# Saudi Journal of Business and Management Studies

Abbreviated Key Title: Saudi J Bus Manag Stud ISSN 2415-6663 (Print) | ISSN 2415-6671 (Online) Scholars Middle East Publishers, Dubai, United Arab Emirates Journal homepage: https://saudijournals.com/sjbms

**Original Research Article** 

# Improvement of Oil Pack Reject Flexible Packaging on Printing, Lamination and Slitting Processes (A Case Study in PT. XYZ)

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**DOI:** <u>10.36348/sjbms.2020.v05i02.001</u> | **Received:** 20.01.2020 | **Accepted:** 27.01.2020 | **Published:** 08.02.2020

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# Abstract

The production process is inseparable from a problem or reject product. PT. XYZ is a flexible packaging converter manufacturing company that has commitment in maintaining quality to reduce reject products. During the period January 2018 - December 2018 the reject value is still above the standard. This study aims to determine the factors causing the reject products of oil pack at PT. XYZ and proposed improvement to control of reject oil pack products. The results of pareto diagram show the reject that gave the biggest contribution is dirty in the printing process, thickness and wrinkle in the lamination process, and saggy in the slitting process. These four factors were analyzed using a fishbone diagram and then propose improvements for the causes of problems with the 5W and 1H methods. The analysis using cause and effect diagrams found that the main causes are the lack of supervision and inconsistency of the operator; poor maintenance of the engine unit; setting machine parameters and order schedules that not precise; the lack of supply and quality of raw materials. And then propose improvements with the 5W1H methods. The proposed improvements are briefing SOP and making engine alarm system; do maintenance, repair or replacement of damaged machine units; setting the machine parameters and order scheduling; monitoring the availability and quality of raw materials. The evaluation results of improvements can reduce the reject in the printing process 45%, the lamination 23% and the slitting 40%.

**Keywords:** Product reject, fishbone diagram, 5W1H.

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# Introduction

The production process is inseparable from a problem or reject product. A reject product is a product that is produced from a production process that does not meet predetermined quality standards. Rejects can be caused by human, machine, method, material and environmental factors. Reject products can be controlled through quality control [1].

PT. XYZ is a flexible packaging converter manufacturing company. In the manufacturing process manufacturing flexible packaging industry consists of several production processes, namely printing, lamination, and slitting. The company's commitment in maintaining quality is always sought to reduce reject products. During 2018, the problem of production

process defects has an average value of 3.78% or 108% of the target set at 3.5% (Figure 1).

At PT. XYZ, there are five types of production groups namely Noodle, Non Noodle, Oil Pack, Sauce Pack, Non Group with different reject standards (Table 1). The most dominant percentage of rejects is in the oil pack because it exceeds twice the standard set.

In producing oil packs consisting of printing, lamination, and slitting processes. The average percentage of reject for each process of oil pack production during January to December 2018 can be seen in Table 2. The lamination process has the highest contribution to the high percentage of reject in the oil pack.

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Table-1: Percentage of average rejects of each group in January-December 2018

Production	Reject (%)	Standard (%)
Noodle	2.95%	2.5%
Non Noodle	5.38%	5%
Oil Pack	3.11%	1.5%
Sauce Pack	2.59%	2.0%
Non Group	5.25%	5%

Source: Data processed (2018)

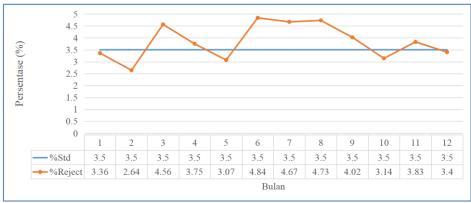


Fig-1: Key Performance Indicator (KPI) of Quality Control (QC) January - December 2018 Source: Data processed (2018)

Table-2: Percentage of average rejects for each oil pack production process in January-December 2018

P							
Proses	Reject (%)	Standard (%)					
Printing	0.31%	1.5%					
Laminasi	2.67%						
Slitting	0.12%						

Source: Data processed (2018)

The 5W1H method is a method of elaborating what, why, where, when, who and how. The 5W1H method is very easy to implement and can lead to new ideas for improvement [2].

# **Research Objectives**

The objectives of this study are as follows

- To determine the factors causing the reject products of oil pack at PT. XYZ
- To propose improvements to the control of reject oil pack products at PT. XYZ

# THEORITICAL REVIEW

#### **Ouality**

Quality is defined as totality of the characteristics of a product that supports its ability to satisfy the requirements specified or applied [3]. According to Vincent Gaspersz, quality is everything that is able to meet the wishes or needs of consumers [4]. American Society For Quality explain that quality is the totality of features and characteristic of a product or service thatbears on it's ability to satisfy stated or implied need [5].

