Production Line Improvement Analysis With Lean Manufacturing Approach To Reduce Waste At CV. TMJ uses Value Stream Mapping (VSM) and Root Cause Analysis (RCA) methods

Misda Yanti
Student at Industrial Engineering
Universitas Islam Negeri Sultan Syarif Kasim Riau
11850220466@students.uin-suska.ac.id

Fitriani Surayya Lubis,
Nazaruddin, Muhammad Rizki, Silvia, Sarbaini
Assistant Professor Industrial Engineering
Universitas Islam Negeri Sultan Syarif Kasim Riau
fitrisurayya@gmail.com, nazar.sutan@uin-suska.ac.id, muhammad.rizki@uin-suska.ac.id, silvia@uin-suska.ac.id, sarbaini@uin-suska.ac.id

Abstract

CV. TMJ (Tuah Mujolai) is a company engaged in manufacturing that produces door frames, window frames, and tables. This research focuses on the manufacture of door frame products where this product always has ordered every month. In the production process, the make-to-order system is implemented. Based on the results of initial observations made by interviewing the company's owner and direct observation, it is known that there are indications of related problems. Namely, Waste or nonvalue added activity in the production process such as excessive processes, delays, defective products, and transportation. Therefore, to reduce the Waste that occurs, it is necessary to apply a Lean Manufacturing approach that uses several tools such as Value Stream Mapping (VSM) to visualize the flow of materials from raw materials to finished products and Root Cause Analysis (RCA) to find the root cause of the Waste that occurs until the end. waste can be reduced or eliminated.

Keywords :

Lean Manufacturing, Waste, Value Stream Mapping (VSM), Root Cause Analysis(RCA), Fishbone

1. Introduction

With the development of the manufacturing industry that is increasingly competitive in the business world, every manufacturing company must be able to increase its productivity from the increasingly fierce industrial competition, diverse demands and increasing numbers also make the company grow to provide the best value and facilities and improve production lines so that to be effective and efficient, and maintain production results so that the company can survive in the business environment. But of course, in every company's production process, there is Waste that must be reduced or eliminated. Waste is defined as an activity in production that does not provide added value (Febianti et al., 2018).

Reducing Waste in the company is an effort that must be done to encourage companies to continue to win in market competence so that productivity and efficiency in the production line of a company can be achieved. To reduce or eliminate Waste that occurs, it is necessary to use a Lean Manufacturing approach. The definition of Lean Manufacturing is an effort to eliminate Waste in a sustainable manner in an industry as well as to increase the added value of a product, this method is also a systemic approach to identify and eliminate Waste through continuous improvement (Daulay and Syukriah, 2021).

This research was conducted on CV. TMJ (Tuah Mujolai) which is one of the manufacturing industries that produces door frames. The problem that occurs in this company is Waste that often occurs so that the production process is not efficient. CV. TMJ was founded by Mr. Rudi Hidayat in the year 2015 having his address at Jl. Kubang Raya, Pekanbaru.

Table 1. Number of Requests For Door Frames (Unit)

Month	200 x 90 cm	200 x 80 cm	200 x 60 cm
April 2021	354	200	220
May 2021	300	250	253
June 2021	360	250	182
July 2021	360	235	280
Agusts 2021	357	280	247
September 2021	359	220	167
October 2021	360	250	230
November 2021	340	255	100
December 2021	360	210	127
January 2022	355	232	122
February 2022	324	197	125
March 2022	330	225	110
April 2022	355	232	200

Based on Table 1, the greatest average demand for door frames is 360 units with a size of 200 x 90 cm, but not all of the products produced or the wood needed can be marketed because, in every production, the product or raw material has defects.

1.1 Objectives

The purpose of this study is to identify the most influential Waste in the production line using the Value Stream Mapping method, identify the root causes of the Waste using the Root Cause Analysis method with the Fishbone model, and provide recommendations for improvement in the production line.

2. Literature Review

By definition, Lean Manufacturing is a continuous effort to Eliminate Waste in the industry and increase added value to products. This method is a systematic approach to identifying and eliminating Waste through continuous improvement, as well as optimizing performance and production processes because it can find, measure, analyze and find solutions for improvement (Farida et al., 2022).

