

A Review on Practical Application of Quality Tools

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ABSTRACT

As we know that competition in automobile industry is increasing day by day. Because now a day's OEM (Own equipment manufacturing) Group are limited in number like Maruti, Honda, Hero, Nissan, General Motors, Yamaha, Ford etc but T1 ,T2 & T3 group company are increasing . OEM group take advantage of this thing and they invite two or more company for manufacture their same child part. Due to which pressure exist on limited company to maintain Quality level as compare to their competitors. Second worst thing is that they can't invest too much on their tools to improve quality and also cannot make pressure on the Customer also. As the customer have other options too. So the better option is that the limited companies focus on Quality tool project to resolve their quality issue instead of making new tool or too much other investment. This is a basic concept which is generally used in Automobile sector to increase the overall production of company and eliminate all unnecessary process so that the profit of a plant can be maximized.

Keywords: 7QC tools, Pareto chart, Fishbone diagram, PDCA

1. INTRODUCTION

The basic tools of Quality are a set of graphical techniques known as the most helpful asset in improving issues related to quality. They are called basic tools because people with a little formal training can work with them. They can be used to solve variety of quality related problems.

Quality tools are used for various purposes related to controlling and assuring quality in most organizations. As variety of quality tools are present for certain set of problems. Some of the quality tools can be used across such areas. These are generic quality tools and can be applied to any condition very easily. There are seven basic quality tools used which are currently being used for many problems in an organizations. These tools can provide information about the problems in the organization and helping to derive solutions for the same. A brief training, mostly a self-training, is sufficient for someone to start using the tools. There is no need of special training for someone to start using these tools.

Today there are many quality assurance and quality control tools available, so the selection of the suitable tool is not always an easy task. Tools are essential ingredients of a process and basic instruments for the success of a quality process. Various organizations have used tools without giving proper thought to their selection procedure and have then faced bottlenecks to progress. Quality tools cannot improve or remove every quality problem but they certainly are a means for solving and improving majority of them. The bottom line is right kind of tools can be very effective in the right hands, while they can be very dangerous in the wrong hands. Thus it is important to know how, when and which tools should be used in problem solving or improvement processes.

Today there are many tools available and are generally a means of achieving expected result with minimum possible time in a predefined manner. In this dissertation we will focus on practical use of quality tools these are called the seven basic quality tools - 7QC tools. They are easy to learn and handle and are used to analyze the existing problems.

2. LITERATURE REVIEW

G. Paliska et al. 2007[1]-The paper is dealing with one segment of broader research of universality systematicness in application of seven basic quality tools (7QC tools). The research was carried out in different areas that include power plant, process industry, government, and health and tourism services. The aim of the research was to show on practical examples that there is real possibility of application of 7QC tools. Furthermore, the research has to show to what extent are selected tools in usage and what reasons of avoiding their broader application are. The simple example of successful application of one of quality tools are shown on selected company in process industry.

G. Paliska et al. 2008[2]-A company has to conduct process data acquisition and analysis in order to confirm capability and effectiveness of its quality management system and to be actively involved in continuous process improvement. Continuous quality process improvement assume application of appropriate quality tools which enables sound decision making process based on facts. In the paper are presented results of research of the systematicness in the application of seven basic quality tools (7QC tools).

Dr. Duško Pavletić et al. 2008[3]-The paper is dealing with one segment of broader research of universality an systematicness in application of seven basic quality tools (7QC tools), which is possible to use in different areas: power plant, process industry, government, health and tourism services. The aim of the paper was to show on practical examples that there is real possibility of application of 7QC tools. Furthermore, the research has to show to what extent are selected tools in usage and what reasons of avoiding their broader application are. The simple example of successful application of the quality tools are shown on selected company in process industry.

LAU EE SHUANG FA08066 Patil3- 2012 [4]-Kaizen is a critical tool for to eliminate or reduce waste from production processes. Seven quality control (7 QC) tools are one of the common methods and techniques of the kaizen. The objective of this thesis is to improve product quality and performance of production using kaizen process approach by reduce or elimination of scrap with the aid of using appropriate 7 QC tools and Standard Operation Procedure (SOP) to improve process efficiency. The methodology use are the kaizen flow by establish a team, identify the waste with the concept of 7 MUDA and reducing the rework waste in the X Company with the aid of 7 QC tools.

The flow chart, Ishikawa diagram, Pareto diagram and histogram are used to record data, identify possible cause of problem, visualize the frequencies of the rework waste and show the causal relationship between the two and the frequency distribution of a set of measurement. The improvement action of kaizen by having SOP in order to increase workers understanding on their duty, reduce scrap, increase productivity, reduce rework problem and hence save the manufacturing cost as well as increase the overall performance of the attached company. Consequently, this thesis will guide the users in the correct and effective way to reduce the rework by utilizes the SOP, 7 QC tools and kaizen flow.