Juran's Quality Handbook explains that the stages in the quality process known as Juran Trilolgy consist of quality planning, quality control, and quality improvement [6]. Then, according to David Garvin, the dimensions of good product quality consist of performance, features, reliability, conformance to specification, durability, serviceability, aesthetics, fit and finish [7].

# **Reject Products**

Products according to the Big Indonesian Dictionary are goods or services that are made or added to use or value in the production process and become the final result of the production process. While reject contain deficiencies that cause the value or quality is not good or less perfect. Of the two meanings, if combined together, it means that reject products mean goods or services that are made in the production process but have deficiencies that cause the value or quality to be less good or imperfect. Reject products are products that do not meet proper specifications. This also means it is not in accordance with the established quality standards. Quality conformity assumes that there is a range of values received for each quality specification or characteristic.

Reject are considered as one of the wastes in the manufacturing system which negatively affects the delivery time, cost and product quality which leads to manufacturing companies facing critical situations with customers [8]. The manufacturer must take further action to overcome the problem of the defective product. Defective products can be controlled through quality control. Quality control aims to improve the quality of products produced by a company by reducing the factors of error, product defects, failures, and specifications mismatch.

# Flexible packaging

Packaging is a technology and material to protect products during the process of distribution, storage, sales and use [9]. Packaging involves designing and producing the container or wrapper for a product. Good packaging can build brand equity and drive sales [10]. Packaging design variables consist of 3 dimensions: graphic design, structure design, and product information [11]. Shimp stated that the design structure is related to the physical features of the packaging, consisting of 3 sub-dimensions: shape, size, and material [12].

Flexible packaging has grown faster than other forms of packaging over the past few decades. Multilayer film technology encourages this growth by allowing special layers with sealing, barrier, or distinguished film layers to meet packaging requirements at a low cost [13]. The process of making flexible packaging from the preparation of raw materials to the consumers is the preparation of raw materials, the printing process, the lamination process, and the slitting process.

The printing process is the process of printing or applying various colors that use ink on the substrate with a printing press [14]. Extrusion lamination is the process of coating a substrate packaging in the form of a plastic film that has been printed on a printing machine with melted polymer resin that has been melted and cooled on a cooling roll or chill roll then pressed using a pressure roll such as making cast film [15]. The slitting process is the last packaging process carried out, namely the process of making plastic packaging labels that are ready to be sent to customers [16].

# Fishbone diagram

Cause and effect diagram developed by Dr. Kaoru Ishikawa, a scientist born in 1915 in Tokyo Japan who was also an alumni of chemical engineering at the University of Tokyo in the 1960s, is widely referred to as the Ishikawa diagram or fishbone diagram [17]. Fishbone diagrams can be used to identify and manage the possible causes of certain effects and then separate the root causes [18].

In the fishbone diagram there are major bones that are the cause, and then there are sub-bones that represent causes in more detail and so on. According to Goetsch and Davis, the causes chosen in making this diagram are categorized into man, methods, machines, materials, and environment (Figure 2) [19].

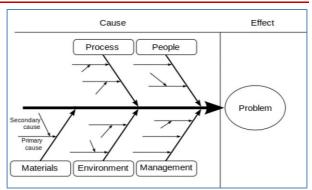


Fig-2: Fishbone diagram

# **5W1H**

The 5W1H method is used to analyze information or problem data in all work formats. 5W1H (who, what, where, when, why, how) is a method of asking questions about a process or problem taken for improvement. The four letters W (who, what, where, when) and the letter H are used to understand details, analyze conclusions and assessments to get to the basic facts and guide statements to get to abstraction. The last W (why) is often asked five times so that one can search to get to the heart of the matter. 5W1H from Six Sigma explains the approach that must be followed by understanding and analyzing the process, project or problem for correct improvement [20].

The 5W1H method is also called the Kipling method because the term 5W1H was originally taken from the Rudyard Kipling poem in 1902. In its application in the production process, we can use this 5W1H method to gather information and analyze problems that occur so that it can take appropriate solutions to overcome them. With the existence of this 5W1H Analysis, it is expected to simplify the process of analyzing the problems to be carried out.

### RESEARCH METHODS

This research was conducted with a qualitative method with a descriptive research approach. In this study using research variables, namely the product reject oil pack packaging in the process of printing, lamination, and slitting.

#### Population and sample

The population in this study is the product reject packaging as a whole in January to December 2018 at PT. XYZ. The sample of this study was taken from the achievement of the reject oil pack product performance in January to December 2018.

# Method of collecting data

Primary data were obtained by collecting data directly obtained through interviews with experts, brainstorming was carried out on production operators, and field observations. Secondary data was obtained from the document study by finding information on the KPI reject report document of the Quality Control

Department related to the most dominant reject product on oil pack group in the period January to December 2018. Secondary data was also obtained from library studies by collecting information from books, journals, and other data sources related to the research conducted.