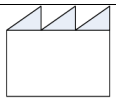
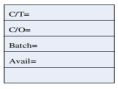
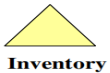
According to (Hi and Taylor, 2000), Waste can be defined as work activities that do not provide added value in a process from input to output along a process from upstream to downstream. In a manufacturing process, an activity that usually occurs in the production process is Value-Adding Activity (VA), an activity that provides added value which, according to consumers, are willing to pay and provide added value to a product/service for that activity. Non-Value Added (NVA) is an activity that does not add value to a product or service in the eyes of consumers. This activity is called Waste which should be removed immediately from the production system. Necessary non-value-added activity (NNVA) is any activity that does not add value to the product or service in the eyes of consumers, but this activity also does not have to be eliminated quickly and is required in existing procedures or operating systems. These activities cannot be eliminated in the short term but can be carried out more effectively (Febianti, et al., 2018). In this study, the object of the product taken is the door frame because the door frame is the

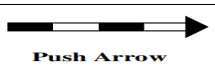
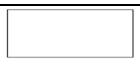
product that has the most demand every month. in all production activities sometimes do not reach the quality and quantity targets applied by the company. This is due to waste in the production process. There are seven types of Waste, namely:

a. Motion is an activity/movement of Waste that does not need to be carried out by the operator, and the movement does not provide added value and can slow down the production process so that the lead time becomes long. An example is placing the equipment needed by the operator too far, so it takes the operator a long time to get to the destination.
b. Transportation, this transportation is an important activity but does not add value to a product. Transportation is the process of moving material or work in process (WIP) from one work station to another, using either a forklift or a conveyor.
c. Excess processing occurs when the work method or work sequence (process) used is deemed not good and flexible so that it is done repeatedly and causes Waste. This can also happen when the existing processes are not standardized, so the possibility of defective products is high. There are variations in the method used by the operator.
d. Waiting is a waste because waiting for the next process, such as a machine that has to be idle because of a breakdown or error. Waiting is the time interval when the operator does not use the time to perform Value-Adding Activity due to waiting for the product flow from the previous process (upstream).
e. Defects, are errors that occur during the production process where the resulting product is damaged or does not meet specifications. And this causes the rework process to be less effective, resulting in high complaints from customers, as well as very high level inspections.
f. Overproduction (excessive production), is a waste caused by production that exceeds consumer demand and results in excessive production, the purpose of producing excessive products is to make more warehouse storage than necessary.
g. Inventories (too much raw material) are a waste where the supply of raw materials is not needed. The point is that there is too much material inventory and too much work in the process between one process and another, so it requires a lot of space to store it. The possibility of this Waste is a very high buffer.

Value Stream Mapping is a technique used to describe the flow of information and materials from the company. To facilitate the process of implementing lean, value stream mapping is used by identifying value-added (VA) activities in the process flow and eliminating non-value-added (NVA) activities. After describing Value Stream Mapping (VSM), the company can see production lead time, production costs, and waste value (Daulay and Syukriah, 2021). Following are the tools used in the creation of value stream mapping (Table 2) :

Table 2. Tools Value Stream Mapping

Symbol Process	 Customer / Supplier	The symbol of this tool is a supplier. If it is placed on the upper left side, it means (the starting point of material flow), and if it is placed on the upper right, it means (the endpoint of the material flow or called the consumer.
	 Dedicated Process	The symbol of this tool is a machine process or department that the material goes through.
	 Data Box	The symbol of this tool is additional information for analyzing the system, and this symbol contains the cycle time, number of operators, and others.
	 Inventory	The symbol of this tool is an inventory of two processes.
Symbol Material	 Shipments	The symbol of this tool is the movement of moving raw materials from suppliers to factories or the movement of moving from factories to consumers.

