

Conference Paper

Quality Control to Incompatibility of Midsole Products with ISO 9001:2008 Analysis

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ABSTRACT

The midsole is an inseparable component of the shoe. For this reason, midsole production must be fulfilled so that the needs of shoe manufacturers to produce shoes can be met according to the target. Midsole Jepara factory is one of the work units of PT. X is a company that processes Compound raw materials into Midsole as its main product. ISO 9001:2008 is an international standard for quality management systems. ISO 9001:2008 establishes requirements and recommendations for the design and assessment of a quality management system. It is expected that the products produced from an international quality management system, will be of good quality (standard). Based on this, this study will discuss the quality assurance contained in a manufacturing company to prevent the absence of things that cause product defects. In analyzing the implementation of ISO 9001:2008 used is the analysis of P control maps, fishbone diagrams, and Pareto diagrams. In controlling the midsole products it produces, PT X applies a policy regarding product quality standards, namely using the PDCA (Plan Do Check Action) quality standard.

Keywords: Quality control, ISO 9001:2008, P control maps, fishbone diagrams, pareto diagrams

Introduction

The midsole is one component in shoes that cannot be separated, the lack of a midsole factory makes the number of shoe production less. For this reason, midsole production must be fulfilled so that the needs of shoe manufacturers to produce shoes can be met according to the target. Currently, midsole factories located throughout Indonesia are trying to strengthen production in meeting the needs of the national and international shoe trade market.

The Jepara Midsole Factory one of PT X's work units is a company that processes compound raw materials into Midsole as its main product. The Midsole X Factory is a mass-production company that only performs the production process when there is consumer demand. This adjusts to the number of consumers at this time.

ISO 9001:2008 is an international standard for Quality management systems or quality (Sivaram et al., 2014). ISO 9001:2008 establishes requirements and recommendations for the

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design and assessment of a quality management system (Ismyrlis et al., 2015). ISO 9001:2008 is not a product standard, because it does not state the requirements that must be met by a product (goods or services) (Barirohmah & Subiyantoro, 2021). ISO 9001:2008 is only a quality management system standard. However, it is hoped that the products produced by an international quality management system will be of good quality (standard) (Chithrangani, 2014).

Based on this, this study will discuss the quality assurance contained in a manufacturing company to ensure that there will be no unwanted things. In analyzing the implementation of ISO 9001:2008 used the analysis of P-control chart, fishbone diagrams, and Pareto diagrams. The problem that will be discussed in this research is to find out the factors that cause product defects in the midsole factory production department and how to minimize product defects that occur.

Literature Review

Quality control

Quality control is an engineering and management activity, by which the quality characteristics of existing products can be measured, compared with specifications or requirements, and take appropriate prevention if there is a difference between the actual appearance and the standard (Mitra, 2016). Good quality will be produced by a controlled process (Qothrunnada et al., 2022), in quality control, there are 7 quality control tools called seven tools that are used to identify improvements that may be made, namely:

1. Histogram
The histogram has a shape like a bar chart that can be used to determine the average price or central tendency of the collected data values, the maximum and minimum data values, the data range, the size of the deviation or dispersion to the average price, the shape of the distribution of the collected data (Shania et al., 2022).
2. Check Sheet
Is a tool to facilitate the process of data collection in the form of sheets with tables for data entry.
3. Pareto Charts
Is a descriptive tool, the goal is to make it easier for quality improvement parties to determine which types of errors should be the main priority for improvement to improve quality (Latifah et al., 2022).
4. Cause-Effect Diagram
This diagram is used to analyze and find factors that significantly influence determining the quality characteristics of work output, looking for the real causes of a problem. (Ismiyah, 2018).
5. Stratification
Stratification is an attempt to group data into groups that have the same characteristics.
6. Scatter Diagram
The scatter diagram is a tool for identifying potential relationships (but not causal relationships) between two variables. The shape of the scatter diagram often identifies the type of relationship that may exist between two variables.
7. Control Chart
A control chart is a statistical tool to set control limits based on existing plots based on the kinds of changes or deviations that occur in the production process (Abdel-Hamid & Abdel-haleem, 2019).

