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ANALYSIS OF QUALITY CONTROL OF THE FINAL PRODUCT OF SARONGS IN THE *PRINTING DEPARTMENT* USING THE *SEVEN TOOLS METHOD*

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Abstract

A product is of good quality provided that the product can meet standards and even exceed the standards set by the company in accordance with consumer desires. Quality control functions to reduce the number of defective products and ensure that the final product produced meets the company's quality standards and can pass inspection. Data processing was carried out using the seven tools method using several statistical tools. Primary data was obtained by observing and interviewing operators. Meanwhile, secondary data obtained from company archive data, analysis using scatter diagrams, shows that the relationship or correlation of data from production results and defective product data is more collected on the right side so that the data shows that there is a correlation or link between the amount of production and the number of defective products, which means that an increasing number of production will have an impact on an increasing number of defective products. Then, using a histogram, it was found that the defect that most frequently occurred in the printing process was the wrong motif, with the highest result being 10,248. Then, the next most frequently occurring defect was 5,537 fading, and the lowest defect was 3,495 fading. Then, by using the Pareto diagram, we obtained the types of product defects that often occur, namely 10,248 wrong motifs.

Keywords: Defect, Quality, Seven Tools

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I. INTRODUCTION

Along with the development of increasingly sophisticated technology, companies are increasingly competitive and competent in producing superior and quality products, of course [1][2]. Therefore, the production process is required to produce output that is of quality value and does not experience many defects [3]. That can be overcome by carrying out quality control on a product to produce a quality product and reduce product defects so that the product can be said to be a good quality product [4]. Quality control is needed to minimize the level of product defects produced so that they can meet the quality standards set by the industry itself [5]. Quality is very important in choosing products by paying attention to competitive price factors [6].

A product is of good quality provided that the product can meet standards and even exceed the standards set by the company and consumer desires [7]. here are several alternatives implemented by companies so that they can continue to compete and produce good products. Quality control functions to reduce the number of defective products and ensure that the final product produced conforms to company quality standards and can pass inspection [8][9]. hecking product quality is usually carried out by each

Quality Control (QC) coordinator assigned to the respective department of each production. The production process that is carried out certainly only sometimes produces good products with standard quality. However, quite a few defective products are produced and, of course, need to comply with what has been determined by the company. That will certainly cause the company to experience a loss because many defective products cannot be marketed. Quality is the main thing in maintaining customer satisfaction. To control the existing market share or even increase the existing market share, companies need to carry out quality control. One way that can be done to control product quality is to continuously improve production quality by the standards set by the company [10].

Based on direct observations in the printing section, especially the flat print section, many defective products still need to be found, such as lost print, torn fabric, dull edges, spots, etc. So, efforts are made to make improvements and improve quality to achieve the company's production targets. Quality control must be carried out because risks often occur in production. Therefore, analysis and data collection will be carried out in this report using the seven tools method. This method will produce results in production whether it meets the established standards. In other words, the seven tools method is a control limit. If production produces many controlled products, there will be no widespread waste. In product quality control, we can find out the causes of product defects and seek suggestions for improvements using statistical methods so that the percentage of defective products can be reduced to as small as possible.

II. RESEARCH METHODS

This research was conducted in the printing department at PT Sukorejo Indah Textile (Sukorintex). Data on the number of defects was obtained from observations for one month, and data was sourced directly from the company regarding the number of defects in each production. Data processing was carried out using the seven tools method using several statistical tools. The data collection technique used in this research is primary data and secondary data. Apart from that, a literature study was also carried out, such as looking for references from related previous research journals. Primary data was obtained by directly observing the production process and operator interviews. Meanwhile, secondary data is obtained from company archive data such as data on daily production numbers, the number of defects (defective products), and the types of product defects.

III. RESULTS AND DISCUSSION

A. Historical Data on Product Defects in the Printing Process

The quality control process in the printing production process could be more optimal, resulting in many defective sarong products in each production. Based on historical data obtained in March 2023, it was recorded that the frequency of product defects was still high.

