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WASTE FACTORS ANALYSIS IN INSTANT NOODLE PRODUCTION PROCESS AT PT PRAKARSA ALAM SEGAR BEKASI: A LEAN SIX SIGMA APPROACH

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Abstract. PT Prakarsa Alam Segar is one of the largest noodle-making companies in Indonesia. In its production activities, waste is one of the main problems of PT Prakarsa Alam Segar. This study aims to determine the activities that result in waste and the right solution to minimize waste during the production process. This study focuses on the use of flour raw materials in the production process in the Noodle 2 department. This research is a descriptive qualitative research conducted using the Lean Six Sigma (LSS) approach with the DMAIC (Define, Measure, Analyze, Improve, and Control) method, a framework to fix problematic processes. The analysis techniques used included cause-effect diagrams, SIPOC diagrams, and FMEA. The results showed that the failure and waste of flour material during the instant noodle production process in the Noodle 2 department was related to 3 processes on the production line, namely: (1) Roll Press, (2) Cutting, and (3) Frying.

Keywords: waste, lean six sigma, DMAIC

INTRODUCTION

The development of industry in Indonesia is very fast, Indonesia has become the largest manufacturing industry base in ASEAN with a contribution of 20.27% to the national economy. The development of the manufacturing industry in Indonesia is currently able to shift the role of commodity based to manufacturing based. In addition, according to Agus Gumiwan (minister of industry), the manufacturing industry is considered more productive and can provide wide-ranging effects so as to increase the added value of raw materials, generate the largest source of foreign exchange, and the largest contributor to taxes and foreign exchange. The Ministry of Industry also noted several sectors that had a performance percentage above the National GDP, including the metal industry at 9.94%, the textile and apparel industry at 7.53%, and the transportation equipment industry at 6.3%. This is also influenced by the increasing purchasing power of the people for various types of products, so that the production process will increase according to demand.

With this intense competition, companies must implement effective and efficient production processes so that they can produce quality products, at the lowest possible prices so as to provide satisfaction to consumers. Companies can obtain maximum profits and minimize losses by paying attention to their business processes,

PT. Prakarsa Alam Segar or currently known as PT. PAS, which is located in the city of Bekasi, is one of the largest instant noodle producers in Indonesia, which was founded in 2003 with the brand "Mie Sedap". PT PAS is a manufacturing company that is part of the Wings Group. In its production activities PT. Prakarsa Alam Segar cannot be separated from productivity

problems, high productivity will create efficiency in the company's operational activities, where the level of productivity itself is influenced by the performance of the production process. Therefore the company must pay attention to the applied production process so as to increase its productivity. It can be seen in general that the production process has the same meaning as the integration of sequences of labor, materials, information, work methods, and machines or equipment, in one environment in order to produce added value for products so that they can be sold at competitive prices in the market (Rosnani Ginting. 2004).

Productivity is a measure that states how resources are managed and utilized to achieve optimal results (Herjanto, 1999). In an effort to increase productivity, everything related to inefficiency activities needs to be reduced or even eliminated. This inefficiency activity is often caused by non-value added or often called waste. In an effort to increase productivity, this waste will have a detrimental effect on the company.

In the initial observations, the researchers found a performance discrepancy in the production process in the Noodle 2 Department. In the October-December 2020 report, PT. The Alam Segar Initiative is experiencing a waste of production in the manufacture of instant noodles. The waste that occurs in the noodle production process is in the form of excessive use of raw materials (flour). it is known that the data on the withdrawal of flour material in the last 3 months from October 2020 to December 2020 can be seen that the withdrawal of flour material in excess, of course this results in considerable waste, the total waste of flour use for the three months above is 8196 kg, of course this has exceeded the limit tolerance given by the company. From the data above, the researcher made initial observations and found some waste in the form of defects and inappropriate processing. The defects occur in the frying process and in the noodle cutting process, while Inappropriate Processing occurs in the rolling press process.

