"A Case Study On Reduction In Rework Percentage Of Skin Panel Of Bolero Using QC Story Approach"

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ABSTRACT

Organizations need to improve their processes to continually achieve customer satisfaction and, to do that in an effective and efficient way, should use quality tools. The main objective of this research project is to improve the level of quality through the use of quality tools in a company in the installation phase. The QC story approach is applied as a methodology to trigger the use of quality tools in problems solving. It is also intended to verify the effectiveness of the PDCA cycle as a methodology for quality tools implementation. A case study was performed starting with the diagnosis of the quality management function, identifying the most critical processes. Subsequently, an analysis of the historical data of the company was made to detect problems and prioritize actions. After, the intervention focused on solving a specific process problem following the PDCA cycle and using quality tools in all its steps. The presented methodology can help companies to increase the use of quality tools which, according to recent study, continues to have little use. All tools have proved to be useful and effective.

Keywords- QC Story, PDCA cycle.

1. INTRODUCTION

According to ISO 9001:2008, organizations should ensure that customer requirements are determined, to ensure their satisfaction. Thus, organizations need to improve their processes and for that use a set of practices, which include various techniques and tools, including most importantly quality tools.

Continuous quality improvement process assumes and even demands that a team of experts in field as well as a company leadership actively use quality tools in their improvement activities and decision making process. Quality tools can be used in all phases of production process, from the beginning of product development up to product marketing and customer support. At the moment there are a significant number of quality assurance and quality management tools on disposal to quality experts and managers, so the selection of most appropriated one is not always an easy task. In the conducted research it is investigated possibilities of successful application of 7QC tools in several companies in power and process industry as well as government, tourism and health services.

Statement of case study:

Reduction in rework percentage of a skin panel (Bonnet) of Automobile using QC story approach.

Brief description of problem:

Bonnet, one of the Skin Panel of Automobile Model is having Dent & Damage issue due to which there were customer complaints and internal rework percent was also very high.

Target of the project:

i) To reduce the Rework % of Dent & Damage from 18.24% to 05 %

ii) To achieve Zero Customer Complaint for Dent & Damage Defect

Methodology of QC story approach

When the management attempts to make a managerial diagnosis, it is important that the people whose work is being diagnosed be properly prepared to enter the discussion. For this purpose, it is very helpful if everyone knows how to tell the QC story. Telling the story properly requires seven steps-

1. **Problem definition**: This step includes an explanation of why the problem is important (which will tie it to the priority statements of the top management or to a problem that is essential as seen at the lower levels). Normally this step includes a discussion of the losses that occur because of the problem, the team that will work on it, and an estimate of what might be done. A target is often specified though it is understood that reaching such a target cannot be guaranteed. A schedule is proposed.

2. **Data collection**: This step involves observing the time, place, type and symptoms of the problem. It involves data gathering and display in an attempt to understand the important aspects of the problem.

3. **Analysis**: In this step the various tools of quality analysis are used, such as Control charts, Pareto charts, cause-and-effect diagrams, scatter diagrams, histograms, etc.

4. **Action**: Based on the analysis, an action is taken.

5. **Study**: The results are studied to see if they conform to what was expected and to learn from what was not expected. Data are taken to confirm the action.

6. **Act / Standardization**: Appropriate steps are taken to see that the gains are secured. New standard procedures are introduced.

7. **Plans for the future / Continuity**: As a result of solving this problem, other problems will have been identified and other opportunities recognized.

These seven steps DO NOT describe how a problem is solved. Problem solving requires a great deal of iteration and it is often necessary to go back to a previous step as new data are found and better analyses are made. However, when it comes time to report on what was done, the above format provides the basis for telling the story in a way that makes it comprehensible to the upper levels of management.

2. EXPERIMENTAL WORK

The following line graph shows the rework percent of bonnet for the duration of May-16 to Nov-16. The average rework percentage was found to be as high as 18.24 %.

