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The PDCA Approach with Seven Quality Tools for Quality Improvement Men's Formal Jackets in Indonesia Garment Industry

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Abstract. Garment production with men's jacket products still finds products with poor quality and a high percentage of defects. The method used in this study is the PDCA approach with seven quality tools. The purpose of this study is to determine the cause of defects, provide solutions to repair these problems by reducing product defects, and reduce the percentage of dominant defects in the Finishing section. This study found that the factors causing the damage were human, machine, method, material, and environmental factors. Meanwhile, improvement efforts are contained in the Action stage, namely 5W+1H. The results of these improvements have an impact on the reduction of finishing defects from 17.8% to 11.8% which means a decrease in defects by 33.7% every month in the finishing section. The implications of this research can be used as a reference to reduce similar problems in the garment industry process. The combination of the PDCA approach and seven repair tools results in a defect percentage control system using a control chart so that defects will be controlled and corrective actions will be taken quickly.

Keyword: Garment Industry, Improvement, PDCA, Seven Tools, Quality Control

Abstrak. *Produksi garmen dengan produk jaket pria masih menemukan produk dengan kualitas yang kurang baik dan persentasi cacat yang tinggi. Metode yang digunakan dalam penelitian ini adalah pendekatan PDCA dengan Seven Tools kualitas. Tujuan dari penelitian ini adalah untuk mengetahui penyebab terjadinya cacat, memberikan solusi perbaikan masalah tersebut dalam mengurangi cacat produk dan menurunkan persentasi cacat dominan pada bagian Finishing. Penelitian ini menemukan bahwa faktor penyebab kerusakan tersebut adalah faktor manusia, mesin, metode, material, dan lingkungan. Sedangkan upaya perbaikan tertuang dalam tahapan Action yaitu dengan 5W+1H. Hasil dari perbaikan tersebut berdampak pada pengurangan cacat finishing dari 17,8% menjadi 11,8% yang berarti terjadi penurunan cacat sebesar 33,7% setiap bulannya pada bagian finishing. Implikasi penelitian ini dapat dijadikan acuan mengurangi problem serupa pada proses industri garmen. Kombinasi pendekatan PDCA dan Seven Tools perbaikan menghasilkan sistem pengontrolan persentasi cacat dengan menggunakan peta kendali sehingga cacat akan terkendali dan tindakan perbaikan akan cepat dilakukan.*

Kata Kunci: Industri Garmen, Perbaikan, PDCA, Seven Tools, Pengendalian Kualitas

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1. Introduction

Within the 2015 period, piece of clothing innovation has progressed a parcel with programmed innovation in design making, cutting forms, sewing forms, and wrapping up forms. With the progressively progressed innovation, it ought to be able to bolster efficiency and quality. But in reality, efficiency and quality are still moo, not assembly the quality prerequisites set by the buyer or buyer. Items gotten by customers are to a great extent decided by the quality of the items delivered following consumer requirements. Companies have to be pay consideration, keep up and control and make strides the quality of the items they deliver by executing and building a quality framework. Quality Control (QC) and enhancement look for to stifle imperfect items from getting into the hands of customers.

One of the strategies that will be utilized to discover out or stifle generation absconds as little as conceivable is to utilize the strategy through the seven quality control devices approach. These seven quality control instruments are a set of QC apparatuses that can be utilized to move forward the execution of a generation handle, from the primary steps within the manufacture of a item or service to the ultimate generation organize [1]. The essential concept of ceaseless prepare enhancement and as a problem-solving strategy is inserted within the organizational culture so that it is simple to get it and must be utilized by different parties, known as the Arrange Check Activity (PDCA) cycle [2].

One of the article of clothing companies in Bandung may be a article of clothing producer merchant from PT. Itochu Indonesia produces men's formal coats (men's suit jackets). The piece of clothing company applies quality benchmarks taking after buyer guidelines, to be specific Satisfactory Quality Level (AQL) 2.5 military standard at the time of last assessment. The absconds gotten for one month from the starting to the conclusion can be seen in Figure 1.

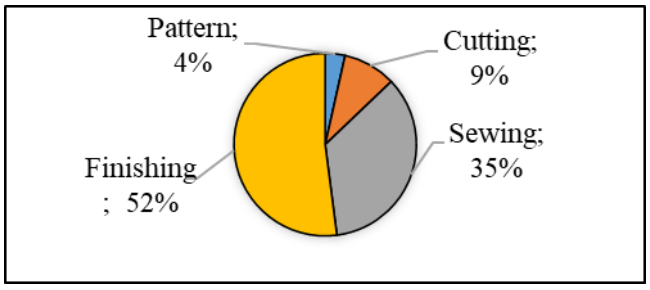

Figure 1 Percentage of Garment Defects at each Stage of the Process in August 2016

Based on Figure 1 appears that the biggest rate is within the wrapping up line at 52%, so this area should be examined for repairing these abandons utilizing the PDCA strategy and seven quality control apparatuses.