Defects in the noodle frying process occur when the temperature used is not in accordance with predetermined standards, namely 145-147 0C. what if the temperature is too high it will cause the noodles to burn, while the temperature is too low will cause the noodles to be raw. Then in the cutting process, it is caused by a synchronous after steam box (steaming using hot steam) the sensor reads abnormally so that when the noodles go down they are pinched by asbar after stem which causes the noodles to split in 2 and become MB (the company's term for wet noodle waste) Inappropriate processing What happens in the roll press process is the thickness of the dough that often changes, the specified standard is 1.15-1.20mm, if the thickness of the dough sheet in the roll press is under (less) than the specified standard, it will result in less noodle weight and if the thickness sheet of noodle dough is rolled press over (exceeds) a predetermined standard, the weight of the noodles becomes excessive (standard weight of noodles is 60g +- 3) and the effect is that the production results can be pulled out and become waste, if this abnormal action is allowed to drag on it will cause a loss. This has shown a deviation and effective control measures are needed so as to achieve the desired process standards by the company. It is interesting to be researched by the author on how to reduce or even eliminate the wast

The lean six sigma method is a systematic approach to defining and eliminating waste or non-value added activities through continuous improvement to achieve six sigma performance levels. Companies can fix problems that occur during the production process to avoid losses due to waste. A company is said to be qualified if it has a good production system with a controlled process. This is like research that has been done before, which is applying lean to

reduce waste (Kusmayadi and Vikaliana, 2021). To meet these objectives, the Lean Six Sigma approach is used, through the Define, Measure, Analyze Improve, and Control (DMAIC) method in the Lean Six Sigma approach, the company can identify waste that occurs along the value stream, namely activities that do not provide value. added (non-value added) such as the number of defects that occur, so that it will increase the speed of the process and the quality of production in the company (Aditya et al, 2014). Thus, it is expected to increase profits and will result in decreased costs incurred.

Based on that problems, this study aims to determine the activities that result in waste and the right solution to minimize waste during the production process. This study focuses on the use of flour raw materials in the production process in the Noodle 2 department.

LITERATURE REVIEW

Waste

The main goal of a lean system is to reduce waste. Waste or young in Japanese is anything that does not add value. Waste is something that customers don't want to pay for. Hines and Taylor (2000) reaffirmed that waste means non-value added activities. There are seven types of waste defined by Shigeo Shingo (1981, 1988), including the following:

1. Overproduction, producing too much more than customer needs or producing faster than customer needs which causes excess inventory.
2. Defects, which are included as defects can be in the form of documentation errors, problems with product quality, or poor delivery performance.
3. Unnecessary Inventory, excess storage and delay of materials and products resulting in increased costs and decreased quality of service to customers.
4. Inappropriate processing, such as errors in using tools while working so as to increase the possibility of making mistakes in the production process.
5. Excessive transportation, can be in the form of time, effort, and costs due to excessive movement of workers, flow of information, and or product materials.
6. Waiting, not doing activities (waiting) for workers, information and goods for a long time and has an impact on poor process flow and increased lead time.
7. Unnecessary motions, all movements of people or machines that do not add value to the goods and services to be delivered to customers but only add cost and time.

Six sigma

The six sigma method is often used by companies to control product quality by minimizing the number of defects or defects. The six sigma method will focus on defects and variations, starting with the stage of identifying critical elements of quality to taking corrective steps for defects or defects that occur. Steps to reduce defects or defects are carried out systematically by defining, measuring, analyzing, improving, and controlling. This step is known as the 5-phase DMAIC (Paul, 1999). DMAIC is carried out systematically based on science and facts towards the six sigma target of 3.4 DPMO (defects per million opportunities) and of course increasing the profitability of the company (Vanany et al, 2007).

Lean six sigma

The principle of lean six sigma is that all activities that cause critical to quality to consumers and things that cause long waste delays in each process are excellent

opportunities/opportunities to make improvements and improvements in terms of cost, quality, capital, and lead time. (George, 2002). Lean six sigma is a combination of lean and six sigma defined as a business philosophy, a systematic approach to identify and eliminate waste or non-value added activities through continuous improvement to radically achieve performance levels Six Sigma, by flowing products (materials work-in-process, output) and information using the Attract system from internal and external customers to pursue excellence and perfection in the form of producing only 3.4% defects for every one million opportunity or operation (Gaspersz, 2010). 2007). Integration between lean and six sigma will improve business and industrial performance through increased speed (shorter cycle time) and accuracy (zero defects). Lean approach will reveal non value added and value added and create value added throughout the value stream process, while six sigma will reduce variation in value added (Gaspersz, 2007). There are five stages in the implementation of quality control with six sigma. The following are the stages of implementing quality control with six sigma:

