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Analysis Problem and Improvement of Appearance Aesthetics Product Model HC C5 / XT with Method of Plan-Do-Check-Action (PDCA) In Pt. XXXX

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Abstract:- This research aims to analyze and Determine the claims of improvement in exports indicates that the appearance aesthetics claim of HC Product models C5 / XT in the form of handling problems, problems machining burr and edge shape problems are the biggest problem from deburring casting process and machining process. In addition to knowing the different conditions in the form of claims received before and after the research is done improvement. Research object is deburring casting process, machining OP-3, machining OP-8 and manual baritori. The method used for solving the problem using the PDCA (Plan, Do, Check, Action) with DELTA (8 Steps and 7 Tools). And research results show that the Necessary repairs of the problems causing the apperance of aesthetics claim that the improvement of the human factor, machine / equipment factors and methods standardize the form factor and Work Instructions and One Point Lecturer. From the research conducted on this issue, it can be concluded that the appearance aesthetics claim can be solved by using PDCA with DELTA to human factors with the determination of special operators and training, factor machine / equipment to perform the installation jig cover, coolant shower and infrastructure improvements line 17, and factor methods work by creating IK Casting Deburring Process, OPL (One Point Lecturer) Deburring Process & Final Casting, OPL Installation and Waiver Provisions and OPL Products Process Manual Process Baritori.

Keywords:- *PDCA, DELTA, Improvement, Appearance Aesthetics.*

I. INTRODUCTION

Use motorcycles as an alternative transportation is one of the factors that influence. Increased demand for motorcycles, providing a greater demand for motorcycle manufacturers to continuously improve its product quality in order to compete with competitors in the domestic and international markets. Enhancement Motorcycle sales in Indonesia, affecting market share for exports. This relates to the procurement of spare parts of motorcycles to meet export requirements. To meet the needs of consumers, it takes a good product quality. Improved quality product depends on the quality management system is being run. Industries that do not run with good quality control will get a barrier to improve quality and make improvements. It is inversely proportional to the running industry with focused quality control and continuous. Product quality is assured awake and will give satisfaction to the customer who purchased the product. PT. XXXX asa company engaged in manufacturing of motorcycle parts to improve product quality to meet customer satisfaction in accordance with agreed standards. *HC* is one of the most important components of the motorcycle. To produce the HC, the general process is to go through the process Casting and Machining process with the warranty process is a process through which QC Dimensions and Final Appearance.

Some HC produced products, the products are shipped overseas (exports) into one big enough problem in 2012. The number of HC export delivery amounted to 129 185 pcs of total delivery (local and export) amounted to 2,650,817 pcs. Indeed, only 5% of the products are sent for export, but the claim against the product reaches 962 ppm (peace per million) or 9.62% of total export delivery per month, or about 215 pcs / month. For export, The customer claims acquired from XXX Co ,. Ltd for 1909 pcs (74%) with 720 ppm by category biggest problem is apperance aesthetics of 1462 pcs (77%). Based on Actual product claim is received and then identified, problems related to the problem of aesthetics appearance is handling marks, machining burr and edge shape. Of these products, investigated the origin of the process by QC Process Chart. Results of the investigation to the actual product of the QC Process Chart is the problem of handling marks are caused by the casting deburring process is based QC Process Chart into the casting process. There was also the problem of handling marks are caused due to baritori manual and OP-3 machining process based QC Process Chart go into Machining process. For machining burr problem caused by OP-8 machining process based QC Process Chart go into Machining process. Problems resulting edge shape for deburring casting process is based QC Process Chart into the casting process. Identification of problems to the actual products claim that their claim aesthetics appearance caused by the casting process, in the form of handling casting deburring mark and edge shape. As for the aesthetics apperance claim caused by the machining process that is at the OP 3, OP-8 and manual baritori mark in the form of handling and machining burr.With condition the thing to do is improve the quality of the product thereby reducing customer claims received from XXX Co ,. Ltd. for

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aesthetics appearance problem. As for improving the quality of the product that is to do with improvement. The research it wants to perform an analysis to determine the appearance aesthetics claim improvement caused by the casting process, namely in the form of handling casting deburring mark and edge shape. In addition to determining the appearance aesthetics claim improvement caused by the machining process that is OP-3, OP-8 and manual baritori mark in the form of handling and machining burr. From the analysis in determining the improvement is expected to be known to the different conditions in the form of claims received and the actual process before and after improvement.