Table 3.1Historical Data on Product Defects in the Printing Process

No.	Date	Production (kodi)	Number of Product Defect (kodi)
1	13 Februari 2023	1710,45	151,75
2	14 Februari 2023	1656,05	116,5
3	15 Februari 2023	2203,75	123,1
4	16 Februari 2023	2265	145,4
5	17 Februari 2023	2103,25	117,5
6	18 Februari 2023	2427,8	138,6
7	19 Februari 2023	2321,75	175,05
8	20 Februari 2023	2379	156,5
9	21 Februari 2023	2580,05	149,7
10	22 Februari 2023	2353,95	140
11	23 Februari 2023	2466,85	203,65
12	24 Februari 2023	2557,6	141,55
13	25 Februari 2023	2394,45	165,05

No.	Date	Production (kodi)	Number of Product Defect (kodi)
14	26 Februari 2023	2396,25	147,15
15	27 Februari 2023	2251,25	142,45
16	28 Februari 2023	2353,94	121,85
17	01 Maret 2023	2176	149,7
18	2 Maret 2023	2454,3	149,7
19	3 Maret 2023	2175,15	175,35
20	4 Maret 2023	2292,2	104,2
21	5 Maret 2023	2124,4	151,9
22	6 Maret 2023	2199,95	119,9
23	7 Maret 2023	2194,25	150,45
24	8 Maret 2023	2175,75	151,2
25	9 Maret 2023	2133,95	161,75
26	10 Maret 2023	1803,8	132,45
27	11 Maret 2023	1687,2	142,2
28	12 Maret 2023	2205,6	163,05
29	13 Maret 2023	1845,7	85,8
Total		63889,64	4173,45
Average		2203,091034	143,912069

In Table 3.1, historical data on product defects is obtained using the following procedure:

1. The data collection process is carried out by making observations.
2. Product defect data is obtained from each shift, which is added to get historical data on daily defective products. Historical product defect data was obtained based on daily report data in the packaging department.
3. Data on the number of finished Wadimor products is only the number of products that are in the Wadimor grade, not the total number of sarong production.

B. Product defects in the printing process

Product defect data in the historical data above, quality control analysis, can be carried out to overcome high levels of product defects, one of which is by using statistical analysis using the seven tools method. Seven tools method 7 quality control tools can be used in the seven tools method, including check sheet analysis, scatter diagrams, histograms, Pareto diagrams, flowcharts, control charts, and fishbone diagrams to determine the causes and effects of product defect problems. However, in this discussion, we only use 4 tools contained in the seven tools method, namely scatter diagrams, histograms, Pareto diagrams, and fishbone diagrams, because they refer to historical data on product defects in the printing process where the only known data is the total product defect data in printing process only, without knowing the detailed data per type of defect. Therefore, this problem can only be solved using 4 tools as a quality control tool. The following is a discussion of the 4 tools used to conduct quality control analysis of product defects in the printing process.

1. Scatter Diagrams

Product defect data in the historical data above, the next step is to test the strength of the relationship between the two variables and determine the type of relationship between the two variables, whether they have a positive or negative relationship or have no relationship. The following are the results of making a scatter diagram which explains the existence of 2 variables: the number of production and the total number of product defects.

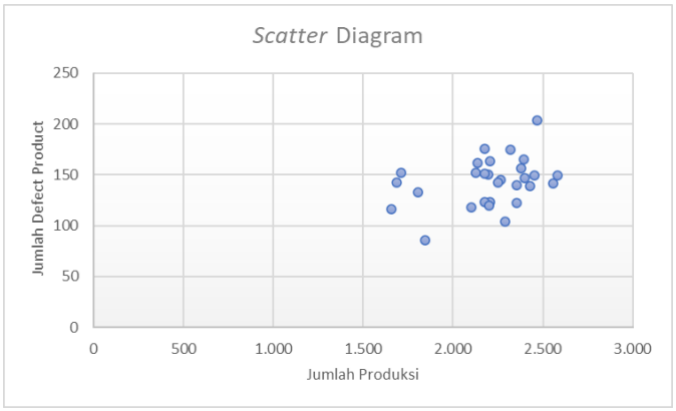

Figure 3. 1 Scatter Diagram in the Printing Process

Figure 3.1 above shows that the relationship or correlation of data from production results and data on defective products is more collected on the right side so that the data shows that there is a correlation or link between the amount of production and the number of defective products, which means that the amount of production will increase. This results in an increasing number of defective products.

