ANALYSIS OF TOTAL PRODUCTIVE MAINTENANCE (TPM) IN SA-9 CAPSULE FILLING MACHINES USING THE OVERALL EQUIPMENT EFFECTIVENESS AND SIX BIG LOSSES METHODS AT PT. XYZ

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Abstract. PT XYZ is a company engaged in herbal medicines, cosmetics, household supplies, and medical equipment. The products produced by PT XYZ are supported by modern infrastructure in terms of equipment, operation, and control. Problems encountered at PT XYZ machines on the production floor are inseparable from problems related to machine effectiveness caused by machine damage. One of the machines that is often damaged and has the highest total breakdown time is the SA-9 capsule filling machine. This causes machine downtime and can hinder the production process so that production targets are not achieved. One approach to overcome these problems, namely with Total Productive Maintenance (TPM) which is measured through Overall Equipment Effectiveness (OEE) and Six Big losses. This study aims to calculate the value of overall equipment effectiveness, calculate the value of the six big losses factor, and determine the root cause of the dominant problem of the six big losses factor on the SA-9 capsule filling machine at PT XYZ. The calculation results show that the OEE value of the SA-9 capsule filling machine is below the international standard, which is 59.8%. The dominant factors that cause low machine effectiveness are reduced speed losses of 27.8% and breakdown losses of 14.4%.

Keywords: Total Productive Maintenance, Overall Equipment Effectiveness, Six Big losses, Reduced speed losses, Breakdown losses

1. Introduction

Increasing productivity is very important for companies to gain success in the business process [1]. One of the efforts to increase productivity in the company is by evaluating the performance of production facilities [2]. In general, problems from production facilities that cause production to be disrupted or stopped altogether can be categorized into three, namely due to human, machine and environmental factors [3]. Efforts to solve these production facility problems can be done by intensively evaluating and maintaining production equipment or machinery, so that it can be used as optimally as possible.

PT XYZ is a company engaged in herbal medicines, cosmetics, household supplies, and medical equipment supplies. Based on observations made at PT XYZ, it is known that the machines on the production floor are inseparable from problems related to machine effectiveness caused by machine damage. A machine that experiences downtime, speed losses, or produces defective products indicates that the machine is not working effectively [4]. One of the machines that often occurs damage and has the most total breakdown time is the SA-9 capsule filling machine. This causes machine downtime and can hinder the production process so that production targets are not achieved.

Alternative equipment management that can be done to increase productivity and effective maintenance is Total Productive Maintenance (TPM) [5]. TPM is a program concept about maintenance that involves all workers through small group activities [6]. The purpose of this TPM is to achieve ideal performance and achieve zero loss, which means no defects, no breakdowns, no accidents, no waste in the production process or changeover process [6]. TPM emphasizes the utilization and involvement of human resources and preventive maintenance systems to maximize equipment effectiveness by involving all departments and functional organizations [7]. TPM is an innovative approach in maintaining machinery and equipment by optimizing equipment effectiveness, reducing/eliminating sudden breakdowns and performing operator self maintenance [8]. Increasing productivity by using TPM principles will minimize losses to the company [9]. To help realize good productive maintenance, it is necessary to measure the effectiveness of a machine using one of the methods in maintenance activities, namely, the Overall Equipment Effectiveness (OEE) method and Six Big Losses.

This research was conducted with the aim of analyzing PT XYZ related to TPM, knowing the OEE value, and knowing the value of six big losses. Measurements are made using the OEE method which then becomes the basis for analysis. The analysis is then used as a reference in identifying six big losses to determine the types of losses that are most dominant and affect the decrease in the effectiveness of the machine, so that the company can take action to avoid these losses.

2. Literature Review

2.1. Total Productive Maintenance (TPM)

TPM is a strategy to enlarge the company to increase effectiveness in the production environment, prioritizing to increase effectiveness in production machinery and equipment [6]. Total Productive Maintenance (TPM) emphasizes the utilization and involvement of human resources and preventive maintenance systems to maximize equipment effectiveness by involving all departments and functional organizations [7]. TPM aims to achieve ideal performance by achieving zero loss, which means no defects, no damage, no waste in the production process or during turnover [6].

