22753	9536	3.875
6	June	212520	32942	11924	3.875
7	July	212520	26306	9522	3.875
8	August	212520	19055	6897	4
9	September	183540	27340	11458	3.875
10	October	202860	25298	9593	3.875
11	November	202860	21417	8121	4
12	December	212520	26881	9730	3.875

Table 3:- The results of sigma level and DPMO measurement

- *Analyze Stage*

In this stage, the analysis and discussion of what has been explained in the previous discussion will be described. The data collected in the previous stage is data measuring the stability of the production process of Herbicide Products for the period of December 2017. In this process stability analysis the researcher uses the np control map, which is used to measure the proportion of nonconformities (deviations / defects) of the unit inspected in the company. The following is a picture of the control map of the production of Herbicide Products in the December 2017 period.

no	Date	Total Production	Total *Defect*	proportion Defect	UCL	LCL	Average	Information
1	12/1/2017	9660	1207	0.125	1247	1182	1215	*in control*
2	12/2/2017	9660	1227	0.127	1247	1182	1215	*in control*
3	12/3/2017	9660	1208	0.125	1247	1182	1215	*in control*
4	12/6/2017	9660	1222	0.127	1247	1182	1215	*in control*
5	12/8/2017	9660	1236	0.128	1247	1182	1215	*in control*
6	12/9/2017	9660	1189	0.123	1247	1182	1215	*in control*
7	12/10/2017	9660	1197	0.124	1247	1182	1215	*in control*
9	12/14/2017	9660	1230	0.127	1247	1182	1215	*in control*
14	12/21/2017	9660	1223	0.127	1247	1182	1215	*in control*
17	12/24/2017	9660	1218	0.126	1247	1182	1215	*in control*
19	12/28/2017	9660	1216	0.126	1247	1182	1215	*in control*
22	12/31/2017	9660	1207	0.125	1247	1182	1215	*in control*
€		115920	14580					

Tabel 4:- Measurement results of Process Stability Measurement

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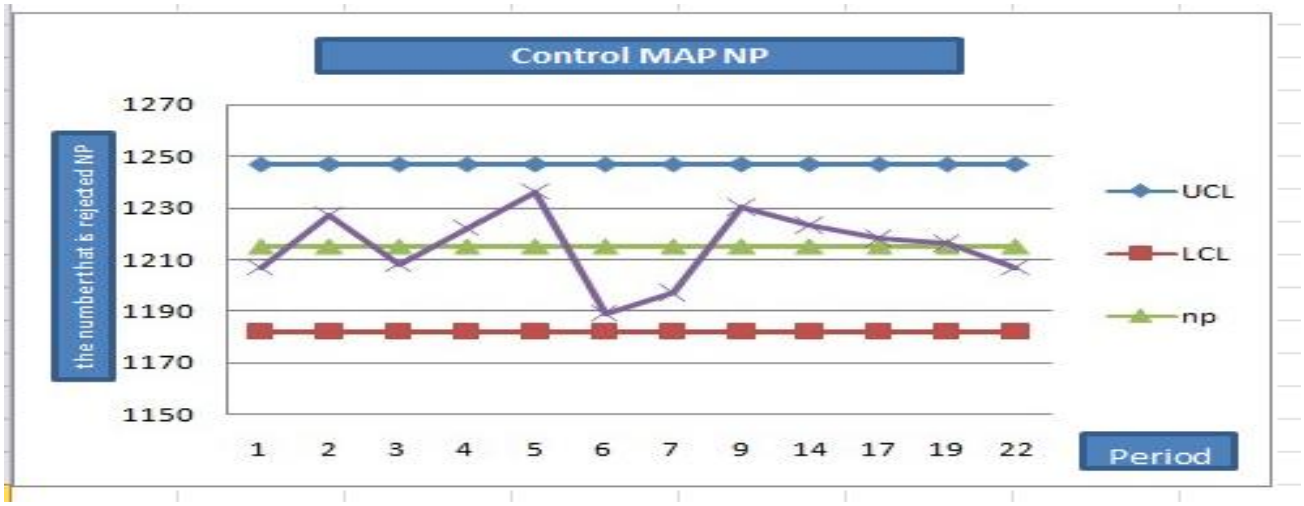

Fig 3:- NP control chart for the production of Herbicide Products in December 2017.