II. RESEARCH OBJECTIVES

- In achieving a customer satisfaction, we need a quality product so that the consumer acceptance of the product is high and the complaint (claim) to be low. And in doing the repair process improvement needs to be done, one of them using PDCA phases with 8 steps for improvement.
- The discussion of the problem of appearance aesthetics is categorized where this problem as a problem associated with the visual. appearance. While the aesthetics meaning aesthetic or related to beauty. So that the aesthetic appearance of products can be defined as the appearance of the viewpoint of beauty to see the goods.
- Improvements made to the problem of aesthetics appearance is expected to affect the output of products that will directly reduce the claim received from the customer, in this case is XXX Co ,. Ltd.

III. LITERATURE REVIEWS

Production process in a manufacturing enterprise, quality is one of the final destination of the product. Generally that product quality will be realized when the orientation of all activities of the company or organization oriented to customer satisfaction (customer satisfaction). According to Kotler (2000) that customer satisfaction is feeling happy or disappointed someone who comes from a comparison between her impression of the performance (yield) of a product with expectations. To achieve customer kepuasan, it is necessary quality products according to customer requirements. Quality according to ISO 8402 (quality vocabulary) in Indrayana (2008) is the tolerance of the characteristics of a product that supports the ability to satisfy the requirements specified or defined. While quality according to Kotler and Keller in Hermawan (2011) is the totality of features and characteristics that are capable of satisfying the needs, expressed or not expressed, the quality also cover product durability, reliability, accuracy, ease of operation and repair, as well as the attributes of other value , Quality according to Gaspersz in Sukendar (2008) is the totality of features and characteristics of a product or service related to its ability to meet specific needs or satisfaction.

In conducting a quality control and improvement, all you need to know the implementation of the application is to run the PDCA (Plan, Do, Check, Action). PDCA cycle runs continuously punctuated standardization process. PDCA cycle was first popularized by W. Edwards Deming. PDCA cycle is often called the Deming Cycle. According to Deming that to produce a quality product, should continue rotating the PDCA cycle. *PLAN* done by developing a plan to planning the specifications, define specifications or standards of good quality, give insight to subordinate the importance of the quality of products, quality control is done continuously and sustainably. Do be done by implementing a plan which has been drawn up plans implemented in stages, ranging from small and evenly distribution of tasks in accordance with the capacity and capability of each personnel.

During implementing the plan must be controlled, which strive for all plans executed as possible to the target can be achieved. The check is done by checking or examining the results achieved by checking or research refers to the determination whether the implementation is on track, according to plan and monitor the progress of the planned improvements. Comparing the quality of production with the standards that have been established, based on the research data showed the failure and then examined the causes of failure. Action carried out by conducting adjustments as needed through an adjustment is made when deemed necessary, based on the analysis above. Adjustments relating to the standardization of the new procedures in order to avoid a resurgence of the same issue or set new targets for the next repair. Action carried out by conducting adjustments as needed through an adjustment is made when deemed necessary, based on the analysis above. Adjustments relating to the standardization of the new procedures in order to avoid a resurgence of the same issue or set new targets for the next repair. Action carried out by conducting adjustments as needed through an adjustment is made when deemed necessary, based on the analysis above.

Adjustments relating to the standardization of the new procedures in order to avoid a resurgence of the same issue or set new targets for the next repair. PDCA model can be used in various levels of management, from top management to first line management (first-line management) and can be applied in a variety of purposes ranging from design management system through the implementation of projects for continuous improvement (improvement). In a way, the PDCA is always supported by the standard to ensure that PDCA action did not decline into a worse condition. In implementing PDCA can be associated with DELTA (Eight Steps and Seven Tools) which is used in making performance improvements on an ongoing basis. Eight Measures adopted in the PDCA addressed through a cycle of continuous improvement known as the Deming cycle shown in the following figure:

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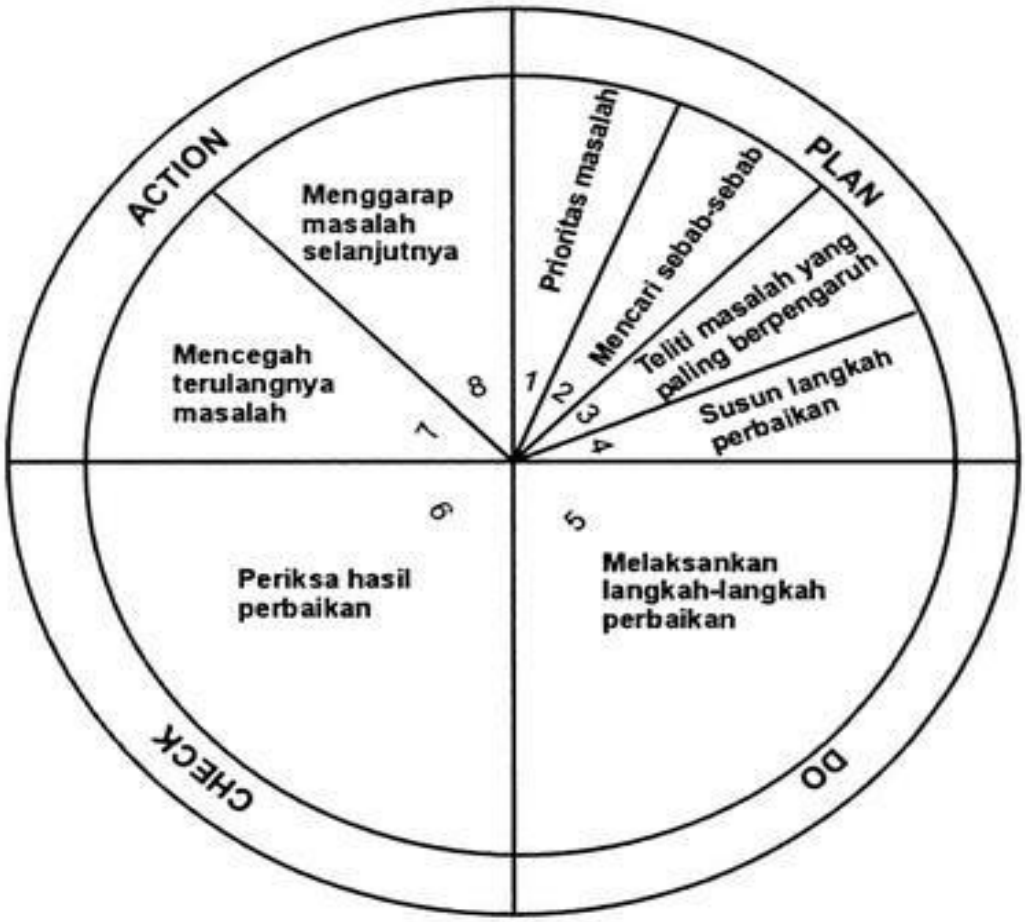

Fig 1:- Linkages PDCA and Eight Steps
Source: DELTA by Kuswadi and Erna Pearl.

Eight Steps, requires tools modest performance improvement is referred to as the Seven Tools. Seven quality control tools or commonly known as the Seven Tool according Gaspersz (2011) is a tool that can be used to improve quality control.

Seven tools are often used as a tool to assist in conducting performance improvement is check sheet (check sheet) and stratification, Pareto diagrams, fishbone diagrams (fishbone), histograms, diagrams and maps stocking control. From seven steps, which are used in the preparation of this thesis is only 3 pieces of check (check sheet), Pareto diagrams and fishbone diagrams (fishbone).

Sheet check, or better known as check sheet is a tool to facilitate the collection of data in the form in which the form of items to be checked listed in the form. The goal is to be gathered easily, concise, complete and accurate. Design check sheet prepared in accordance with the data to be collected and usually relies on the idea of check sheet maker to choose different data in a particular category.

Diagram Pareto is a graph prepared to demonstrate the problem by ordering from large to small as the number of defects, defect type and number of occurrences. This graph to show the most dominant so as to prioritize the issues to be resolved. In Pareto diagrams, problems occur most commonly indicated by a bar graph and the highest first placed on the far left side and so on until the problem occurs at least shown by the graph of the lowest final and placed on the far right side.

