RELEVANCE OF 8D METHODOLOGY

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Abstract: Nowadays, manufacturing of products is more and more complex with the several technologies involved in the production process during the operation. The good result of production and quality is a great challenge for automotive industries by complicated system, operations, technological advancement, new competitors and source of globally. Build-up in the manufacturing sector is very difficult; it is required all inclusive perspective of major manufacturing attributes that need to be considered when a production decision as regarding to cost, time and quality are implemented. The quality is a major issue in the production line when the different type of product is manufactured with the help of various processes. Due to that fact, the 8D methodology is one of the best usable approaches for improving the quality of product, process and sort out the complaints of customer. In this paper, 8D methodology has been applied to solve the problems in the automotive industries. The subject area will yield a large value to implementing 8D methodology for academics, advisers, researchers and practitioners.

Key Words: - The Quality Assurance, Quality Tools & Techniques, 8D Methodology, Statistical tools

INTRODUCTION

The Eight Disciplines (8D) are a problem solving methodology designed to find out the root causes of a problem, devise a short-term fix and implement a long-term solution to prevent recurring problems. When the product is defective, it is clear the customers are not satisfied with the product and service, and then the 8D is an excellent first step to improving Quality and product Reliability (Deepak Dhounchak, 2017). In the production process the 8D methodology is elaborate the team oriented approach to solve the critical problems. The main aim of the 8D methodology is that to find out the root cause of a problem and develop containment actions to protect customers from the problem and takes place the corrective action to protect similar problems comes in the future. The structure, discipline and operations are the main strength of the 8D methodology. The 8D is useable composite methodology utilizing best practices from various existing approaches (Deepak Dhounchak, Lalit Kumar Biban, 2017). The 8D is a problem solving methodology that is determines the systemic change, increasing the quality of an entire process in order to not only avoid the problem at hand, but also other issues that may stem from a systemic failure.

The key aspects are by which the efficiency critically influences customer satisfaction and their loyalty by using the 8D problem solving methodology. In fact, nowadays modern business uses different methods for solving the problems with usage of which lead to effective problem management process and to prevent the problems in the future. The relation between the customers and organizations dependent upon the by using best structured problem solving method by using their good communication skills and there are the 8D is one of the best structured methods. ISO/TS 16949:2009 is the ISO certificate for the automotive supplying industry, due to this ISO the organization should solve the problem to identify the root cause and eliminate permanently. The organization which is used this method; Yet, if a customer prescribed problem solving format exists, the industry should be used the prescribed format, which is usually described in company's Customer Specific Requirements (CSR) document (Sharma, C., & Kadyan, S. 2016b).

The 8D methodology is also known as G8D, Global 8D, TOPS8D is one of the most widely solution used for solving the problem as a tool related to non-conformities recurrence prevention in the manufacturing process, they commonly used for solving complaints problems through customers as like complaints management in automotive production. For continuous improvement in any industry use the various techniques the 8D methodology is one of complex tool for that. In fact, 8D is a tool for solving comprehensive problems of significant scale, that is, problems, the resolution of which is generally not inside the influence of individuals, or the solution of which requires more time and possible more investment. By contrast, it is currently most commonly used as a tool for handling complaints in the types of the automotive industry, and not just the automotive industry. The 8D method often appears not to be a sufficient tool for solving the problems without using the sufficient data for the implementation of corrective action and decision making in the complaint management (Deepak Dhounchak, Lalit Kumar Biban & Shakti, 2017).