1. Define, this stage defines several things related to making an output process flow diagram. These things are made in accordance with the action plans that must be carried out to carry out the improvement of each stage of the key business process. Each action plan must follow RHUMBA: Realistic (realistic), Humanistic (attention to human aspects), Understandable (can be understood), measurable (can be measured), Behavioral (can be broken down into more specific actions). Good action plans can be written in 5W+2H form, in the following sequences: What (what action plan will be carried out), When (period of time the action will be implemented), Where (in which stage of the process the action plan will be implemented). will be implemented), Who (who will be responsible for implementing the action plan), Why (why the action plan was chosen), How (how the action plan will be implemented), and How-Much (how much will it cost to implement the action plan). the action plan) (Harry et al, 2000). At this stage it will be done using SIPOC diagrams and Value Stream Mapping.
2. Measure, is the stage of measuring the problem that has been defined to be solved. At this stage there is data collection which then measures the characteristics and capabilities of the current process to determine what steps should be taken to make improvements and further improvements. The process steps can use a process flowchart (process flowchart). Then carried out measurements that are strengthened, record the results on process control cards (process control cards), and conduct an analysis of process capabilities in the short and long term. At the measure stage, there are three important things in this measurement step, namely selecting key critical-to-quality (CTQ) characteristics that are directly related to customers, measuring data at the outcome level and measuring process performance (Harry et al, 2000). At this stage, the calculation of the amount of waste will be carried out using the FMEA (Failure Mode and Effect Analysis) method.
3. Analysis, at the analysis stage is the stage to find a solution to solve the problem based on the root cause that has been identified. At this stage there are two important things in the analysis step, namely determining process capabilities and identifying sources of variation. Analysis of the capability should only be carried out if the process is in a stable condition (Juran, 1993). The purpose of this stage is to identify what steps are needed to be carried out in improving a process and reducing the main sources of variation. The results obtained in this stage, can be used to modify the boundaries of a better process, modify certain steps of the process, and/or choose better materials and equipment. According to (Gaspersz, 2005),

4. Improve, after getting the root of the problem and the solution, the next step is to take action on the problem by conducting tests and experiments to be able to optimize the solution so that it is really useful to overcome the problems at hand. In the Improve step, there will be two main things that must be done, namely knowing the potential causes that cause process variations and finding the relationship between the key variables causing the variation (Harry et al, 2000). At this stage, it will be carried out using the Brainstorming method.
5. Control, the organization can use the ISO 9001 quality management system and the ISO14001 environmental management system as a system to ensure that documented procedures have been implemented correctly. Control is carried out on each action plan that is implemented, in order to achieve the expected sigma improvement target results. Thus, the control measures will control the system characteristics that are critical to the value for the customer. In this stage there are proposals regarding improvements in the process and related aspects as well as the implementation of the proposed improvements (Pyzdek, 2001).

METHOD

This study uses a descriptive research method with a qualitative approach. Because the research utilizes qualitative data and is described descriptively, this study aims to analyze events, phenomena and events that exist socially.

Conceptualization is the steps taken to describe an activity and reduce the research concept into parts that are easier to understand. In this research, which can be operationalized are:

1. Use of non-standard flour raw materials (over Withdrawn).
2. What factors affect the waste of raw materials.
3. What steps need to be applied to overcome the problem of waste.

Sampling in this study using purposive sampling technique, purposive sampling is a sampling technique using certain considerations, and coupled with snowball sampling, snowball sampling is a sampling technique based on interviews or correspondence. This method asks for information from the first sample to get the next sample, so continuously until all the needs of the research sample can be met

In this study, the Cause Effect Diagram and FMEA analysis were used, using a Lean Six Sigma approach. In the Lean Six Sigma approach, there is DMAIC.