	 Push Arrow	The symbol of this tool is a material push from one process to the next.
	 FIFO Lane	The symbol of this tool describes the process that uses the FIFO (First-In-First-Out) inventory system where the inventory is maximum.
	 Safety Stock	The symbol of this tool is the amount of inventory to anticipate consumer demand that increases suddenly.
	 Production Control	The symbol of this tool is the center of production scheduling or control carried out by departments, people, or operations.
Symbol Information	 Manual Information	The symbol of this tool is a direct flow of information with a conversation or report.
	 Electronic Information	The symbol of this tool is the transfer of information through electronic media in the form of email, telephone, and others.
	 Kaizen Burst	The symbol of this tool describes an improvement by applying kaizen to create a future state map of a value stream.
	 Operator	The symbol of this tool is the number of workers needed to carry out the process at a certain station.
	 Other Information	The symbol of this tool is additional information that describes something written in the value stream mapping.
	 Timeline	The symbol of this tool describes the timeline to tell the value-added times (cycle times) and the value of non-value-added times (wait). And its function is to add up the total lead time and total cycle time.

Calculation Process Efficiency Cycle

$$(\text{PEC}) = \frac{\textit{Value Added Time}}{\textit{Total Lead Time}} \text{x } 100\ \% \qquad \ldots (1)$$

Calculation Talk Time

$$T = \frac{\text{TA}}{\text{D}} \qquad \ldots(2)$$

Root cause analysis is a tool used to find the root cause of the current Waste so that the Waste can be lost or reduced and avoid similar incidents in the future. Many parties often solve existing problems by using short-term solutions, which will not increase the company's profits. To increase efficiency and profitability, you must look to the root of the problem by observing problems or symptoms that might cause problems (Setiawan and Widyadana, 2019).

Fishbone diagram atau diagram tulang ikan merupakan salah satu metode atau alat untuk meningkatkan kualitas. Seringkali diagram ini juga dikenal sebagai diagram sebab-akibat. Masalah akan dipecah menjadi sejumlah kategori yang berkaitan, mencakup manusia, material, mesin, prosedur, kebijakan, dan sebagainya. Setiap kategori memiliki sebab-sebab yang perlu diuraikan melalui sesi brainstorming (Ponda, et al., 2022)

3.Methods

The research methodology is a description of the sequence that describes the activities from the beginning to the end of the research so that it is more focused.

3.1 Research Object

The object of this research is the door frame production process at CV.TMJ. In the production carried out at this company, there is still a lot of Waste that occurs caused by several factors, so the production floor becomes inefficient.

3.2 Data Collection

The data collected in this study are as follows:

1. Primary data

Primary data is data obtained from direct observations with the owner of the company or the operator concerned. The primary data used are the time of the production process, data on the number of operators, the number of machines, and the number of workstations.

2. Secondary Data

Secondary data is data in the form of information owned by the company. Secondary data required is company profile and production data.

3.3 Data Processing

1. Make Current Value Stream Mapping

Current Value Stream Mapping is an initial picture or a real picture of production at each station, the flow of information, and materials in CV. TMJ prior to the repair so that from this picture, it can be seen what Waste occurs in the door frame production process, causing the production process to be inefficient.

2. Talk Time Calculation

Talk time is the time it takes to produce a product according to the customer.

3. Make Root Cause Analysis

Root cause analysis is a tool used to find the root cause of Waste so that Waste can be reduced or disappear in the future. The model used to identify Waste is Fishbone, where the fishbone diagram is a fishbone diagram or often called a cause-and-effect diagram which is used to analyze the Waste by finding the root cause of the problem.

4. Improvement Proposal

Proposed improvements made to the production process at CV. TMJ is useful for providing continuous improvements so that the production process becomes more efficient by applying improvements consistently. The The improvement proposal given is to make a maintenance report card and a maintenance procedure sheet.

5. Make Future Value Stream Mapping

Future Value Stream Mapping is a description of production at stations, information flow, and materials for the future that have been proposed for improvement by eliminating or eliminating activities that do not provide added value, it can be seen before and after Waste is eliminated so that it can be seen that the efficiency level of the production floor increases after repairs are made.

4.Data Collection

The data collection consists of primary data, and secondary data, where the primary data obtained are the time of the production process, the number of production operators, and the number of machines and work stations, while the secondary data consists of company profiles and production data.