ISO 9001:2008 Quality Management System

Management System is a coordinated activity to direct and control the organization about quality. QMS can be used as a strategic tool to develop process and resource performance in making continuous improvements, providing excellent service for user satisfaction to prepare for international competition and gain international recognition. The demand for quality assurance

then gave birth to a standard that is more system and process-oriented, namely the Quality Management Standard (Darmaji et al., 2019). Quality Management System is a set of documented procedures and standard practices for system management that aims to ensure the suitability of a process and product (goods or services) to the needs of certain requirements determined by the customer and the organization (Gandara, 2020).

Benefits of implementing ISO 9001:2008 quality management system

The benefits of implementing ISO 9001:2008 have been obtained by many companies. Some of the benefits can be noted as follows:

1. Increase customer trust and satisfaction through organized and systematic quality assurance. The documentation process in ISO 9001:2008 shows that the policies, procedures, and instructions related to quality have been well planned.
2. Quality management system audits from companies that have obtained ISO 9001:2008 certification are carried out periodically by the registrar from the registration agency, so that customers do not need to carry out quality system audits. This will save costs and reduce duplication of quality system audits by customers.
3. Companies that have obtained a certificate (ISO 9001:2008) are automatically registered with the registration agency, so if a potential customer wants to find an ISO 9001:2008 certified supplier, they will contact the registration agency. If the name of the company has been registered with an international standard registration institution, then it means that new market opportunities are open (Frederika, 2017).

Material and Methods

This research was conducted at the Midsole Factory in Jepara Regency. The object of research is the quality of the Midsole product at PT. X. The problems faced by the midsole factory are defects in the midsole, namely burning, tearing, bubbles, and dirt. After collecting data, then the data that has been obtained is processed using the P-control chart, cause and effect diagram (fishbone), and Pareto diagram. In determining the priority of problems by using product defect report data to identify problems in the form of the largest number of product defect reports in the production department and determine one parameter that will be prioritized for problems in quality improvement. Problem identification is done by using a P-control chart, Pareto diagram, and fishbone diagram. Furthermore, an analysis is carried out using ISO 9001:2008 which establishes the requirements and recommendations for the design and assessment of the quality management system, which aims to ensure that the organization will provide products, both in the form of goods and services that meet the requirements that have been set.

Results and Discussion

Defect product data

Table 1. Defect midsole data for july and august period

Midsole Type		July					August				
		Type Of Defect					Type Of Defect				
		Total Production	Burn-ing	Tear-ing	Bubble	Dirty	Total Production	Burn-ing	Tear-ing	Bubble	Dirty
Lite Racer CLN		186.659	5.311	4.940	1871	3.352	117.666	1.029	1.599	1.752	1.362
Falcon Elite		-	-	-	-	-	37.135	2.326	586	396	604
Run Falcon 2.0		288.171	8.561	3.662	3.533	7.443	89.951	2.236	838	583	1.286
<i>To be continued...</i>											

Midsole Type	July					August				
	Type Of Defect					Type Of Defect				
	Total Production	Burning	Tearing	Bubble	Dirty	Total Production	Burning	Tearing	Bubble	Dirty
Strutter REG	207.415	5.554	5.638	1.650	3.841	217.219	7.199	3.139	1.555	3.535
Swiftrun 22	158.786	4.063	2.023	5.084	1.386	291.982	7.021	3.244	7585	2.667
TOTAL	841.031	23.489	16.263	12.138	16.022	753.953	19.811	9.405	11.872	9.454