The marvel of the issues confronted by the piece of clothing companies can be overcome with the seven quality control instruments approach, to control and minimize flawed generation. Quality itself is one of the characteristics of a item or benefit indicated by customers [3]. The

quality control is carried out to conduct advance examination, and it can be seen how the quality control happens within the product [4].

Quality tools like these seven tools can be used within a company's existing quality management to identify short-term quality process deviations and fix them immediately. These seven tools are easy to use and management has no difficulty in implementing them [5]. The data analysis technique that aims to control well in the context of the recently used statistical data in production is called Statistical Process Control (SPC) [6].

Endeavors are made to decrease harm to the ultimate product that's harmed within the generation or conveyance prepare, so it is fundamental to know the components causing the harm, investigation of information collection strategies utilizing perception, interviews, and documentation thinks about at that point analyze methods utilizing quality apparatuses and 5W + 1H investigation [7]. One of the strategies is utilizing the basic execution of the seven instruments in quality control absconds for batik material fabricating. Quality instruments utilized incorporate; a check sheet, histogram, stream chart, control chart, diffuse, pareto, and fishbone [8]. In this ponder, it is nearly the same as utilizing quality apparatuses as a strategy of enhancement, but the change approach in this ponder employments the PDCA concept approach so that each arrange can utilize quality instruments agreeing to the stages of enhancement.

In this consider, it is nearly the same as utilizing quality instruments as a strategy of advancement, but the change approach in this ponder employments the PDCA concept approach so that each arrange can utilize quality instruments agreeing to the stages of enhancement. Figure 1 appears the stages of the wrapping up prepare within the make of formal men's coats, the biggest rate of surrenders are 52%, so this segment should be repaired utilizing seven quality instruments that are connected to the PDCA approach. The reason of this think about is to decide the cause of surrenders, give arrangements to repair these issues by diminishing product defects, and decrease the rate of prevailing surrenders within the Wrapping up section.

2. Related Worked

Lessening item absconds delivered by community machines by executing seven quality apparatuses as one of the quality administration instruments [9]. Execution of the strategy seven essential rebellious of quality control contributes to the levelheaded company of generation and trade forms of the undertaking, expanding its steadiness and competitiveness in household and remote markets [10]. One viewpoint that must be kept up in expanding customer certainty and minimizing generation as well as decreasing the number of imperfect items utilized in moving forward item quality is to utilize seven quality advancement instruments, particularly pareto graphs, fishbone graphs, and analyzed the causes with 5W+1H [11].

Strategy Seven quality change instruments comprise of check sheets, stratification, histograms, pareto charts, scramble graphs, control charts, and fishbone graphs [12]. The sound strategy is one of the item plan strategies that utilize a orderly approach at each arrange to deliver potential

arrangements [13]. A organized and orderly strategy points to progress forms that center on diminishing prepare change, squander as much as conceivable, and diminishing surrenders (products/services that are exterior determinations) by utilizing an seriously and factual problem-solving device called the Incline Six Sigma (LSS) Approach [14].

The seven fundamental devices of quality are a assignment given to a settled set of graphical procedures distinguished as being most supportive in investigating issues related to quality [15]. Seven quality devices that incorporate check sheets, stratification, histograms, diffuse graphs, control charts, pareto graphs, and fishbone graphs are utilized to analyze the causes of surrenders [16]. The enhancement organize may be a arrange of activity to actualize quality change with the six sigma approach, after knowing the causes of each sort of item imperfection that's most prevailing [17].

Utilize the PDCA strategy and apply the gather action (SGA) concept in eight remediation steps to decrease the rate of item abandons [18]. In general, it was concluded that the PDCA cycle could be a instrument that makes a difference to recognize and create and execute change openings in incline fabricating ventures [19]. PDCA is contained in an interminable circle, which permits all actualized and connected arrangements to be considered as markers of assist enhancement exercises [20]. With respect to the usage of Kaizen by Steps 8 PDCA to decrease line surrenders within the sticking prepare, by applying this strategy, the company can decrease the board scrap rate by 38% compared to the made strides board scrap rate, and the company can accomplish the board scrap target [21].

3. Methodology

The information required in this think about are essential information and auxiliary information. The information included within the essential information is an investigation of the causes of abandons, coordinate perception of test making, whereas the auxiliary information incorporates generation report information and archived month to month generation deformity information. To get investigate information as specified over, the analysts utilized a few information collection strategies, specifically records, and perceptions. Information collection was carried out from Eminent to November 2016, where the information gotten were investigate information on the generation prepare of men's articles of clothing at a piece of clothing company in Bandung. Based on the marvels described, this investigate employments the foremost fitting sort of investigate is blended strategies inquire about which combines quantitative investigate strategies and subjective inquire about strategies to be utilized together [22]. The investigate system can be seen in Figure 2.

