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Implementing Basic Quality Tools in Small Business Environment

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Abstract

The increasing of economic growth in Indonesia is encouraging the growth of small and medium enterprises. These conditions prompted heightened level of competition and require companies constantly maintain their product quality. Small business environment in Indonesia are generally unfamiliar with the application of structured quality tools. This paper aims to describe the empirical experience of applying seven basic quality tools in CV. Berkah Abadi. This firm is small business located in Bandung, which produces docmart shoes with brand name BnA. The seven tools are check sheets, scatter diagram, cause and effect diagrams, cause and effect diagrams, Pareto chart, flow chart, histogram and statistical process control chart. There are many challenges in implementing these basic tools in a small business environment, among others, the unavailability of data and culture. After concept introduction to the firm with patiently observation and assistance, the implementation of these tools become possible.

Keywords: quality management, small business, operations management

1. Introduction

Indonesia is a developing country, one of trigger aspect is economic factors. The increasing of Indonesia's economic affect on the growth of SMEs (Small and Medium Enterprises). Increasing number of SMEs pose stiff competition among the SMEs, therefore each company must be able to perform the steps in anticipation survive and maintain the existence of the company.

One way to win a tight competition is to improve product quality. A SMEs that can survive and thrive in the national and global competition should be able to deliver products in the form of goods or services of better quality, competitive price, faster delivery and better service than competitors. To meet customer satisfaction in manufacturing, product quality is very important to be managed. Excellent quality can avoid repair costs, which ultimately will make the company's operations will be efficient and effective, therefore the company should continue to conduct quality control

CV. Berkah Abadi is one of SMEs that concentrates on the production of shoes that was established in 2011. CV. Berkah Abadi has an own shoe brand that BNA, Devinata and JNB to focus on producing shoes woman boots (or docmart shoes thay said) types. CV. Berkah Abadi can also accept orders for shoes from outside parties in large number In the production process, CV. Berkah Abadi often produce a defective products

Factory and office CV. Berkah Abadi domiciled in Cimahi - West Java. CV. Berkah Abadi has its own trademark by BNA and Devinata named. CV. Berkah Abadi working on the production process by using a workforce of 12 people are able to produce 100 pairs of shoes every day

Quality control is intended to correct the deviation in the production process, so that the company can anticipate to do the repairs for the next production. Increasing number of irregularities in the production process, will result in additional costs / losses incurred by the company in improving disability or economic loss would defective products. Products that meet the quality standards to be followed by the standard production process as well

2. Study of Literature

This study originated from the concept of operations management. Operations management is a set of activities that add or create value of a product by processing resources (inputs) into finished goods or services (outputs). Strategy objectives of operations management perspective is to create competitive advantage in the form of cost leadership, differentiation, or (fast) response which such strategies can be obtained by performing 10 operating decisions effectively. One of the 10 decision of the operation is the quality management.

Quality management ensures how the quality of a product or service meets or exceeds the expectations of consumers, to consumers will feel satisfied with the decisions in the quality control of a product or service. Improving the quality associated with detecting and eliminating common causes that lead to variability in operations. In practice, there are tools that can help oenerapan manajamen quality, the tool is statistical process control with 7 tools of TQM 7 Total Quality of Management.

Statistical Process Control is a methodology of quality data collection and analysis, as well as the determination and interpretation of measurements that describe the process in an industrial system, to improve the quality of products to meet consumer expectations (Gaspersz). Benefits of SPC itself is to minimize variations that appear in the process to improve competitiveness, reduce costs, increase productivity and employee skills meningkatkan. Seventh This quality control tool used separately prior to 1960. However, in the early 1960s, all the tools are combined by a Japanese scientist beranam Kaoru Ishikawa, to create the Quality Control Circle effective and practical tools. Such tools include: cause-and-effect diagram, check sheet, control charts, histograms, Pareto charts, scatter diagrams, and stratification. In pengendalian quality, these tools are used in all stages of improvement methods, such as define, measure, analyze, improve, and control

Flowchart (flowchart) is used to show the details of a process, including tasks and procedures, alternative paths, decision points, and rework. In each project quality improvement, understanding the process is the most essential part.

Fishbone diagram (fishbone diagram) is often also called Ishikawa diagrams or cause-and-effect diagram (diagram causation). Fishbone diagram is a tool to identify potential causes of the effects or problems, and analyze the problem through brainstorming sessions. The problem will be broken down into a number of categories related, including human, material, machinery, procedures, policies, and so on. Each category has causes that need to be elaborated through a brainstorming session.

Pareto diagram is a special bar chart that divides the groups by category, and compare from the largest to the smallest. Pareto chart (Pareto chart) is a chart that contains a bar chart (graph bars) and line charts (line graph)

Control chart or control chart is a map that is used to study how the process of change from time to time. The data plotted in a time sequence. Control charts are always composed of three horizontal lines, namely: line center (center line), Upper control limit (UCL), dan.Lower control limit (LCL).

