
**ANALISA PENGENDALIAN KUALITAS MENGGUNAKAN PENGENDALIAN KUALITAS
STATISTIK DI PT MASSINDO SINAR PRATAMA MANADO***QUALITY CONTROL ANALYSIS USING STATISTICAL QUALITY CONTROL AT PT MASSINDO
SINAR PRATAMA MANADO*

by :

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Abstract: In order to survive in a competitive market, improving quality and productivity of product or process is a must for any company. This study is about to apply the statistical quality control tools in the production processing and on final product in order to reduce defects by identifying where the highest waste is occur at and to give suggestion for improvement. The approach used in this study is direct observation, thorough examination of production process lines, fishbone diagram, and information has been collected from company through interview, and control chart (p-chart) was constructed. It has been found that the company has good quality control but still found the defect product. The principal aim of the study is to create awareness to quality team how to use statistical tools in the problem analysis, especially to train quality team on how to held an effective brainstorming session, and exploit these data in cause-and-effect diagram construction and control chart construction.

Keywords: quality, statistical quality control, ishikawa diagram, p-control chart

Abstrak: Agar dapat bertahan di pasar yang kompetitif, peningkatan kualitas dan produktivitas produk atau proses merupakan keharusan bagi perusahaan manapun. Penelitian adalah tentang menerapkan alat pengendalian kualitas statistik dalam proses produksi dan pada produk akhir untuk mengurangi produk cacat dengan mengidentifikasi di mana kerusakan terjadi dan memberikan saran untuk perbaikan. Pendekatan yang digunakan dalam penelitian ini adalah pengamatan langsung, pemeriksaan menyeluruh terhadap jalur proses produksi, diagram tulang ikan, dan informasi yang telah dikumpulkan dari perusahaan melalui wawancara, dan diagram kontrol (p-chart). Ditemukan bahwa perusahaan memiliki kontrol kualitas yang baik namun tetap di dapati produk cacat. Tujuan utama penelitian ini adalah untuk menciptakan kesadaran akan tim yang berkualitas bagaimana menggunakan alat statistik dalam analisis masalah, terutama untuk melatih tim yang berkualitas mengenai bagaimana mengadakan sesi brainstorming yang efektif, dan memanfaatkan data ini untuk membuat diagram sebab dan akibat dan membuat diagram control.

Kata kunci: kualitas, pengendalian kualitas statistik, diagram sebab akibat, diagram kontrol-p

INTRODUCTION

Research Background

Quality is the important thing for a company that produces a product because quality as a barometer for consumers to assess a product is good or bad. Consumers want goods they bought in accordance of what is desired as well have good and secure conditions. Therefore, companies should be able to control the quality of products in order to compete and accepted by consumers.

Quality control with statistic tools useful also oversees the level of efficiency. So, it can be used as a tool for the detection and prevention of damage tolerate avoiding / preventing defects occur. Detection is usually performed on the finished product and the prevention as early as possible so that defects in the product can be prevented.

This study is analyze how the process of quality control in PT Massindo Sinar Pratama to make it a reference for other companies. Although PT Massindo Sinar Pratama is one of the best companies in Indonesia, according to the results of interviews with the management of PT Massindo Sinar Pratama there are still found defective product during the production process, so this study want to know what factors cause damage to the product, and later this research can be a reference for the company to be better. The title of this research is The Quality Control Analysis Using Statistical Quality Control at PT Massindo Sinar Pratama.

Research Objectives

The purpose of this research:

1. Analyze the implementation of quality control in Massindo Sinar Pratama PT
2. Identification the factors that cause damage or defect product manufactured by Massindo Sinar Pratama PT to prevent the occurrence of product defect
3. Help the company solve their problem

LITERATURE REVIEW

Quality

Quality is an operations manager's objective is to build a total quality management system that identifies and satisfies customer needs, the totality of features and characteristics of a product or service that bears on its ability to satisfy stated or implied needs (Heizer & Render, 2006:253)⁶