Samadhan D. Bhosale et al. 2013 [5]-The aim of this paper is to apply the quality tools to find out the root causes of the quality problems related to manufacturing of mechanical seal. The modes of defects on production line are investigated through direct observation on the production line and statistical tools like Check sheets, Histogram, Pareto analysis, Cause and Effect diagram etc are used in enhancing the process by continuous monitoring through inspection of the samples. The work shows utility of quality tools to find the root causes of the problems and eliminate them. A case study has been carried out in 'EKK Eagle Products India Pvt. Ltd' company that specializes in manufacturing of mechanical seal.

Varsha M. Magar1, Dr. Vilas B. Shinde 2014 [6]-In this paper a review of systematic use of 7 QC tools is presented. The main aim of this paper is to provide an easy introduction of 7 QC tools and to improve the quality level of manufacturing processes by applying it. QC tools are the means for Collecting data, analyzing data, identifying root causes and measuring the results. these tools are related to numerical data processing .All of these tools together can provide great process tracking and analysis that can be very helpful for quality improvements. These tools make quality improvements easier to see, implement and track. The work shows 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. The development of people improves the internal environment of the organization, Which plays a major role in the total Quality Culture.

3. PHASES OF PROBLEM SOLVING BY QUALITY TOOLS

PDCA	DMAIC	A3	PSP
Plan	Define	Clarify the Problem	1. Create team & collect Information
	Measure	Break the problem in parts	2. Describe the
		Set a target	3. Define a Containment
	Analyze	Analyze the problem	4. Analyze the root cause
		Find countermeasure	5. Define possible
Do	Improve	Check countermeasure	6. Implement corrective
Check	Control	Evaluate the result and processes	7. Define actions to avoid recurrence
Act		Standardize the process	8. Follow up/congratulate

PLAN

First establish the objectives and processes to deliver the results in accordance with the objectives. Planning also includes the formation of team along with a limited time frame with suitable steps. Plan to improve your operations first by finding out what things are going wrong and come up with ideas for solving these problems

DO

Do designed changes to solve the problems on a small scale first. One such example is prototype if there is any fitment related problem. This minimizes irregularity to routine activity while testing whether the changes will work or not. Implement the plan, execute the process, and make the product.

CHECK

Study the actual results and compare against the expected results to confirm if any variation is there or not. Look for deviation in actual implementation from the plan and also look for the suitability and completeness of the plan to enable the execution. Check whether the small scale experimental changes are able to achieve the desired outcome or not.

ACT

To implement the changes on a larger scale if found successful. It means making the changes a routine part of your activity. Also Act to involve other department affected by the changes and with their cooperation you need to implement them on a larger scale. If the Check shows that the Plan that was implemented in earlier stages is an improvement to the prior benchmarking then that becomes the new standard or benchmarking for future references.

4. APPLICATION

Incoming Quality control-Quality tools can be used to control the incoming material quality and quality by various measures. The process of the supplier can be studied and controlled by the quality tools by checking the process at supplier end and the product before entering the storage area.

- **Process & product improvement-** The product and process can be improved by effectively implementing the quality tools. The in process defects can be removed in the early stages by the quality tools. If the quality tools are applied properly then the profit can be maximized and the cost of recurrence of a process can be reduced to a minimum level.

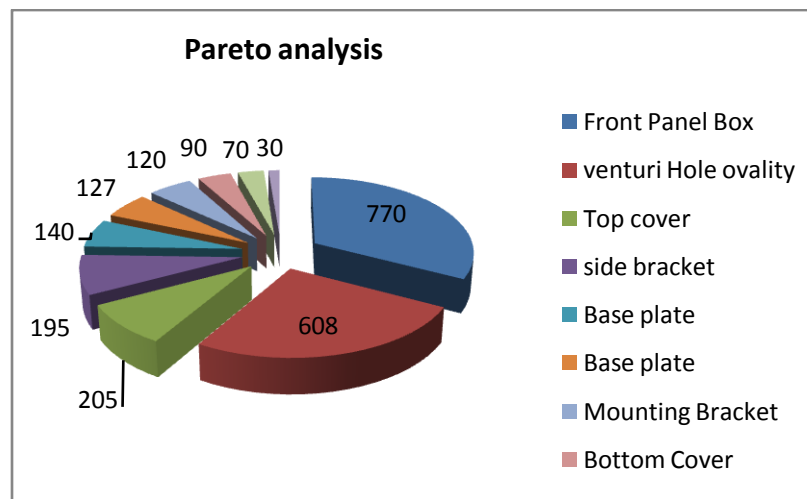
- **Durability-** Quality assurance tools like gauge and fixtures if applied to their best of capabilities and produce a product with fine precision or accuracy. This leads to less time consumption as in producing the same item without the aid of such tools.
- **Market driven product-** The designed and developed by the organization must meet the customer requirements. Features above or below the required standard by the customer will put the product in rejection category. Quality tools make sure that the product being produced meets the given expectations aesthetically and functionally.
- **Customer satisfaction-** Quality tools make sure that the demands of the customers are met properly within the given time frame. For the assurance of same the supplier has to undergo a quality audit before the actual production run or SOP.