# METHOD OF DATA ANALYSIS

a. Analysis of Cause and Effect Diagrams (Fishbone Diagram)

Fishbone diagrams are used to analyze the causes of problems that are grouped into human, machine, material, method, and environmental criteria.

# b. Proposed Improvements with 5W1H

The 5W1H method is used to make improvements using questions as a reference.

What, what's the problem?
Who, who is responsible for this problem?
Where, where did the problem occur?
When, when is the planning to fix the problem done?
Why, why does the problem occur?
How, how to overcome the problem?

# DATA ANALYSIS Collect Data and Determine Priorities a. Reject Oil Pack in the Printing Process

In the printing process, there are eight categories of reject products that are blocking, nonstandard colors, shadow, dirty, scratch, ink blotch, ink bald, and dash images (Figure 3a). Of the eight types of reject printing during the period January - December 2018 none exceeded the standard. However, with the Pareto diagram (Figure 3b) it is seen that the most dominant reject category is dirty with a cumulative percentage value of 94.01% (more than 80%).

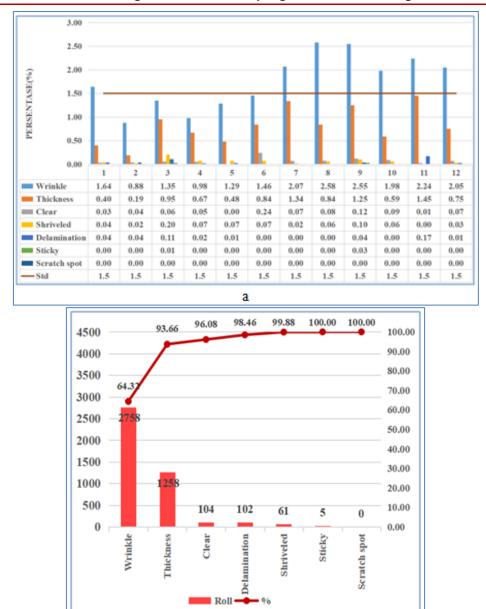
# b. Reject Oil Pack in the Lamination Process

In the process of lamination, there are several classifications of reject lamination products namely wrinkle, thickness, clear, shriveled, delamination, sticky and scratch spot (Figure 4). Through the pareto diagram, the most dominant is wrinkle and thickness with a cumulative percentage of 93.66% (more than 80%).



Fig-3: (a) Percentage of reject oil packs products in the printing process from January to December 2018. (b) Pareto diagram of reject oil pack in the printing process from January to December 2018

Source: Data processed (2018)



b
Fig-4: Percentage of reject oil pack in the lamination process from January to December 2018
Source: Data processed (2018)

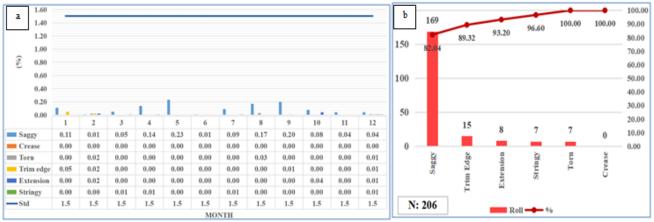


Fig-5: (a) Percentage of reject oil packs products in the slitting process from January to December 2018. (b) Pareto diagram of reject oil pack in the slitting process from January to December 2018

Source: Data processed (2018)

# a. Reject Oil Pack in the Slitting Process

The types of reject in the slitting process are saggy, crease, torn, trim edge, extension, and stringy (Figure 5a). There is no reject that exceeds the standard, but through the pareto diagram (Figure 5b) can be seen that the reject saggy is dominant with a cumulative percentage value of 82.04% (more than 80%).

# Analysis of Cause and Effect Diagrams (Fishbone Diagrams)

This analysis is done by direct observation to the field and conducting interviews and discussions with related employees. The interviews and discussions aim to find out the possible causes of not achieving the target of oil packs reject.