LITERATURE REVIEW

First the "8D methodology" is described in 1986 by Ford in a Ford manual. The eight steps are described by the Ford manual to address chronic problems of product and process also. Ford mainly used this methodology in power train like: transmission, chassis, engine etc. at various processes like design engineering, manufacturing engineering and production. There are many problems finding out in the Design Engineering and the Manufacturing Engineering than in 1986 Ford motors give an assignment to their quality engineers to develop a manual and subsequent course should be achieving a new approach for solving the problem identified. In 1987 the created manual documented as a Team Oriented Problem Solving (TOPS) of this methodology. In "Dearborn, Michigan" Ford World Headquarters the manual and subsequent course material were piloted. The US Army issued historical roots; according to quality standard MIL-STD 1520 this roots is called 8D method "Corrective Action and Disposition System for Nonconforming Materials". Published in 1974, a cost efficient plan is introduced for handling and dispose of nonconforming materials. They described how to handle the information between the parties and how to manage the process. The main aim was that the identification of errors, root cause analysis, the limitation of waste, the prevention of fault recurrence, cost reduction in manufacturing and improve quality. This method was used by all US Army suppliers until 1995. Due to, the "Ford Motor Company" create "Team Oriented Problem Solving (TOPS)", it is also called TOPS8D. Later VDA published its own version

for the OEMs and the suppliers of the automotive industry in Germany. This is now commonly used as a complaint solving process (Edler, 2001).

(Kelkar, 2004) During the entire life cycle of a mass production of the product the automotive industry needs to be exchange, the quality information and the services also through a network. The problem solving methodology is used not only for solving the complaints of customers; it is also used for handling the internal nonconformities for the effective changes. So there are no doubt the 8D method cannot be used widely for solving the complaints as a pandemic tool, it is dealt with very carefully with the occurrence of nonconformities as a methodology. The 8D used as a composite problem solving methodology, with the help of tools and techniques from various approaches based on the Plan-Do-Check-Act (PDCA) cycle.

In fact, for the implementation of corrective action and related to the complaint handling the 8D methodology is a good standardized method. All the time, a fresh research shows that in most companies the connection with the complaint management to the other business processor of an industry by information technology and organization along with the assessment of the importance of the highest quality in complaint management are still a problem (Behrens, 2007). "The complaint will always represent the kind of information that is annoying to customers". (Paulova, 2010) says in their research positive value for the industry working with complaints as systematically. For organization, not efficiently using the 8D would mean spending resources on analysis without an effective result, and a continuous failure to improve processes.

Marolt and Gomiscek (2005), 8D problem solving methodology in any organization is powerfully connected with the process of continuous improvement is basically problem solving process, so they state the following:

Reactive Improvement:-

Due to solving a problem after identification, like when a defective product or process has been discovered in the organization and at customer end.

Proactive Improvement:-

Using the suitable method and techniques for prevent the problems before they occur, and before the product manufactured.

By the Helena Stantos Rodrigues et al, In their study (2013) found that it is must innovate for initiatives and motivate for good work for any organization, and due to that it is easy to deliver and exchange your ideas and knowledge with team or an employee. It is the most important information as the 8D process may start the innovation process for the most problematic area.

According to Nenadal (2011), the organization has to seek the effective and efficient formula for motivating the 8D teams. An effective and efficient motivation system can combine the interests of employees with the business objectives during the staff meetings, which would achieve the personal satisfaction. Nenadal found the best solution of motivating the employee, the money is a very effective and expensive form of a reward to employees. So the organization has invested in cash rewards, how much it wants people to get used to quickly. And trying to have motivates the employee through the rewards.

In the automotive industries, there are a big challenge to improve the product quality and reducing the product manufacturing time, and one of the most difficult challenges is faced by industry for a new product information with the reducing the product development time (PD). There is diversity in solving the problems or quality process which commonly used in the large manufacturing companies consist the following:

➢ (Juran, 1986), Juran on Quality Improvement
➢ (Grosby, 1986), Improve Quality through Defect Prevention
➢ (Deming, 1986), Quality Improvement
➢ (Ishikawa, 1986), The Process Improvement
➢ (Harrington, 1987), Improvement the Process
➢ (Harrington, 1991), Improvement in the Business Process
➢ (Institute of Industrial Engineers, 2002), The Training and the Implementation of Six Sigma

Concluding on all of the above views about 8D, it can be stated that the advantages of the 8D method are its flexibility, allowing it be adopted to different situations and circumstances. This means that it can be used for investigating local problems in their own workstation, or multi-disciplinary teams investigating more complex issues that cross functional and departmental boundaries. It can be assumed that the efficiency of the 8D process is dependent on the problem solving team's performance and the motivation of teams and individuals is a way of increasing the 8D process efficiency.