4.1 Production Process Time

The following time the process of making the door frame was measured directly with a stopwatch, and the number of observations was carried out five times. (Table 3)

Table 3. Activity Data and Production Process Time

No	Activity	Observation (Sekon)				
		1	2	3	4	5
1	Measurement of wooden posts for each section	157	150	157	146	160
2	Cutting each piece of wood according to customer's request	150	145	155	153	147
3	Smoothing the top and bottom sides of the wooden block	515	513	510	509	515
4	Slashing wood in each part that has been smoothed	472	450	467	463	482
5	Equalize the thickness of each piece of wood	176	180	155	177	178
6	Smooth and profile the wood in every part	1020	1011	1032	1009	1023

4.2 Number of stations, machines, and operators

The following is data on the number of stations, machines, and operators in CV. TMJ on door frame production (Table 4):

Table 4. data on the number of stations, machines, and operators

No	Station	Machine Name	Number of Machines	Operator
1	Measurement	Manual	-	1
2	Cutting	Cutting Machine	1	1
3	Reaping	Crab Elbow Machine	1	1
4	Equalizing the thickness of the wood	Press Machine	1	1
5	Split	Split Machine	1	1
6	Refinering and making of wood profile	Ironing Crab Machine Dan Router Machine	2	1

5. Résults and discussion

5.1 Current Value Stream Mapping

The first step is to identify Waste that occurs in CV. TMJ is to create a Current Value Stream Mapping. The following is a description of the real Value Stream Mapping in the Door Frame production process as follows (Figure 1):

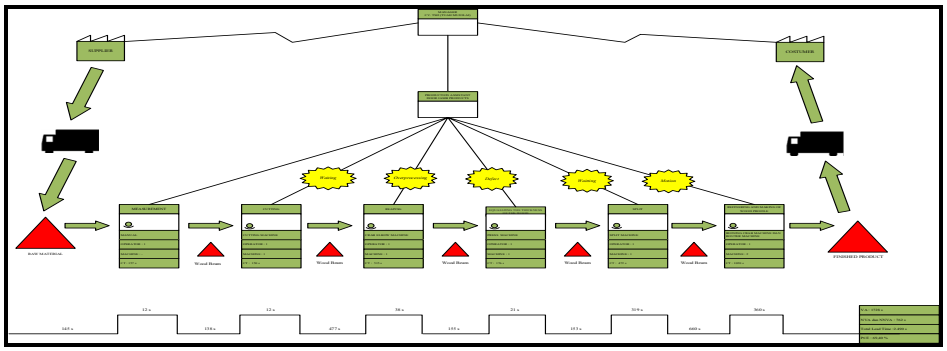


Figure 1. Current Value Stream Mapping

After the map of the actual situation in CV.TMJ is described. It can be used as a reference for analysis of Waste that occurs in the production process. From the Value Stream Mapping, it will be classified as value-added (VA), non-value-added (NVA), and necessary non-value-added (NNVA) as follows : (Table 5)

Table 5. Real State Map Analysis

No	Activity	Time (Sekon)	Category
1	The wood is brought to the measuring station	22	NNVA
2	Timber is measured manually for each section	135	VA
3	Wood waiting to be cut	50	NVA
4	Cutting machine setup	26	NVA
5	Cut each piece of wood according to size	88	
6	The cut logs are taken to the pruning machine	12	NNVA
7	Crab machine setup	38	NVA
8	The wooden block is smoothed using an angled crab machine	425	VA
9	Perform repeated inspections after grinding	30	NVA
10	The smoothed wooden blocks are brought to the press machine	5	NNVA
11	Press machine setup	8	NVA
12	Equalize the thickness of the wooden block	163	VA
13	The pressed wooden blocks are brought to the splitting machine	5	NNVA
14	Split machine setup	120	NVA
15	Splitting wood	347	VA
16	The wooden beams are taken to the next station to be assembled into the door frame	15	NNVA
17	Assembling wooden blocks into door frames	402	VA
18	Setting up the ironing crab machine	10	NVA
19	Smooth each side of the door frame	130	VA
20	Setting up the router machine	10	NVA
21	Creating a profile on the door frame using the Router machine	408	VA
22	Smoothing the wood that has been on the router using sandpaper manually	45	VA

Process Efficiency Cycle

$$(PEC) = \frac{Value\ Added\ Time}{Total\ Lead\ Time} \text{ x } 100\ \%$$

$$= \frac{1728}{2490} \text{ x } 100\ \%$$

$$= 69{,}40$$

Talk Time

$$T = \frac{\text{Time Available}}{\text{Demand}}$$

$$T = \frac{360}{10}$$

T = 36 menit

5.2 Root Cause Analysis

Root Cause Analysis is a tool used to find the root cause of the existing Waste so that Waste can be reduced and disappear in the future. The tools used to identify the waste problem are fishbone, where the factors influencing the Waste are humans, materials, machines and equipment, and methods. The following are the causes of waste:

5.2.1 Identification of Waste Using Fishbone Diagram

The identification of Waste that occurs in CV. TMJ in the production of door frames, which is based on the theory of seven wastes which can be seen from direct observations, and examines the data obtained from the Current Value Stream Mapping mapping as follows:

a. Defect

Waste of defects occurs in several factors, namely machine, operator, material, and method factors. Defects that occur are caused by the blades used for production are blunt and have not been sharpened first, resulting in cracked raw materials, defects are also caused by poor quality raw materials, operators who do not understand the material so they are not careful in working, the wrong way of working so the process Poor sorting of raw materials results in product defects. The cause and effect of Waste can be seen from the following fishbone diagram: (Figure 2)

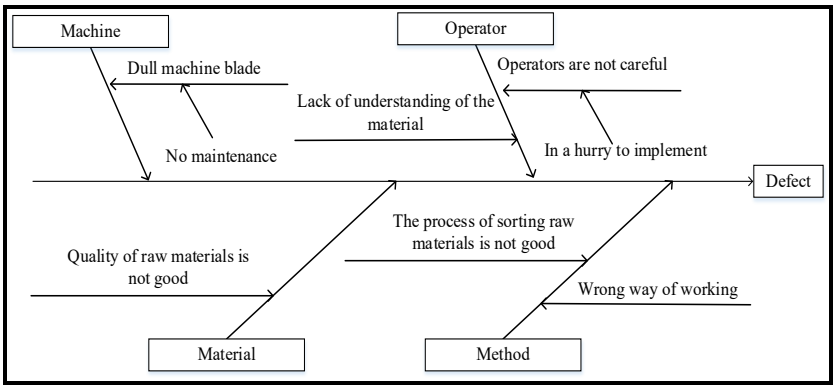


Figure 2. Fishbone Diagram Waste Defect

b. Waiting

Waste of waiting occurs at the cleavage station and the planting station, this Waste of waiting time is caused by machine downtime so that the machine must be repaired first so that it can be used for production besides that Waste of waiting time occurs because semi-finished materials must be processed to a later stage, causing rework. To find the root cause of Waste in detail, it is necessary to use a fishbone diagram as follows: (Figures 3 & 4)