Agreeing to Figure 2, subjective ponders are fishbone graphs and 5W+1H, others are included in quantitative considers. The steps of the overview utilize the PDCA staged approach, and each organize of the method uses the suitable method within the steps to require efficiency measures. The methods utilized at each arrange incorporate:

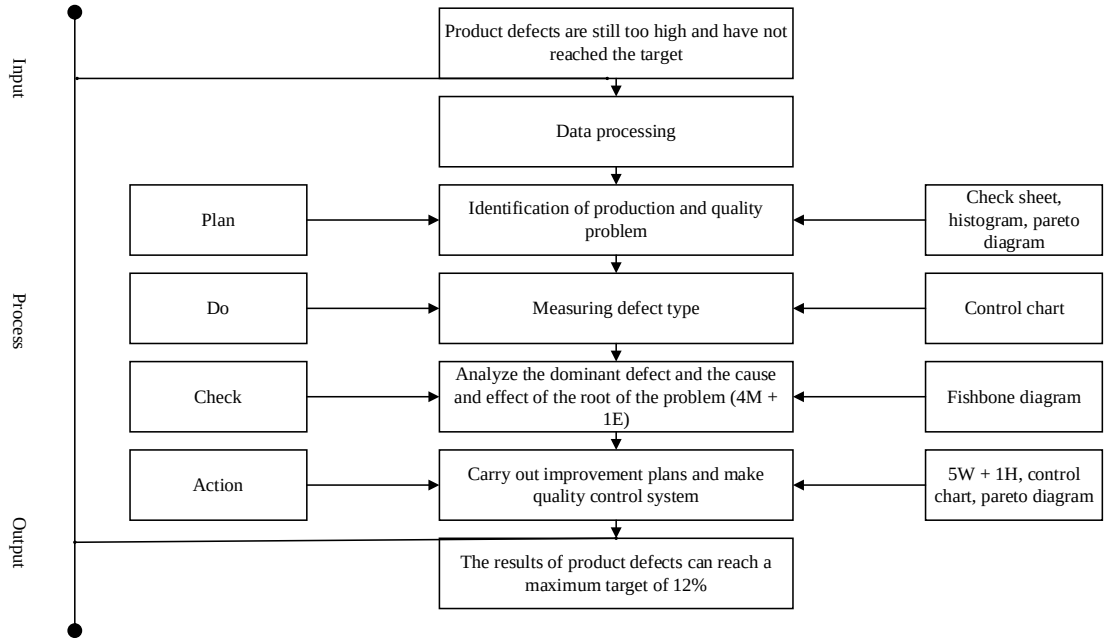

Figure 2 Research Framework

3.1. Phase P – Plan

At this arranging organize, the investigate decides the target for accomplishing wrapping up line absconds. The administration of the wrapping up division has set a deformity decrease target of 25% per month on normal. The strategies utilized in this arranging stage incorporate:

A. Check Sheet

The compilation of information utilizing check sheets and its ensuing control ought to be reflected within the quality change arrange [23]. The reason of utilizing this check sheet is to encourage information collection for a particular reason or to be turned into profitable data [15].

Collecting data by taking garment products at random (random), then inspecting the product to find product defects, then classifying the types of defects, recording the types of defects, and counting the number of defects. Data collection was carried out for 30 days, data collection was recorded using data observations (check sheet). Make a check sheet of the amount and type of data collected, namely data on defective products in finishing production processes, then input them into microsoft excel software to form a check sheet.

B. Histogram

The histogram could be a bar chart utilized to appear the nearness of scattering information and recurrence conveyance. A recurrence dispersion appears how regularly each particular esteem in a information set happens. This chart can too analyze the characteristics and causes of information scattering. The information within the histogram is separated into classes, the watched esteem of each lesson is appeared on the x-axis [9]. From the comes about of information handling, a histogram chart is made which appears the dispersion of the number of defects on the sewing line and the wrap up line. The way to induce this histogram is to record

the number of acknowledged and rejected surrenders within the number of tests watched, at that point input them into minitab 19 computer program to create a histogram.

C. Pareto Diagram

A Pareto chart could be a bar chart that shows issues within the arrange in which they happened, from the number of issues most habitually to the slightest common. The figure appears the most elevated bar (distant cleared out) to the least bar (distant right) [24].

The strategy of making pareto graphs in this think about is to record generation and absconds from the sort of wrapping up line surrenders some time recently enhancement, at that point input them in minitab 19 program to make a pareto chart.