The definition of quality is conformance to requirements (requirements meaning both the product and the customer's requirements). The system of quality is prevention. The performance standard is zero defects (relative to requirements) .The measurement of quality is the price of nonconformance. (Crosby, 1979:58)²

Quality Control

Quality control may generally be defined as a system that maintains a desired level of quality, through feedback on product/service characteristics and implementation of remedial actions, in case of a deviation of such characteristics from a specified standard. This general area may be divided into three main subareas: off-line quality control, statistical process control, and acceptance sampling plans.(Mitra, 2008)¹

The quality of goods produced and services rendered has been monitored, either directly or indirectly, since time immemorial. However, using a quantitative base involving statistical principles to control quality is a modern concept.

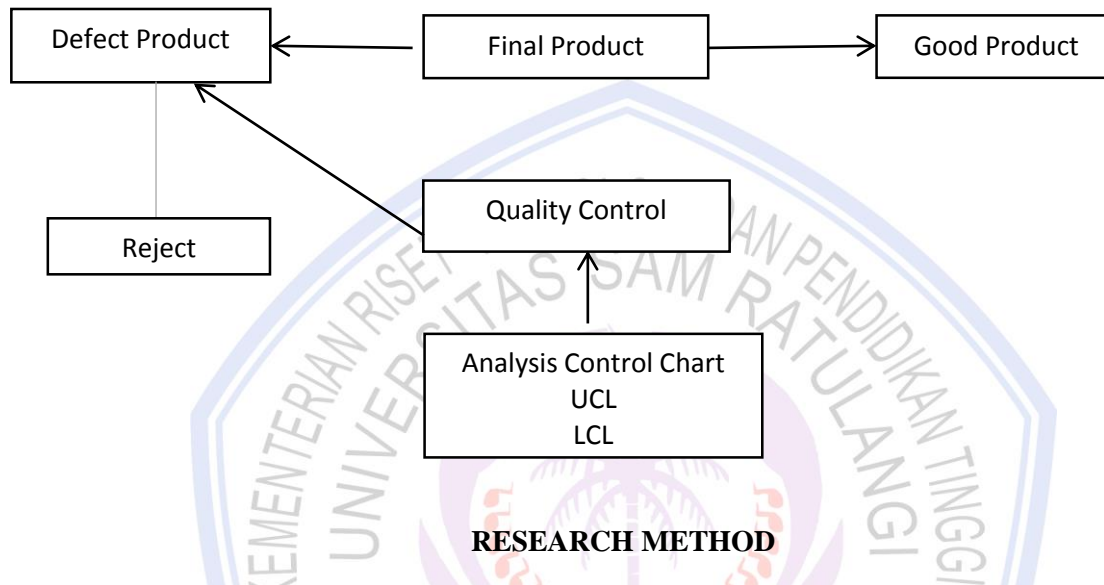
Statistical Quality Control

Statistical quality control has seven (7) major statistical tools can be used as a tool to control the quality as Also mentioned by Heizer and Render in his book Management Operations (2006; 263-268)⁶, among others, namely; Check Sheet, histogram, control chart, Pareto Chart, ,fishbone diagram, scatter diagrams, and design of experiment (DEO).

Previous Research

Hassan Assareh (2012)⁵ Bayesian Hierarchical Models in Statistical Quality Control Methods to Improve health care in hospital. The reliability of any statistical result in the clinical context is affected by the quality of data being used. In this study we consider application of the well-established statistical tools in industrial quality control program to improve the quality of clinical data in the medical registries. Technical and procedural aspects of acceptance sampling plans and statistical process control tools including control charts and root causes analysis were discussed and translated into a quality control program for clinical data.

Conceptual Framework



Type of Research

This research uses qualitative research methods. This research is a descriptive-based research, which explains the data systematically about the facts and the events at the time of the research.

Place and Time of Research

In this research the authors obtained data from PT. Massindo Sinar Pratama which is located on Husni Thamrin No.1 64, which captured data is data about the total production and defective product on February, 2017.

Variable

The variable used in this research is the total production data and the defective products at PT Massindo Sinar Pratama were then calculates using statistical tools.