2.2. Overall Equipment Effectiveness (OEE)

Overall Equipment Effectiveness (OEE) is a method of measuring the effectiveness of the use of a machine or equipment or system by involving several points of view in the measurement process [6]. In the calculation of OEE, there are 3 important components that underlie the calculation of the equipment efficiency index and affect the effectiveness of the machine, namely Availability, performance, and quality. The equation for calculating the Overall Equipment Efficiency (OEE) value is as follows [6]:

$$OEE = Availability\ Rate \times Performance\ Efficiency\ Rate \times Quality\ Rate \quad (1)$$

The standard OEE value that applies internationally according to the Japan Institute of Plant Maintenance (JIPM) is ≥ 85% so that the ideal composition to achieve this value is as follows [6]:

- Availability Rate ≥ 90%
- Performance Efficiency Rate ≥ 95% and
- Quality Rate ≥ 99%

2.3.Availability

Availability is a parameter that shows the percentage of equipment availability time when performing operations compared to the overall time [10]. This availability takes into account Availability loss, which includes any event that stops planned production for a considerable period of time. Availability value can be calculated with the following formula:

$$Availability = \frac{Run\ Time}{Planned\ production\ time}\ x\ 100\% \quad (2)$$

2.4.Performance efficiency

Performance Efficiency is a ratio that describes the ability of equipment to produce goods [11]. There are three important factors needed to calculate Performance Efficiency, namely ideal cycle time, total count, and run time. Ideal cycle time is the time used by the machine to complete one unit of product with ideal machine speed. Ideal here is a speed that is comfortable for workers and produces the planned production output. The Performance Efficiency Rate value can be calculated using the following equation [6].

$$Performance\ Efficiency = \frac{ideal\ cycle\ time\ x\ total\ count}{run\ time}\ x\ 100\% \quad (3)$$

2.5. Quality rate

Quality Rate is a ratio that describes the machine's ability to produce products according to predetermined specifications [11]. The data needed in calculating the Quality Rate are total production and total defects. The Quality Rate value can be calculated using the equation below.

$$Quality\ Rate = \frac{Good\ count}{Total\ count} \quad (4)$$

This good count is the production output that has been reduced by reject products. The good count value can be calculated with the following equation.

$$Good\ count = Total\ count - reject\ product \quad (5)$$

2.6. Six big losses

There are 6 losses that cause low performance of the equipment known as six big losses [6]. The purpose of calculating the six big losses is to determine the overall effectiveness value. From this OEE value, steps can be taken to improve or maintain the value. The following are the six big losses [6]:

2.6.1 Breakdown losses

Breakdown losses are losses caused by unexpected machine failures that require certain handling [10]. To calculate breakdown losses can use the following equation [12].

$$Breakdown\ losses = \frac{Total\ breakdown}{Loading\ time}\ x\ 100\% \quad (6)$$

2.6.2 Setup and adjustment losses

Setup and adjustment losses are categorized as losses due to setup time which results in the final product produced not in accordance with the company plan [1]. Setup and adjustment Losses can be calculated using equation [1].

$$Setup\ and\ adjustment\ losses = \frac{Setup\ time}{Loading\ time}\ x\ 100\% \quad (7)$$

2.6.3 Idling and minor stoppage losses

Idling and minor stoppage are losses caused by temporary problems or problems that take a short time to resolve [10]. An example is a bottleneck due to a stuck product. The problem can be resolved when the operator removes the stuck product, and the process can run again afterwards. Idling and minor stoppage can be calculated using equation [13].

$$Idling\ and\ mirror\ stoppage\ = \frac{Idling\ and\ Mirror\ Stoppage}{Loading\ time}\ x\ 100\% \qquad (8)$$

2.6.4 Reduced speed losses

Reduced speed losses are losses due to the machine not working optimally (decrease in operating speed) occurs if the actual operating speed of the machine/equipment is less than the optimal speed or designed machine speed [1]. Reduced Speed Losses can be calculated using equation [14].

$$Reduced\ speed\ losses\ = \frac{Good\ product}{Actual\ output} - \frac{Good\ product}{Max\ output}\ x\ 100\% \qquad (9)$$

2.6.5 Reject in process

Reject in process is a loss where the quality of the product does not match the request [10]. Losses that occur in this category will not pass quality control and cannot be reworked. Reject in Process can be calculated using equation [14].

$$Reject\ in\ Process\ Losses\ = \frac{\frac{Reject}{Actual\ output\ permenit}}{Total\ production\ time}\ x\ 100\% \qquad (10)$$

2.6.6 Reject on startup

Reject on startup is a loss that occurs because the quality of a product does not match when the machine is just starting its production time [14]. This event can occur because the machine heating process is lacking. Reject on Startup can be calculated using equation [14].

$$Reject\ on\ startup\ losses\ = \frac{\frac{Reject\ on\ startup}{Actual\ output\ permenit}}{Total\ production\ time}\ x\ 100\% \qquad (11)$$

2.7. Pareto Chart

Pareto chart is an image that sorts a classification of data from left to right in order of highest to lowest rank [15]. Pareto chart help to solve the most important problems to be resolved immediately or the highest rank and to problems that do not need to be resolved or the lowest rank and by using pareto chart, it can be seen which problems are dominant and less dominant problems. Pareto chart can also be used to find 20% of the types of defects that constitute 80% of the defects of the entire production process [15].