Table 2. Defect midsole data for september period

Midsole Type	September				
	Type Of Defect				
	Total Production	Burning	Tearing	Bubble	Dirty
Lite Racer CLN	248.197	3.105	4.249	1.679	3.526
Falcon Elite	128.032	4.292	1.552	706	1.443
Run Falcon 2.0	177.628	3.509	1.286	996	2.734
Strutter REG	218.160	3.489	1.034	894	1.566
Swiftrun 22	220.056	4.671	1.100	5.177	1.863
TOTAL	992.073	19.066	9.220	9.452	11.131

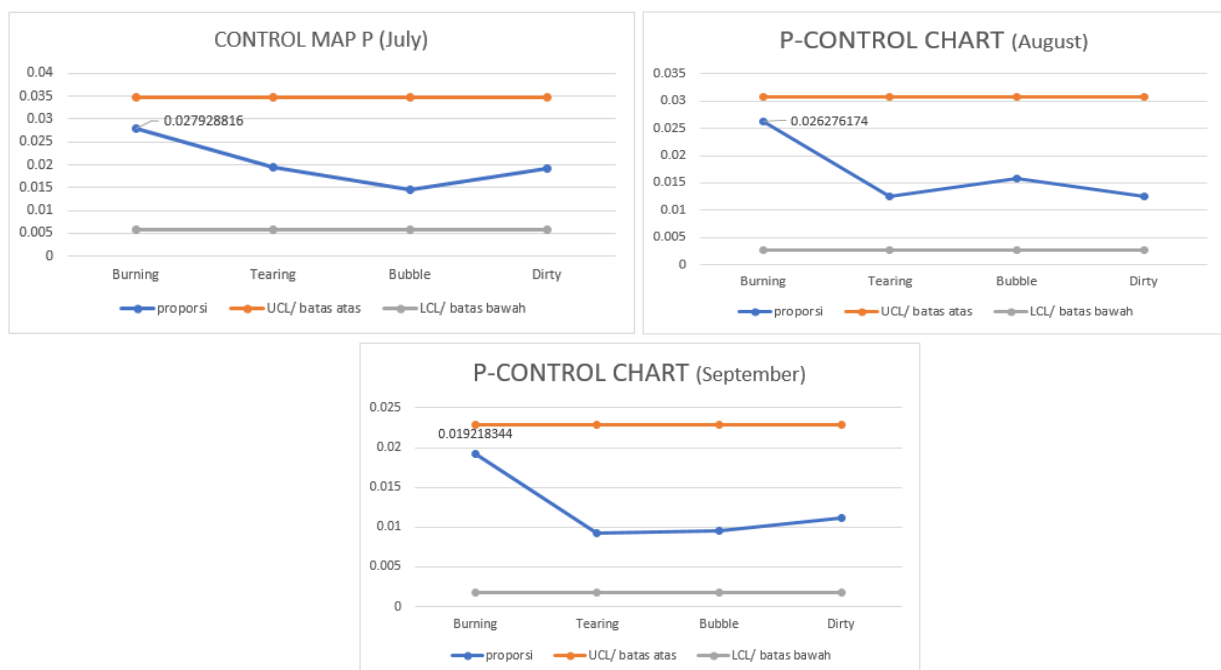
Data processing*P-control chart*

Figure 1. P-control chart in July, August & September

Pareto Charts

It can be seen from the Pareto diagram below, that the defect value in July on the burning type was 23,489, or 35% of the total defect in July. For the defect value in August, the burning type was 19,811, or 39% of the total defect in August. For the defect value in September the burning type was 19,066 or 39% of the total defect in September.