After collecting data, identification of the processes that occur in the manufacture of instant noodles and identification of waste during the production process is carried out. From this process, it is determined what type of waste has a major impact on the use of excess flour. Then analyzed using cause effect diagrams and using FMEA and FTA analysis methods. From there, the root of the problem will be drawn as material for making suggestions for improvement. The steps taken are as follows:

Identification of production process

The production process is a way, method and technique of using resources such as labor, machinery, materials and existing costs to create or increase the usability of goods and services (Assauri, 2004). The importance of understanding the production process, and the process flow

used by PT. The Alam Segar initiative in detail is to make it easier to identify the amount of material wastage that occurs in the noodle-making process area in the Noodle 2 Department.

Define

At this stage, the definition of the problem that will be appointed as a source of research is carried out. The problem is related to the presence of waste in the mixing, rooling, and freiyering areas. To identify what processes are involved, from the sequence to the interactions between processes, as well as the components involved in each process, a SIPOC diagram is made. The SIPOC diagram shows the major activities or subprocesses in a business process, along with the framework of the processes presented in the form of a Supplier-Input-Process-Output-Customer diagram (Gasperz, 2002). From the translation using SIPOC, it will be completed using Value Strem Mapping (VSM). VSM is a concept of LSS that shows all activities carried out by the company, using VSM can identify the presence of waste during the production process (Wilson, 2010).

Measure

The measurement stage is carried out in 2 stages based on direct data to measure the amount of flour used and what failure mode has the highest value through the FMEA method. Here are the steps taken:

1. Measuring the amount of flour over withdrawn
2. Measurements were made on the noodle production process based on the company's operational standards. In this process, because the use or retrieval of flour at PT Prakarsa Alam Segar Bekasi has been modernized, the data collection is done by downloading the data that has been recorded on the flour silo admin.

Failure Mode and Effect Analysis (FMEA)

1. FMEA is a tool used to identify and assess risks associated with potential failures. In solving the over-withdrawn problem that occurs in the mixing-rolling-fryerig process, the RPN (risk priority number) value will be determined which is the result of a calculation between the severity (S), occurrence (O), and detection (D) values. The highest RPN is the priority in providing recommendations. The steps taken are as follows:
2. Identification of failure data
   Identify potential failure modes, to find out what causes wastage of flour in the area of the noodle production process. From the failure mode, it will be known what factors caused the failure.
3. Identification of the effects of potential failures, namely determining the effects of a process failure after the identification of the failure mode occurs.
4. Determination of severity value, given to each potential failure effect based on literature study and using brainstorming techniques with operators and related parties in the production process.
5. Determination of the value of the failure rate (occurance), is the level of occurrence used to determine the frequency of failure effects to occur. The emergence of potential failures is obtained through questionnaires filled out by managers and related officers.

6. Calculation of the value of the detection rate, is the level of detection or action taken by the company to overcome the failures that occur. The purpose of the detection method is the control carried out by the company at this time.
7. The calculation of the PRN value is used to determine which failure mode should be prioritized in its handling, the RPN value can be determined by multiplying the severity, occurrence, and detection values that have been obtained previously.

Analyze

This stage is the identification of the cause of the problem by using:

Cause effect diagrams

After taking measure steps, it will be found that the amount of flour used exceeds the standard usage limit in the production process, based on this data, a cause effect diagram will be used to find the root cause of the problem in the Mixing-Rolling-Fyayering process in the noodle department 2. Output obtained From the cause effect diagram, this is an analysis of 5 factors that cause problems, including man, machine, method, material, and measurement.

Improve

After knowing the root cause, the next step is to determine a proposed improvement for each cause that arises. Determination of improvement proposals is carried out by brainstorming techniques with line noodle technicians, supervisors, and Noodle 2 area managers. By using brainstorming techniques, the right improvement proposals will be obtained and can be applied by PT. Alam Segar Initiative so as to reduce the percentage of flour wastage in the production process of making noodles..

