Quality Control For PT. Straightway Primex With Bayes-Fishbone Methods and Control Chart Analysis

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Abstract. Quality control is a process that essentially renders the entity as the quality reviewer of all the factors involved in the production activity. Quality Control process of each company is a very important thing to do. One method that can be used in the quality control process is Quality Control methods at PT. Straightway Primex. PT. Straightway Primex was established in 1989 is a company that produces photo frames and has 1500 employees. PT. Straightway Primex produces 9 products consisting of wooden frame, shelving, baroque frame, mirror frame, tray, ledges, corbel, and mini furniture and has 19 machines used in the production process to produce the product according to the pre-order customer. The Quality Control division is very influential in the manufacturing process of its production, one of which is timber frame. Quality Control can minimize the defect that occurs. The method used is the Bayes-Fishbone method and analyzed the P-control map for the top three defects. Bayes Fishbone used has the highest percent is on the man and machine factor of 30%. Defect on picture frame type OTS 311 size 16 x 20 cm Expresso color is defect less spray amounting to 32.90% with a defect amount of 101 pieces. Meanwhile, the smallest defect in the photo frame type of OTS 311 size 16 x 20 cm expresso color is defect rupture of 0.65% with 2 pieces of defects.

1. Introduction
Quality is either a level or a degree of something. According to Goeth and Davis, quality is a dynamic condition related to products, services, people, processes, and environments that meet or exceed what is expected. Therefore, it is important that every company pay attention to the quality aspects of the product or service he made. This quality is very important for every company because consumers are very concerned about this aspect to increase the sales of the products made. The methods or ways of each company to guarantee and improve its quality vary depending on the product and the problems that exist in the company. Thus, this quality should not be ignored for the company.

PT. Straightway Primex is a company that is very concerned about the quality of its products by means of attention in human terms, methods, materials, machines, and working environment owned by PT. Straightway Primex. The company was first built in Indonesia on January 1989 which is located in Cikupa, Tangerang. The product created by PT. Straightway Primex is wood frame. There are a lot of types, types, and colors produced from this company. Quality is observed from the beginning of material into the warehouse of raw materials to become wood frame so.
PT Straightway Primex was established in 1989 is a company that produces photo frames and has 1500 employees who address Jl Raya Bitung Km. 11 No. 38 Cikupa 15710 – Tangerang. In addition to photo frame production, PT. Straightway Primex manufactures also mirror frames, tray, ledges, Cornel and multi functional products goods or mini furniture, such as learning table children, chairs and cabinets of wood

2. Method and materials
The Bayes-Fishbone methodology is used to analyze causation or cause and effect relationships by noticing the linkage or relationship between variables of some potential root causes so expected, the actual root cause variation can be identified. By implementing this systematic procedure developed then the Fishbone diagram can be corrected the weakness so it is expected to be better able to recognize the appearance of common cause variations by determining the most influential root cause represented by variables that are capable of producing the highest value of collective probability.

3. Results and discussion
Data defect of the photo frame type OTS 311 size 16 x 20 cm color expresso and antique brown for 1 month and the types of defect that occur. The wooden photo frame of this type is ordered as many as 2400 pieces and made since the month of Desmber 2019 and still shopping until January 2020 PT. Straightway Primex has a QC pass which every day is filled by QC part in every place such as framing, sanding, finishing, and packing. However, most repair occurs in the finishing section. QC Data Pass section finishing for a month can be seen in table 1 below.

Table 1. Defect Data of Wooden Photo Frame Type OTS 311 Size 16 x 20 cm Expresso Color

| Day | Type OTS 311 Size 16x20 cm Expresso Color | Accept | Repair |
|-----|-------------------------------------------|--------|--------|
| 1   | 166                                       | 26     |
| 2   | 24                                        | 1      |
| 3   | 160                                       | 18     |
| 4   | 50                                        | 7      |
| 5   | 10                                        | -      |
| 6   | 8                                         | -      |
| 7   | 174                                       | 22     |
| 8   | 38                                        | 2      |
| 9   | 26                                        | -      |
| 10  | 102                                       | 24     |
| 11  | 183                                       | 37     |
| 12  | 153                                       | 2      |
| 13  | 66                                        | -      |
|          | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | Total |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------|
| Lack of  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 2400  |
| Paint    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 307   |
| Spray    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Lack of  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Sanding  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Process  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Faded    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Color    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Get hit  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Broke    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Patches  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |
| Scalloped|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |       |

**Figure 2.** Pareto Diagram

**Table 2.** Defect Percentage of Wooden Photo Frame Type OTS 311 Size 16 x 20 cm Expresso Color
| Type of Defect              | Week | Total | Percentage |
|----------------------------|------|-------|------------|
| Lack of Paint Spray        | 18   | 19    | 24         | 28 | 12 | 101 | 32.90% |
| Lack of Sanding Process    | 16   | 30    | 17         | 9  | 20 | 92  | 29.97% |
| Faded Color                | 4    | 22    | 3          | 5  | 6  | 40  | 13.03% |
| Get hit                    | 3    | 4     | 2          | 3  | 4  | 16  | 11.73% |
| Broke                      | 1    | 0     | 1          | 0  | 0  | 2   | 6.51%  |
| Patches                    | 7    | 5     | 10         | 11 | 3  | 36  | 5.21%  |
| Scalloped                  | 3    | 7     | 4          | 2  | 4  | 20  | 0.65%  |
| Total                      | 52   | 87    | 61         | 58 | 49 | 307 | 100%   |

Analysis of P Control Chart
The following is the analysis of the P control chart based on types of defect the largest is lack of paint spray.