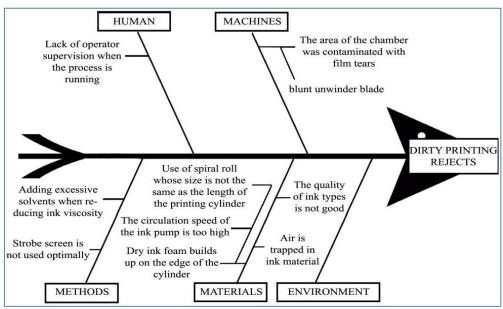


Fig-6: Cause and effect diagram of dirty reject in the printing process

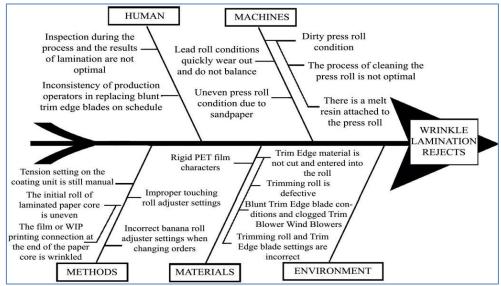


Fig-7: Cause and effect diagram of wrinkle reject in the lamination process

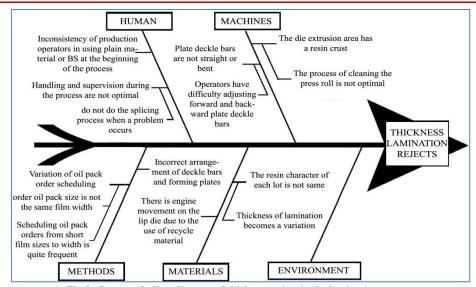


Fig-8: Cause and effect diagram of thickness reject in the lamination process

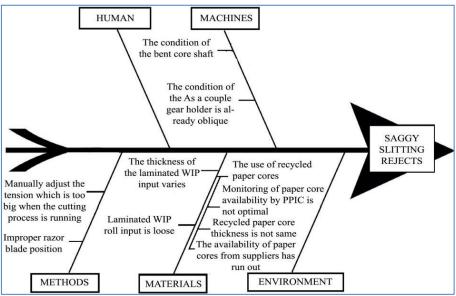


Fig-9: Cause and effect diagram of saggy reject in the slitting process

# **DISCUSSION**

There are four factors that influence the high dirty printing reject, namely human factors, machine factors, method factors, and material factors. The human factor is the lack of operator supervision during the road process. The engine factor is caused by the area of the chamber being contaminated with a tear. The method factor is that the strobe monitor screen is not used maximally and the addition of excessive solvents when decreasing ink viscosity. Material factors are the dry foam of ink that has accumulated on the edge of the cylinder, the air trapped in the ink, and the ink quality is not good.

The causes of wrinkle and thickness lamination reject is also influenced by four factors. The human factor is that the inspection during the process is not optimal and the inconsistency of production operators in the replacement of trim edge blades. The machine factor is caused by dirty press roll, lead roll condition which wears out quickly and unbalanced. The method factor is setting the tension on the coating unit is still manual, the initial roll of the laminated core is not flat, the adjustment of the touching roll adjuster is incorrect, and the adjustment of the banana roll adjuster is incorrect. Fator material is a trim edge material that is not cut.

In saggy slitting reject is caused by 3 factors. The engine factor is due to the bent As condition and the oblique couple gear holder condition. Factors of the method are setting the tension that is too large manually when the cutting process is running and the razor blade position is not right. Material factors are caused by the use of recycled paper cores and laminated WIP input thickness.

Repair Analysis Using 5W + 1H

Table-3: Improvements of the printing processes with 5W1H

Table-3: Improvements of the printing processes with 5W1H						
Causes	What	Why	How	Who	When	Where
Human	Lack of operator	Operators are less concerned	Conduct a briefing to the	SPV printing	Periodically	Printing
	supervision	with the results of the printing	operator regarding the		once a week	production
	when the process	process produced and do not	printing machine SOP			area
	is running	fulfill the process control	(FPT-PRD-001)			
		obligations according to the	regarding the obligation			
		SOP	to monitor the printing			
			process			
		The absence of a warning	Create an OPL system	SPV printing	Januari 2019	Printing
		system on the engine	(one point lesson) to			production
			remind operators			area
			Make an alarm system on	Engineering	Januari 2019	OSG printing
			the machine if a problem			machine
			occurs			
Machines	The area of the	The PM (preventive	Review the PM schedule	PPIC and	Januari 2019	OSG printing
	chamber was	maintenance) schedule is	that has been set every 1	engineering		machine
	contaminated	delayed because orders have	month and made a joint			
	with film tears	increased	commitment to fit the			
	due to a blunt	* 1 1	plan	CDI	D ' 1' 11	000
	unwinder blade	Independent operator	Briefing operators to run	SPV printing	Periodically	OSG printing
		monitoring of machine	the AM system by filling		once a week	machine
		maintenance is lacking because the AM (autonomous	out the form provided			
		maintenance) system is not				
		running				
Methods	Adding	Foam on the surface of the ink	Adding solvents or	Operator	Every oil pack	OSG printing
- Internous	excessive	Tourn on the surface of the fine	solvents little by little	Operator	production	machine
	solvents when		and checking the		process	
	reducing ink		viscosity after adding the		1	
	viscosity		solvent with zhan cup 3			
			gauge			
	Strobe screen is	The results of the oil pack	During the process the	Operator	Every oil pack	OSG printing
	not used	printing process are not	operator must monitor		production	machine
	optimally	controlled	and monitor the print		process	
			quality results in front of			
			the strobe monitor screen			
			Make a shift schedule to	SPV printing	Januari 2019	OSG printing
			control the strobe			machine
			monitor every two hours			