Data Collecting Method

There are two types of data which are primary data and secondary data. Primary data is data originated by the researcher for the specific purpose of addressing the research problem. Obtaining primary data can be expensive and time consuming because it involves all size steps of the marketing research process (Malholtra, 2012;124)⁷. The primary data are collected from face to face interview and direct observation in company. "Data are gathered through such existing sources called secondary data" Sekaran (2009:113)⁸. Documentation considered as the secondary data. Documents can be found in form of: letters, memoranda, agendas, announcements and minutes of meeting, administrative documents, formal studies or evaluation of the same site study, newspaper clippings and other articles appearing in the mass-media.

Data Analysis Method

In this research, the data processing can be done with using the tools contained in the Statistical Quality Control (SQC). The steps are as follows:

1. Collect production data and the defective product (Check Sheet)
2. Make a Histogram
3. Make Control Chart (P-chart)
4. Make a Fishbone Diagram
5. Make Recommendations / Proposed for improved quality

RESULT AND DISCUSSION

Company Profile

Massindo Group is a company that specializes in the bedding industry since 1983. The brands under Massindo Group are proven of good quality and trustworthy for the people of Indonesia. The brands included are Spring Air, Therapedic, Comforta, Super Fit, dan Protect-A-Bed.

Vision

Become 50 times bigger in 2020.

Mission

To increase the family quality of life in the society

Figure 1. Company Organization Structure



Sources : Massindo Sinar Pratama, PT

Quality Control in Company

Steps by Step Quality Control at PT Massindo Sinar Pratama

- Step 1 : The employees check the materials and do the production process
- Step 2 : **Operators** monitor the manufacturing process and ensure that there is little variation.
- Step 3 : **Engineers** routinely monitor the product design for issues. When a problem is found, it is immediately fixed.
- Step 4 : When the product has become a springbed, Quality Control division checks the entire production in order for no defective product.

According to interviews and observations at the company, quality control at PT Sinar Pratama Massindo is done very well because every item produced is always checked stage by stage (double control). This inspection conducted to avoid damage product. The company is applying a double quality control checked, meaning that every item that passes through the production process is always checked by officers production, after it was checked by quality control division.

Result

Check Sheet

Production Data for the month of February, 2017

Table 1.1

Day	Total Production	Types Of Defect		Total Of Defect Product
		Excess Yarn	Springbed Sloping Border	
1	100	1	-	1
2	100	-	-	-
3	100	-	1	1
4	Off Work			
5	Off Work			
6	100	-	-	-
7	100	-	-	-
8	100	-	-	-
9	100	1	-	1
10	100	-	-	-
11	Off Work			
12	Off Work			
13	100	1	-	-
14	100	-	1	1
15	100	1	-	1
16	100	-	-	-
17	100	-	-	-

18	Off Work			
19	Off Work			
20	100	1	1	2
21	100	-	-	-
22	100	-	-	-
23	100	-	-	-
24	100	-	-	-
25	Off Work			
26	Off Work			
27	100	1	-	1
28	100	-	1	1
Total	2000	6	4	10
Average	100	0.3	0.2	0.5

Resources : PT Massindo Sinar Pratama (*Processing Of Primary Data*)

Histogram

After the check sheet is made, then the next step is to make histogram. The histogram is useful to see what kind of the most happen damage.

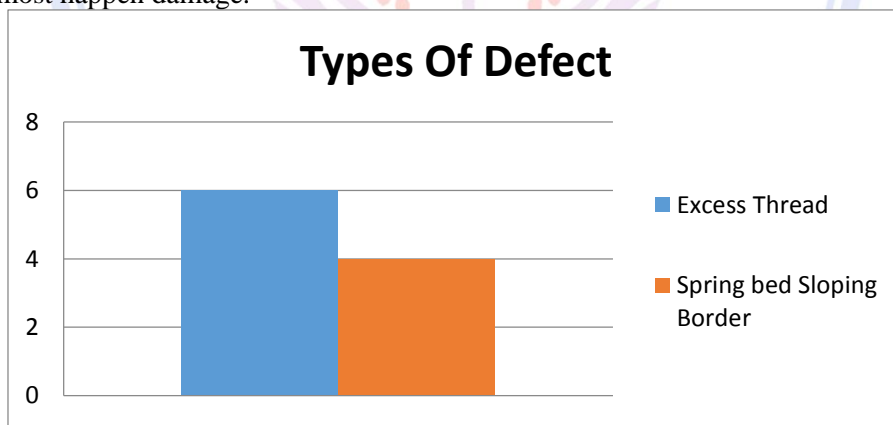


Figure.2

Sources : Processing of Primary Data

Control Chart (p-chart)