3. Method

This research was conducted at PT XYZ which is located in Bogor, West Java. PT XYZ is a company engaged in herbal medicines, cosmetics, household supplies, and medical equipment. The object of this research is SA-9 capsule filling machine. This research was conducted through several stages, starting with making observations or direct observations to the field to find out the production flow at PT XYZ in order to find what problems occur in the production line. Followed by determining the research topic based on field observations and literature studies that have been carried out processing research data. After that, identify what data is needed in the research. The data that has been collected is then processed using a predetermined method. In this study, the data is processed to obtain the overall equipment effectiveness (OEE) value and the value of the six big losses factor as a reference to determine the types of losses that are most dominant and affect the decrease in machine effectiveness.

4. Result

4.1. Data of SA-9 Capsule Filling Machine

The data of SA-9 capsule filling machine are primary data and secondary data. Time data on the SA-9 capsule filling machine from January 2 - February 3, 2023 which can be seen in Table 1.

Table 1. Time Data of SA-9 Capsule Filling Machine

Week	Number of workdays	Number of working shifts	Working Time per shift (minutes)	Rest Time per shift (minutes)	Cleaning time per shift (minutes)	Quality Check time per shift (minutes)	Setup time per shift (minutes)	Breakdown Time per Week (minutes)	Ideal Cycle Time (seconds)	Planned Downtime (minutes)
1	6	3	480	30	20	30	10	945	2,5	0
2	6	3	480	30	20	30	10	1.175	2,5	0
3	6	3	480	30	20	30	10	1.335	2,5	0
4	6	3	480	30	20	30	10	1.280	2,5	0
5	6	3	480	30	20	30	10	1.115	2,5	0

Data on total production output and total rejected products produced by SA-9 capsule filling machine from January 2 - February 3, 2023 can be seen in Table 2.

Table 2 Production Output Data of SA-9 Capsule Filling Machine

Week	Output (pcs)	Reject (pcs)
1	1.328.817	17.276
2	1.315.337	19.990
3	1.298.692	19.373
4	1.291.101	18.568
5	1.319.318	20.929

4.2. Calculation of availability

The results of the availability calculation on the SA-9 capsule filling machine from January 2 - February 3, 2023 can be seen in Table 3.

Table 3 Availability of SA 9 Capsule Filling Machine

Week	Runtime (minutes)	Planed Production Time (minutes)	*Availability*
1	6075	8100	75,0%
2	5845	8100	72,2%
3	5685	8100	70,2%
4	5740	8100	70,9%
5	5905	8100	72,9%
Average			72,2%

Table 3. contains data on the level of availability of the SA-9 capsule filling machine from January 2 to February 3, 2023 at PT XYZ which has an average availability of 72.2%. Based on the Japan Institute of Plant Maintenance (JIPM) that the average availability value can be said to be not ideal because ≤ 90%.

4.3. Calculation of performance efficiency

The results of the calculation of performance efficiency on the SA-9 capsule filling machine from January 2 - February 3, 2023 can be seen in Table 4.

Table 4 Performance Efficiency of SA-9 Capsule Filling Machine

Week	Ideal Cycle Time (seconds)	Total Count (pcs)	Run Time (seconds)	Performance Eficiency
1	0,225	1.328.817	364.500	82,0%
2	0,225	1.315.337	350.700	84,4%
3	0,225	1.298.692	341.100	85,7%
4	0,225	1.291.101	344.400	84,3%
5	0,225	1.319.318	354.300	83,8%
Average				84,0%

Table 4. contains data on the level of performance efficiency on the SA-9 capsule filling machine from January 2 to February 3, 2023 at PT XYZ which has an average performance efficiency of 84%. Based on the Japan Institute of Plant Maintenance (JIPM) that the average performance efficiency value can be said to be not ideal because ≤ 95%.