Diagram of causation is often called the diagram fishbone (fishbone) is a diagram showing the relationship between cause and effect. Causal diagram first introduced by Prof. Kaoru Ishikawa in 1953. From the name it, this diagram is also often called the Ishikawa diagram. Causal diagram used to help identify the root cause of a problem, generate ideas for the solution of problems and assist in the investigation or fact-finding further. The purpose of this diagram in order to show the causes and characteristics of quality caused by the cause of it. Factors that influence, usually there are five (5) main factors, namely: man (man), materials (materials), method (method), machine (machine), and the environment (environment). Usually abbreviated to 4M and 1E. The causes which may be collected, does not always include five groups of factors above. In the causal diagram, factor the cause of the defect, while the characteristic quality of the result. In general, the factors must be written in more detail to create diagrams to be useful.

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From the results analysis, then made improvement. According to Nigel Slack (2006) in Operations and Process Management, Improvement (improvement) is the activity eliminate the distance / differences between the current state and the desired target of an operation or process. It is the ultimate goal for all operations and process management activities. In addition, almost all well-known operating systems in recent years, such as Total Quality Management, Lean Operations, Business Process Re-engineering and Six Sigma, all focused on *improvement* on performance. All of this involves assessingto the difference between current performance and targets, balancing the use of continuous improvement and breakthrough improvement, adopting a proper repair techniques, and try to ensure that the repair will last (it does not fade over time).

➢ *Framework Thought*

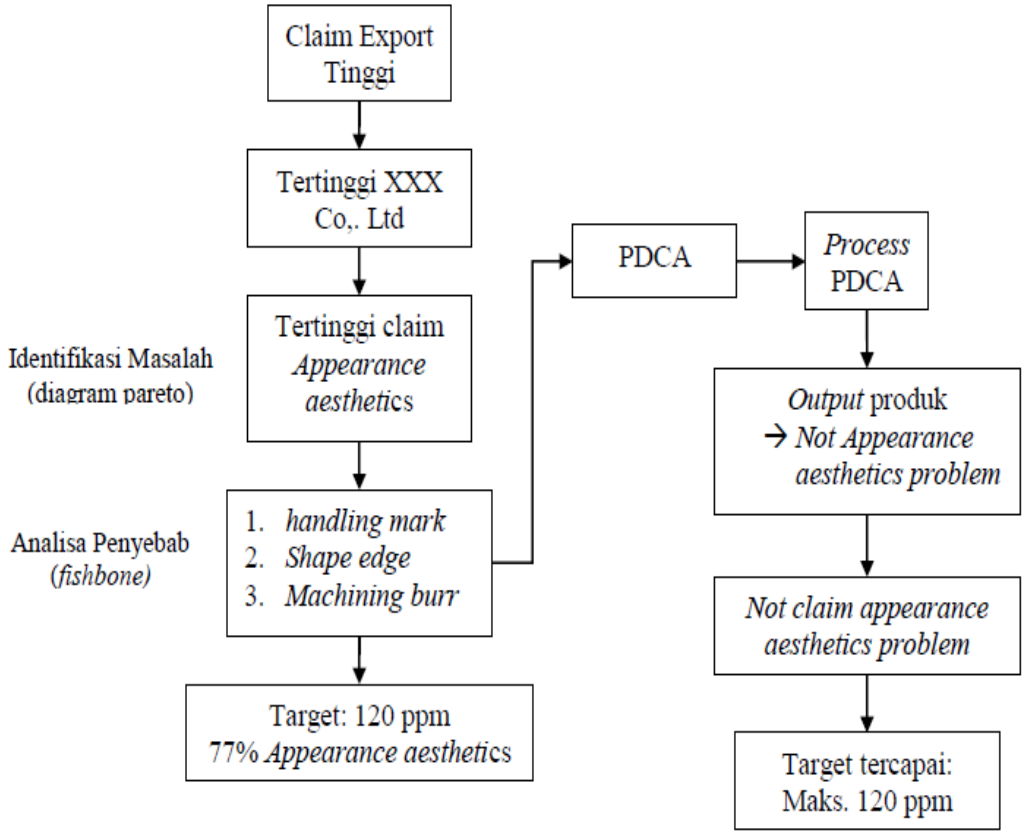

Fig 2:- Framework Thought Stage of completion using PDCA Phase by Phase P (Plan), D *(Do)*, C (Check) and A (action).