RESULTS AND DISCUSSION

From the results of observations and interviews that the author has done, it is found that some waste in the form of defects and inappropriate processing. The defects occur in the frying process and in the noodle cutting process, while Inappropriate Processing occurs in the rolling press process. Defects in the noodle frying process occur when the temperature used does not match the predetermined standard, which is 145-147 0C. if the temperature is too high it will cause the noodles to burn, while the temperature is too low will cause the noodles to be raw. Then in the cutting process, it is caused by a synchronous after steam box (steaming using hot steam) the sensor reads abnormally so that when the noodles go down they are pinched by asbar after stem which causes the noodles to split in 2 and become MB (the company's term for wet noodle waste). Inappropriate processing that occurs in the roll press process is the thickness of the dough that often changes, the specified standard is 1.15-1.20mm, if the thickness of the dough sheet in the roll press is under (less) than the specified standard, it will result in less noodle weight. and if the thickness of the noodle dough sheet is rolled press over (exceeds) a predetermined standard, the weight of the noodles becomes excessive (standard weight of noodles is 60g +- 3) and the effect is that the production results can be pulled out and become waste. The following is a Cause Effect Diagram on flour waste (Figure 1)

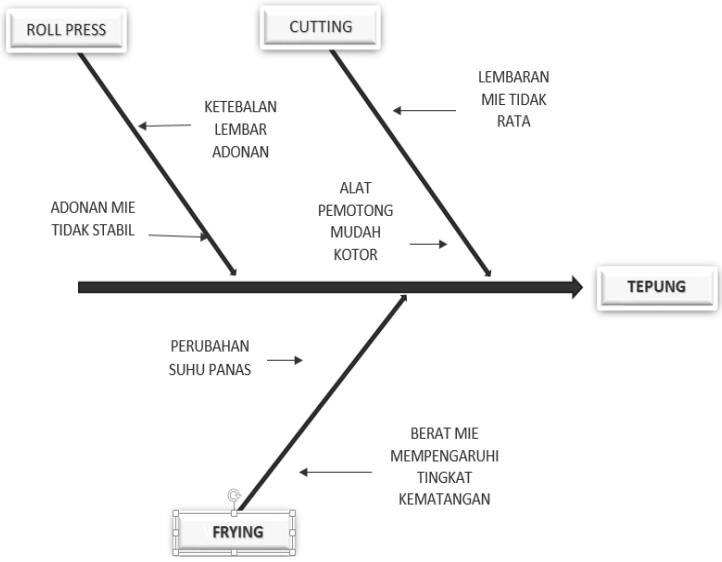

Figure 1 Cause Effect Diagram of Flour Waste

The following is an explanation of the waste that occurs:

1. Roll press "Unstable noodle dough (soft/dry) causes the thickness of the dough sheet to vary", while the standard required for the suitability of the dough sheet thickness is 1.20mm if the thickness of the noodle is less than the specified standard it will automatically affect the the weight of the noodles that will be printed in the next process and causes the noodles to be unfit for packaging. From the noodles that are not suitable to be packaged earlier, of course, they become semi-finished goods which will later be collected as noodle waste. And if the thickness of the noodles is excessive, the weight of the noodles also exceeds the specified standard and can affect the next process and then it will only pile up into noodle waste. If this inefficiency activity continues, it is possible that this is one of the factors that results in wasting flour raw materials in the noodle production process 2.
2. Cutting - The noodle sheet cutter gets dirty easily because the noodles are sticky and not cut perfectly and left on the cutter roll, so the cutting process is not perfect and causes the noodles to pile up at the bottom and fall out of place. This causes the noodles to fall and pile up under the cutting machine and only become MB waste (wet noodles). If this inefficiency activity continues, it is certain that the waste of flour material as the main ingredient for making noodles will continue and can harm the company in the future.
3. Changes in heat temperature can occur due to 2 things, the first is because the hot steam hole is disturbed by leftovers from frying noodles and the second is because the heat sensor reading that regulates the hot steam from the stem blower has an error, so the burst continues even though the temperature is hot. achieved". The temperature standard set is 1470C, if the temperature of the frayer tub exceeds or is even below 1470 then the fried noodles can certainly not go through the next process. Noodles fried at a temperature below 1470 will not cook evenly and noodles fried above 1470 will burn. Scorched noodles and noodles that are not cooked evenly will not be packaged for further processing, and noodles that are not evenly cooked and charred noodles will only be piled up and turned into HH noodle waste (finely crushed). If this inefficiency activity continues, it is certain that the waste of flour material as the main ingredient for making noodles will continue and can harm the company

in the future. According to Mr. Suvari as the Department Head (manager) at the Noodle 2 Department, "Indications of wasteful flour can be seen from the products that fail to be packaged (defective), the noodle waste that continues to accumulate will greatly affect the use of raw materials which should have been defective. can be counted as finished goods, instead they only become piles of garbage which are only transported by dump trucks."