4.4. Calculation of quality rate

The results of the quality rate calculation on the SA-9 capsule filling machine from January 2 - February 3, 2023 can be seen in Table 5.

Table 5 Quality Rate of SA-9 Capsule Filling Machine

Week	Total Count (pcs)	Reject (pcs)	Good Count (pcs)	*Quality Rate*
1	1.328.817	17.276	1.311.541	98,7%
2	1.315.337	19.990	1.295.347	98,5%
3	1.298.692	19.373	1.279.319	98,5%
4	1.291.101	18.568	1.272.533	98,6%
5	1.319.318	20.929	1.298.389	98,4%
Average				98,5%

Table 5 contains data on the quality rate level on the SA-9 capsule filling machine from January 2 to February 3, 2023 at PT XYZ which has an average quality rate of 98.5%. Based on the Japan Institute of Plant Maintenance (JIPM), the average quality rate value can be said to be not ideal because ≤ 99%.

4.5. Calculation of overall equipment effectiveness (OEE)

The results of the OEE calculation on the SA-9 capsule filling machine can be seen in Table 6.

Table 6 OEE of SA-9 Capsule Filling Machine

Week	*Availability*	Performance	*Quality rate*	OEE
1	75,0%	82,0%	98,7%	60,7%
2	72,2%	84,4%	98,5%	60,0%
3	70,2%	85,7%	98,5%	59,2%
4	70,9%	84,3%	98,6%	58,9%
5	72,9%	83,8%	98,4%	60,1%
Average				59,8%

Table 6 contains data on the OEE level of the SA-9 capsule filling machine from January 2 to February 3, 2023 at PT XYZ which has an average OEE of 59.8%. Based on the Japan Institute of Plant Maintenance (JIPM), the average OEE value can be said to be not ideal because ≤ 85%. Comparison of the OEE value of the SA-9 capsule filling machine with the ideal OEE value based on the Japan Institute of Plant Maintenance (JIPM) standard can be seen in Figure 1.

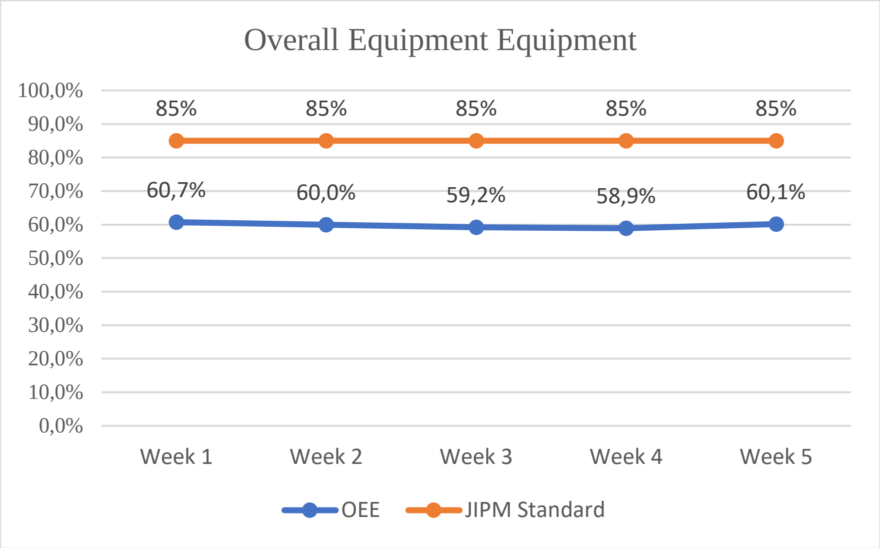

Figure 1 Comparison of OEE Value Based on JIPM

Based on Figure 1 above, it can be seen that the largest OEE value of the SA-9 capsule filling machine is the first week of 60.7% while the smallest value is the fourth week of 58.9%. The average OEE value of the SA-9 capsule filling machine is 59.8%. The OEE value of the SA-9 capsule filling machine can be said to be not ideal because the OEE value of the SA-9 capsule filling machine from January 2 to February 3, 2023 is still below the standard OEE value based on JIPM.

4.6. Calculation of six big losses

The results of the calculation of the six big losses on the SA-9 capsule filling machine can be seen in Table 7.