Causes	What	Why	How	Who	When	Where
Materials	Dry ink foam builds up on the edge of the	The circulation speed of the ink pump is too high	Set the circulation speed of the ink pump to the low position	Operator	Every oil pack production process	OSG printing machine
	cylinder	Use of spiral roll whose size is not the same as the length of the printing cylinder	Collecting spiral roll data that is not the same size as the printed cylinder and standardizing the length of the spiral roll	SPV printing	Januari 2019	OSG printing machine
			Make a spiral roller purchasel	Purchasing	Februari 2019	OSG printing machine
	Air is trapped in ink material	Ink availability in the receptacle at the minimum level	Control the ink level in the reservoir	Operator	Every oil pack production process	OSG printing machine
		The ink pump is leaking	Replace the leaky ink pump in good condition	Operator	Every oil pack production process	OSG printing machine
	The quality of ink types is not good	Foam on the surface of the ink	Do not use ink and replace alternative ink from other suppliers	Operator	Januari 2019	OSG printing machine
			Inform the supplier to make improvements to the ink quality	QC	Januari 2019	OSG printing machine

Table-4: Improvements of the lamination processes with 5W1H

Human   Huma				its of the lamination processes with			
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the beginning of the process of the cruting area and the edge area is tightened to 2.5 cm  Machine Dirty press roll condition as the machine stops or changes the order is not optimal and uneven  Pulse of extrusion area has a resin crust are not straight or bent or bent or bent or lent of the machine stops or changes the order is not optimal as a resin crust are not straight or bent or bent or lent of laminated paper core is uneven  Methods  Machine Dirty press roll condition as the straight one of the interest of the machine of the plug method is not able to handle reject thickness of the cutting area and the edge area is tightened to 2.5 cm  Causes  What  The process of cleaning the press roll when the machine stops or changes the order is not optimal as a resin crust  Machine S  The die extrusion area has a resin crust  The die extrusion area has a resin crust  All the press roll when the machine stops or changes the order is not optimal as a resin crust  The die extrusion area has a resin crust  The film flow on the press roll when the machine stops or changes the order is not optimal as a resin crust  The die extrusion area has a resin crust  The film flow on the press of cleaning the press roll when the machine stops or changes the order is not optimal as a resin crust  The die extrusion area has a resin crust  The die extrusion area has a resin crust  The film flow on the press of cleaning the press roll when the machine stops or changes the order is not optimal as a resin crust  The die extrusion area has a resin crust  The film flow on the press roll when the machine stable and uneven  All the press roll area the stable and uneven  The die extrusion area has a resin crust area difficulty and the respect thickness  Plate deckle bars are not straight or bent triple and the respect thickness  Plate deckle bars are not straight or bent triple are not straight or bent triple are not straight or bent triple area to crust triple area to straight or bent triple area to straight or bent triple area to straight o	1						
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Machine   Condition   Condit		1					
Causes   Condition   the press roll when the machine stops or changes the order is not optimal	Machine	Dirty press roll	The process of cleaning		Operator	Fach oil	Extrusion
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Lead roll conditions quickly wear out and do not balance   Uneven press roll to sandpaper						lamination	machine 5
Conditions quickly wear out and do not balance   Linewen press roll   The film flow on the press roll condition due to sandpaper   Linewen press roll   The film flow on the press roll becomes unstable and uneven   The film flow on the press roll when the sandpaper   Linewen press roll when the condition due to sandpaper   The die extrusion area has a resin crust   The process of cleaning the press roll when the machine stops or changes the order is not optimal are not straight or bent   Plate deckle bars are not straight or bent   Dent the form of the press roll when the machine stops or changes   Plate deckle bars are not straight or bent   Dent the form of the press roll when the form of the press roll when the form of the press roll when the form of the press roll when the form of the press roll when the machine stops or changes   Perform a thorough and periodic cleaning die with a triangular copper plug and rotate the manifold in and out several times so that the die wall is perfectly clean   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if the die plug method is not able to handle reject thickness   Split die and die cleaning if t			the order is not optimal				
Quickly wear out and do not balance							
Make repairs on the As Lead Roll holder that is worm   Septended Propertion		conditions	becomes unbalanced	used to be smooth type into screw	lamination	2019	lamination
December 1   December 2   December 3   December 3   December 4   December 5   December 4   December 4   December 4   December 4   December 5   December 4   Dec		quickly wear out		type			machine 5
December 2019   Condition due to sandpaper   The film flow on the press roll condition due to sandpaper   The die extrusion area has a resin crust   The process of cleaning area has a resin crust   Plate deckle bars are not straight or bent   Department of the coating unit is still manual   The initial roll of laminated manual manual   The film or WIP printing on the coating unit is still manual   The film or WIP printing connection at the end of the paper core is uneven   The film or WIP printing adjuster settings   The film or WIP printing to the laminated or core corectly and quickly when splicing and the press roll with condition that are still flat		and do not		Make repairs on the As Lead Roll	Engineerin	Januari	Extrusion
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Uneven press roll condition due to sandpaper   Condition due to sandpape					8		
Condition due to sandpaper		Uneven press roll	The film flow on the press	Replace the press roll with	Operator	Ianuari	
Sandpaper   Uneven					Operator		
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	L	ron adjuster		raising the speed slowly and when		раск	iamination