A histogram is a tool such as a bar chart (graph bars) are used to show the frequency distribution. A frequency distribution shows how often each different values in a set of data occurs. The data in the histogram is divided into classes, observation value of each class is shown on the X axis

Scatter diagram (scatter diagram) is a graph showing a pair of numerical data on the Cartesian coordinate system, with one variable on each axis, to see the relationship of two variables. If two variables are correlated, coordinate points would fall along a line or curve. The better correlation, the more stringent the points are close to the line.

3. Method

This research is a scientific way to get data with a specific purpose and usefulness, Sugiono (2011: 1). The method used in this research is descriptive analysis method. Descriptive method according to Moh. Nazir (2005: 5) is a method in researching the status of human groups, an object, a set of conditions, a system of thought or an event with the aim to create a description, picture or painting in a systematic, factual, and accurate information on the facts, the properties and the relationship between the phenomena investigated

The method is used to determine how to control of women shoes quality that have been made by the company and to determine what impact, if the method is applied to the product quality control docmart CV boots. Berkah Abadi. Descriptive method will be explained on the company's current situation based on the facts and data that have been collected and investigated the efforts made in the quality control process. This study using Statistical Process Control (SPC) as a tool to implement the quality control methods.

In collecting the data required in this study used a variety of sources and techniques. The first technique is a field research (field research) with observation or data collection by reviewing or visit the company as well as interviews, the data collection is done directly by contact and held a question-answer with the company. The next technique is a librarby research obtained through a literature review of textbooks lecture, internet, journals, documents and other reference sources were also taken from some of the examples of previous studies in Library and Scientific Information Centre of the Faculty of Economics and Business, University of Padjadjaran and other related to the problem being studied.
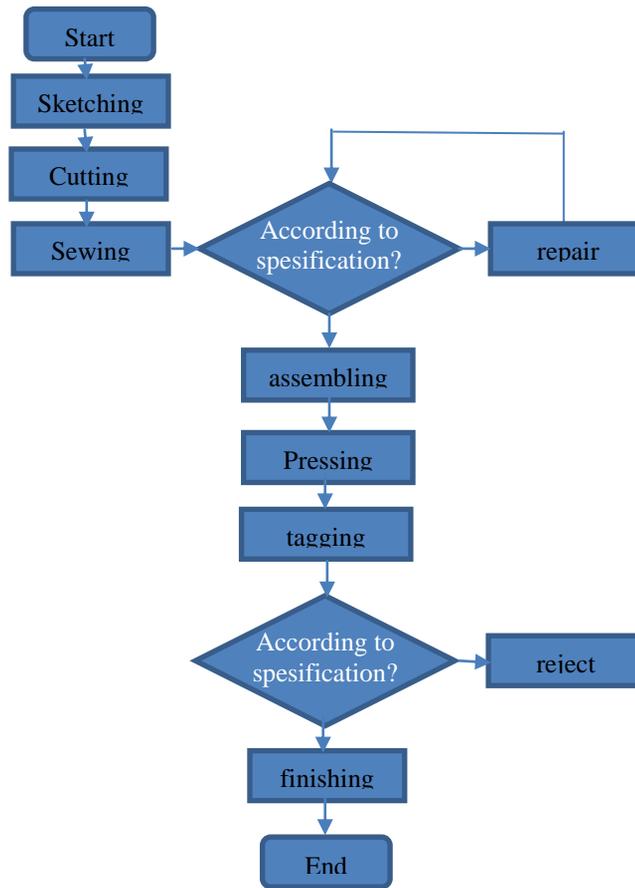
4. Results & Discussion

in this study will be divided into three parts tool consisting of tools for generating ideas which consists of a fishbone diagram, tools to organize the data that consists of Pareto charts, and tools for identifying problems that consists of a control chart.