The problem of *handling marks*, *edge shape* and machining burr derived from casting deburring process, OP-3 machining, machining and OP-8 baritori manually resulting customer problems whose appearance aesthetics claim does not reach the target. The Company has set a target of 120 ppm for each month or about 22 pcs per month, but it has actually exceeded the target set.

IV. METHODELOGY

Problem-solving method used is the method of PDCA with eight steps. This method is a strategy that is done to find out the problems in the process by minimizing the failure to produce a product that can provide total satisfaction to those who use the product HC PT. XXXX. This method is very helpful in the process improvement of quality performance as well as the productivity of the company. Eight-step strategy has an approach known as PDCA cycle (Plan-Do-check- Action).

PDCA cycle stage is an approach that has stages that includes the eight steps can be seen in the following figure:

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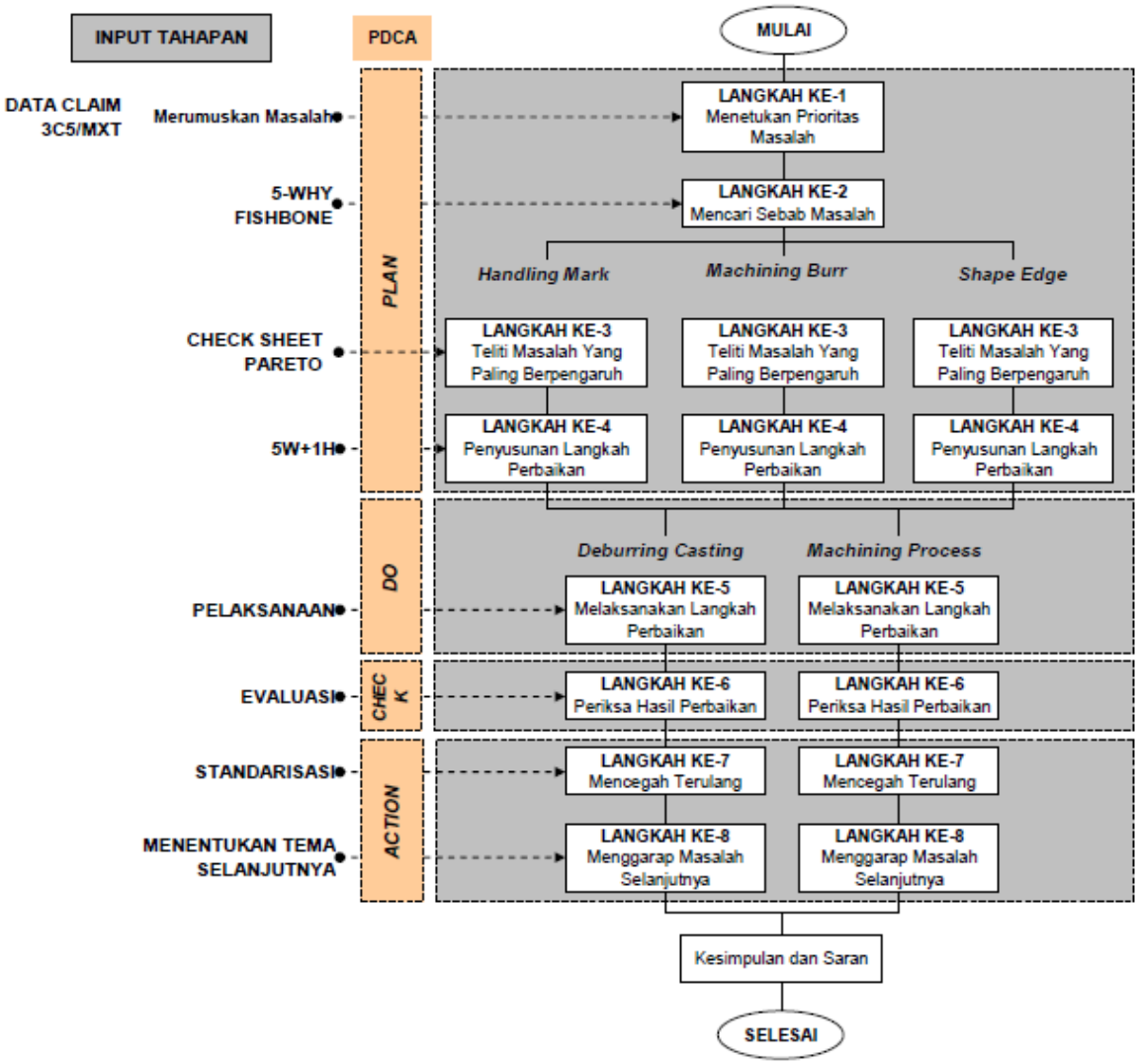