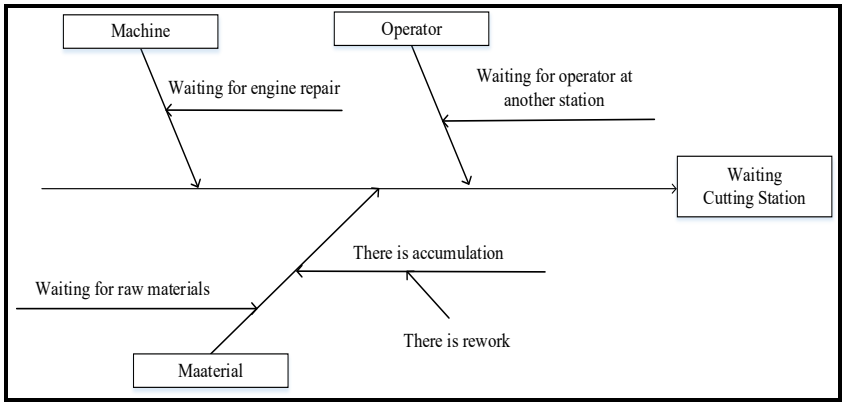


Figure 3. Fishbone Diagram Waste Waiting Cutting Station

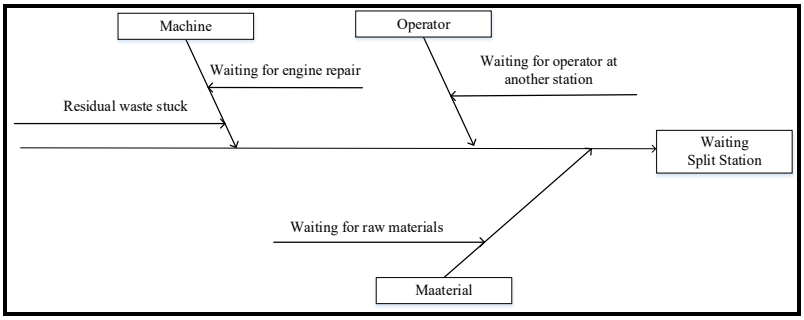


Figure 4. Fishbone Diagram Waste Waiting Split Station

c. Overprocessing

From the VSM results which have been described that overprocessing Waste occurs at the gardening station because the operator performs repeated inspections and causes Waste to occur, the machine used is also lacking in maintenance so that the blades on the machine are blunt so an analysis is needed to find the root cause of the Waste using a fishbone diagram. (Figure 5)

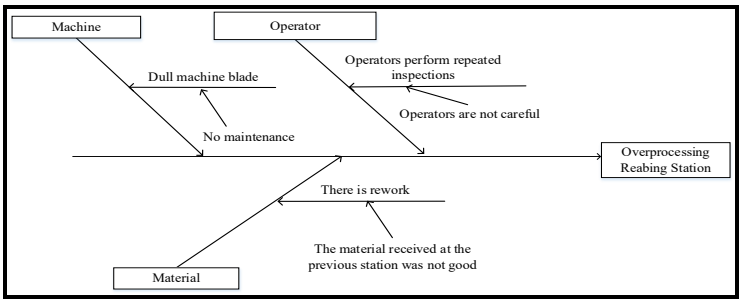


Figure 5. Fishbone Diagram Waste Overprocessing Reabing Station

d. Motion

Waste that occurs at the last station that has been described in vsm is motion, where the cause of this Waste is the equipment needed by the operator to be used in places that are difficult to reach or too far away so that the operator takes a long time to reach. From the fishbone diagram it can be seen the root cause of Waste. (Figure 6)

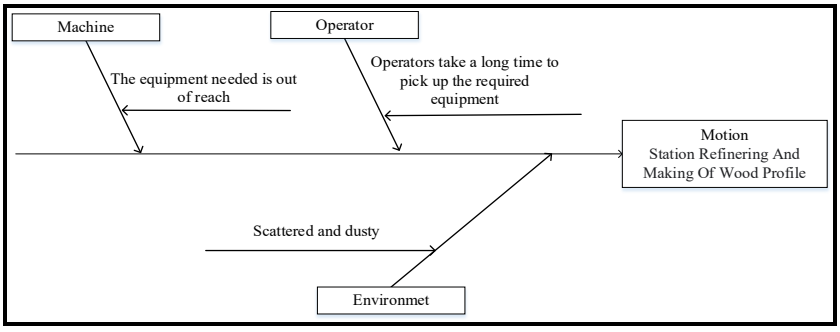


Figure 6. Fishbone Diagram Motion Station Refinering And Making Of Wood Profile

From the results of the analysis that has been done, it can be seen the causes of Waste in the production process, where the Waste must be eliminated by providing continuous improvement. The proposed improvements are:

a. Maintanance Report Card, as follows : (Table 6)

Recommendations for improvement are to make a maintenance report card so that workers can check the condition of the machine and find out the condition of the machine, if there is damage it is repaired so as not to hamper the production process. The form of the report is as follows:

Table 6. Maintanance Report Card

MAINTENANCE REPORT		
Machine :		Date :
No. Machine :		Production Unit :
No.	Component	Action
Operator Name:		
Start Time :		
Hour Finished :		
Note :		

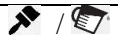
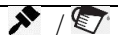
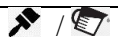
b. Make a Maintenance Procedure Sheet, as follows: (Table 7)
Recommendations for improvement to be made are to make a check sheet containing machine maintenance procedures so that there is no negligence in each maintenance procedure, in the form of a report as follows:

Table 7. Make a Maintenance Procedure Sheet

CV. TMJ (TUAH MUJOLAI)
MAINTENANCE PROCEDURE CHECKLIST

Station :
No. Machine:

No. Documentation : .....
No. Publication : .....
No. Revision : .....