	settings when changing orders		the film flow is good the splicing is done immediately		lamination	machine 5
	Variation of oil pack order scheduling	Scheduling oil pack orders from short film sizes to width is quite frequent	Coordinate with the PPIC team during the meeting schedule, ensuring oil pack orders are arranged from long to short film sizes	PPIC and SPV lamination	Once a week	Meeting Room
	Incorrect arrangement of deckle bars and forming plates	Thickness of the edge area is thick and thin	Setting the deckle bar and forming plates according to the SOP of the FPT-PRD-005 extrusion machine on how to deal with irregularities	Operator	Each oil pack lamination	Extrusion lamination machine 5
Material s	Rigid PET film characters	Uneven film flow	Make changes to tension settings adjusted to the type of film	Operator	Each oil pack lamination	Extrusion lamination machine 5
			Adjust the banana roll slowly	Operator	Each oil pack lamination	Extrusion lamination machine 5
	Trim Edge material is not cut and entered into the roll	Trimming roll is defective	Perform replacement trimming roll with conditions that are still good and prepare ready-made trimming spare parts	Engineerin g	Januari 2019	Extrusion lamination machine 5
		Blunt Trim Edge blade conditions and clogged Trim Blower Wind Blowers	Replace Trim Edge knives immediately if problems occur every 2 days and Verify the TE blade replacement form in the field is done according to schedule and Repair Trim Edge wind blowers and stop the process temporarily	Operator dan SPV Produksi Laminasi	Januari 2019	Extrusion lamination machine 5
		Trimming roll and Trim Edge blade settings are incorrect	Repairing pneumatic pressure blades Trim Edge	Engineerin g	Januari 2019	Extrusion lamination machine 5
	The resin character of each lot is not the	Thickness of lamination becomes a variation	Conduct die temperature adjustments to areas of thick or thin thickness	Operator	Each oil pack lamination	Extrusion lamination machine 5
	same		Hold discussions with suppliers to improve resin quality	QC	Januari 2019	Extrusion lamination machine 5
	There is engine movement on the lip die due to the use of recycle material	Recycle resin quality is not good	Do not use resin recycle during the process	Operator	Januari 2019	Extrusion lamination machine 5

Table-5: Improvements of the slitting processes with 5W1H

Causes	What	Why	How	Who	When	Where
Machines	The condition of the bent	The rewinder is	Replace the As core shaft	engineering	Januari 2019	Thosin slitting
	core shaft	swinging and				machine
	The condition of the As a	unstable	Fixing As a couple gear	engineering	Januari 2019	Thosin slitting
	couple gear holder is		holder			machine
	already oblique					
Methods	Manually adjust the	Unwinder and	Reduces tension and	Operator	Every oil pack	Thosin slitting
	tension which is too big	rewinder become	controls during the		production process	machine
	when the cutting process	unbalanced	cutting process			
	is running					
	Improper razor blade	Thickness WIP	Shift the razor blade	Operator	Every oil pack	Thosin slitting
	position	laminate thin edge	position to the same area		production process	machine
		area	as the one next to it			
Materials	The use of recycled	The availability of	Monitoring the	PPIC	Januari 2019	Raw Materials
	paper cores	paper cores from	availability of paper	Departerment		(RM) paper
		suppliers has run	cores for oil packs and			core
		out	cooperation contracts			warehouse
			with suppliers			
	The thickness of the	The thickness of	Defaults the engine by	Operator	Every oil pack	Thosin slitting
	laminated WIP input	the used paper	slowly adjusting speed		production process	machine
	varies	core is not the	and initial tension			
		same	Inform the lamination	Operator	Every oil pack	Lamination
			department to be repaired		production process	Departement
				Operator	Every oil pack	Thosin slitting
					production process	machine
			Inform the lamination	Operator	Every oil pack	Lamination
			department to be repaired		production process	Departement

# **Evaluation of Improvement Results**

Evaluation is carried out to compare the conditions before improvement with after improvement by reviewing the data after the improvement is done. Thus, it can be seen that the improvement that have been made are effective or not. Evaluation is done by

looking at the level of product rejects after the improvement process. Overall packaging reject and especially oil pack rejects, were compared before improvement (2018) and after improvement (2019) (Table 6).

