8D complaint solving method in an automotive component processing company

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Abstract. The 8D Report is a method used by engineers and other specialists to solve product or process problems. The purpose of the report is to identify, correct and eliminate recurring problems. The 8D report sets out permanent corrective actions based on the statistical analysis of the problem as well as the origin of the problem. This type of report has been developed by Ford Motor Company and has become a standard in the automotive industry, especially used to solve customer complaints about non-compliant products. The name of the 8D report comes from "8 Disciplines". These 8 disciplines are actually 8 points that delimit the steps you take if a problem or defect is observed in a process or product. Solution stages are: choice 8D team identification and responsibilities, problem description, defining of the control actions, cause analysis, defining the corrective actions and demonstration of efficacy, the implementation of corrective actions and demonstration of effectiveness, Prevention of recurrence of nonconformities and completion and signing the final report 8D.

1. Introduction

The name of the 8D report comes from "8 Disciplines". These 8 disciplines are actually 8 points that delimit the steps you take if a problem or defect is observed in a process or product. The 8D complaint-handling method in a component manufacturing company for automotive industry has the following steps [1],[2].

2. Working method

2.1. D1 - 8D team identification and responsibilities

This stage involves nominating the team members with the necessary skills and experience. This is done on the basis of the 8D ratio of figure 1.

This report contains the following: date of issue - start date of the report, final report - date of last signature on the 8D report, interim report - date on which the 8D report is sent to the client in the interim phase, the date of the complaint – when the complaint was received from the customer (complaint number, description of the non-compliance, etc.), figure 2.

The report also contains a data set related to the product: supplier name, material, client material code, series etc.

The piece we are going to analyses is shown in figure 3 and it is made of EN 10294-1 19MnVS6. Steel with the following characteristics: higher strength, better ductility, better machinability, good weldability and even hardenability and dimensional stability.

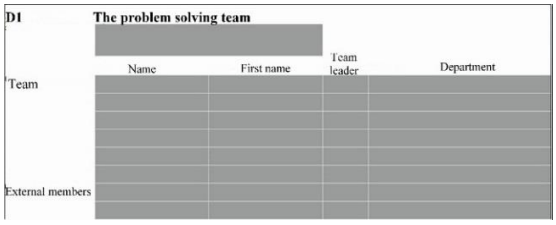

Figure 1 Report of naming of the 8D team and responsibilities

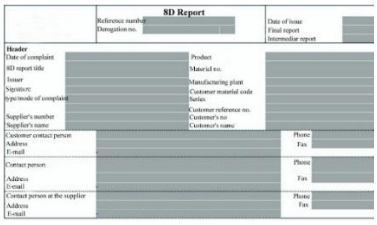

Figure 2. Model of the 8D Report

This piece requires a large number of machining operations and high precision according to the processing plan shown in figure 4. Choosing the right people to be part of the team is critical to solving the problem. The team has to be a multidisciplinary team, to have one member in each department to look at the problem from different perspectives.

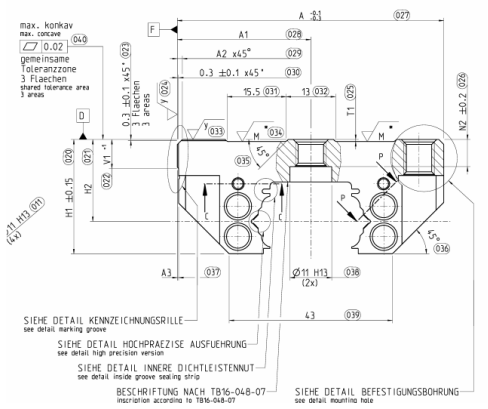

Figure 3. Technologically analyzed piece

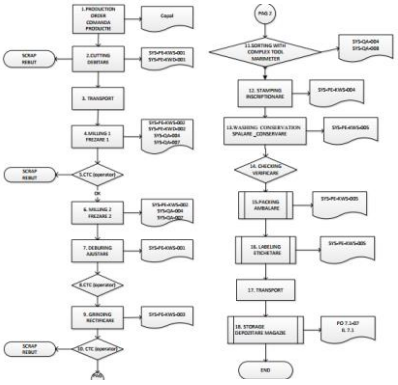

Figure 4. Processing stages

Every person will have a well-established role in this team. The role of the quality engineer is the link between the customer and the company. He / she needs to know the client's requirements very well to be able to present to the team both the problem and what is to be done in this 8D report.

2.2. D2 - Problem description

Describing the issue clearly and concisely. Collecting information - the issue is addressed from two points of view, namely: the customer and the manufacturer. Results: A clear and complete description of the problem, as shown in figure 5.