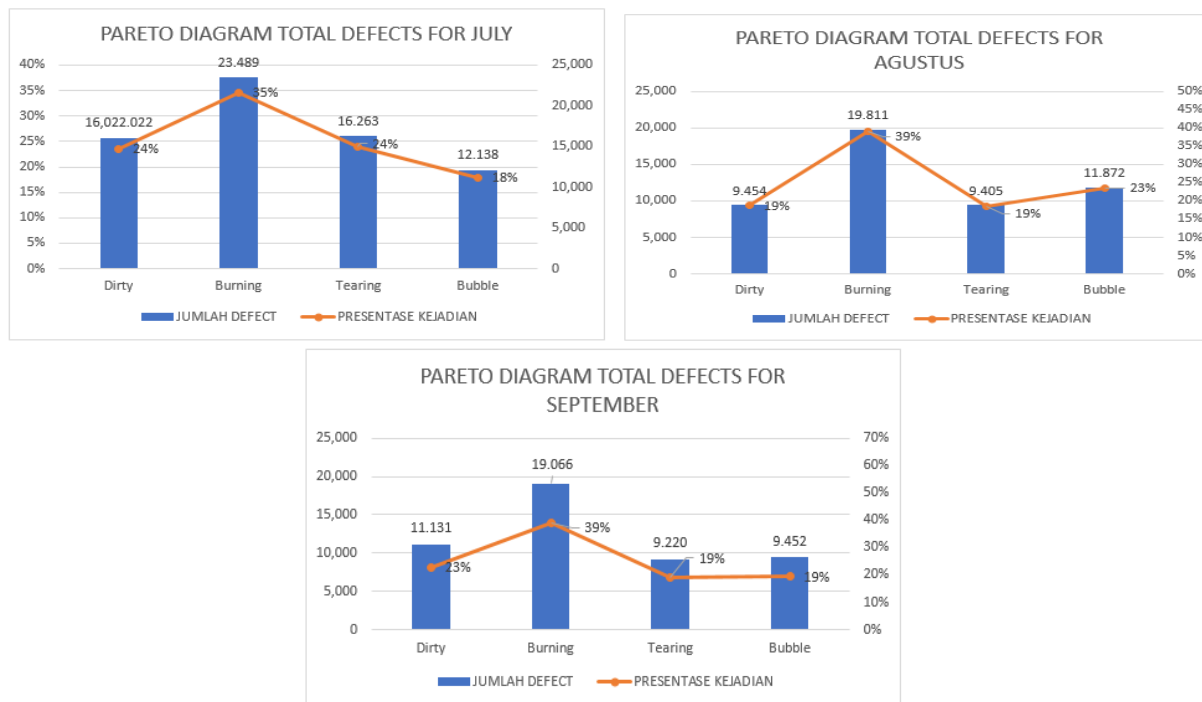


Figure 2. Pareto charts in July, August & September

Cause-effect diagram

Defects of a product can be caused by various things so the types of defects in the midsole can be identified as follows (Figure 3):

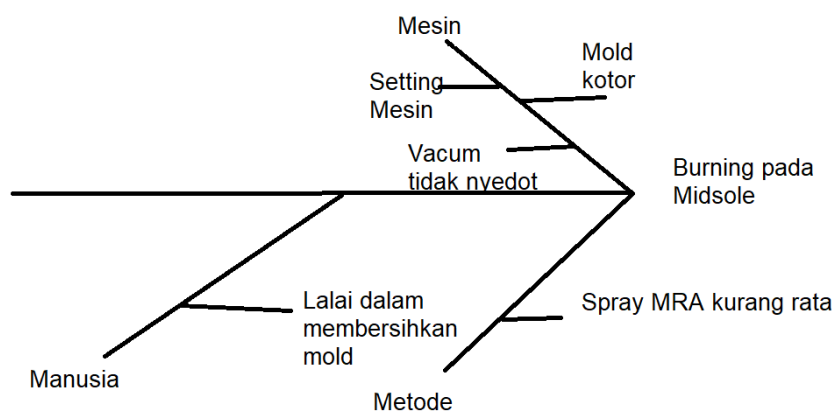


Figure 3. Cause effect burning defect midsole

Damage to burning is caused by the method, namely when spraying MRA liquid where this liquid functions so that the midsole does not burn. The other causes are the engine factor, which includes the wrong engine settings or not by the standard, the mold on the engine is still dirty and the vacuum in the engine mold does not suck oxygen from the outside so that the oxygen demand in the mold is not met, causing burning in the midsole. The last factor is the human factor or the operator who carries out the work negligently in cleaning areas that can cause the midsole to burn or burn.