After conducting research and looking at the company data obtained, it can be concluded that the causes of defective products are located on 4 factors, namely: human, material, machine and method. For this reason, researchers focus on these five factors to be identified with a causal diagram (fishbone) to find sub-factors of these factors. Fishbone diagrams can be seen in the picture as follows:

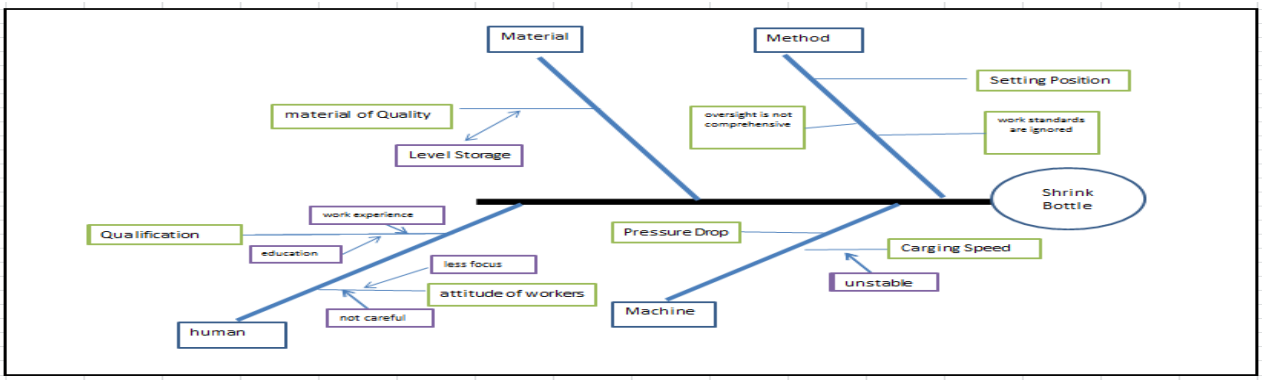

Fig 4:- Fishbone Diagrams of defect shrink bottles

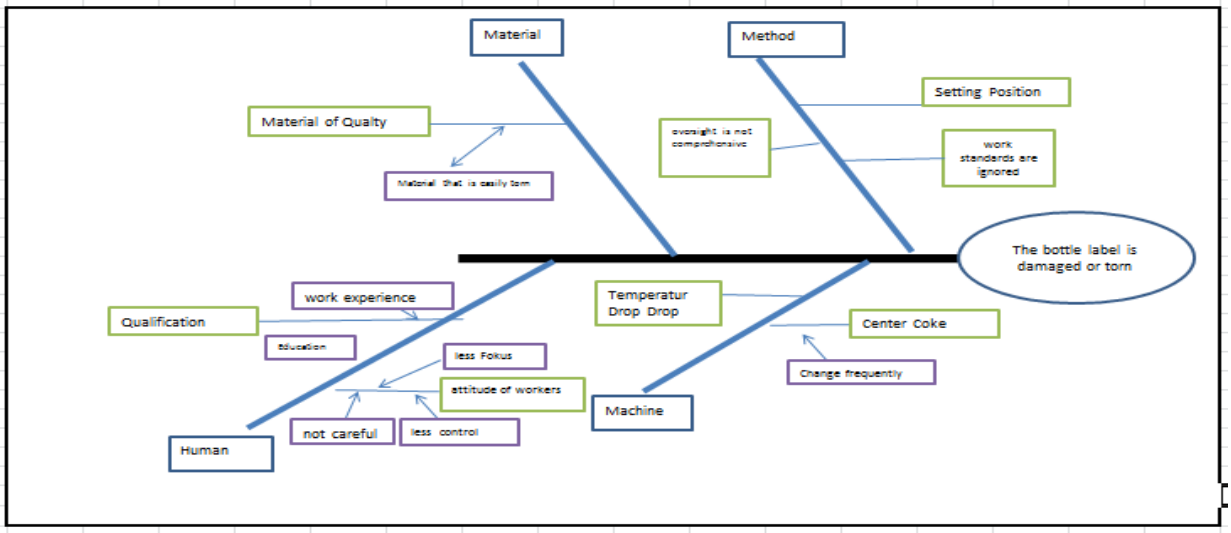

Fig 5:- Fishbone Diagram defect Bottle labels are damaged or torn

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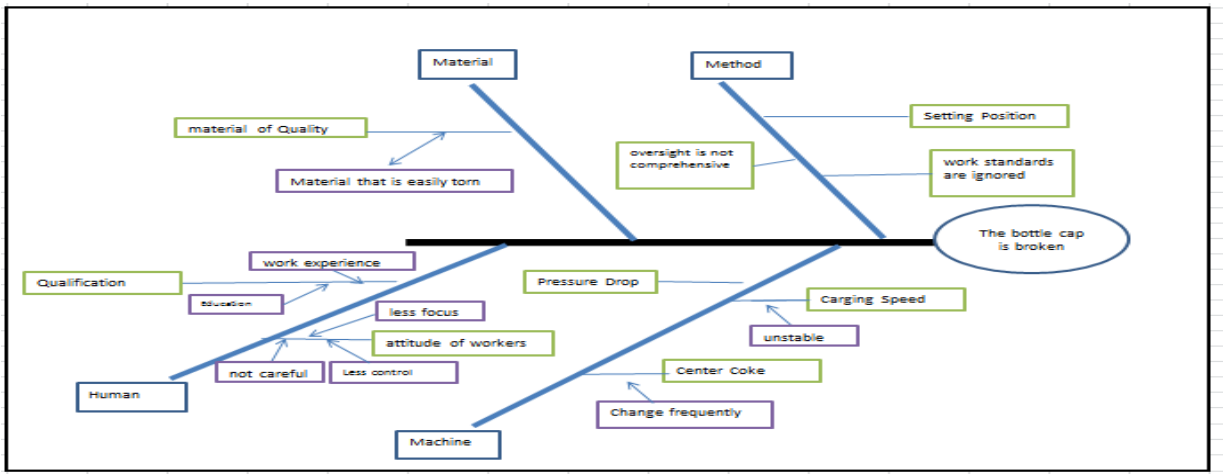