Table 7 Six Big Losses of SA-9 Capsule Filling Machine

Types of losses	Week 1	Week 2	Week 3	Week 4	Week 5	Average
Breakdown Losses	11,7%	14,5%	16,5%	15,8%	13,8%	14,4%
Setup and adjustment losses	2,2%	2,2%	2,2%	2,2%	2,2%	2,2%
Idling and minor stoppage losses	0%	0%	0%	0%	0%	0%
Reduced speed Losses	26,6%	27,3%	28,2%	28,6%	27,1%	27,8%
Reject in process	1,3%	1,5%	1,5%	1,4%	1,6%	1,5%
Reject on startup	0%	0%	0%	0%	0%	0%

Based on table 7 above, it can be seen that the average value of the six big losses of the SA-9 capsule filling machine on January 2 to February 3, 2023 is reduced speed losses and breakdown losses with a value of 27.8% and 14.4%.

The analysis of the six big losses aims to find out what factors of the six big losses factors make the biggest contribution that results in the low effectiveness of the SA-9 capsule filling machine. Comparison table of current performance with six big losses on SA-9 capsule filling machine from January 2 to February 3, 2023 can be seen in Table 8.

Table 8 Comparison of Current Performance with the Six Big Losses

Types of Losses	Average Losses	Current Performance
Reduced speed losses	27,8%	72,2%
Breakdown losses	14,4%	85,6%
Setup and adjustment losses	2,2%	97,8%
Reject in process	1,5%	98,5%
Idling and minor stoppage losses	0%	100%
Reject on startup	0%	100%

The comparison diagram of the average value of the percentage of six big losses and the current performance of the SA-9 capsule filling machine from January 2 to February 3, 2023 can be seen in Figure 2.

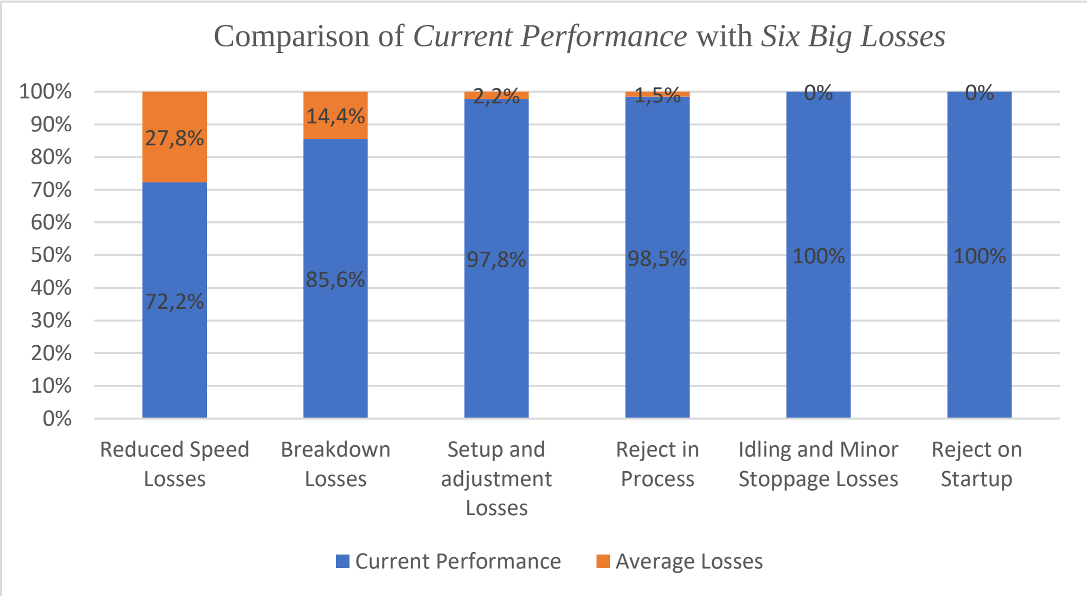

Figure 2. Comparison of Current Performance with Six Big Losses

Based on Figure 2 above, there are 2 types of losses that dominate, namely reduced speed losses and breakdown losses. Reduced speed losses have an average loss of 27.8% which means that the current speed performance of the SA-9 capsule filling machine is 72.2%. While breakdown losses have an average loss of 14.4% which means the current performance of the SA-9 capsule filling machine is 85.6%. The value of reduced speed is due to the unstable rotation of the disctray and the unstable capsule magazine that causes the capsule drop process to be messy. While breakdown losses are due to machine damage to the trigger, capsule magazine, and gear hopper. If these losses are allowed, the impact that will be borne by the company is that losses will increase every day, and production time is reduced due to frequent downtime so that production capacity decreases. Therefore, it is necessary to analyze and improve efforts to overcome this.