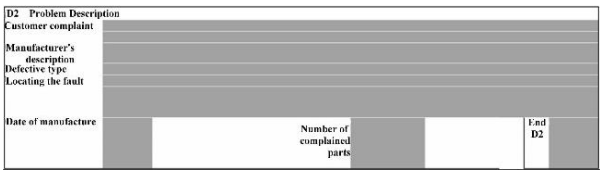

Figure 5 Report to present the problem

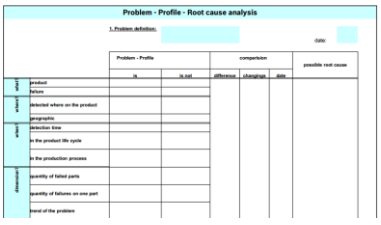

Figure 6 Report on the analysis of the causes

The customer's complaint must contain a description of the non-compliance with all relevant customer-specific influences from the time it was discovered.

The manufacturer's description contains the non-conformity from the manufacturer's point of view with all relevant data, figure 6.

2.3. D3 – Defining of the control actions

The manufacturer has a catalog of 37 possible defects only for the processing of this piece, which details the ones that are accepted or rejected. This analysis is made according to the consumer's requirements.

Initialisation of the most appropriate actions to isolate the problems. Isolation actions consist of the following steps, figure 7: securing current production (egg taking into account the use of other lines or other locations, blocking stock, applying warning signs, informing employees); Checking the storage stock / stock in circulation - on transport; Checking the stock at the customer (egg customer's warehouse, items being in transport to the customer, other affected customers?).

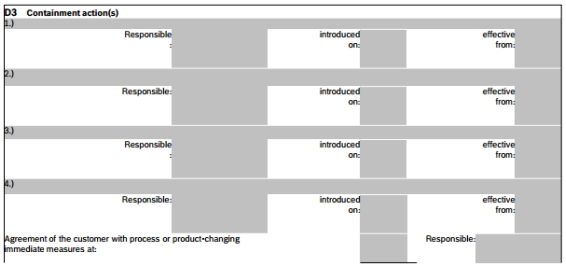

Figure 7 Report of control actions

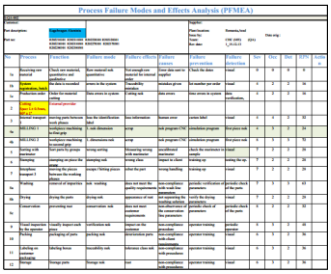

Figure 8 Control Plan

The control plan for the part under consideration is shown in figure 8. Compliance with the control plan during the manufacturing process makes it possible to find the noncompliance stage and to remedy very quickly. After completion of step D3, the 8D Report will be sent to the customer. The customer will reject or approve the taken actions to stop the production of defective parts.

2.4. D4 Cause analysis

The objective of step D4 is to determine the root cause of occurrence and non-detection of nonconformity. Analysis of the non-compliance in terms of appearance "Why did the defect occur?" and from the non-detection point of view "Why the fault was not detected?";

The analysis of the occurrence of the defect is studied from the point of view of the MRC managerial root cause and TRC technique, figure 8.

After determining the causes and the risk analysis, the 8D report is updated and the control actions implemented in step D3 are reviewed to determine their effectiveness and their need for further development. The client is informed about the status of the 8D report.

2.5. D5-Defining the corrective actions and demonstration of efficacy

Defining corrective actions and demonstrating effectiveness are aimed of creating a list of all actions that can eliminate the cause of nonconformity, actions for the occurrence and non-detection of nonconformity, checking the effectiveness of the identified actions, determining and confirming the "optimal" corrective actions, including steps and responsibilities for implementing actions and communicating corrective actions to customers, figure 9.

An important part is the size verification module during the processing process that follows the dimensions of the designer and the possibility of defect prevention. For this purpose, during the process, all machining and related dimensions will be included in the measurement plan of the dimensions resulting from the technological processing (presented in part) containing 107 operations, figure 10.

After this stage, all possible corrective actions, regardless of their costs, will be mentioned; The basic principle is, "Preventing errors is more important than eliminating defects."

Figure 9 Defining the corrective actions

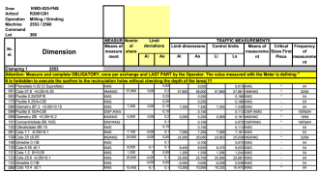

Figure 10 Measurement plan during processing

Are all actions traced - for appearance and non-detection, TRC and MRC have been taken into account? Are the proofs of the effectiveness of the actions attached and approved? Is there a relationship between the root cause and the measures taken at D4?

2.6. D6 The implementation of corrective actions and demonstration of effectiveness

The objective of Step D6 is to implement the actions defined in Step D5.

The activities of this step are: implementing corrective actions, confirming the effectiveness of the implemented actions, eliminating the emergency actions implemented in step D5.

The corrective actions chosen from those determined in Step D5 are being implemented, the measures must be both to avoid and to detect the nonconformity. The way how the problem was solved is verified and the actions are monitored, figure 11.