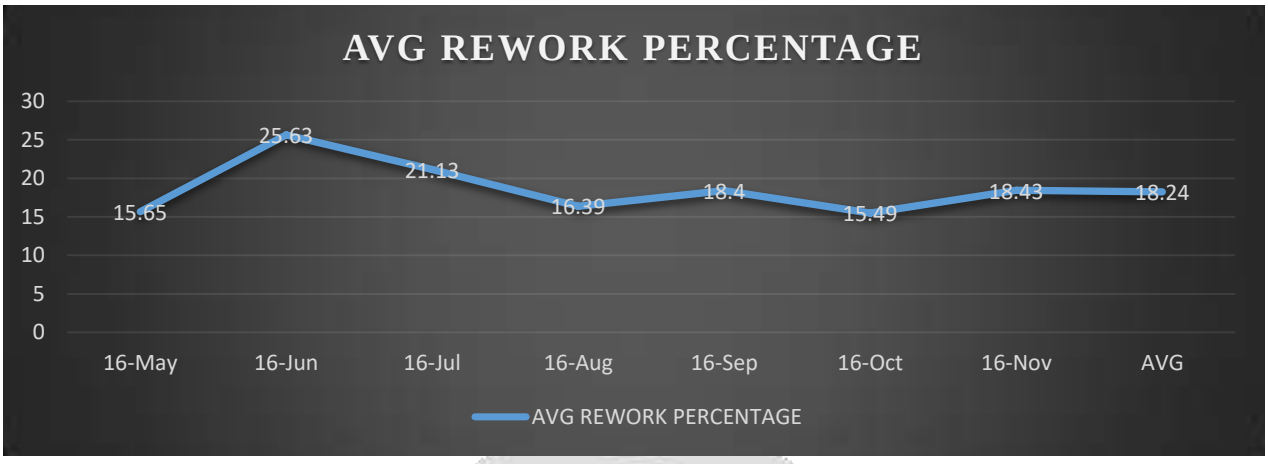

Chart.no.1 Rework Percentage Monthwise

GEMBA OBSERVATIONS:

From the GEMBA observations i.e. actual on field observation of the manufacturing process at each stage, we have identified following set of key points which are suspected to have influenced on the dent, damage and scratches on the bonnet.

SR NO.	GEMBA OBSERVATION
1	Operator is skilled – Level
2	Specific control plan/sop is available near m/c
3	Layout is proper
4	No die mark ,ejection mark scoring observed & die polishing ok
5	Guide roller height is ok
6	Location pin height is ok
7	Damaged rollers observed
8	Burr below 10% of material thickness but loss burr observed
9	Specified machine used – LB02
10	All machine parameters ok
11	Machine & die cleaning ok , die cleaning not as per frequency
12	No oil leakage of machine
13	All machine & inspection equipment's are calibrated
14	Dust on blank
15	Packaging strip mark on blank
16	Skeleton mark on top and bottom blank.
17	Loose thread of leather hand gloves
18	Storage of draw panel on skeleton/platform
19	No Sharp corner of pallets/conveyor

Table no.1. GEMBA observation

3. ANALYSIS

By doing brain storming session with superiors and engineers of industry we have known the possible causes of the problem. So we sorted those causes by categorizing them in 4M condition. In all 14 points were shortlisted for why-why analysis. Following table shows categorization of the identified key points as valid or invalid.

No	Probable Cause	Probable Cause Test & Observations	Conclusion
1	Dust on blank	Dust observed on every top blank of RM packet	Valid

2	Packaging strip mark on blank	Hard Packaging strip mark observed to every RM blank pack. In that one top & bottom blank having strip mark	Valid
3	Loose threads of tarpaulin sheet on blank	Not Observed	Invalid
4	Skeleton mark on top and bottom blank.	Blank Packs kept on each other it causes damage to top & bottom blank	valid
5	Uneven height loading unloading rollers	Not observed	Invalid
6	Damaged rollers	Roller found in damage condition cause heavy scratch & dent while loading blank in draw opt to every panel 1 in 25 nos.	Valid
7	Sharp corner of roller mounting bracket	No any sharp corner of roller mounting bracket	Invalid
8	Locating pin height	No any dent due to locating pin	Invalid
9	Loose thread of leather hand gloves	Loose thread of hand gloves on blank causing minor dent in draw op. in frequency of 1 in 15 no of strokes	Valid
10	Unskilled operator	Skill Level 3	Invalid
11	Storage of draw panel on skeleton/platform	Storage of draw panel on skeleton/ Platform causes dent & damage.	Valid
12	Unclean die set	Die set cleaned as per frequency	Invalid
13	Sharp corners of conveyor.	No sharp corner of conveyor	Invalid
14	Loose burr from trim.	Loose Burr to trim op which get spread continuously on die surface while unloading panel	Valid

Table no.2. Analysis taken on observation

4. ACTION PLAN

Thus we have sorted the probable causes and found out the actual root causes. Now the corrective action were taken for each of the root cause so as to minimize their adverse effects. Following table shows the corrective measures to be taken to solve the problem.