4.7. Pareto chart of six big losses

Pareto chart are used to determine and analyze the causes of problems and obstacles that occur most dominantly in the SA-9 capsule filling machine. The pareto chart in this study uses data on the average value of the percentage of losses that occur in the SA-9 capsule filling machine. The image of the pareto chart on the SA-9 filling machine from January 2 - February 3, 2023 can be seen in Figure 3.

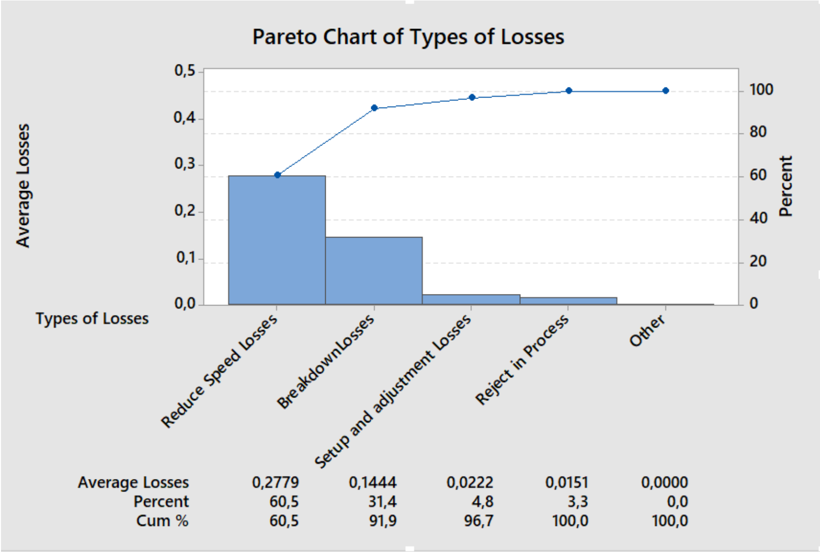

Figure 3. Pareto chart of six big losses

Based on the pareto diagram in Figure 3, it explains that the biggest factor affecting the losses that occur in the SA-9 capsule filling machine at PT XYZ. The results shown in the pareto diagram are using the 80/20 principle where 80% of the low value of machine effectiveness is caused by 20% of losses. Pareto results show that the most losses are reduced speed losses with a value of 60.5%, and Breakdown losses with a value of 31.4%. Reduced speed losses are caused because the capsule magazine and disctray are unstable so that the speed of the machine used decreases or is not in accordance with the standard or the machine runs slower than the ideal time and can result in the final product not in accordance with the demand from the company. And Breakdown losses can be caused by damage to the trigger and gear hopper so that the breakdown time value is getting higher. So this loss is chosen as a priority for improvement efforts so that later it will minimize losses and can increase the effectiveness of the production process on the SA-9 capsule filling machine.

4.8. Fishbone Diagram

After calculating and analyzing losses, the next step is to explore the root causes of the problem. The diagram used to identify the causes of a problem is the Fishbone diagram. The causes of this problem come from various sources such as humans, materials, machines, methods, environment and measurements [16]. Based on the calculation of the six big losses above, the dominant factors that need to be analyzed are reduced speed losses and breakdown losses.

4.8.1 Fishbone diagram of reduced speed losses

Fishbone diagram for reduced speed losses in SA-9 capsule filling machine can be seen in Figure 4. Based on the Fishbone diagram in Figure 4, it can be seen that there are five factors that can cause the value of reduced speed losses, namely man, machine, material, method, and environment. Problems in the man factor are setting errors and operations not in accordance with the SOP. The problem in the machine factor is the unstable capsule stopper because the capsule stopper is damaged. This caused the process of inserting capsules into the disctray to become messy.

