

Improving the Profit by Finding the Root Cause and Quality of Manufacturing Product (CT Wheel/Crain Part) by the Help of 8D Problem Solving Tool

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Abstract- Customer satisfaction is the first priority for survival in market because quality is the big challenge for manufacturers that's why a research was done to find out the root cause by the help of 8D tool in which 8D used as a problem-solving technique. In order to find out the better result 8D problem solving technique was used to analyse and solve the problem after that, Pareto analysis was done to identify vital causes. After the brainstorming session, (C&E) cause and effect diagram was plotted then 5why analysis was carried out. First the record was collected then an investigation was done to identify issues which harm the customer complaints management process throughout an overall work in crane industry. 8D is used as a problem solving tool as well as to reduce the cost and improve the quality and the customer satisfaction. Aim of this research is to explore the utility of selected (8DS) problemsolving tools and techniques in root-cause analysis to demonstrate their practical application. It can be followed out on product, system and process also. This method is used as a tool for regular improvement and corrective measure to rectify the minor and major issue. Basic advantage of this method is, it is an easy to find out problems according to occur. Its main basic tools and technique is to attacks on the PDCA (PLAN-DO-CHECK-ACT) cycle. The methodology of 8D is a team oriented problem solving (TOPS).

Keywords: 8D, WH, root causes, permanent solution, Profit.

I. INTRODUCTION

The 8Ds method was developed at Ford Motor Company and introduced in 1987 as a "Team Oriented Problem Solving" (TOPS) (Goodwin et al., 2019). Implementation of 8-D method in the manufacturing company shows frequency of each defect before and after implementing the 8Ds method of inverted cables (Vargaes et al., 2020). Pacheco-Pacheco sought to optimize delivery times of alteration clothing products in a tailor shop by implementing the 8Ds method and found that production times decreased by 2.46% in two mix products (Pacheco-Pacheco et al., 2018). Zasadzie'n, (2017) employed the 8-Ds method to reduce machine downtimes. Since the method has been applied in industries to solve product and service-related problems, such as customer complaints, deviations, returned purchases, poor machinery maintenance (Saad et al., 2016; Stjepandi et al., 2016). 8Ds method

is popularly applied to solve quality problems but at least one of the following events are presented the company receives customer complaints, Safety or regulatory issues have been discovered, Internal rejects, waste, scrap, underperformance, or test failures occur at abnormal levels (Bremmer and Update, 2015). As per business perspective, the 8Ds method is able to find out the root causes, identify and rectification that's means their possible solutions (Saad et al., 2013). Since 2005, The Company has had the 8D method integrated in its business information technology. After 2005, neither the method nor the information support has undergone any further changes. The two methods Qualitative Method and Quantitative Method were used (Problem Solving Methodology, 2012) Carlos A. The 8Ds is a teamwork-oriented problem-solving method that aims at identifying the root cause of a problem to solve it through a corrective-action-guided procedure within a hard atmosphere (Cheng et al., 2010). This

case study describes the problems associated with the quality of manufacturing product in a company that uses the 8D methodology to reducing the defects and improving the quality.

A. Eight discipline in problem solving (The 8 Disciplines are) tool in PDCA



Figure 1: 8D tool

B. The 8D methodology

- D1-team formation
- D2-problem analysis
- D3-containmentactions
- D4-root cause analysis
- D5-corrective actions;
- D6-verification of the corrective actions
- D7-preventive actions
- D8- congratulates the team.

The 8D methodology is an effective tool to eliminate the root causes. There are reports of the successful use of this methodology to resolve the problems, mainly defects or warranty issues [8]. This methodology was never planned to replace a systemic quality system. Objective of 8D is to discover the weak point in the management systems and find out the root cause and eliminate them. The week point of the 8D methodology is one-page problem-reporting effort. Some steps can take a few hours, while others can take weeks or more .In manufacturing, many problems can occur only with a unique set of conditions, which calls for in-depth studies and experiments.

C. The 8D methodology stands in days

After receiving the complaint the response time rules associated step in 8D methodologies are as follows:

Y1 (1 day) - A1; Y2 (2 days) - A2 and A3; Y14 (14 days) - A4 and A5; A6 and A7 defined; Y60 (60 days) - all steps completed.

For example, after receiving a complaint from the customer, steps A1 to AD3 should be finished inside 2 days and the customer should receive the second feedback on the complaint.

II. LITERATURE REVIEW

Following will be the review of literature on 8D methodologies and its application in problem solving, and application of various quality control tools to reduce the rejection level. This paper is based on review of my previous case study. In paper study done on crab as well as CT wheel defects, second based on customer responding time and three is based on reducing the maintenance cost, customer complaint status before 8d tool implementation and how 8d change the company turn over. Over all this paper is based on how much company's benefit over defect regarding cost and quality. As per my research work done my in other paper I am going to represent the some data for evolution how cost reduces and company get benefit more and more by the 8d tool and how(8D's) this one is team oriented.