RELEVANCE OF 8D IN AUTOMOTIVE INDUSTRY

8D methodology are implemented in the automotive industries with the help of using those 8 steps:

D0- Prepare and Planning

Proper planning will always translate to better start. Thus, before the 8D method analyzing begins, it is always a good idea to ask an expert first for their impression (Deepak Dhounchak, Lalit Kumar Biban & Shakti, 2017). After receiving feedback, the following measures should be applied prior to forming a team.

➢ On the basis of symptoms to collect all information.
➢ The correct question could be asked by a use of symptoms checklist.
➢ The emergency response action (ERA) is to be used for identifying the symptoms, which protects the customer from further exposure to the undesired symptoms.

D1- Make Team

Make a Cross Functional Team (CFT) of a few members from many disciplines. The Quality-one talk to this principle, one step further by having two levels of CFT;

➢ A Core Team structure of three people should represent the three respective subjects; Product, Process and Data.
➢ The (SME) Subject Matter Expert team, which is responsible for brainstorm, study and observe (Deductive or Divergent Techniques)
➢ The Additional Subject Matter Expert is brought at different times to teach the employee's for brainstorming, data collection and analysis.

Teams require proper preparation, setting the ground rules is paramount. To ensure the steady progress they implement the various disciplines like checklist, forms and many other techniques. 8D must always have two key members (Deepak Dhounchak, Lalit Kumar Biban & Shakti, 2017): A Leader and Champion/sponsor.

➢ The Leader is the person who knows the 8D process and can lead the team through it.
➢ The Champion or Sponsor is the one person who can affect change by agreeing with finding and can provide final approval on such changes.

D2- Describe the Problem

The 8D method's initial focus is to properly describe the problem utilizing the known data and placing it into specific categories for future comparison. The "Is" data supports the facts whereas the "Is Not" data does not. As the "Is Not" data is collected, many possible reasons for failure are able to be eliminated. This approach utilizes the following tools (Deepak Dhounchak, Lalit Kumar Biban & Shakti, 2017).

➢ 5 Why or Repeated Why (Inductive Tool)
➢ Problem Statement (Deductive Tool)
➢ Fishbone/Ishikawa Diagram (Deductive Tool)
➢ Is/Is Not (Inductive Tool)
➢ Problem Description

D3- Develop Interim Containment Plan (Interim Containment Action)

In the interim, before the permanent corrective action has been determined, an action to protect the customer can be taken. The Interim Containment Action (ICA) is temporary and is typically removed after the Permanent Correct Action (PCA)

➢ Verification of effectiveness of the ICA is always recommended to prevent any additional customer dissatisfaction calls.

Plan temporary counter measurement is to protect customers (Deepak Dhounchak & Lalit Kumar Biban, 2017).

D4- Determine and Verify Root Causes & Escape Point

The root cause must be identified to take permanent action to eliminate it (Deepak Dhounchak, Lalit Kumar Biban & Shakti, 2017). The root cause definition requires that it can be turned ON or OFF, at will. Activities in D4 include:

➢ Comparative analysis listing differences and changes between "Is" and "Is Not".
➢ Development of root cause based on remaining items.
➢ Verification of the root causes through data collection.
➢ Review Process Flow Diagram for location of root cause.
➢ Determine Escape Point, which is the closest point in the process where the root causes could have been found but was not.

D5:- Permanent Corrective Action

The permanent corrective action is directed toward the root cause and removes/ changes the conditions of the product or process that was responsible for the problem. Activities in 5D include.