Improve

1. Roll Press Failure. Failures in the Roll Press process are in the form of adjusting the thickness of the dough sheet, as well as a roll machine that gets dirty easily because the remnants of the dough sticking to it make the dough sheet wavy and cause the dough sheet to tear, failure in the roll press process greatly affects subsequent processes. For example, if the thickness of the dough sheet is under or over, then this will affect the weight of the noodles which will go into the frying pan, if over, the weight of the noodles will be excessive and if under, the weight of the noodles will be less. And if the roll plate is dirty, it can cause the noodles to wavy and the noodles to become uneven so that it interferes with the slitter process, namely the process of cutting the dough sheet into noodle sheets before being cut into squares and printed on the cutting and folder process. This is also supported by the results of the FMEA analysis that the ranking of the failure rate in the Roll Press process is seen from the RPN (risk priority number) value which reaches 384. This type of failure needs serious attention from the management, for improvement efforts so that the number of failures that occur can be suppressed or reduced.
2. Cutting and Fonder failure. This type of failure in the cutting process occurs because the noodle sheet is not flat causing the noodles to be cut imperfectly and the noodles are not in the printing position (defect), the remaining pieces often stick to the cutting tool, this results in the noodle sheets not being cut perfectly and the noodles coming out through steam. the box is too dry so that it can cause the noodles to stick to the cutting machine and buildup (over load) and result in down time and a lot of noodle waste that accumulates. The pusher for the noodle sheets is often not synchronous, this causes the cut noodles to fall out of the noodle mold so that during the frying process, the shape of the noodles does not match the mold and becomes bad stuff. Based on the FMEA analysis, it is known that the cutting failure rate ranking is seen from the RPN (risk priority number) value which reaches 258. This type of failure needs serious attention from the management, so that the number of failures that occur can be reduced or reduced.
3. Frying failure. The type of failure in the frying process in the form of hot temperature instability caused by an abnormal temperature reading sensor and the shrinking of oil when frying in the fryer tub is quite influential on the level of maturity, therefore suggestions for improvement are needed so that the inefficiency activity can be reduced or even eliminated.

Table 1 Improvement Recommendation of Roll Press

Type of Failure	Causative Factors	Aspect that need to be repaired			
		Man	Method	Machine	Man
Unstable dough thickness	Dough from the previous process	Checking is done by batch			Calibration of flour and alkali scales
	There is no sensor for indicator	Setting the thickness of the dough sheet per 30 minutes	Installation of lights that indicate the weight of noodles	Speed sensor per machine roll	Maintenance tools
Corrugated dough sheet	The rest of the dough stuck to the wall of the roll press	Checking the dough slab	Doing cleaning using tools every 15 min		

There are 2 types of failure in the Roll Press process, namely unstable dough and wavy dough sheets

1. The dough is not stable because the mixing process between camping flour and alkaline water often experiences problems, such as undercooked dough, flour that exceeds the amount or even less, and foamy alkaline water. So that this affects the lumpiness of the dough that will be pressed on the roll machine, to minimize repair activities, such as calibrating (re-measuring) the weight of the flour dose per batch and calibrating the alkaline tera as well as checking the mixer area so that the problems that make the dough do not cook can be avoided, then install a sensor to maintain the thickness of the dough sheet in the Roll Press process.
2. The wavy dough sheet is caused by residual dough sticking to the roll walls which causes the noodles to be uneven, the solution is that the operator is required to diligently check the cleanliness of the roll plate so that if there is a dirty plate it can be cleaned immediately.