Fig 6:- Fishbone Diagram Defect The bottle cap is broken

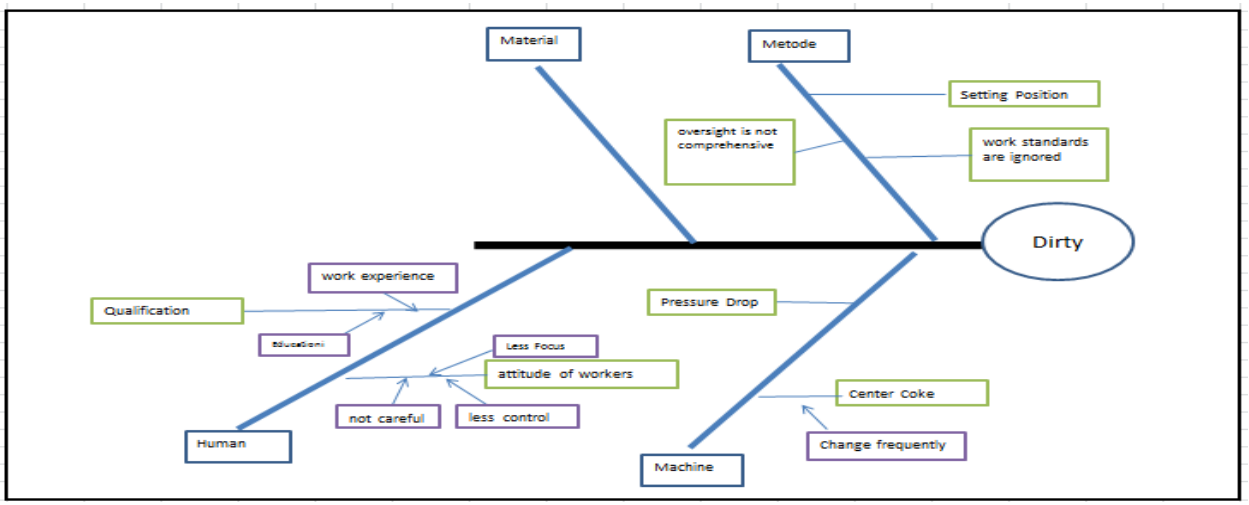

Fig 6:- Fishbone Diagram Defect Dirty

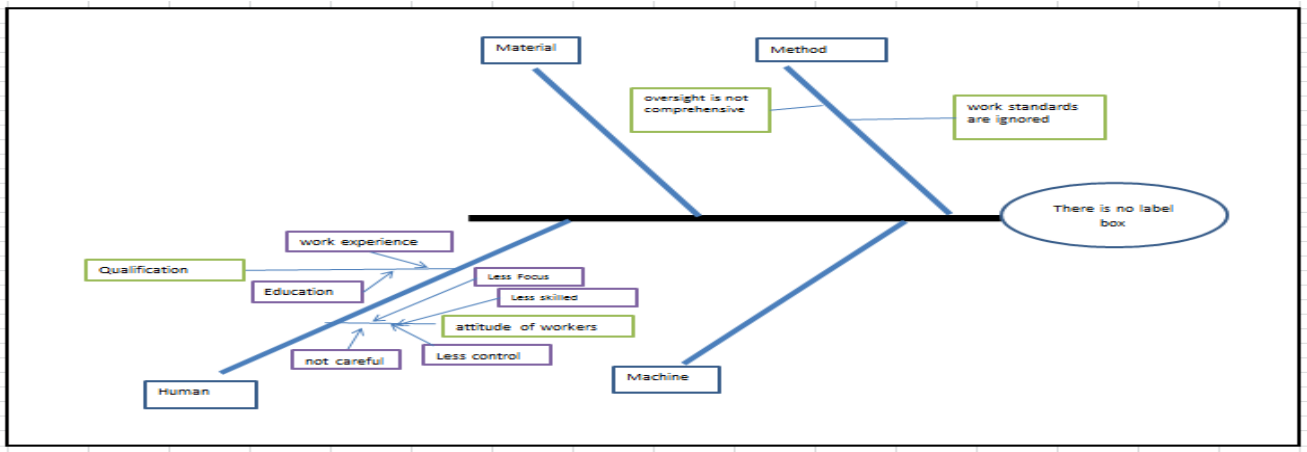

Fig 7:- Fishbone Diagram Defect There Is no Label Box

➢ *Improve Stage*

After the analysis phase above, the next step is the improvement stage. This stage of improvement will help to improve quality and improve the production process. Repairs are carried out based on the priority of corrective actions by determining the factors causing the main problems carried out using the FMEA method, FMEA analysis is based on interviews with the head of production and plant production staff Site Herbicides, Here is the method FMEA:

Modes OF failure	*Effect (s) of Failure*	*SEV*	*Cause (s) of Failure*	*OCC*	*Current process Control*	*Detect*	*RPN*	*Recommended action (s)*
Shrink Bottle	**Quality of Packaging is not in accordance with company standards**	**6**	**Method**	4	Supervise the operator during the machine setting process	4	*96*	Provide training and breefing to operators
			The process of positioning the machine settings is not according to the procedure					
			Machine	5	Check on pressure drop items	3	*90*	Conduct periodic checks of the pressure parts on the engine
			Pressure Drop on problem machines					
			Charging Speed is not stable	6	Check on Charging Speed items	3	108	Conduct periodic checks on the charging speed on the engine