➢ Establish the Acceptance Criteria which include mandatory requirements and wants.
➢ Perform A Risk Assessment/Failure Mode And Effects Analysis (FMFA) On The PCA Choices.
➢ Based on risk assessment, make a balanced choice of PCA.
➢ Select control-point improvement for the escape point.
➢ Verification of effectiveness for both the PCA and the escape point and required.

D6:- Implement and Validate the Permanent Corrective Action

To successfully implement a permanent change, proper planning is essential. A project plan should encompass: communication, steps to complete, measurement of success and lessons learned.
Activities in D6 include:-

➢ Develop project plan for implementation.
➢ Communicate the plan to all stakeholders.
➢ Validation of improvements using measurement.

Quality department are responsible for implement and validation the permanent corrective action. The Quality department aware the works about the changes of working process and machining process (Deepak Dhounchak & Lalit Kumar Biban, 2017). Apply the permanent changes in working process and machining process.
R&D department remove the containment action plane for permanent changes.

D7:- Prevent Recurrence/System Problem

D7 affords the opportunity to preserve and share the knowledge, preventing problems. On similar products, processes, locations or families, updating documents and procedures, work instruction are expected at this step to improve future use (Deepak Dhounchak & Naveen Khatak, 2017).
Activities in D7 includes:-

➢ Review similar products and processes for problem prevention.
➢ Develop/update procedures and work instructions for system prevention.
➢ Capture standard work/practice and reuse.
➢ Assure FMEA updates have been completed.
➢ Assure control plane have been update.

Prevent recurrence systemic issues/Action resulting from Predict Root Cause Analysis for new product introduction and/ Quality System:

D8:- Congratulate Your Team

Teams require feedback to allow for satisfactory closure (Deepak Dhounchak, Lalit Kumar Biban & Shakti, 2017). Recognizing both team and individual efforts and allowing the team to see the previous and new state solidifies the value of the 8D process.
Activities in 8D includes:-

➢ Archive the 8D documents for future reference.
➢ Document lessons learned on how to make problem solving better.
➢ Before and After comparison of issue.

The team has been informed of action results and their effectiveness and congratulated.

TOOLS AND TECHNIQUE USED IN 8D

The following tools and technique used in the 8D methodology:

- Ishikawa Diagram
- Pareto Chart
- Root Cause Analysis
- Design of Experiments
- 5W, 2H (Who, What, Where, When, Why, How, How often)
- Check Sheet
- FMEA
- Flow Chart
- Statistical Process Control

BENEFITS OF 8D

- The 8D are the effective approach to find out the root cause, developing the proper actions to removing the root causes, and relevance the permanent corrective action for removing the problems permanently from the product and process in automotive industries.
- It is help full to explore the control system that allowed the problem to escape. The escape point is studied for the purpose of improving the ability of the control system to detect the failure or cause when and if should occur again.
- The anticipation loop explores the systems that permitted the condition that allowed the failure and cause mechanism to exist in the first place.
- It is helpful to improving the quality of the product.
- It is helpful to increasing the production of industries.
- It should be very beneficial to satisfying the customer through solving the problems.
- The 8D methodology are best approach to escape the problems.

LIMITATIONS OF 8D

- The required training in the 8D problem solving methodology is difficult.
- The suitable data collection and analysis tools are difficult in used, like Fishbone Diagram, Process Flow Chart, Pareto Charts, Why Why Analysis.

CONCLUSION:

Look as one of the basic problem solving methodology particularly in automotive industry, the 8D methodology offers a necessary solution from identifying the root cause until the relevance of preventive action. The tactical tool had to be successful meet the expectation of the quality team by overcoming the major defect in the production line. Mostly, the relevance of the 8D method will lighten the waste and reducing the cost of production, and increasing the production. Therefore, the quality of the product can be improved and fulfil the customer satisfaction in the competitive market.

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