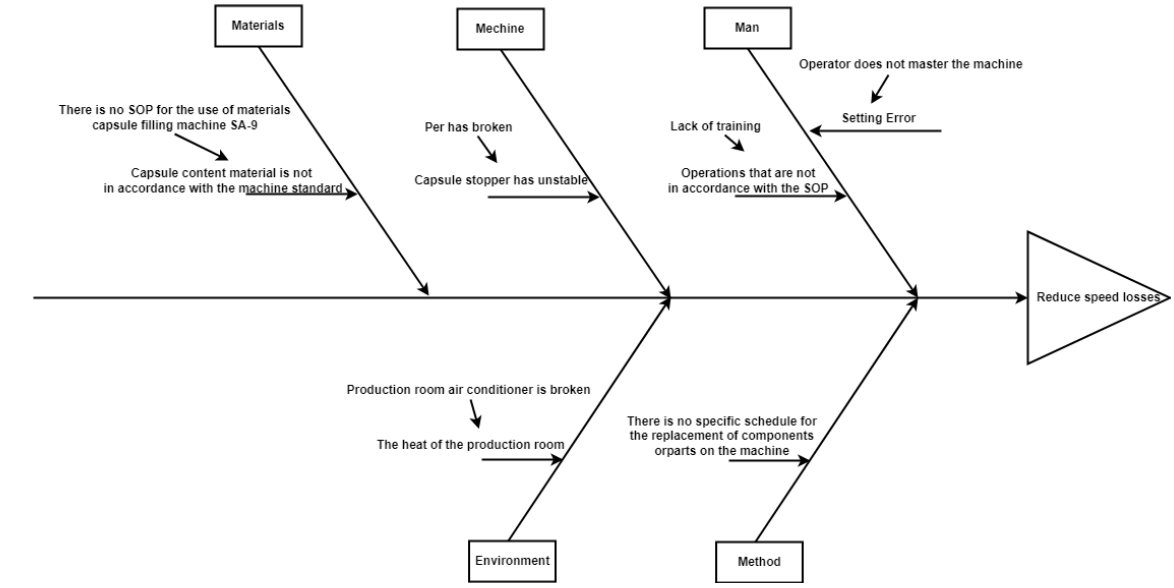

Figure 4. Fishbone Diagram of Loss of Reduced Speed

The problem in the material factor is that the capsule filling material is not in accordance with the machine standard because there is no SOP for the use of capsule filling material in the SA-9 capsule filling machine. This can cause the gear hopper to wear out easily. The problem with the method factor is that there is no specific schedule for replacing components or parts on the machine. This can cause wear and tear of machine components and sudden damage. And the problem with the environment factor is that the production room is hot because the air conditioner in the room is broken.

4.8.2. Fishbone diagram of breakdown losses

Fishbone diagram for breakdown losses in SA-9 capsule filling machine can be seen in Figure 5

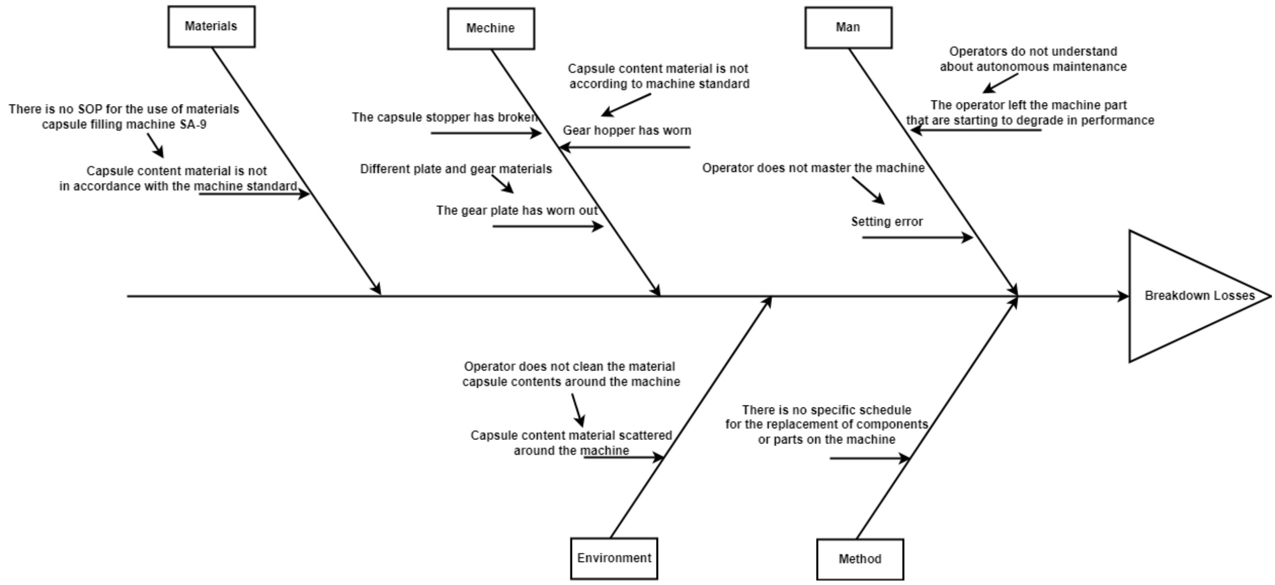

Figure 5 Fishbone Diagram of Breakdown Losses

Based on the Fishbone diagram in Figure 5, it can be seen that there are five factors that can cause the value of Breakdown losses, namely man, machine, material, method, and environment.