			Material	4	Check on Packaging materials before the production process	4	96	Tightening inspection of packaging material inspection
			The bottle packaging material is fragile					
			Human	3	Conduct briefings and supervision of the head of production	4	72	Provide gradual warnings and sanctions
			negligent in implementing controls					

Tabel 5:- FMEA analysis of defect shrink bottles

Modes OF failure	Effect (s) of Failure	SEV	Cause (s) of Failure	OCC	Current process Control	Detect	RPN	Recommended action (s)
The bottle label is damaged or torn	**Quality of Packaging is not in accordance with company standards**	**5**	**Method**	4	Supervise the operator during the machine setting process	4	*80*	provide training and breefing to operators
			The process of positioning the machine settings is not according to the procedure					
			Machine	5	Check on temperature drop items	3	*75*	Conduct periodic checks on the temperature section of the engine
			Drop temperature on a problem machine					
			Center coke is not stable	6	Check on Center coke items	3	90	Perform periodic checks on parts of the Center coke on the machine
			Material	5	Check on Packaging materials before the production process	4	100	Tightening Supervision of packaging material inspection and replacing label material with High quality
			The packaging material on the label is easily torn					
			Human	3	Conduct briefings and supervision of the head of production	4	60	Provide gradual warnings and sanctions
			negligent in implementing controls					