Table-6: Comparison of rejects before improvement (2018) and after improvement (2019)

Reject	2018	2019	Analysis
Parameters	Percenta	age (%)	
Overall reject	3.78	3.05	decreased
(5 group)			
Oil pack reject	3.11	2.52	decreased
Printing reject of	0.31	0.19	decreased
oil pack			
Lamination	2.67	2.25	decreased
reject of oil pack			
Slitting reject of	0.12	0.08	decreased
oil pack			

Source: Data processed (2018, 2019)

The overall reject packaging performance was initially 3.78% to 3.05 which is already below the standard of 3.5%. This improvement effort is not done instantly, but it is a continuous improvement. For reject oil pack, it decreased from 3.11% to 2.52%. However, this value is not in accordance with the target set for oil packs of 1.5%. So that further improvements are needed in order to achieve the desired reject target.

The improvement has a significant effect on dirty rejects of the printing process. The number of dirty rejects in 2018 amounted to 471 roll, in 2019 reduced to 232 roll. Through the comparison of the pareto diagram before and after the improvements, the percentage of reject decreased by 45% (Figure 10).

The results of improvements in the lamination process have a positive impact that can reduce the reject in this process by 23% (Figure 11). The improvement is focused on decreasing wrinkle and thickness because it is the most dominant reject. The improvement is quite effective in reducing wrinkle reject from 2,758 roll to 1,963 roll.

Improvements that have been made show a decrease in reject in the overall slitting process by 40% (Figure 12). The amount of sagging rejects can be reduced from 169 roll to 93 roll.

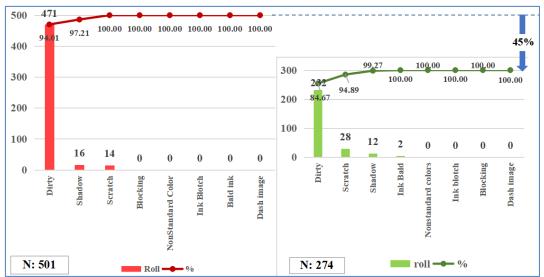


Fig-10: Comparison of the Pareto diagram on printing rejects before improvement (2019) and after improvement (2019)

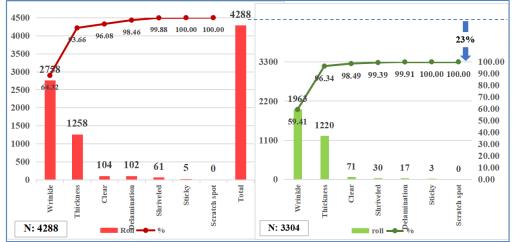
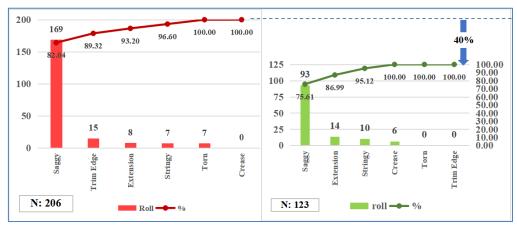


Fig-11: Comparison of the Pareto diagram on lamination rejects before improvement (2019) and after improvement (2019)



 $Fig-13: Comparison \ of \ the \ Pareto \ diagram \ on \ slitting \ rejects \ before \ (2019) \ and \ after \ improvement \ (2019)$ 

# **CONCLUSION**

The conclusions that can be drawn from this study are:

- a. There are four factors that influence the high reject oil pack packaging, they are human factors, machine factors, method factors, and material factors. The human factor that causes rejects is the lack of operator supervision and inconsistency during the process. From the engine factor that is due to inadequate engine unit conditions and lack of maintenance. Method factors that cause are machine parameter settings and incorrect scheduling of orders. The last factor is the material factor, namely the lack of supply of raw materials and poor quality of raw materials.
- b. To reduce reject oil packs, the method used is the 5W1H method. Proposed improvement of reject control is drawn from four factors. Suggestions for improvement on human-caused factors are conducting SOP briefings and making machine alarm systems. The engine factor is repairing or replacing damaged engine units and cleaning the engine units regularly. The proposed method improvement method is to set machine parameters appropriately according to the standard and set the order scheduling from long to short film sizes. Whereas the

- material factor is monitoring the availability and quality of raw materials, implementing a buffer stock system, and making requests for quality improvement to suppliers.
- c. The results of the evaluation of improvements in the production process of oil pack packaging have a positive impact which can reduce the reject in the printing process by 45%, the lamination process by 23% and the slitting process by 40%.

# **SUGGESTION**

Based on the results of the research that has been done there are a number of suggestions that need to be considered including:

- Stricter supervision is needed in the field during the lamination process when changing orders of oil packs with short to wide sizes.
- It is necessary to review the machine unit part of the lamination process as a whole which needs to be repaired and replaced by the engineering team.
- SOP (Standard Operation Procedure) pocket book is made for every process of printing, lamination, and slitting which is distributed to each operator.
- Further research needs to be done with the Six Sigma method with the DMAIC model and using FMEA improvement analysis in more detail to

reduce the problem of rejecting oil packs so that it can achieve the desired target.