3.2. Phase D – Do

This inquire about stage points to decide quality control with a few strategies of enhancement, among others, with a control chart that capacities to control surrenders inside a foreordained constrain some time recently making repairs. The strategy utilized in this stage of the program incorporate:

A. Control Chart

This consider is way better suited to utilize a p-chart, comparable to ponders that degree the number of mistakes or predispositions in generation units. Probabilistic inspecting implies that each component within the populace has an break even with chance of being included within the test [25]. The another step is to utilize a control chart, which in this consider applies to a p-chart, to measure the number of absconds or nonconformities within the units created. Utilize a p-chart when the number of disappointment chances is consistent or settled. Make a control chart to show a outline for controlling the extent of piece of clothing item blunders within the wrapping up line some time recently change at that point input them in minitab 19 program to create a p-chart. The steps in making a control outline with a every day demonstrate are as takes after:

- Determine the Center Line (CL) and control map:

$$\bar{P} \text{ or } CL = \frac{\sum cacat}{\sum Inspeksi} \quad (1)$$

- Determine the Upper Control Line (UCL):

$$UCL = \bar{P} + 3\left(\frac{\sqrt{\bar{P}(1-\bar{P})}}{nl}\right) \quad (2)$$

- Determine the Lower Control Line (LCL):

$$LCL = \bar{P} - 3\left(\frac{\sqrt{\bar{P}(1-\bar{P})}}{nl}\right) \quad (3)$$

3.3. Phase C – Check

This examination arrange investigate is to look at the most causes of the prevailing imperfection issue utilizing the fishbone chart.

A. Fishbone Digram

Fishbone graph may be a quality enhancement apparatus that's carried out by beginning with an analysis of the results or problems that arise and after that in a organized way trying to find conceivable causes by way of conceptualizing. In common, 5 components cause deviations within the prepare, counting 4M (Fabric, Strategy, Machine, Man) and 1E (Environment) [15]. This strategy is carried out by coordinate perception of the generation wrapping up line and conducting interviews or conceptualizing with administrators included within the generation prepare of each generation line. After getting the cause information, at that point the information is entered into Microsoft Visio to create a fishbone graph.

3.4. Phase A – Action

At this final arrange some time recently turning back to the beginning organize, the devices utilized are 5W + 1H and a control chart after repair.

A. 5W+1H

One of the organized strategies to create numerous thoughts by employing a arrangement of questions related to the issue or objective that has been set is called the 5W+1H strategy [26]. This consider employments the Focus Group Disccusion (FGD) strategy in a assembly where the substance of the dialog at the assembly decides 5W+2H and examines information examination procedures with the comes about of common understanding. Perform investigation utilizing the root analysis method (5 Why) to induce the genuine cause of a issue. So in this case the clarification of the causes of the issue on the cause-and-effect graph with Root Cause Analysis (RCA) is interrelated. In case the cause-and-effect graph depicts all conceivable causes, then RCA conducts a more profound unearthing of the cause to urge to the genuine cause so that the enhancements given will be more compelling and right on target.

B. Control Chart

Make a control chart to appear a control chart for the extent of piece of clothing item blunders within the wrapping up line after changes are made. Beginning from filling out the check sheet information after enhancement, at that point from each sort of wrapping up deformity will be filled with imperfection information, input data into minitab 19 to make control charts and pareto graphs. The steps for making a control chart utilizing the day by day show are the same as the steps in area 3.2.1.

C. Pareto Diagram

The strategy of making pareto charts in this ponder is to record generation and absconds from the sort of wrapping up line absconds after change, at that point input them in minitab 19 program to create a pareto graph.

4. Result and Discussion

4.1. Phase P – Plan

At this arranging arrange, a few discoveries were gotten by employing a instrument within the frame of check sheets some time recently and after repairs. Findings of defect problems can also be in the form of pareto diagrams, and can also be in the form of histogram diagrams. The results can be described in several ways:

A. Check Sheet

The results of data processing using a check sheet before improvement can be seen in Table 1.