Tabel 6:- FMEA analysis of defect bottle label is damaged or torn

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Modes OF failure	Effect (s) of Failure	SEV	Cause (s) of Failure	OCC	Current process Control	Detect	RPN	Recommended action (s)
The bottle cap is broken	**Quality of Packaging is not in accordance with company standards**	**6**	**Method**	4	Supervise the operator during the machine setting process	4	96	provide training and breefing to operators
			The process of positioning the machine settings is not according to the procedure					
			Machine	5	Check on pressure drop items	3	90	Conduct periodic checks of the pressure parts on the engine
			Pressure Drop on problem machines					
			Center coke is not stable	6	Check on Center coke items	3	108	Perform periodic checks on parts of the Center coke on the machine
			Charging Speed is not stable	5	Check on Charging Speed items	3	90	Conduct periodic checks on the charging speed on the engine
			Material	4	Check on Packaging materials before the production process	4	96	Tightening Supervision of material packaging checks Examination of Packaging materials before the production process
			The packing material on the lid is easily broken					
			Human	3	Conduct briefings and supervision of the head of production	4	72	Provide gradual warnings and sanctions
			negligent in implementing controls					

Tabel 7:- FMEA Analysis Defect Broken bottle cap

Modes OF failure	Effect (s) of Failure	SEV	Cause (s) of Failure	OCC	Current process Control	Detect	RPN	Recommended action (s)
Dirty	Quality of Packaging is not in accordance with company standards	3	**Method** The process of positioning the machine settings is not according to the procedure	4	Supervise the operator during the machine setting process	4	48	provide training and breefing to operators
			Machine Pressure Drop on problem machines	5	Check on pressure drop items	3	45	Conduct periodic checks of the pressure parts on the engine
			Center coke is not stable	6	Check on Center coke items	3	54	Perform periodic checks on parts of the Center coke on the machine
			Human negligent in implementing controls	4	Conduct briefings and supervision of the head of production	4	48	Provide gradual warnings and sanctions

Tabel 8:- FMEA Analysis defect Dirty

Modes OF failure	*Effect (s) of Failure*	*SEV*	*Cause (s) of Failure*	OCC	*Current process Control*	*Detect*	*RPN*	*Recommended action (s)*
There is no label box	Quality of Packaging is not in accordance with company standards	3	**Method** work standards are not appropriate	4	Supervise to operator	3	*36*	provide training and briefings to operators Supervise operators
			Human negligent in implementing controls	4	Conduct briefings and supervision of the head of production	4	48	Provide gradual warnings and sanctions

Tabel 9:- FMEA Analysis Defect There is no label box

➢ *Proposed Improvement Analysis*

Based on the results of FMEA analysis above, Improve solution will be determined by arranging the value of the RPN to find out the cause of failure which will be prioritized for corrective actions. After that, the cause of failure will be taken with the high value for each type of failure that occurs. The table below is a ranking table of RPN values for causes of Herbicide product defect.

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Modes OF failure	Cause (s) of Failure	*RPN*
Shrink Bottle	Charging Speed is not stable	108
	The process of positioning machine settings is not according to the procedure	96
	The bottle packaging material is fragile	96
	Pressure Drop on problem machines	90
	negligent in implementing controls	72
The bottle label is damaged or torn	The packaging material on the label is easily torn	100
	Center coke is not stable	90
	The process of positioning machine settings is not according to the procedure	80
	Drop temperature on a problem machine	75
	negligent in implementing controls	60
The bottle cap is broken	Center coke is not stable	108
	The process of positioning machine settings is not according to the procedure	96
	Packaging Material on the lid is easy to tear	96
	Pressure Drop on problem machines	90
	Charging Speed tidak stabil	90
	negligent in implementing controls	72
Dirty	Center coke is not stable	54
	The process of positioning machine settings is not according to the procedure	48
	negligent in implementing controls	48
	Pressure Drop on problem machines	45
There is no label box	Pressure Drop on problem machines	48
	work standards are not appropriate	36

Tabel 10:- RPN Ranking Table

The highest RPN value for the type of defect of the shrink Bottle is caused by an unstable Charging Speed with a value of RPN 108. If the Charging speed is unstable, the pressure and speed of the bottle rotation in the engine are not suitable. Proposed actions for improvement to the company:

1. Conduct periodic checks and supervision of the use of toll speed charging.
2. Perform routine machine spare parts changes, especially in the section on Charging speed.

The highest RPN value for the type of label defect in a damaged or torn bottle is caused by a packaging material on the label that is easily torn with a value of RPN 100. If the packaging material on the label is easily torn, it will be easy for the label to torn. Proposed actions for improvement to the company:

1. Check material on label material.
2. Upgrading raw materials to high quality to vendors.
3. Making Label material part of the Company's Quality Focus.