Table 2 Improvement Recommendation of Cutting and Folder

Type of Failure	Causative Factors	Aspect that need to be repaired			
		Man	Method	Machine	Man
Noodles are not printed perfectly	The noodle cut is not appropriate	Adjusting the cutter rotation to avoid mistakes	Periodic cleaning	Installing automatic lubricating spray	
	Noodles unfit to the mold	Supervise		Noodle pusher repair	
Overload on cutting	The noodles that come out of the steam box are too dry	Ensures that the FM lubrication flow is not blocked	Doing cleaning using tools every 15 minutes	Installing a tank for FM . mixing	

There are 2 types of failure in the Cutting and Folder process, namely imperfect noodle molds and cutting overload:

1. The noodle mold is not perfect because the uneven noodle sheet causes the noodles to be cut imperfectly and the noodles are not in the printing position (defect), and the noodle sheet pushers are often not synchronous, this causes the cut noodles to fall out of the noodle mold. To reduce or even eliminate the waste above, repairs will be made by installing automatic lubricant on the noodle slide after the cutting machine will enter the printing press and adjust the pusher settings according to the rotation of the cutter,
2. The noodles that come out through the steam box are too dry so that it can cause the noodles to stick to the cutting machine and buildup (over load) and the remaining pieces often stick to the cutting tools, this results in down time and a lot of noodle waste that accumulates. To avoid this activity from continuing, suggestions for improvements will be made, such as installing an FM mixing tank so that the operator does not need to pour lubricant manually, but the operator still has to check the pipe whether the lubrication pipe is clogged or not every shift, then the operator is required to do cleaning on the cutting tools using the tools provided.

Table 3 Improvement Recommendation of Fryer

Type of Failure	Causative Factors	Aspect that need to be repaired			
		Man	Method	Machine	Material
Temperature instability	Sensor reads abnormal temperature	Setting the temperature		Thermometer sensor repair	
	Hot steam vent clogged	Doing periodic cleaning		Installation of temperature sensor alarm	
Oil shrinkage in the fryer	oil and get carried away by noodles when frying	Filling up the oil in the fryer tub regularly			

There are 2 types of failure in the fryer process, namely the abnormal temperature reading sensor and the shrinkage of oil in the fryer tub which causes the noodles to burn/raw:

1. Temperature instability is caused by an error in the thermometer reading temperature sensor so that the steam blower continues to emit hot steam even though the heat in the fryer tub has reached 1470C, or otherwise the temperature has dropped below 1450C but the steam blower does not even turn on and the potential for both is the presence of the buildup of crushed noodles left over from the frying pan which blocks the hot steam vent from the steam blower. For the proposed improvement, it is necessary to re-check the sensor and replace the thermometer by the engineering department and the operator is required to clean the fryer tub every time the machine is off during breaks (for the adjustment of the operator's rest hours due to periodic cleaning, replacement is carried out when the operator rests).
2. The reduced or shrinking oil in the fryer is influenced by the water content contained in the noodles to be fried, the higher the water content, the more the noodles will absorb oil, this is because the hot temperature during frying will cause the water content to evaporate. This lost water will be replaced by oil. Because the reduced oil in the fryer is what causes the noodles to not be fully submerged in oil, this results in the noodles not being cooked evenly. The repair solution given is that the operator is required to check the oil in the fryer tub.

CONCLUSION

Factors of failure and waste of flour material that occur in the instant noodle production process at the Noodle 2 Department are in 3 processes on the production line, namely: (1) in the Roll Press process, (2) in the Cutting process, (3) in the Frying process.

To reduce the failures that occur in the Cutting and Fonder process: (1) repairs are carried out by installing automatic lubricant on the noodle slide after the cutting machine which will enter the printing press and adjusting the pusher settings according to the rotation of the cutter, (2) installing an FM mixing tank so that the operator does not need to pour the lubricant manually, but the operator still has to check the pipe whether the lubrication pipe is clogged or not every shift, then the operator is required to clean the cutting tools using the tools provided.

To overcome the existing failures in the frying process, the management replaces the thermometer by the engineering department and the operator is required to clean the fryer tub every time the machine is off during breaks (to adjust the operator's rest hours due to periodic cleaning, replacement is carried out when the operator breaks). And operators are required to check the oil in the fryer tub.

Regarding the research findings as described above, there are several suggestions that can be submitted, namely companies also need to pay attention to the performance in the production process and provide extra handling on the parts that are considered critical as stated above, to reduce or even eliminate the factors that cause waste.

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