Table 1 Number and Type Finishing Line Defect

Observation	Number of inspections on sewing line (AQL 2.5)	Number and Type of Defect										
		Slanted Lapel	Poor Shape Lapel	Poor shape Shoulder	Twisting	Bubbling	Puckering	Lapel Too High/Low	Pressing Impression	Breaking Armhole/Sleev	Amount of No Good	Amount of Good
1	125	0	2	0	2	2	3	2	2	1	14	111
2	125	0	2	1	2	1	3	2	2	2	15	110
3	125	1	2	0	2	2	3	2	2	2	16	109
4	125	0	2	1	1	2	3	2	2	2	15	110
5	125	0	2	0	2	1	3	2	1	2	13	112
6	125	1	2	1	2	2	2	2	1	1	14	111
7	125	0	1	0	2	2	3	1	2	2	13	112
8	125	0	2	1	2	1	3	12	2	2	25	100
9	125	1	2	0	2	20	2	1	12	1	41	84
10	125	0	2	1	2	2	3	2	1	2	15	110
11	125	0	0	0	2	12	12	21	2	2	51	74
12	125	3	2	1	1	1	2	2	2	2	16	109
13	125	0	1	0	2	2	3	2	1	1	12	113
14	125	0	2	1	2	30	10	12	12	2	71	54
15	125	1	2	0	2	2	3	2	2	2	16	109
16	125	0	0	1	1	14	3	20	2	2	43	82
17	125	0	2	1	2	15	4	2	2	1	29	96
18	125	2	0	0	2	14	3	12	2	2	37	88
19	125	0	2	1	2	2	5	1	10	2	25	100
20	125	4	2	0	1	3	2	2	2	1	17	108

Observation	Number of inspections on sewing line (AQL 2.5)	Number and Type of Defect										
		Slanted Lapel	Poor Shape Lapel	Poor shape Shoulder	Twisting	Bubbling	Puckering	Lapel Too High/Low	Pressing Impression	Breaking Armhole/Sleev	Amount of No Good	Amount of Good
21	125	0	0	1	2	21	3	12	2	2	43	82
22	125	2	2	0	2	2	3	1	2	1	15	110
23	125	2	2	1	2	2	2	2	1	2	16	109
24	125	0	2	1	2	2	3	2	2	2	16	109
25	125	0	0	0	2	2	2	2	2	1	11	114
26	125	2	2	1	2	1	3	1	1	2	15	110
27	125	0	0	0	2	2	2	2	2	2	12	113
28	125	0	2	1	2	1	3	2	2	1	14	111
29	125	2	0	0	2	2	3	1	1	2	13	112
30	125	0	2	1	2	1	3	2	2	1	14	111
	3,750	21	44	16	56	166	102	131	81	50	667	3083
	%	0.56%	1.17%	0.43%	1.49%	4.43%	2.72%	3.49%	2.16%	1.33%	17.8%	82.2%

Table 1 shows that each type of defect can be filled in on the check sheet by examining 30 samples carried out. As for the result, the highest defect from the finishing section is the bubbling defect of 4.43%. Another study in the garment industry with non-formal clothing products resulted in a dominant defect, namely uncut seams by 14% [27]. Each stage of the garment industry process produces different dominant defects according to the type of product produced.

B. Histogram

After knowing the rate of absconds for each sort of imperfection within the wrapping up segment, then processing the information employing a histogram to decide the rate of surrenders. The histogram chart can be seen in Figure 3.

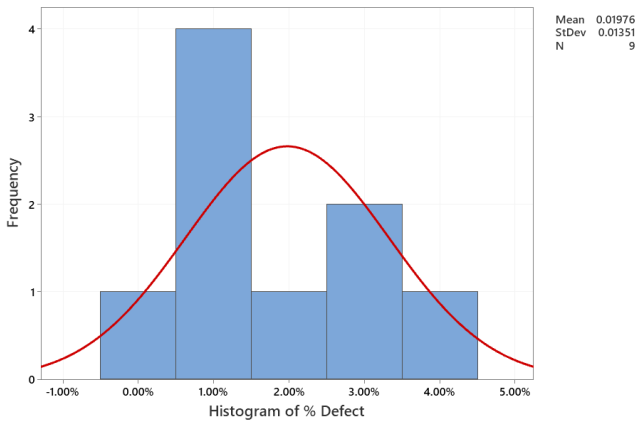

Figure 3 Histogram Finishing Line Defect

Figure 3 shows that the distribution of defects at the 1% level is at most 4 types of defects so the distribution is not evenly distributed between levels, as evidenced at the 3% level there are only 2 types of defects. Critical to Quality (CTQ) in this study there are 3 types of defects because they fall into the 3%-4% percentage of the largest defects. The types of defects that enter the CTQ are bubbling, lapel to high/low, and puckering. In another study with a different product, namely the socks product, there were 8 types of CTQ defects [28].

C. Pareto Diagram

The results of data processing using a pareto diagram can be seen in Figure 4.