The highest RPN value for this type of defect The broken bottle cap is caused by an unstable Center coke with a value of RPN 108. If the Center coke is unstable, the center coke is inaccurate resulting in the wrong pressure and rotation. Proposed actions for improvement to the company:

1. Conduct periodic checks and supervision of the Center coke.
2. Perform routine machine spare parts changes, especially at the Center coke
3. Conduct training and training for operators who do Center coke settings.

The highest RPN value for the dirty defect type is caused by the unstable Center coke with a value of RPN 54. If the Center coke is unstable, the center coke is inaccurate resulting in the wrong pressure and rotation. Proposed actions for improvement to the company:

1. Conduct periodic checks and supervision of the Center coke.
2. Perform routine machine spare parts changes, especially at the Center coke.
3. Conduct training and training for operators who do Center coke settings.

The highest RPN value for the type of non-existent defect There is no label box is caused by negligence in implementing the control with a value of RPN 48. Proposed actions for improvement to the company:

1. Making breezes every day so that operators concentrate more and have good performance.
2. Conduct training and training routinely at least every 6 months for operators who do work on the label box attachment section.

➢ *Control Stage*

After compiling the improve phase using FMEA analysis, then at the control stage to maintain an increase in the sigma level of the process, It is expected that corrective measures to control the quality of herbicide products will prevent the same problem from happening again, the steps at the control stage include:

1. Ensure the quality of raw material packaging material is in accordance with company standards and the process of storing and using packaging materials in accordance with the FIFO method.
2. Conduct regular and regular training at least 3-6 months and special supervision in the implementation phase of the work.
3. Controlling the engine maintenance and repairing items or parts on the machine that often have problems such as the center coke, to prevent damage that results in disruption of the production process and defects.
4. Carry out control on the implementation of production methods and continue to evaluate so that they remain effective and efficient.

VI. CONCLUSION

From the results of research that has been done on Herbicide products at PT. Inti Everspring Indonesia and its proposed improvements, it was concluded that:

1. Can Know and identify the types of defects in Herbicide products:

➢ Shrink Bottle

In this defect there is a bottle that shrinks due to pressure or falls from the packaging machine and presser on the machine that does not fit because of pulls or scratches resulting in the bottle not tidy and shrink.

➢ The bottle label is damaged or torn

In this defect there is a label on the bottle that is torn or damaged.

➢ The bottle cap is broken

Defects that occur because the bottle cap is damaged during the capping process.

➢ Dirty

This defect is caused by the presence of liquid impurities on the bottle or packaging, resulting in impurities that make colors that are not suitable for the packaging.

➢ There is no label box

This defect occurs because There is no label box contained in the box so it is not appropriate.

2. Researchers can find out the causes of defects in Herbicide products, namely factors:
➢ Material
➢ Method
➢ Human
➢ Machine

3. Proposed improvements based on the causes of disability, among others:

1. Human

a) Providing training or training to employees, training is conducted by gathering employees to learn about production in general both in theory and in field practice. This practice is expected to be able to improve skills and experience for employees.
b) Give sanctions on employees who violate regulations. Giving sanctions is expected to reduce employees who do not meet work standards and reduce the chances of employees making mistakes. sanctions can be in the form of warning and warning letters.

2. Machine

a) Perform periodic checks and supervision of the use of toll speed charging.
b) Perform routine replacement of engine spare parts, especially on the part of Charging speed.
c) Conduct periodic checks and supervision of the Center coke.
d) Perform routine replacement of machine spare parts, especially in the Center coke section.
e) Carry out maintenance, maintenance and repairs on every machine on a regular basis usually carried out once a month. Maintenance of machines with engine maintenance regularly aims to reduce the risk of damage to the engine.

3. Material

a) Conduct material checks on packaging material. Upgrade raw materials to high quality to vendors.

4. Method

a) Socialize with breefing and training methods and work standards for all employees. Socialization is expected that employees pay more attention to and implement work methods and standards, so that the quality of products produced is in accordance with the quality standards expected by the company. Dissemination is done by giving direction to new employees and attaching the methods and standards of work on the bulletin board and other places that are often visited by employees.

VII. SUGGESTION

After obtaining conclusions from the research that has been done in the preparation of this thesis report, the authors want to give advice as a consideration for companies in improving the quality control of the products produced, there are suggestions:

1. Companies can improve the quality control of herbicide products by reducing the percentage of defective products by making improvements in terms

of handling raw materials, machinery and human resources during the production process.

2. It is best for the company to implement recommendations for improvements provided and consider the results of proposed improvements.
3. Increasing awareness and capability of all operators will be important to maintain the quality of the products produced.

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