Steps by steps making control chart is as follows:

- a. Calculate the percentage of damage
- b. Calculate the central line
- c. Calculate Upper Control Limit
- d. Calculate Lower Control Limit

Calculate the percentage of damage

Table 2

Day	Total Production	Types of Damage		Total Of Damage Product	Percentage of Damage Product
		Excess Yarn	Spring bed Sloping Border		
1	100	1	-	1	0.01%
2	100	-	-	-	-
3	100	-	1	1	0.01%
4	Off Work				
5	Off Work				
6	100	-	-	-	-
7	100	-	-	-	-
8	100	-	-	-	-
9	100	1	-	1	0.01%
10	100	-	-	-	-
11	Off Work				
12	Off Work				
13	100	1	-	1	0.01%
14	100	-	1	1	0.01%
15	100	1	-	1	0.01%
16	100	-	-	-	-
17	100	-	-	-	-
18	Off Work				
19	Off Work				
20	100	1	1	2	0.02%
21	100	-	-	-	-

22	100	-	-	-	-
23	100	-	-	-	-
24	100	-	-	-	-
25	Off Work				
26	Off Work				
27	100	1	-	1	0.01%
28	100	-	1	1	0.01%
Total	2000	6	4	10	0.1%
Average	100	0.3	0.2	0.5	0.0005%

Calculate Central Line

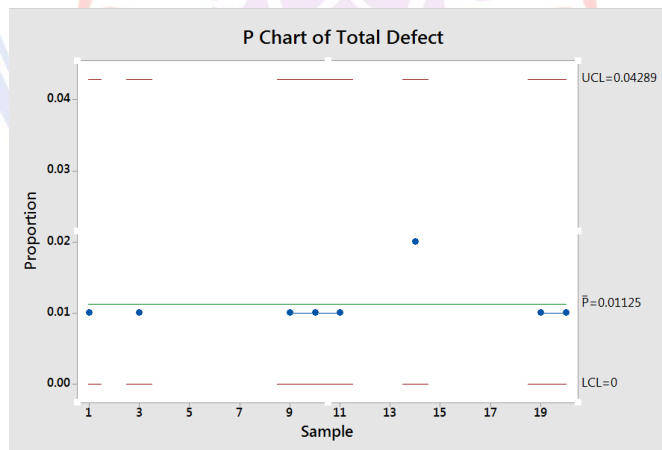
$$CL = \frac{\sum np}{n} = \frac{10}{2000} = 0.005$$

Calculate Upper Control Limit

$$UCL = 0.05 + 3 \left(\frac{\sqrt{0.05(1-0.05)}}{100} \right) = 0.05 + 3(0.0217) = 0.06$$

Calculate Lower Control Limit

$$LCL = 0.05 - 3 \left(\frac{\sqrt{0.05(1-0.05)}}{100} \right) = 0.05 - 3(0.0217) = -0,06 (0)$$



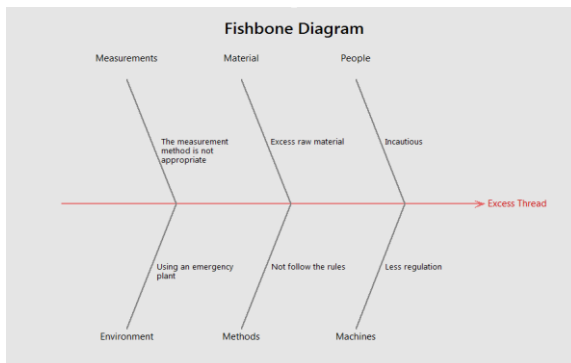
Fishbone Diagram

Causes are usually grouped into major categories to identify these sources of variation. The categories typically include