SR NO	ROOT CAUSE	CORRECTIVE ACTION
1	Dust on blank	Blank washing proposal to be taken with MIL & M&M
2	Packaging strip mark on blank	Additional support of corrugated shit to be provided at all corners (Raw material supplier).

3	Damaged rollers	All damaged rollers to be replaced & Check point to be added in PM check list
4	Loose threads of leather hand gloves	Skin tight knighted hand gloves to be used
5	Storage of draw on skeleton/platform	Dedicated pallets to be made for draw storage
6	Loose burr from trim	Trim tool to be rectify for burr
7	Skeleton mark on lower and upper blank	Packaging improvement to be taken with MIL.

Table no.3. Action Plan on causes

5. RESULT

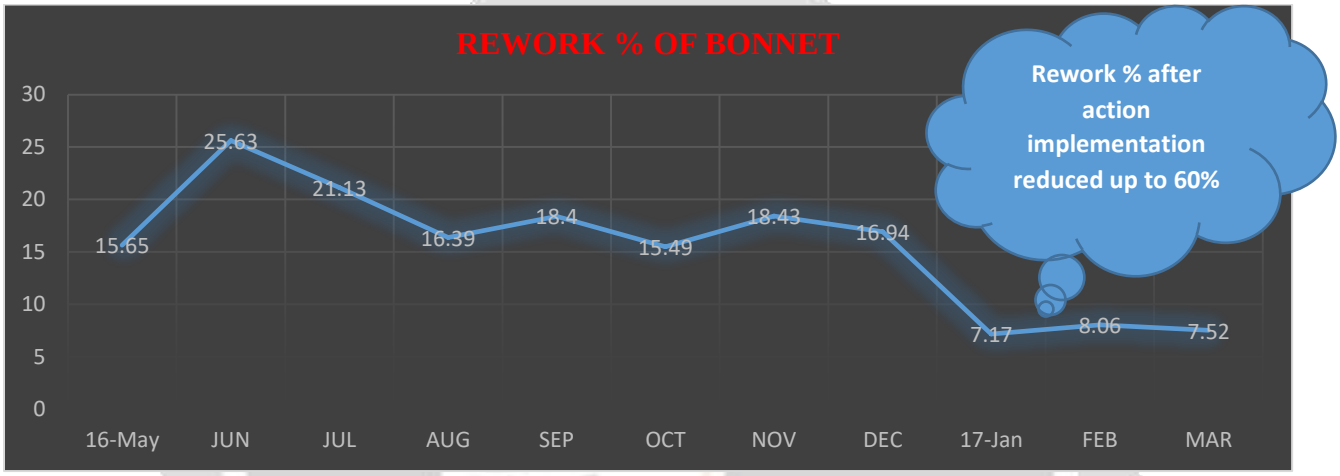

Chart no. 2. Rework % after action implementation

As we have already discussed that the part had an average rework percent of 18.24%. We had set our target to bring down this high percent of rework up to 5%. But after action plan implementation the data was gathered and analyzed and we found that the new average rework was 7.5% (Avg. of last 3 months).

Thus we have achieved approximately 60% of rework reduction in our first trial of project. The predicted annual cost saving is up to 4.5 lacks per annum.

6. CONCLUSION

1. Statistical QC is chiefly concerned in making sure that several procedures and working arrangements are in place to provide for effective and efficient statistical processes, to minimize the risk of errors or weaknesses in procedures or systems or in source material

2. Seven QC tools are most helpful in troubleshooting issues related to quality

3. All processes are affected by multiple factors and therefore statistical QC tools can be applied to any process.

4. The continuous use of these tools upgrades the personnel characteristics of the people involved. It enhances their ability to think, generate ideas, solve problem and do proper planning.

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