Fig 3:- Stages Troubleshooting Using the PDCA in 8 Steps

Data and the necessary information is relevant to the issues in this thesis that the data relating to the above theme is a flow chart of production (QC Process Chart) as a depiction of the process and the problems that arise in a process that is in the process of casting and machining, the data claim the customer which include the origin of the customer, the type of claim, the claim and the amount of the claim of photos and data to support the form of the actual condition of the pitch obtained by observation, interviews and group discussions with the team at the Quality Section I and Section I. Production

To collect data and the information required in this study, both from businesses and other sources is a primary by collecting data directly obtained through observation, interview and discussion Among groups in Section I and Section Production Quality I for determining the root cause aesthetic appearance. And secondary data documentation studies and literature study.

The analytical method required in this thesis is the collection of data from the data claim grouped and created Pareto diagram to determine the problem causing the claim, then made check sheet to identify, the actual product and the process, diagram fishbone and analysis 5W + 1H (man, machine, material, method, environment) is used to make it easier to analyze the cause of the problem.

Analysis of the cause of this problem is necessary to determine the main issues in detail based on the data and information into man, machine and method, recommends an improvement plan, evaluate and study the previous actions by doing a comparison claim between before and after improvement, standardizing of the improvements made.

Analysis conditions there is done by looking at the actual direct product claims are accepted. Of the actual product, analyzed the causes of this using the tools fishbone diagram (fishbone) were evaluated from 4M factors with the aim of finding the cause of the problem to perform PLAN stage. By using fishbone diagrams are expected to know the cause of inter-related problems so as to identify the cause of problems that may arise. By this stage, all are expected to become clearer and allow it to be able to see all the potential causes and find the root of the problem.

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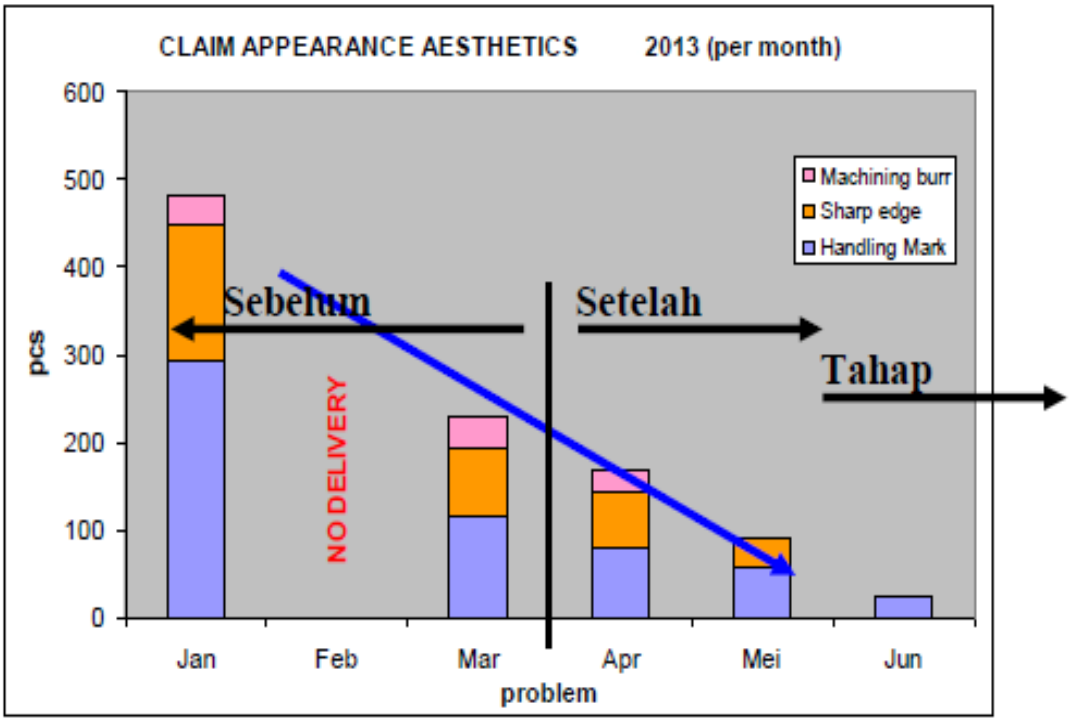
Determining factors 4M by 5-Why's as determining the root causes of the results obtained for handling marks and shape edges for deburring castings in the casting process that is not their operators fix to the process and the workings of the operators who perform the process deburring models C5 / XT likened to the process of local products which uses one deburring tool (reamer) for all positions. Differences in understanding and standards for product C5 / XT is a thing that should be emphasized because the product is an export product and thus require special treatment. As for handling mark baritori OP-3 and OP manual and machining burr-8 in the process of machining, the problem is the difference operator skill where operators do not fix the machining process so that the different ways of working and there is no way of work to be done for the machining of C5 / XT.