2. Histograms

Based on the results of the scatter diagram above, it can be seen that there is a correlation between the 2 variables, so the next step is to carry out a quality control analysis using a histogram to identify the types of defects that occur. The following data and histogram results are shown in Table 3.2

Table 3. 2Histogram Data in the *Printing Process*

Type of Defect	Number of Defect	Percentage (%)
Luntur	5.537	1,78%
Mblobor	3.495	1,12%
Salah Motif	10.248	3,29%

After carrying out the calculations in the table above, the next step is to create a histogram graph as in the image below.

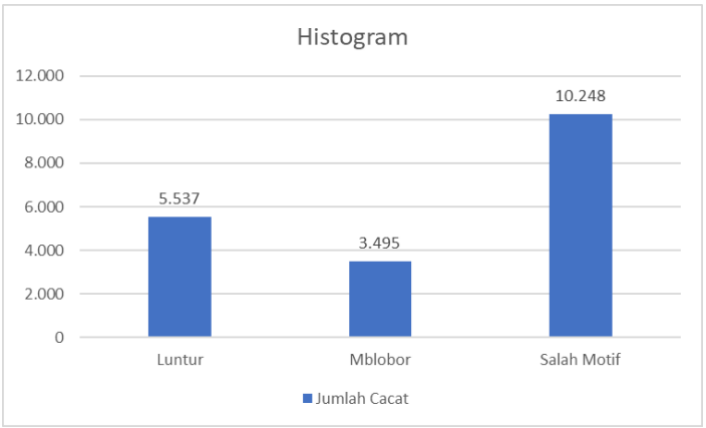

Figure 3.2Histogram of the *Printing Process*

The histogram results show that the defect most often occurs in the printing process is the wrong motif, with the highest result being 10,248. Then, the next most frequently occurring defect was 5,537 fading, and the lowest defect was 3,495 fading.

3. Pareto Chart

Based on the data that has been obtained, data processing is carried out using a Pareto diagram to determine which factors are the most important or the types of defects that are most dominant and prioritized based on the order of the number of defective products that occur starting from the highest number of defects to the least or highest frequency low. The following is the cumulative percentage calculation data.

Table 3. 3Calculations of Cumulative Percentage of Product Defects in the Printing Process

Type of Defect	Number of Defect	Cumulatif Defect	Percentage (%)	Cumulatif (%)
Luntur	5.537	5.537	1,78%	1,78%
Mblobor	3.495	9.032	1,12%	2,90%
Salah Motif	10.248	19.280	3,29%	6,19%

In table 3.5 is the data needed to create a Pareto diagram as in the image below.