Organize the data
Flowchart
The main production precess is produce upper until it fused with the bottom with perfectly. This is a flowchart about production process of docmart shoes CV. Berkah Abadi:
1. *Sketching*. The first stage in the production process docmart shoes is to do scetching the raw material to make a pattern. The process of making this pattern is made to all the basic ingredients of a shoe upper. Patterns are formed serves as a pathway or a marker on the next process is cutting and sewing.
2. Cutting. After scetching on the upper wall surface of the raw material, the next is to perform cutting in accordance with the pattern that has formed on scetching stages.
3. Upper Sewing. Merge process of the components that have been patterned and cut previously. In the sewing process is still using human power to direct the material to the eye of the needle sewing machine according to the patterns that have been made.
4. Assembling. The next process is to unite the upper which has been finished to the bottom by means of gluing surface of the upper and bottom parts to be glued with a brush that has been smeared by the glue shoes. To get best glue and strengthen the upper and bottom, then do ovening process. This was done for 10 minutes to get the ideal strength of the glue.
5. Pressing. Pressing is done to form a shoe upper strengthen the shoe bottom using a press machine
6. Sewing. Stages sewing this time is the process of suturing between the upper and bottom, this is done so that the upper and bottom with a stronger glue.
7. Tagging. This process is the process of making holes and mounting eye ducks. The usefulness of the eye duck (hole for the rope) is as mounting holes shoelaces. This process uses a punching tool hang tag.
8. Finishing. The last process is finishing the install insole and shoelaces to uper and bottom which has a perfect glue. In the installation process insole used a little glue to glue the insole to the bottom of shoes. Products that have passed through the finishing process, the product will be stored in storage.

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         ┌─────────┐
         │  Start  │
         └────┬────┘
              ↓
      ┌──────────────┐
      │  Sketching   │
      └──────┬───────┘
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      ┌──────────────┐                                          ┌──────────┐
      │   Cutting    │              ◇ According to  ─────────→  │  repair  │
      └──────┬───────┘              spesification?              └──────────┘
             ↓                      ◇
      ┌──────────────┐
      │   Sewing     │──→
      └──────────────┘
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Picture 1. Flowchart Docmart Product Process

Pareto Chart

Table 1. Data types of defects, the number of defects, the percentage of disability and disability cumulative percentage of footwear products docmart period February 2015

Types of Defect	Total	Percentage	CumulativePercentage
Neat Glue Sole	28	41,79104	41,7
Dirt / Blackspot	16	23,8806	65,67164
Squiggle Pattern	8	11,9403	77,61194
No Neat Stitches	7	10,44776	88,0597
Wrinkle	6	8,955224	97,01493
Torn Material	2	2,985075	100

Here is a Pareto diagram which can be made from the results of observations are shown in Table
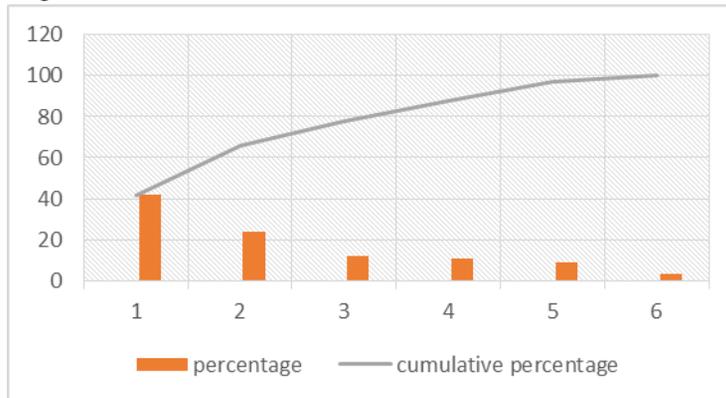

Picture 2. Pareto Chart of defect product CV. Berkah Abadi

Based on research conducted during the 10-day production process, the Pareto chart above, the level of disability is most common in the production process is the stain docmart shoe glue / glue that is not neat that cause stains on the upper surface of the shoe with the percentage rate of 41.79%. The error rate is kind of dirty / blackspot occurred 16 times, or 23.88% of the total error that occurred. The third type of disability is graffiti pattern on the shoe occurred 8 times with a percentage of 11.94% of the total error that occurred. The next type of disability is not neat stitching 7 times the percentage rate of 10.44% of the total disability occurs. Error wrinkles on the upper shoe with events as much as 6 times or 8.95% of the total error that occurred. The next error is the discovery of the tear with events as much as 2 times or 2.98% of the total error that occurred on the 10th day of production in Februar