Type Of Care	Method	Device	Date							Desc
LUBRICATION:			1	2	3	4	5	30	31	
Lubricate:										
Blade	Watered									
Blade drive axle	Watered									
Altitude rotary gear blade	Watered									
Board width rotary gear	Watered									
As gear Balting	Watered									
INSPECTION:										
Check engine oil	Seen by									
Check handling blade speed	Rolled									
Check eye acuity Knife	Touched									
Check the state of balting	Touched									

Check mains electricity	Seen by									
Tighten the eye bolts Knife	Rolled									
Tighten all bolts	Rolled									
CLEANING:										
Clean up trash in the area Workbench	Wiping									
Clean the trash in the eyes Knife	Wiping									
clean up trash in the area under the machine	Wiping									
DESCRIPTION: (√) Realization *** put a full line in the column if it's a holiday**		Note:				Month:				
Operator		Is Known,				Received Production Processing Assistant				

Based on the results of the analysis, a proposed improvement is made which is then described by Future Value Stream Mapping, as a mapping of the flow of material and information after repairs are made. Here is the Future Value Stream Mapping. (Figure 7)

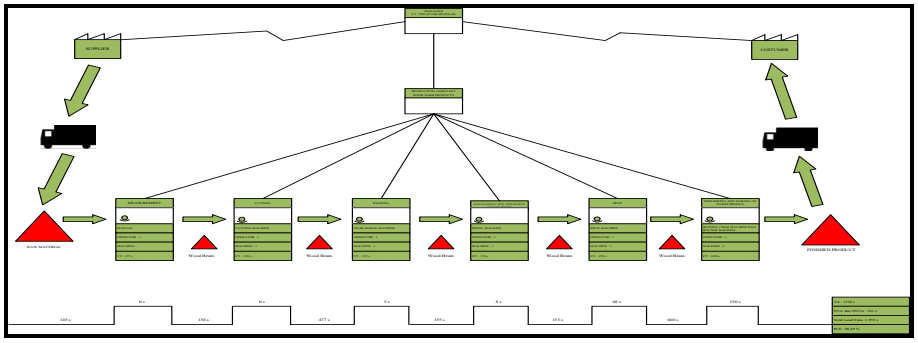


Figure 7. Future Value Stream Mapping

Process Efficiency Cycle

$$(PEC) = \frac{Value\ Added\ Time}{Total\ Lead\ Time} \text{ x } 100\ \%$$

$$= \frac{1728}{1959} \text{ x } 100\ \%$$

$$= 88{,}20\ \%$$

Comparison of the Lead Time and Process Efficiency Cycle values with the proposed conditions.(Table 8)

Table 8. Comparison

No	Value	Actual	Proposal
1	Lead Time	2.490	69,40 %
2	Process Efficiency Cycle	1.959	88,20 %

6. Conclusion

Based on the processing that has been carried out by the researcher, the conclusion that can be drawn is that the product under study is the door frame because the demand for each month is always more. From the analysis of the Current Value Stream Mapping, the known wastes are, defect, waiting, overprocessing, and motion. The cause of the Waste is analyzed using a fishbone diagram. Proposed improvements to be able to reduce or eliminate Waste that occurs is to inspect the machine before the machine is used, such as making a maintenance report card and machine maintenance procedure sheet, as well as making a production control card. After the implementation of lean manufacturing and recommendations for improvement, Future Value Stream Mapping is made, then after VSM is described, it is known that the comparison of the actual lead time value is 2,490 and the actual process efficiency cycle is 69.40%, while the proposed lead time value is 1,959 and the proposed process efficiency cycle is 88, 20%. So that after improvements are made, the production process is more efficient where the production time reaches the target and consumer demand.

References

Anastasya, Ayuni, and Ferida Yuamita., Quality Control of 330 ml Bottled Drinking Water Production Using the Failure Mode Effect Analysis (FMEA) Method at PDAM Tirta Sembada. *Journal of Applied Industrial Technology and Management 1.I*, 15-21, 2022.

Ayu, F.T.B., Engineering Improvement of Doll Production Process with Integration of Line Balancing and Value Stream Mapping Methods. *Journal of Operations Excellence*: *Journal of Applied Industrial Engineering*, 10(3), 294-303, 2018.