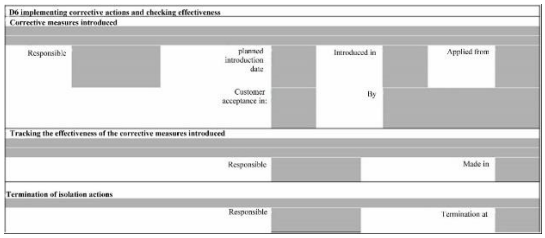

Figure 11 Corrective actions report

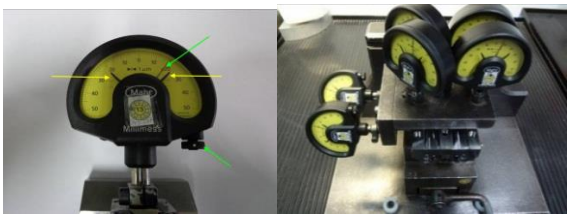

Figure 12 Internal measurement procedure with micrometer

The control actions implemented in step D3 are removed only after the effectiveness of the corrective actions has been demonstrated - the justification for cancelling the control measures is documented.

After processing the parts on the grinding machine, it will be measured with the dial comparator to determine the precision class in which the piece conforms to the internal standard. The measurement method with the comparator is described in: Internal measurement procedure with micrometer the QA-004, figure 12.

If it is necessary to implement actions that bring changes to the product / process, the client's consent is required to implement the corrective actions defined in step D5 and document this.

2.7. D7-Prevention of recurrence of nonconformities

The objective of step D7 is to identify the measures necessary to avoid the recurrence of defect or similar defects. A plan for implementation, monitoring of the effectiveness and evaluation of preventive actions is established. The defined actions are implemented and documented, and if there are actions that are not implemented, the reason will be justified, figure 13.

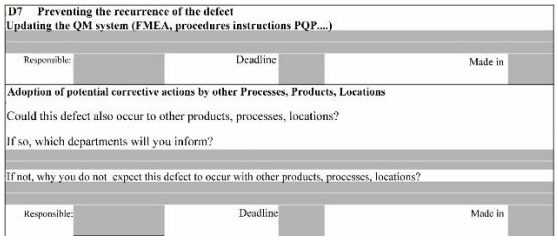

Figure 13 Implementing preventive actions to improve the process

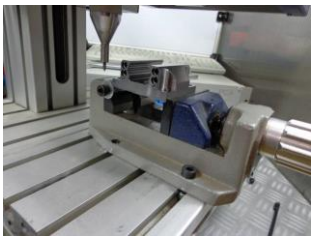

Figure 14 Positioning the piece in the vies of the imprinting machine

Updating the QM system (FMEA, Instructions-Procedures, PQP) - Upgrading the FMEA, details of IPC changes, the frame control plans and other relevant documents are very important in the event of customer noncompliance.

2.8. D8 – Completion and signing the report

The objective of step D8 is to successfully complete the process of resolving nonconformities. A meeting is organized with all those involved in the 8D report, for the evaluation of steps D1-D7 and closure of the report. Conclusions and completion of the 8D Report in figure 15.

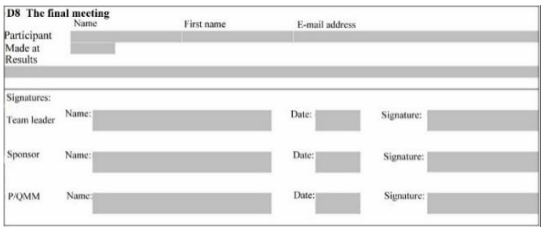

Figure 15 The 8D final report

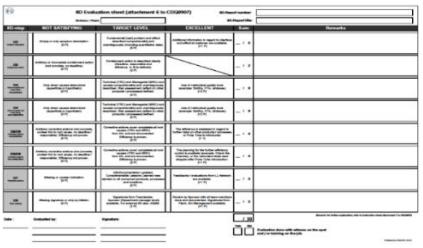

Figure 16 The final evaluation of the method 8D

A final meeting is taking place with members of the 8D Reporting Team, presenting what was good in solving the 8D Report and what needs to be improved. The results are documented by the final format assessment called "FR 08958-2", figure 16.

3. Conclusions

This way of dealing with nonconformities can be applied when technology flow can be verified. Namely, the company has clear and interconnected procedures. The control plans are sustainable, there are measurement and control equipment and skilled people who can do it. All of this data is stored in a company database that makes it possible to access it from anywhere.

An important step is the corrective action by which the company must eliminate the cause of the non-compliance in order to prevent its recurrence. As a final idea, the action includes: customer complaint and defect analysis, determination of the causes of non-compliance, undertaking actions to prevent recurrence of non-compliance, implementation of necessary actions and execution of the final 8D report.

References

[1] Miclaus I.M, Quality management (Managementul calității), Ed. Dacia, Cluj, 2008;

[2] Gheorghe Sima, Ramona Lile, Glavan Dan, Elena Muncut, Management, Traceability and Control of Industrial Processes, Soft Computing Applications pp 971-980, 03 November 2015, DOI: 10.1007, ISBN 978-3-319-18415-9, Online ISBN 978-3-319-18416-6;