At this stage, action plans will describe the allocation of resources as well as priorities and alternatives carried out in the implementation of the plan. Improvements are made to all sources that have the potential to create defective products based on the results of the causal diagram analysis.

At this stage, the root cause of the defect will be used to determine an improvement plan by setting improvement targets.

- **Method factor**
- The method factor is one of the factors in the occurrence of defect burning. Therefore, some improvements to the method are needed, so that the potential that causes defects can be prevented, namely by:
 1. Spray MRA evenly on the mold or the mold on the midsole.
 2. After spraying, use an air gun to sprinkle the expansion in the mold cavity so that the liquid spreads evenly.
- **Engine factor**
 The machine factor is one of the causes of product defects. Therefore it is necessary to make some improvements to the machine, so that the potential that causes defects caused by the machine can be prevented, namely by:
 1. Make settings on the machine according to the standards that have been set and perform periodic checks on the machine settings to avoid machine errors.
 2. Cleaning molds or molds regularly so that when printing dirt does not hinder the printing of the machine, causing a burnt defect in the midsole.
 3. Cleaning the vacuum regularly because the vacuum in the mold serves to circulate air or oxygen from outside to inside, if the vacuum is not dirty or clogged then the air cannot flow, causing the midsole to burn.
- **Human/operator factor**
 The human factor or operator is one of the factors causing defects in the midsole and can reduce product quality. Therefore, it is necessary to make some improvements to the machine, so that the potential for causing defects caused by the machine can be prevented, namely by the operator must always clean the mold so that defects do not occur.

ISO 9001:2008 quality management analysis

In controlling the midsole products that PT. X applies a policy regarding product quality standards, namely the quality that has been set. The quality standard that is set is using the quality of PDCA (Plan Do Check Action). Where in paying attention to product quality, it is carried out by carrying out a plan or improvement plan, doing or planning, checking, namely assessing whether it can be applied to the field, action means taking direct action to the inspection field and sampling testing according to the standards used by PT. X.

ISO 9001:2008 is an international standard for Quality management systems. ISO 9001:2008 establishes requirements and recommendations for the design and assessment of a quality management system. ISO 9001:2008 is not a product standard, because it does not state the requirements that must be met by a product (goods or services). ISO 9001:2008 is only a quality management system standard. With the certification of the ISO 9001:2008 standard, it can increase cus-

tomer trust and satisfaction through organized and systematic quality assurance. The documentation process in ISO 9001:2008 shows that the policies, procedures, and instructions related to quality have been well planned.

Conclusion

1. PT. X, which is in Jepara, produces midsole, from July 2021 to September 2021. There are a number of defects that have been classified into 4, namely 62,366 burning defects, 34,888 tearing defects, 33,464 bubble defects, and 26,607 dirty defects. It can be seen from the data that the most defect from midsole products is defect burning. This is due to the method, namely at the time of spraying the MRA fluid where this fluid functions as the midsole gas do not burn. As for other causes, namely because of the engine factor where in this factor includes the wrong engine settings or not in accordance with the standard, the mold on the machine is still dirty and the vacuum in the mold of the machine does not suck oxygen from the outside so that the oxygen demand in the mold is not met, causing burning on the part. midsole. The last factor is the human factor or the operator who carries out the work negligently in cleaning areas that can cause the midsole to burn.
2. In controlling the midsole products that PT. X applies a policy regarding product quality standards, namely the quality that has been set. The quality standard that is set is using the quality of PDCA (Plan Do Check Action). Where in paying attention to product quality, it is carried out by carrying out a plan or improvement plan, do or plan, check, namely assessing whether it can be applied to the field, action means taking direct action to the inspection field and sampling testing according to the standards used by PT. X. Whereas this Midsole Factory still does not show that the company's quality management system has not implemented ISO 9001:2008 standard certification.

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