A). OBJECTIVE SHEET COMPANY

PLANNED V/S ACTUAL

Company Objective Measurable Sheet										
Sl. No.	Parameter to be Measured	Method of Measurement	Observation		Target (YTD) Observation of 2015		Trend	Ref. Doc Name & No.	Responsibility	
			2013	2014	2015	Observation of Year 2015				Target to be Measured as
1	Customer Rej	PPM	7735	4398	2000	4500	Cummulative	Monthly	Trends	HOD QA
2	Supplier Rejection	PPM	9800	8800	7000	8000	Cummulative	Monthly	Trends	HOD QA
3	Rejection Press Shop	PPM	7600	39426	10000	5898	Cummulative	Monthly	Trends	HOD PRESS SHOP
4	Rework Paint Shop	% of Production	7600	2.95	2.00	1.40	Avg	Monthly	Trends	HOD PAINT SHOP
5	In House Scrap	PPM	1513	444	300	450	Cummulative	Monthly	Trends	HOD PRESS SHOP
6	PDI Rejection	PPM	3711	921	500	1050	Cummulative	Monthly	Trends	HOD QA
7	Cost Of Poor Quality	% of sales	1.75	0.95	0.8	1	Cummulative	Monthly	Trends	HOD QA
8	Kaizen	Nos	NA	7 Nos	5 Nos per month	60	Total Nos	Monthly	Trends	HOD QA
9	Logistic Cost	% of sales	2.01	1.89	2.00	2.22	Cummulative	Monthly	Trends	HOD DISPATCH
10	Delivery as Per Schedule	%	NA	97.28	100	97.77	Avg	Monthly	Trends	HOD DISPATCH
11	Machine Break Down	Hours	NA	1516	20 hr/M (240 Hr)	24.7 (297)	Avg	Monthly	Trends	HOD MAINT.
12	Die Break Down	Hours	18	28.66	25	35.47	Avg	Monthly	Trends	HOD TOOL ROOM
13	OEE-PRESS SHOP	%	NA	58.47	75%	63.73%	Avg	Monthly	Trends	HOD PRESS SHOP
14	OEE-WELD SHOP	%	NA	31.44	75%	61.49%	Avg	Monthly	Trends	HOD WELD SHOP
15	OEE-DUCT SHOP	%	NA	42.45	75%	#REF!	Avg	Monthly	Trends	HOD DUCT SHOP
16	OEE-PAINT SHOP	%	NA	NA	75%	67.23%	Avg	Monthly	Trends	HOD PAINT SHOP
17	Supplier Audits		As Per Plan							Concern HOD
18	Training		As Per Plan							

B). PARETO ANALYSIS FOR SORTING OUT PROBLEM BY ANALYSING PREVIOUS DATA



CONCLUSION

Quality tools are used quite extensively to find the solution of many manufacturing related issues and to solve them with the help of basic tools of quality. By using QA/QC tools effectively the running cost of a process can be reduced to a minimum extent by the cost of almost nothing. Rework can be minimized by the effective implementation of quality tools resulting in less labor cost and more profit.

FUTURE SCOPE

As competition is increasing day by day in Automobile original equipment manufacturers (OEM) and its ancillary companies whether it is Tier-1 supplier or Tier-2. In order to improve the good will the company has to implement quality tools in a adequate manner. If a organization has implemented quality tools at all levels then it may reduce the chance of occurrence to a minimum level. Along with this the overall cost of the process is reduced by the implementation of Quality tools at initials level.

Tools used in this process are-

- Fishbone diagram
- In House Rejection Analysis
- Flow chart
- Customer Return Rejection Analysis
- Pareto Analysis
- SPC

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REFERENCES

- [1]. G. Paliska a, D. Pavletic b, M. Sokovic c, "Quality tools – systematic use in process industry"
- [2]. Paliska, G.; Pavletić, D. & Soković, M., "Application Of Quality Engineering Tools In Process Industry", Advanced Engineering
- [3]. Akshay S. Nalawade, Tejas S. Patil, Shubham V. Sutrave, Shivam M. Dixit, Prof. TusharPatil , "A Review: Implementation of KAIZEN", International Journal For Engineering Applications And Technology
- [4]. Lau Ee Shuang Fa08066, "Implementation Of 7 Qc Tools By Using Kaizen Approach For Same Manufacturing Industry".
- [5]. Samadhan D. Bhosale1, S.C.Shilwant2, S.R. Patil, "Quality Improvement In Manufacturing Processes Using SQC Tools". International Journal of Engineering Research Vol. 3, Issue 3, May-Jun 2013, pp.832-837
- [6]. Chirag B.Patel1, Dr.Hemant R. Thakkar," Reducing Casting Defects And Improving Productivity In A Small Scale Foundry: A Review". International Journal For Engineering Applications And Technology.
- [7]. Varsha M. Magar1, Dr. Vilas B. Shinde, C., "Application of 7 Quality Control (7 QC) Tools for Continuous Improvement of Manufacturing Processes", International Journal of Engineering Research and General Science Volume 2, Issue 4, June-July, 2014ISSN 2091-2730