Identifying Process Tools

Control chart

The data is taken from CV. Berkah Abadi that measured quality control of the amount of the final product. Measurements were performed with the Statistical Quality Control control limit the type of p-chart at the end of the product samples conducted during the 10-day production activities in February. Based on the description of the production of CV.Berkah Abadi, the average number of products produced docmart shoes in February as many as 50 pairs of shoes. Based on information from the production of CV. Berkah Abadi then be selected 47 samples of products shoes docmart with tolerance limit of 1% is taken from the theory of sampling Isaac and Michael.
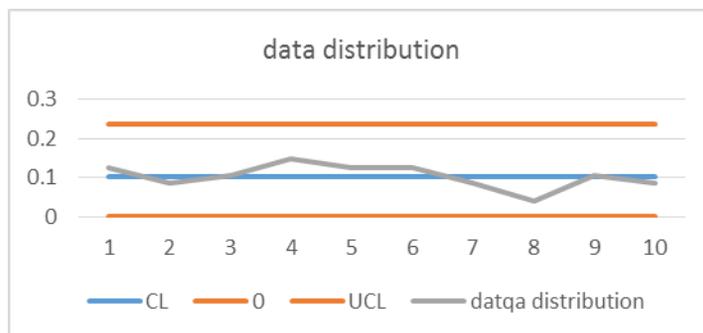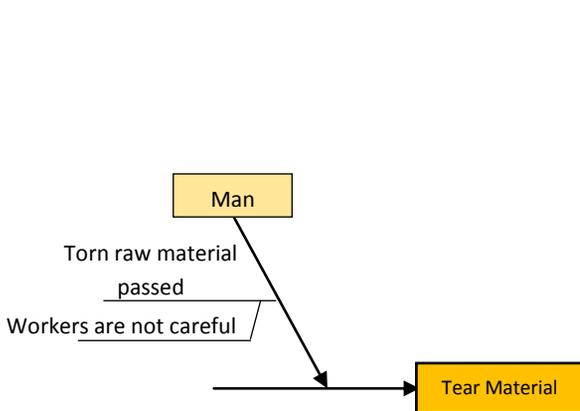

Picture 3. Data dostribution in p-chart

The results of the control of the p-chart maps to the data collected shows that the data is within the control of the central limit 0.1 upper limit of 0.237, -0.029, and the lower limit (0).
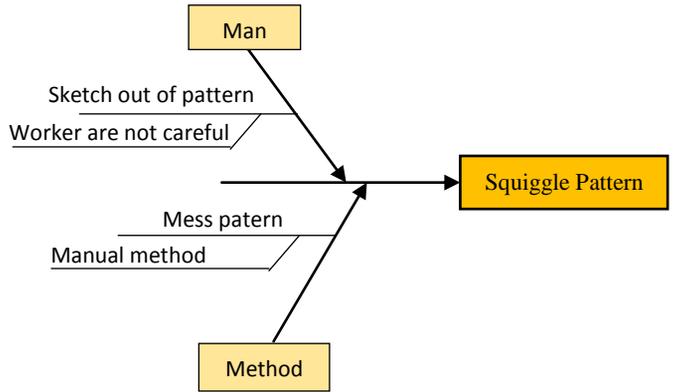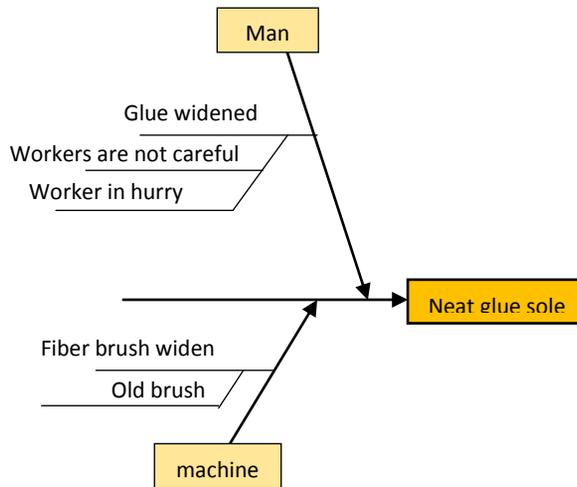
generating ideas tools

Fishbone

Fishbone diagram shows the outlines of causes / factors that cause the disability type 6.

Picture 4. Fishbone diagram tear material defect

Picture 5. Fishbone diagram squiggle pattern defect

Picture 6. Fishbone diagram neat glue sole defect

Based on the analysis of a fishbone diagram 6 types of defects that occur in CV. Berkah Abadi footwear products. there are four factors that cause the 6 types of disability, human factors, machine, method and environment. Human error is the factor most likely to cause the occurrence of disability with 6 factors. The second is an error on

that machine with 5 factors, errors in methods and environmental factors have the respective one factor that can cause product defect

5. Conclusion

Based on research that has been conducted on the production process docmart shoe brands BNA produced by CV. Berkah Abadi, it can be concluded that the company still has a production process that produces defective products. Adalapun some things that can be summed up in this study was

Application of quality control in the CV. Berkah Abadi conducted by monitoring without any activity or preventive measures which mean the error that occurred. The control activities performed by each worker without any special team to handle the problem of quality control in every production process

Factors that produce a defective product in general is a factor of human, machine, method and environment. As in detail the factors that cause disability, among others:

- Man, that workers who are not careful, no concentration, and in a hurry during the production process and not keeping the worker can produce defective products.
- The machine, which is the lack of care before and after the production process, and the use of old engine and component incomplete into the root causes of defects.
- Environment, which is the raw material storage room dirty can cause tainted products.
- The method, namely the production process which still use manual way can increase the likelihood of the occurrence of errors.

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