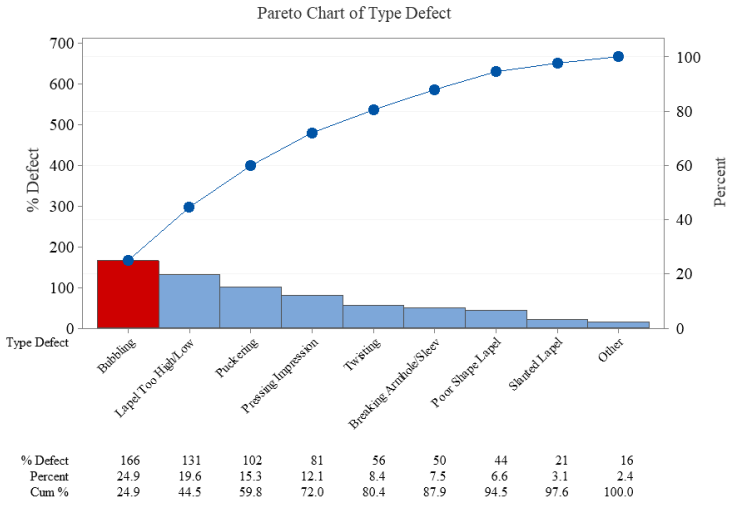

Figure 4 Pareto Diagram Before Improvement

Figure 4 appears that the most noteworthy imperfection within the generation line of men's formal coats is the wrapping up portion with the title bubbling deformity of 24.9%. Prevailing surrenders in pareto graphs ought to be redressed so that the rate of absconds as a entire can be decreased [29].

4.2. Phase D - Do

A. Control U-Chart

The result of data processing, and then the p-chart before the improvement is obtained. Input the data into minitab-19, and the p-chart control in Figure 5 will be generated.

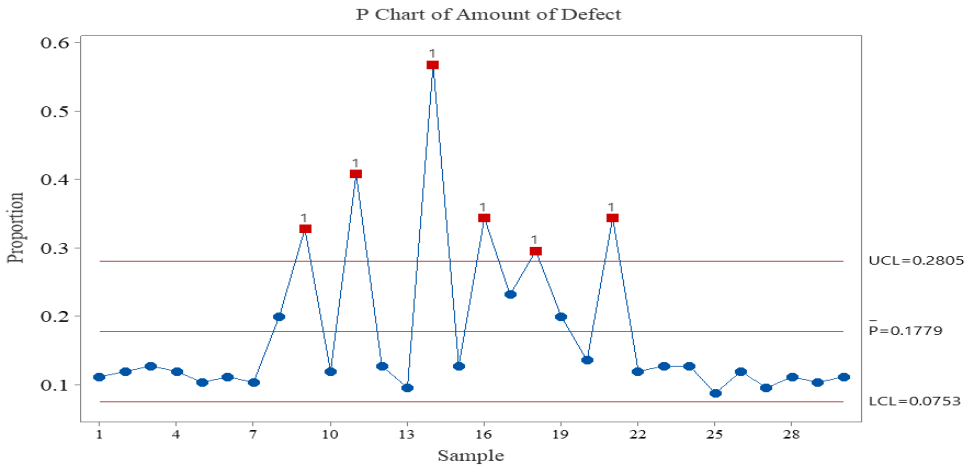

Figure 5 Control Chart Before Improvement

Figure 5 shows that the results of the percentage of defects 6 samples do not enter the limit, meaning that there is a percentage of defects that are out of the predetermined standard path, so this needs further treatment to reduce the percentage of defects as a whole. The percentage value of defects outside the control chart is a product discrepancy that occurs and must be immediately retested or repaired if the distribution is large [30].

4.3. Phase C – Check

A. Fishbone Diagram

Based on the brainstorming between the operator and the leader using interviews with questions with the sentence why-why analysis, the main factors causing the root cause can be seen in Figure 6.