1. Lack of Paint Spray Defect
Spraying or painting process, the resulting color is less evenly and should be in the repair back so that the resulting color can be evenly. Calculation table of P control chart less spray defect can be seen in table 3 below.

| Week | Total of production | Defect | Percentage | Proporsi | CL | UCL | LCL |
|------|---------------------|--------|------------|----------|----|-----|-----|
| 1    | 2400                | 18     | 0.75%      | 0.0075   | 0.0084 | 0.0108 | 0.0059 |
| 2    | 2400                | 19     | 0.79%      | 0.0079   | 0.0084 | 0.0108 | 0.0059 |
| 3    | 2400                | 24     | 1.00%      | 0.0100   | 0.0084 | 0.0108 | 0.0059 |
| 4    | 2400                | 28     | 1.17%      | 0.0117   | 0.0084 | 0.0108 | 0.0059 |
| 5    | 2400                | 12     | 0.50%      | 0.0050   | 0.0084 | 0.0108 | 0.0059 |

Figure 3. P Control Chart Lack of Paint Spray Defect Graphic
Analysis of NP Control Chart
Lack of paint spray defect is the largest of defect percentage. Calculation table of NP control cart less spray defect can be seen in table 4 below.

| Week | Total of production | Defect | Percentage | Proporsi | CL   | UCL   | LCL   |
|------|---------------------|--------|------------|----------|------|-------|-------|
| 1    | 2400                | 18     | 0.75%      | 0.0075   | 20,20| 33,626| 6,774 |
| 2    | 2400                | 19     | 0.79%      | 0.0079   | 20,20| 33,626| 6,774 |
| 3    | 2400                | 24     | 1.00%      | 0.0100   | 20,20| 33,626| 6,774 |
| 4    | 2400                | 28     | 1.17%      | 0.0117   | 20,20| 33,626| 6,774 |
| 5    | 2400                | 12     | 0.50%      | 0.0050   | 20,20| 33,626| 6,774 |

![Figure 4. NP Control Chart Lack of Paint Spray Defect Graphic](image)

Analysis of C Control Chart
Lack of paint spray defect is the largest of defect percentage. Calculation table of C control cart less spray defect can be seen in table 5 below.

| Week | Total of production | Defect | Percentage | Proporsi | CL   | UCL   | LCL   |
|------|---------------------|--------|------------|----------|------|-------|-------|
| 1    | 2400                | 18     | 0.75%      | 0.0075   | 20,20| 33,683| 6,717 |
| 2    | 2400                | 19     | 0.79%      | 0.0079   | 20,20| 33,683| 6,717 |
| 3    | 2400                | 24     | 1.00%      | 0.0100   | 20,20| 33,683| 6,717 |
| 4    | 2400                | 28     | 1.17%      | 0.0117   | 20,20| 33,683| 6,717 |
| 5    | 2400                | 12     | 0.50%      | 0.0050   | 20,20| 33,683| 6,717 |
4. Conclusion
The conclusion of this journal is as follows:
1. PT. Straightway Primex produce 9 products consisting of wooden frame (photo frame), shelving, baroque frame, mirror frame, tray, ledges, corbel, and mini furniture.
2. PT. Straightway Primex has 19 machines used in the production process to produce products according to the pre-order customer.
3. Based on the resulting product, which distinguishes the photo frame type OTS 311 with other types is during the process of using emboss machine because the function of this emboss machine is to make motifs according to customer desires. In this photo frame Jesini OTS 311, the motif given is the dots and lines that make the photo frame look more attractive with a blend of expresso colors.
4. Defect on picture frame type OTS 311 size 16 x 20 cm The largest Expresso color is Defect less spray of 32.90%.
5. Defect on picture frame type OTS 311 size 16 x 20 cm smallest expresso color is Defect broken ie by 0.65%.
6. The largest defect is 101 pieces (less spray) and the lowest defect is a total of 2 pieces (rupture).
7. The main factor on Bayes-Fishbone which has the highest percent is on the man and machine factor of 30%.
8. In the analysis of C and NP control map, the calculation of the control map on the defect is less solid resulting in the value of LCL (Lower Center Line) under the value of 0 (minus) of -0.485 and -0.471 due to the number of second week defect which is too significant as far as 22 pieces compared to the other week defect.

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