Then a lot of scrap left in the jig because of the profile on the jig, equipment damaged, cutting parameter path that does not cover the shift in the position of casting. And an error setting on jig and how baritori handling manual and to mark caused by manual baritori Factors 4M-1E in the discussion above, environmental factors are considered good and worth for every process there are periodic checks such as illumination (LUX) and the fan so it was not too hot and stuffy. Therefore, environmental factors are not addressed in the determination of the root of the problem on a fishbone. For planning corrective measures based on analysis of the 5W + 1H, actions for problems that led to the claim 3 apperance aesthetics can be divided into 2 categories of actions based QC Process Chart. The division is the repair process is the improvement of the casting process, which includes the problem of handling marks and shape edge caused by the deburring casting and improvement of the machining process, ie which include handling marks caused by OP-3 & baritori manual and machining burr caused by OP-8 , The problem of the division, the repairs can be combined into two processes based QC Process Chart which is an improvement on the process of casting and machining process. In the DO phase, improvements made to the casting process is the determination of special operators deburing casting and training, providing and determine which tool is used, make provision deburring casting export products, create a special line deburring process C5 / XT. As for the machining process is a special operator machining process determination and training, installation of shower coolant and machining jigs.

Problem-solving method used is the method of PDCAwith eight steps. This method is a strategy that is done to find out the problems in the process by minimizing the failure to produce a product that can provide total satisfaction to those who use the product HC PT. XXXX. This method is very helpful in the process improvement of quality performance as well as the productivity of the company. Eight-step strategy has an approach known as PDCA cycle (Plan-Do-check- Action). PDCA cycle stage is an approach that has stages that includes the eight steps can be seen in the following figure: cover, repair line, offset cutting path parameters of 500µm, the determination of how to set the product on a jig and evaluation baritori way that does not cause handling marks.

CHECK phase is done by checking the result of improvements made by looking at the actual claim is received and can be seen in the following graph:



Graph 1:- Appearance Claim Aesthetics 2013 (After Repair)
Source: Customer Claim Data Export HC

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From the graph the above shows that after repair and effective implementation started in May 2013, drawn indeed effective action taken to reduce claim apperance aesthetics. And the results can be seen that customer satisfaction (composite performance measures) increases which are considered better quality as seen from the level of customer complaint and effective from June 2013. For the problem of edge shape and machining burr, indeed his claim down to 100%. But for problem handling marks, still has problems. It looks still the claim which was accepted in June 2013 by 26 pcs. For ACTION stage in preventing recurrence do with the creation of standards. This standardization is made in the form of Work Instructions (IK) and One Point Lecturer (OPL), which describes the process that must be done and what tools are used. Creation of standard form of IK & OPL based on the results of training conducted on carriers such as the process of setting the product on a jig, baritori manual processes and casting deburring process. Based on analysis using fishbone cause claim the aesthetics appearance problems on product C5 / XT associated with handling problems mark deburring casting, machining mark handling, edge shape and machining burr, is related to human problems, the engine / infrastructure and methods. To mark handling deburring and edge shape caused by the way of the operator. In addition there is a factor of the tools and methods used in the process of casting the casting deburring. In addition, much scrap terjabak on a jig. To mark caused by the handling baritori manual process, caused by the method or the workings of the operator in using the tools baritori manual and in general, the existing problems is to equate the process of product C5 / XT with other products that do have levels of different motorcycles. Of the different causes of the problem is acted upon by the training of the operators, repairs to infrastructure damaged by normalization of conditions, modifications jig on the machine and determine the working methods of the operator in the form of work methods and tools used. In the training phase the operator, the first thing to do is determine a specially designated operator for the training. For the working methods and tools used, the initial stage is done is to evaluate the process.