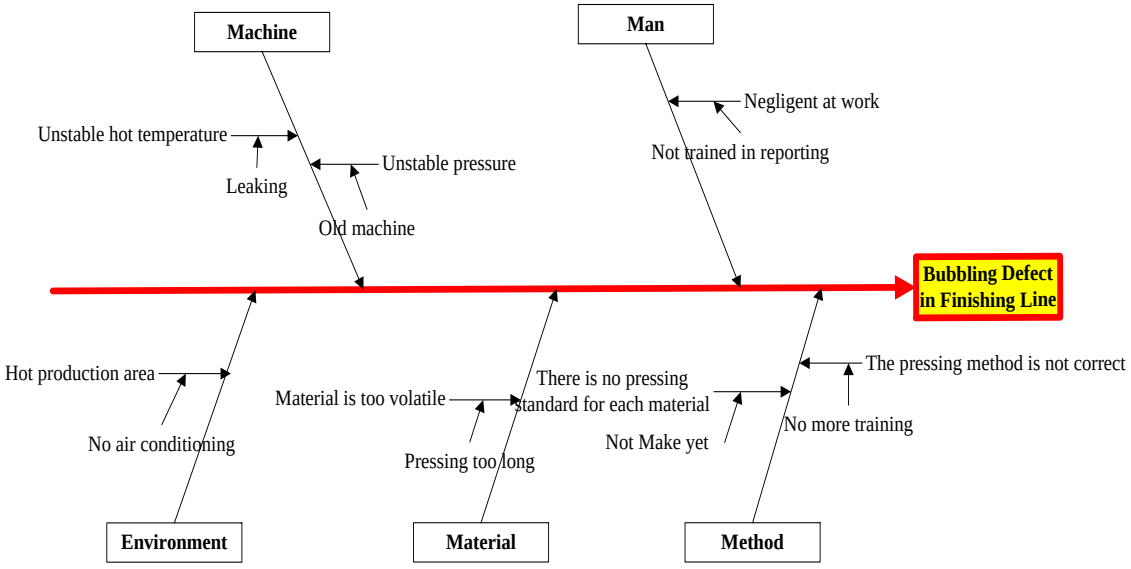

Figure 6 Diagram Fishbone of Finishing Line Defect

In Figure 6, it can be seen in the fishbone diagram that the main dominant factor in the finishing section is the bubbling defect, consisting of the machine, man, material, method, and environmental factors. All causal factors use why-why analysis in determining the root of the problem. In another study, all problems from dominant defects will be discussed using a fishbone diagram plus why-analysis, so that the cause and effect of a problem will be answered at the meeting [31].

4.4. Phase A – Action

A. 5W+1H

Based on the results of the meeting with the leader and expert judgment using FGD to determine 5W+1H, the improvement plan can be seen in Table 2.

Table 2 5W+1H Improvement Plan

No	What	Why	How	Who	When	Where
	What is the problem?	Why should it be dealt with?	How to deal with it?	Who is in charge?	When will it be implemented?	Where is it carried out?
1	Unstable hot temperature	The pressing machine is too old and the spare part has been discontinued	Propose an engine replacement	Wahyu	Sep, 3rd 2016	Pressing machine
2	Negligent at work	no warning sign related to Work Instruction (WI)	Attaching WI or warning sign near the work area	Sukamto	Sep, 15th 2016	Near production area
3	No more training	New employees for the finishing line need SOP training	Every new employee needs to be given theoretical and practical training outside of working hours	Dadang	Oct, 2nd 2016	Finishing line area
4	Material is too volatile	no material inspection has arrived yet	A random inspection of every arrival lot	Rimawati	Oct, 7th 2016	Laboratory
5	Hot production area	Employees are not comfortable working	Providing a fan in a hot area	Asep G	Sep, 8th 2016	Production area

Table 2 shows that repairs have been scheduled in stages according to work priorities by looking at the level of difficulty in making improvements. All problems must be taken corrective action to affect reducing the percentage of defects. In another study, the repair conditions used 5W+1H, where usually the repair team will see the priority of repairs that must be started to repair so that repairs are more scheduled and directed [32].

B. Control Chart

After the data processing results are obtained p-chart and after improvement, input the data into minitab-19, the p-chart control in Figure 7 will be generated.

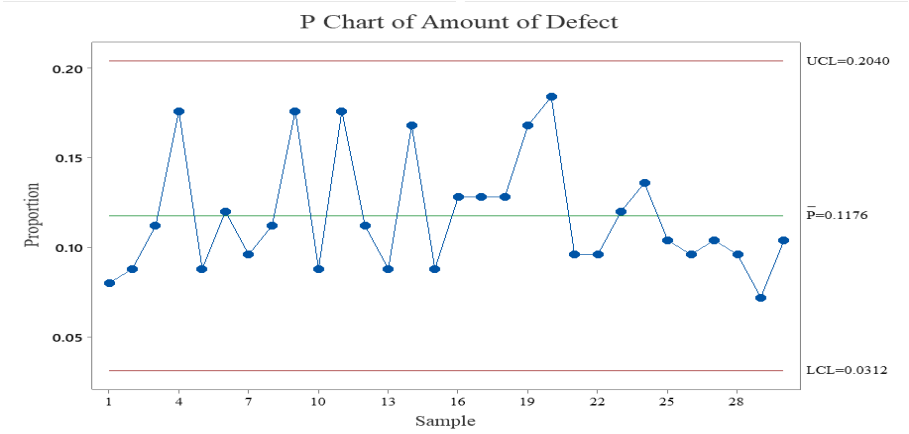

Figure 7 Control Chart After Improvement

Figure 7 shows that the results of the percentage of defects are all within the limit, meaning that there is no percentage of defects that go out of the predetermined standard path. The results of this p-chart indicate that the results of the improvements that have been made in the 5W+1H planning have been carried out in earnest in carrying out the repairs.

C. Pareto Diagram

The results of data processing using a pareto diagram can be seen in Figure 8.