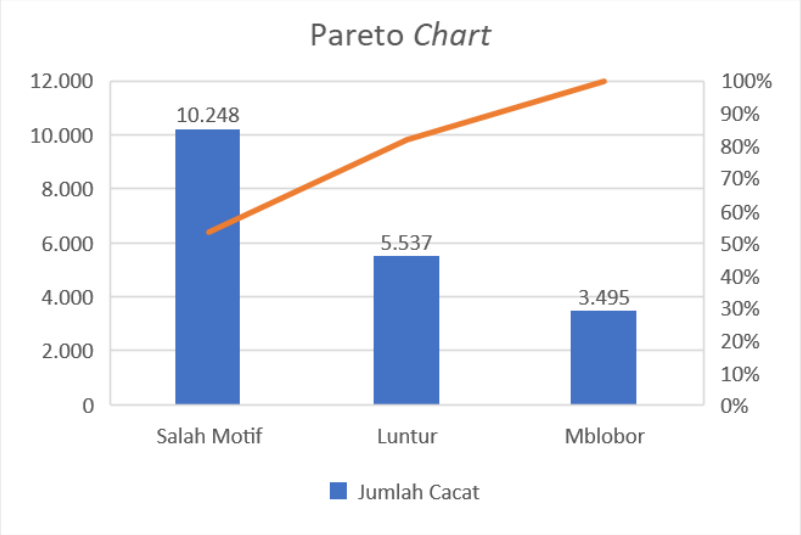

Figure 3.3Pareto Diagrams in the Printing Process

Based on the Pareto results above, the types of product defects that often occur are 10,248 wrong motives. Therefore, to analyze the factors causing defects in wrong motives using Pareto analysis is following existing principles where 80% of problems are caused by only 20% of causes. The Pareto diagram above shows that product defect problems that exceed 80% occur with 10,248 wrong motifs. If the wrong motive is resolved, more than 20% of the causes have been resolved. Therefore, it will have a good impact on the entire production process. The Pareto diagram above is useful for knowing and comparing the largest and most dominant levels of defects so that the highest defects from the graph above can be corrected first, namely wrong motives.

4. Fishbone Diagram (Cause and Effect Diagram)

Based on the results of previous data processing using Pareto diagrams, it can be seen that the defects that occur most frequently are wrong motifs, fading, and leaking. Then, the causes of defective products are identified, which is interpreted as a fishbone diagram. Several factors influence and cause defective products from each type of defect. The following is Figure 3.4 fishbone diagram for defective products.

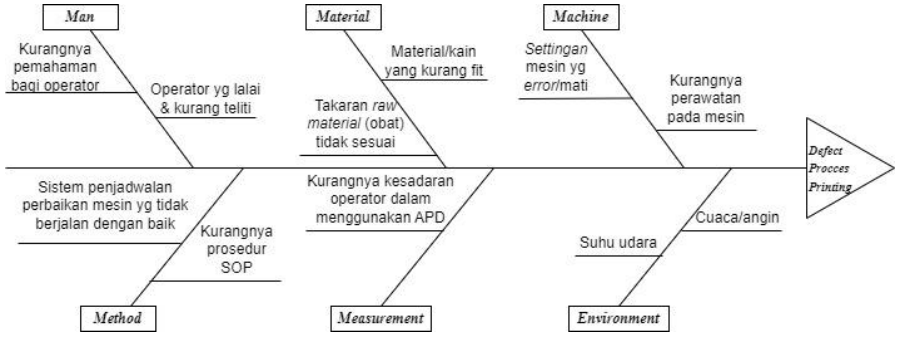

Figure 3. 4 Fishbone Diagram in the Printing Process

The fishbone diagram image above shows that several factors cause product defects in the printing process, which shows that there are 6 factors, namely man, material, machine, method, measurement, and environment, shown in the following table along with proposed improvements.

IV. CONCLUSION

Based on the data processing results, it can be concluded that several defective products result from the printing production process. Namely, analysis using a scatter diagram shows that the relationship or correlation of data from production results and defective product data is more collected on the right side so that the data shows that there is a correlation or link between the amount of production and the number of defective products, which means that an increasing amount of production will have an impact on an increasing number of defective products. Then, using a histogram, it was found that the defect that most frequently occurred in the printing process was the wrong motif, with the highest result being 10,248. Then, the next most frequently occurring defect was 5,537 fading, and the lowest defect was 3,495 fading. Then, by using the Pareto diagram, we obtained the types of product defects that often occur, namely 10,248 wrong motifs. Therefore, to analyze the factors causing defects in wrong motives using Pareto analysis is per existing principles where 80% of problems are caused by only 20% of causes. The Pareto diagram above shows that product defect problems that exceed 80% occur with 10,248 wrong motives, indicating a need to improve processes and methods to improve quality control. If the wrong motive is resolved, more than 20% of the causes have been resolved. Therefore, it will have a good impact on the entire production process.

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