Having found the appropriate tools and methods are appropriate, these improvements into the training materials and later be made in the form of IK or OPL. In this phase of infrastructure repair is to replace the damaged base and list (closing end of the machine was broken). Then the jig modification by the way made the cover jig to prevent scrap stuck on a jig equipped with shower coolant to ensure jig in pristine condition. With improvements that began in April 2013, to deterioration in appearance aesthetics claim decreased an average of 11% per month. And in June 2013 decreased to 3% of the total claim aesthetics appearance in 2013.

V. CONCLUSION AND RECOMMENDATIONS

A. Conclusion

Based on the results of the settlement of the problem, application of the improvement that has been described in chapter 5 can be concluded as follows:

- Problems claims *aesthetics appearance* that such as casting and handling mark *shape edge*, process derived from casting deburring. After the stage of Plan (C in PDCA), then in step DO (step 5) is carried out improvement made is:
  - Factor human: determination khususus operator and operator training in order to perform the process according to the provisions applicable to the product HC models C5 / XT.
  - Factors machine / tool: process with a chisel, reamer, belton, cheaper and hammers were used according to the needs and positions that will be done deburring parts and the provision of all the deburring tool.
  - Factor method: created for Casting Deburring Process Work Instructions that explain about each position do deburing and tools used (see Appendix 6)

- Issues claim that aesthetics appearance such as handling marks baritori OP-3 and OP manual and machining burr-8, problems and improvement of its combined into a machining process that is Line 17. Following the Plan phase (C in PDCA), then in step DO (step 5) the improvement stage that is:
  - Factor human: determination of special operators and training so that the operator can perform the process in accordance with export products.
  - Factor engine: coolant shower installation and installation of the cover jig so that no *scrap* the remaining The jig and offset parameters 500μm cutting path.
  - Factor method: determination OPL Installation Process Conditions and Release of Product to baritori that do not cause handling marks.

- The difference between the condition before and after the improvement seen is:
  - Previous no special operator for the model C5 / XT. Diperbaikan and conditions is to define a special operator and operator training to the special, both deburring process of casting and machining process.
  - Previous there is no difference with the method of the product other than C5 / XT that had a potential claim aesthetics appearance. With training, delivered processes applied in the production process C5 / XT contained in IK & OPL.
  - Condition damaged infrastructure and its jig machines there are a lot of scrap. Then corrected with the installation of coolant shower and cover installation jig. Besides changes in the parameters offset cutting path of 500μm and improvements in work methods baritori manual.

The result is the total claim aesthetics appearance to 3% of the total claim.

- *Improvement* relates to the method, outlined in the standard form: Casting Deburring Process Work Instructions, OPL (One Point Lecturer) Process Deburring & Final Casting, OPL Installation Process Conditions and Release of Product and Process OPL Baritori Manual.

B. Suggestion

- Following the improvement and standardization and has done training for specially designated operator, the recommendations submitted to the PT. XXXX is by monitoring and periodic audits to improvements and standards that has been established. From the results of the monitoring and auditing can be used as a reference for improvement countinuous.
- Needs to be done in the form of equalization equalization judgment standard of appearance standards and standards of appearance XXX XXXX Co ,. Ltd. for the product C5 / XT because of problems related to the claim apperance visual aesthetics products that function is not problematic. In addition to seeing the actual product before it is sent and received in the current product XXX Co ,. Ltd. This is done by comparing the condition of products already on the judgment OK when sent to XXX Co ,. Ltd. and at the time of the previous products in the judgment OK, accepted by XXX Co ,. Ltd. and use the same product. The aim is to look at other factors causing the problem happens claim aesthetics appearance apart from the production process, there may be a transportation

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