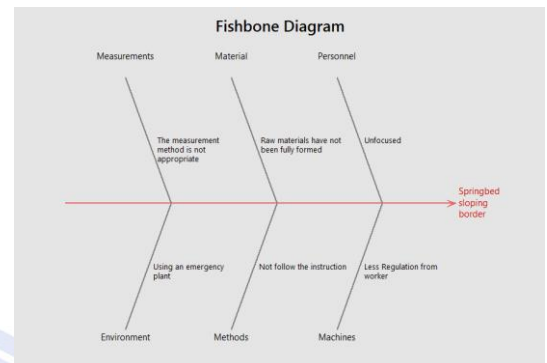
1. People: Anyone involved with the process
2. Methods: How the process is performed and the specific requirements for doing it, such as policies, procedures, rules, regulations and laws
3. Machines: Any equipment, computers, tools, etc. required to accomplish the job

4. Materials: Raw materials, parts, pens, paper, etc. used to produce the final product
5. Measurements: Data generated from the process that are used to evaluate its quality
6. Environment: The conditions, such as location, time, temperature, and culture in which the process operates.

Excess Yarn



Springbed Sloping Border



Discussion

There are two types defect that arises in production process that are excess yarn and spring bed sloping border. Excess yarn occur because workers who are less careful and do not follow the rules during the production process is also due to the yarn which is one of the main raw material excess and also the standard measurement for the yarn is not appropriate this is also caused by a less regulatory machine of workers, but everything that happens may be caused by environmental factors because the company still uses an emergency plant due to fires occurring in the old factory. Springbed sloping borders occur due to workers who are less focused and do not follow instructions while doing work as well as borders that have not been formed perfectly but already installed in the springbed using a machine that has not been set by workers and materials used to make the border does not fit the size of the company standard it causes there is damage in the springbed produced, , but everything that happens may be caused by environmental factors because the company still uses an emergency plant due to fires occurring in the old factory. And for the last steps, after knowing the cause of damage in PT Massindo Sinar Pratama, then prepare a proposed corrective action generally in an effort to suppress the level of the defect product.

CONCLUSION AND RECCOMENDATION

Conclusion

1. The interview, direct observation, brain storming, check sheet, histogram, control chart and fishbonediagrams analysis have provided useful information in identifying causes for rejection, remedies and in proposing optimal solution to be implemented for productivity improvement.
2. Based on control chart, quality control in PT Massindo Sinar Pratama very controlled because there is no points outside the limits of control so that this company can be a reference for other companies in terms of quality control.
3. Based on histogram, the most happen damage is the excess yarn with the amount of damage as much as six products, and for the damage type of spring bed sloping border as many as four products.
4. Based on the result of fishbone diagram analysis can be known factors causing damage in production process are people, methods, machines, materials, measurements, and environment.

Recommendation

1. Recommendation for Correcting Excess Yarn

Although all the workers in PT Massindo Sinar Pratama have attended the training before starting work but there are still workers who are less careful when doing the work, my recommendation for this company is

should be every day before starting to work the officers have the briefings to be careful in doing the work and given strict sanctions for employees who are not careful, and preferably before making the production process checked all the available raw materials in accordance with the standard or size set by the company or not, and as much as possible immediately complete the construction of the plant so as not to use the emergency plant.

2. Recommendation for Correcting Sloping Border

The lack of focus of the worker is caused by the hot room temperature and the narrowness of the room, so the company needs to add additional facilities to the workers or immediately complete the construction of the new plant so as not to linger on the emergency plant so that it can reduce and even eliminate the defect product, and must check the raw materials used are already in accordance with the standards set by the company, as well as checking and repairing the machine periodically.

Company need to always use statistical methods to be able to know the type of damage and the factors that cause the damage to occur. Thus the company can take precautions to reduce the damaged product for subsequent production.

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