III. CASE STUDY

For the case study purpose, the customer complaint record/data was selected because the issue was live and occurred many times. There were maximum customer complaints and there was demand of 8D for this part from the customer.

A. Data Collection and Data Analysis

For preliminary analysis, past three months rejection data was collected and to identify the major defect, Pareto analysis has been carried out. The ultimate aim of this step was to focus on the major issue. The table shows the rejection data.

Table1: Dimensional Error in CT whee

Spec.	tolerance	Dia max	Dia min	Obs.	Mean observ-ation	P/R	Root cause
118	0.035	118	117.86	116	116.007	R	Dim. Instrument
118	0.035	118	117.86	116	116.007	R	Dim. Instrument
118	0.035	118	117.86	116	116.007	R	Dim. Instrument

Profit

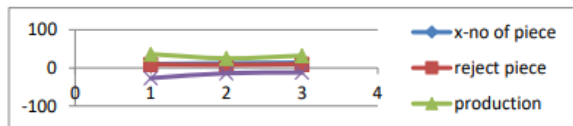


Figure 2: After inspection

B. As per paper second paper which is based on customer complaint, pending, and reoccurs that's mean customer complaint based status

Table 2: Complaints and improve actions before using new tool

S.No	Complaint	Resolve	Pending	Reoccur
1	15	5	10	1
2	22	10	12	0

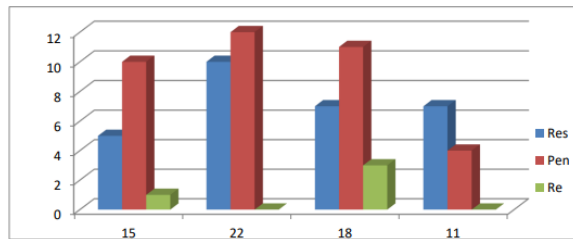


Figure 3: Graph before tool implementation

Table 3: Complaints and improve actions after using new tool

S.No	Complaint	Resolve	Pending	Reoccur
1	18	16	2	0
2	20	19	1	0



Figure 4: Graph after tool implementation

C. This article is based on the Reducing the Maintenance cost by using the 8d tool
After collecting the data, 8D methodology is applied to solve the problem. The details of the activities are as follows.

Step 1: Forming the Cross-Functional Team (D1)

To solve the problem a team was formed. From customer side one person from quality department and from supplier side one from machining and as well as from quality department.

Step 2: Description of the Problem (D2).

To identify the root causes of occurrence of issue and to get deeper understanding of probable causes for the occurrence of problem brainstorming technique and why why analysis is used. The following causes were identified for the occurrence of problem.

No use of service detail record

Wrong sampling inspection (1 part checked in 1 lot)

Less skill of the operator

Negligence for customer review

Table 4: Maintenance cost before tool implemented

S.No	Capacity (T)	Quantity	Test Hour	Running Hour	No of issue
1.	12	8	12-13	80	2
2	12	4	12-13	80	2
3.	12	6	12-13	82	3

After D7 some test and trail was done to look out the result.

Table 5: Maintenance cost after tool implemented

S.No	Capacity (T)	Quantity	Test Hour	Running Hour	1st service	Issue	Running Hour	2nd service	No of issue
1.	12	2	12-13	80	0	0	0	0	0
2	12	2	12-13	80	0	0	0	0	0
3.	12	4	12-13	82	0	0	0	0	0



Figure 5: Fish bone diagram

5. Company turn over impact after implementation of PDCA 8D tool

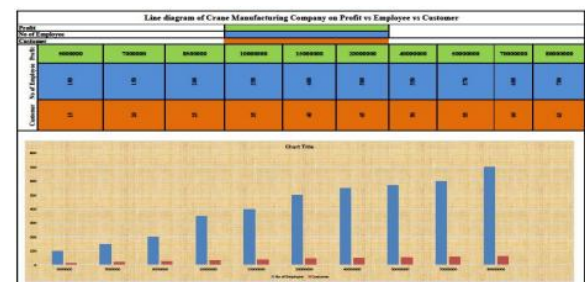


Figure 6: Line diagram with graph turn over vs employees vs customer

IV. CONCLUSION

The 8D methodology used as an excellent tool for solving the problem and for improving the customer satisfaction and reducing the cost .The results of the study show that the methodology is more effective and it provides systematic guidelines for internal as well as external. After implementing 8D

methodology the issue reduces to zero percent. So the company declares that the 8D activity is closed for such issue. To eliminate this issue the quality improvement program is put in practice to improve the performance of such process, by studying the root causes and describing the changes made to the process. The performance was evaluated by time to time and the quality of the responses to customer complaints and for decision making effective resources was made. By the help of this tool company turn over grow up.

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