Azhra, F. H., Awandani, H., & Ibrahim, F. Application of Lean Thinking With Value Stream Mapping Method And VALSAT Analysis To Reduce Waste In Closer Body Steel Components. 2020.

Daulay, M., Amri, A., & Syukriah, S., Waste Analysis in the Container Unloading Process with a Lean Service Approach at Pt Pelindo I Lhokseumawe Branch. *Industrial Engineering Journal*, 10(2), 2021.

Farida, M. E., Azizah, F. N., & Hamdani, H., Implementation of Lean Manufacturing to Reduce Waste in Pivot Piece Production (Case Study of PT. Tri Jaya Teknik Karawang). *STRING (Technology Research and Innovation Writing Unit)*, 6(3), 279-288, 2022.

Febianti, E., & Kulsum, K., Analysis of the Coalescer Filter Gas Production Process Using Lean Manufacturing and Simulation Methods. *Journal of Industrial Services*, 3(2), 2018.

Fhadillah, I., Anggraeni, N. F., & Sugiarto, A. R. A., Waste Analysis At Pt. Xyz Uses 8 Wastes. *Scientific Journal of Applied Information Technology*, 6(2), 157-162, 2020.

Gaspersz, V., *Continuous Cost Reduction Through Lean Sigma*. Jakarta: PT. Main Library Gramedia, 2006.

Hasanah, T. U., Wulansari, T., Putra, T., & Fauzi, M., Application of Lean Manufacturing with Takt Time and FMEA Methods to Identify Waste in the Sterile Production Process of PT. XYZ. *JRSI (Journal of System and Industrial Engineering)*, 7(2), 89-95, 2020.

Lestari, K., & Susandi, D., Application of Lean Manufacturing to Identify Waste in the Production Process of Knitting Fabrics on the Production Floor of PT. XYZ. *In Proceedings of Industrial Research Workshop and National Seminar* (Vol. 10, No. 1, pp. 567-575), August, 2019.

Nurdiansyah, D., Fatimah, S. N., Nurwiyanti, H., & Fauzi, M., Proposed Waste Efficiency of Bed Sheet Production Process at PT. ABC Using Value Stream Mapping Method. *Bayesian Journal: Scientific Journal of Statistics and Econometrics*, 2(1), 93-106, 2022.

Ponda, H., Fatma, N., & Siswantoro, I., The Proposed Application of Lean Manufacturing Using the Value Stream Mapping (VSM) Method in Minimizing Waste in the Production Process of Motorcycle Tires in the Tire Manufacturing Industry, 2022.

Rizki, Muhammad, et al., Comparison of Four Time Series Forecasting Methods for Coal Material Supplies: Case Study of a Power Plant in Indonesia, *2021 International Congress of Advanced Technology and Engineering (ICOTEN)*. *IEEE*, 2021.

Setiawan, B., & Widyadana, I. G. A., Minimizing Waste in an Effort to Reduce Production Process Time at PT X. *Titra Journal*, 7(2), 193-200, 2019.

Yuamita, Ferida., Sarden Production Quality Control Using Failure Mode and Effect Analysis (FMEA) Method To Minimize Can Defects At PT. Maya Food Industries, *Journal of Applied Industrial Technology and Management 1.I*, 1-6, 2022.

Biography

Misda Yanti is student in Industrial Engineering Departement at Sultan Syarif Kasim State Islamic University, Indonesia

Fitriani Surayya Lubis is assistant professor Industrial Engineering Departement at Sultan Syarif Kasim State Islamic University, Indonesia

Nazaruddin is assistant professor Industrial Engineering Departement at Sultan Syarif Kasim State Islamic University, Indonesia

Muhammad Rizki is an Assistant Professor in Sultan Syarif Kasim State Islamic University at Industrial Engineering Department. His master's degree was in Industrial Engineering Department from University of Indonesia, and he got a dual degree in Master Business and Administration from National Taiwan University of Science and Technology in Taiwan. He is currently a member of IEOM as a faculty advisor and published several articles in the international conference about Simulation Modeling, Healthcare Management, and industrial engineering area

Silvia is assistant professor Industrial Engineering Departement at Sultan Syarif Kasim State Islamic University, Indonesia

Sarbaini is assistant professor Industrial Engineering Departement at Sultan Syarif Kasim State Islamic University, Indonesia