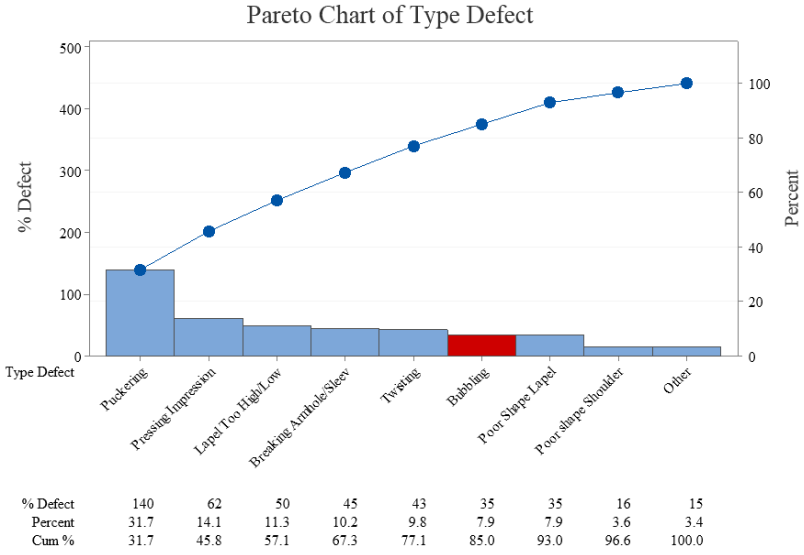

Figure 8 Pareto Diagram After Improvement

Figure 8 appears that the most elevated deformity within the generation line of men's formal coats is the wrapping up portion with the title puckering imperfection of 31.7%, and the bubbling imperfection has diminished to 7.9% after change.

D. Comparison Quality Product Result

After taking corrective actions, the next step is to check the results of quality products through the seven quality tools and defects (%) before and after improvement can be seen in Table 3.

Table 3 Comparison Bubbling Defect Result

No	Parameters	Units	Before Improvement	After Improvement	Result	Remarks
1	Quality inspection	pieces	166	35	Decrease 131	By check sheet tools
2	Diagram pareto	%	24.9	7.9	Decrease 68.2	
3	Control p-chart	samples	6	0	Decrease 6	
4	Bubbling defect	%	4.43	0.93	Decrease 79.0	
5	Finishing losses	%	17.8	11.8	Decrease 33.7	

Table 3 shows that there is a decrease in the number of defects by 131 pieces from before the improvement of 166 pieces to after the improvement is 35 pieces of bubble defects in the finishing section. This affects reducing production costs, so the company gets a cost savings of IDR68,121,000 per month (If the price of 1 piece of men's formal jacket is IDR520,000).

From the results of data processing and data analysis, consistency is needed from all parties in the finishing section, starting from data collection on defects and production using check sheets, monitoring the percentage of defects through control charts, and controlling corrective actions so that the consequences of all finishing sections will be able to increase productivity and product quality.

5. Conclusion and Future Research

In this think about, conclusions can be drawn counting the prevailing components causing surrenders are bubbling abandons within the wrapping up area, to be specific from the machine, human, fabric, strategy, and natural components. The components caused by the machine comprise of unsteady hot temperature conditions, human causes counting workers being careless at work, the cause of the strategy being no more preparing, the cause of the fabric being that the fabric gotten is as well unstable, and natural causes comprising of the generation zone is still hot.

The enhancement endeavors that have been made are: propose an motor substitution, joining WI or caution sign close the work zone, each unused representative should be given hypothetical

and viable preparing exterior of working hours, a irregular review each entry part, and giving a fan in a hot region.

The result of the improvement affects reducing finishing line defects from 17.8% to 11.8%, which means that there is a 33.7% decrease in defects in the finishing line every month. The decrease in the percentage of finishing defects was mostly contributed by the decrease in bubble defects from 4.43% to 0.93%. which means a decrease of 79.0%.

The limitation in this research is that observation is only at the most dominant stage in the garment process, namely the finishing section, so that in the process of analysis and corrective action only problem solving that occurs in the finishing area does not spread to other parts, that is the weakness of this research. It is hoped that the success of this research can be applied to other process stages that are still in the garment sector by providing improvement campaigns to other parts to understand and implement continuous quality improvement using seven improvement tools combined with the PDCA approach.

The implications of this research can be used as a reference to reduce similar problems in the garment industry process. The combination of the PDCA approach and seven repair tools results in a defect percentage control system using a control chart so that defects will be controlled and corrective actions will be taken quickly.

Subsequently, assist investigate is suggested to move forward the generation handle by coordination incline strategies viably in lessening squander and Six Sigma strategies in lessening generation abandons, so that the integration of these strategies can create effectively and viably within the article of clothing industry in Indonesia.

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