Problems in the man factor are setting errors and operators letting machine parts that begin to decline in performance. Problems in the machine factor, namely the platuk gear wears out due to different platuk and gear materials, the gear hopper wears out due to the capsule content material not in accordance with the machine standard, the capsule stopper is damaged. This can cause the machine to not run so repairs are needed. The problem in the material factor is that the capsule filling material is not in accordance with the machine standard because there is no SOP for the use of capsule filling material in the SA-9 capsule filling machine. This can cause the gear hopper to wear out easily. The problem in the method factor is that there is no specific schedule for replacing components or parts on the machine. This can cause wear and tear of machine components and sudden damage. And the problem in the environment factor is that the capsule material is scattered around the machine because the operator does not clean the capsule content material around the machine.

4.9. Proposed Improvements

The proposed improvements in this study are carried out to reduce the high level of reduced speed losses and Breakdown losses on the capsule filling machine.

4.9.1. Proposed improvements reduced speed losses

Proposed improvements to reduce the high level of reduced speed losses on the SA-9 capsule filling machine can be shown in Table 9.

Table 9 Usulan Perbaikan Reduced Speed Losses

Factor	Problem	Proposed Improvements
Man	Setting error	Operators are retrained on machine settings
	Operation that is not in accordance with the SOP	Operators are retrained on the correct operation of the machine in accordance with the SOP.
Machine	Capsule stopper has become unstable	Checking and replacing the capsule stopper periodically
Materials	Capsule content material does not conform to the machine standard	Making SOP regarding the use of capsule filling material on SA-9 capsule filling machine
Method	There is no specific schedule for the replacement of components or parts on the machine	Make rules both in writing and verbally regarding rules or component replacement schedules
Environment	production room that is hot	Checking and repairing room air conditioners

4.9.2 Proposed improvements breakdown losses

Proposed improvements to reduce the high level of breakdown losses on capsule filling machines can be shown in Table 11.

Factor	Problem	Proposed Improvements
Man	Setting error	Provide retraining to operators on machine settings
	Operators leave machine parts that are starting to degrade in performance	Provide training to operators on autonomous maintenance, such as machine cleaning, oil lubrication, and inspection.
Machine	Gear plate has worn out	Replacing the plate with a plate of the same material as the gear
	Gear hopper has worn out	Make SOP regarding capsule filling materials in accordance with machine standards
	Capsule stopper has broken	Checking and replacing the capsule stopper periodically
Material	Capsule content material does not conform to the machine standard	Making SOP regarding the use of capsule filling material on SA-9 capsule filling machine
Method	There is no specific schedule for the replacement of components or parts on the machine	Make rules both in writing and verbally regarding rules or component replacement schedules
Environment	Capsule contents scattered around the machine	Emphasize operator discipline in cleaning the machine area during operation.

5. Conclusion

The SA-9 capsule filling machine from January 2 to February 3, 2023 has an average availability value of 72.2%, an average performance efficiency value of 84%, an average quality rate of 98.5, and an average OEE value of 59.8%. The average value of OEE still does not meet the JIPM standard. Based on the results of the Six big losses analysis and Pareto diagram, it shows that the most dominant losses on the SA-9 capsule filling machine are reduced speed losses with an average value of 27.8% and breakdown losses with an average value of 14.4%. Problems in the man factor are setting errors and operations not in accordance with the SOP. Problems in the machine factor are worn platuk gear, worn hopper gear, and broken capsule stopper. Problems in the material factor, namely the capsule content material is not in accordance with the machine standard. The problem with the method factor is that there is no specific schedule for replacing components or parts on the machine. And the problem with the environment factor is that the room is hot and the capsule contents are scattered around the machine. Proposed improvements to the SA-9 capsule filling machine from the results of the analysis are to provide retraining to operators regarding machine settings and autonomous maintenance, replace the platuk with a platuk of the same material as the gear, make an SOP regarding the use of capsule content material in the SA-9 capsule filling machine, check and replace the capsule stopper regularly, make rules both written and verbal regarding the rules or schedule for replacing components, check and repair the room air conditioner, and emphasize operator discipline in cleaning the machine area while operating.

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