# REFERENCE

- 1. Hariastuti, N. L. P. (2015). *Analisis Pengendalian Mutu Produk Guna Meminimalisasi Produk Cacat*. Seminar Nasional IENACO, 268–275.
- 2. Suhardi, B., Anisa, N., & Laksono, P. W. (2009). *Minimizing waste using lean manufacturing and ECRS principle in Indonesian furniture industry*. Cogent Engineering. Cogent, 6, 1–13.
- Pamungkas, T. P., Rahman, N., & Nasution, A. (2018). Perbaikan Kualitas untuk Meminimasi Cacat Produk Foldable Lens Folder dengan Menggunakan Metode TRIZ. Prosiding Teknik Industri, 4(2), 574–581.
- Febriana, E. K. (2017). Pengaruh Keragaman Produk, Kualitas Produk Dan Lokasi Penjualan Terhadap Kepuasan Konsumen. Journal of Management, 3(3).
- 5. Napitupulu, M. E. and Hati, S. W. (2018). Analisis Pengendalian Kualitas Produk Garment Pada Project in Line Inspector Dengan Metode Six Sigma Di Bagian Sewing Produksi Pada PT Bintan Bersatu Apparel Batam, Journal of Applied Business Administration, 2(1), 29–45.
- 6. Wahyuni, H. C., Khamim, M., & Sulistiowati, W. (2015). *Pengendalian Kualitas*. Sidoarjo: Graha Ilmu.
- 7. Alkatiri, H. A., Adianto, H., & Novirani, D. (2015). Implemetasi Pengendalian Kualitas Untuk Mengurangi Jumlah Produk Cacat Tekstil Kain Katun Menggunakan Metode Six Sigma Pada PT. SSP. Jurnal Online Institut Teknologi Nasional, 03(03), 148–159.
- 8. Realyvásquez-Vargas, A. (2018). Applying the Plan-Do-Check-Act (PDCA) cycle to reduce the defects in the manufacturing industry. A case study, Applied Sciences, 8, 1–17.
- 9. Srivastava, A., Kumar, V., & Singh, A. K. (2018). Computerized and Electronic Controls in Food Packaging, Journal of Applied Packaging Research, 10, 28–45.
- 10. Kotler, P., & Armstrong, G. (2015). *Dasar-Dasar Pemasaran*. 9th edn. Edited by Alexander Sindoro. Jakarta: Indeks.
- 11. Prameswari, N. S., Suharto, M., & Wulandari, E. (2018). *Strategi Branding Melalui Inovasi Desain*

- *Kemasan bagi Home Industry Sabun Cair*, Desain Komunikasi Visual, Manajemen Desain dan Periklanan, 3(2), 35–54.
- 12. Njoto, T. K. (2016). Pengaruh desain kemasan, cita rasa, dan variasi produk terhadap keputusan pembelian konsumen Bumi Anugerah, PERFORMA: Jurnal Manajemen dan Start-Up Bisnis, 1(4), 455–463.
- 13. Morris, B. A. (2017). The Science and Technology of Flexible Packaging: Multilayer Films from Resin and Process to End Use. Cambridge: Elsevier.
- 14. Mehra, S., Singh, A., & Verma, S. (2017). *To Study the Solid Wastages and its Minimization in Gravure Printing*, International Journal of Science, Engineering and Computer Technology, 7(2), 136–138.
- Rohman, S. A. (2017) Pengembangan Produk Pelapisan Plastik Kemasan Dengan Pemanfaatan Resin Recycle Pada Proses Extrusion Laminasi, Teknobiz Journal Ilmu Program Studi Magister Teknik Mesin, 7(2), 105–114.
- Akbar, I. A. (2019). Analisis Kerusakan Etiket dan Penyelesaian Masalah dalam Pembuatan Kemasan Plastik di PT.ICBP. Mercubuana University Repository.
- Silva, A. S., Medeiros, C. F., & Vieira, R. K. (2017). Cleaner Production and PDCA Cycle: Practical Application for Reducing the Cans Loss Index in a Beverage Company, Journal of Cleaner Production. Elsevier Ltd, 150, 324–338.
- 18. Nugroho, R. E., Marwanto, A., & Hasibuan, S. (2017) Reduce Product Defect in Stainless Steel Production Using Yield Management Method and PDCA, International Journal of New Technology and Research (IJNTR), 3(11), 39–46.
- 19. Ridwansyah, M., Nusraningrum, D., & Sutawijaya, A. H. (2019). Analisis overall equipment effectiveness untuk mengendalikan six big losses pada mesin pembuatan nugget, Open Journal Mercubuana, 3(1), 38–51.
- 20. Naranje, V., Naranje, A., & Salunkhe, S. (2018). Improving Process Performance with World-Class Manufacturing Technique: A Case in Tea Packaging Industry, Innovative Design, Analysis and Development Practices in Aerospace and Automotive Engineering. Singapore: Springer, 65–78.