

Quality Alerts in Manufacturing

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Abstract — For this project the quality claims from customers to manufacturing plants was the topic discussed. The historical data across the months is the main tool used to drive this project. The data collected from the customer claims corresponded to the first 4 months of the year and was divided in 5 classifications. This type of issues affect the integrity of companies that sent products with defects to customers. According with the data obtained, the major offender of this project was the missing components in the products and an example of this classification was described. The actions taken to solve the problem was decided by a Root Cause Analysis that was composed by Containment Plan, Corrective Actions, and Preventive Actions. Every single one of the steps helped to determine an improvement in the process used and is explained in details in the project.

Key Terms — Customer complaints, Manufacturing, Quality Alerts, Reports.

INTRODUCTION

The topic that will be discussed is one very common in manufacturing plants: the quality claims that companies receive from customers. The idea is to classify these incidents and look for areas of improvement so that they do not recur.

Explanation of the project

The purpose of this project is to classify incidents reported by customers. These incidents affect the quality controls in manufacturing, What is expected is to develop a process that ensures customers receive products free from defects and meet their needs [1]. The lack of process and incorrect implementation of quality controls in manufacturing are the main causes when a product is impacted by an issue. A five whys analysis was used to execute the plan according to the results

obtained [2]. This analysis helped to find the true root cause of the problem. An important key in this project is the data collected, which helped to develop a process in which the classification of claims helped identify what areas in manufacturing are failing. The reduction of incidents and the classification of data undoubtedly helped to improve the quality of the products.

Objectives

The objectives of this project were to:

- Reduce the number of claims
- Reduce escalation
- Improve the quality in the products
- Improve Customer Service
- Strengthen areas of weakness

METHODOLOGY

Data was collected from January to April. The data are presented in the Table 1 and Table 2 and they were graphed, which helped to identify the areas of failure. Once the data collection and classification was completed, the team proceeded to work with the root cause analysis and identify the areas that are affecting the process, to then generate a plan.

DATA CLASSIFICATION

In this section the different classifications that were used in the project to classify incidents according to the data that was collected based on customer complaints is detailed and presented. This section described each of the classifications to understand a better way to which it's referred when someone talks about the quality defects that are affecting the process. There is a lot of quality controls that help execute an operation in the manufacturing floor. When quality can be

“operationalized”, the production performance is governed at the manufacturing moment instead of after-the-fact in response to a quality issue [3].

Used Classifications

The classifications used in this project to describe the defects reported by customers are described below:

- **Missing Components** - Any complaints related to incomplete material in an order or product are classified as missing components; in other words this classification helps to identify incomplete orders.
- **Carrier** - This classification is related to transportation problems, which incurs, for example, when the product is damaged during transportation or when incorrect or delayed shipments occur.
- **Escalation** - An escalation is an emergency complaint in which a specific lot of units are affected.
- **Wrong Configuration** - When a product arrives at the customer and does not match the order.
- **Defective units** - This classification is for the products that the customer receives and have functional problems.

METRICS RESULTS

In Tables 1 and 2 are presented the results of the metrics with their respective classifications of the cases reported by customers in the dates mentioned. The number of incidents by classification from January to April are shown in Figure 1. This helped to determine the plan implemented for every single one of the cases. Is necessary to remember that this is a classification chart by defects per month, which means that every case needs to be addressed individually and every investigation needs to be driven separately.

Table 1
Cases per Manufacturing Month

Classifications	Jan	Feb
Wrong Configuration	1	0
Escalation	0	0
Missing Components	6	3
Carrier	4	2
Defective Units	0	1

Table 2
Cases per Manufacturing Month

Classifications	Mar	Apr
Wrong Configuration	2	0
Escalation	1	0
Missing Components	7	3
Carrier	3	0
Defective Units	0	0

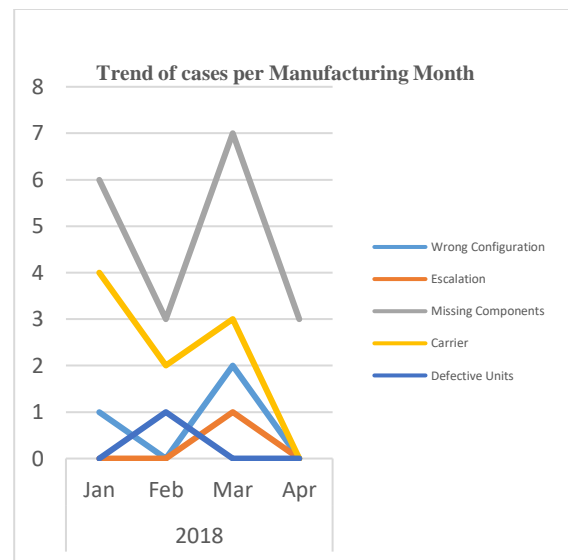


Figure 1
Chart of trend of cases per manufacturing month

Major offender

According to the data collected, customers reported a total of 33 defects from January to April, making the classification of missing component the major offender. Followed by the carrier issue which

had 9 defects reported in the 4 month of data collected. Based on the results obtained, the first classification chosen to be worked was the missing components with the objective of reducing the number of defects as soon as possible. The purpose is find the root cause of the problem to avoid the recurrence.

ROOT CAUSE ANALYSIS

The root cause analysis in the project was directed to the major offender which is the classification of missing components. This analysis was composed of the sections below.

Five Whys Analysis

In this analysis, one of the cases inside the classification of missing components was discussed. Using the 5 whys questions, the problem description was posed.

- What?: Customer reported 10 cases of missing labels in different units.
- When?: According to the data collected, the cases were reported in the month of March and April.
- Where?: The incidents were reported at the area of integration process.
- Who?: Customer (NHF) reported the cases to the factory with extremely urgency.
- How?: Components from different locations were received by the factory to be assembled and tested and then to be sent to customer.

Using the 5 whys analysis, the root cause of the problem was identified. The root cause of the problem is that lots of parts of the supplier arrived from other locations and the factory does not verify if these parts have the required labels. This is why the cases reported by the customer tell that the product is missing certain labels that identified parts of the unit, which becomes a quality escape that needs to be corrected immediately in order to provide to customer a product that meets all their expectations.

Containment

The containment plan are described in the following bullets:

- Run an alert in the assembly area for the units worked during this period to investigate if more units were shipped with the defect. Product Inspections allow to verify product quality on site at different stages of the production process and prior to its dispatch [4].
- Hold units in production to verify if all of them meet the requirements of labels.
- Request a report to supplier about the defect of the units they are sending.

Corrective Actions

The corrective actions taken were to develop a process that emphasizes checking labels before sending any unit to customer and to emphasize in the training of operators the areas of inspection. As is already known, the effort to provide trainings to operators is essential to improve a process.

Preventive Actions

For the preventive actions, one of the instructions was updated to labeling component process and work instructions. With the process and the instruction updated, the effort should be concentrated in the trainings. The training is a systematic activity performed to modify the skills, attitudes and the behavior of an employee to perform a particular job. These actions need to guarantee the quality of the products.

CONCLUSION

The project was successful due to the results obtained. Data was collected from the past months based on customer complaints about the products they received. With the data collected, many things were executed to develop new processes that helped improve the quality of the products. In many ways that data can be used, one of them is already shown in the most common defects, which were illustrated in the graph. Thanks to the fact of use this data, the actions been taken and the plan to improve areas of

weakness was developed. In the project an example of the cases of missing components was used since it was the major offender in the metrics. As was already mentioned, each case is evaluated individually.

This project helped reduce incidents and improve the quality of the products and services thanks to root cause analysis and the actions taken. This undoubtedly improves the quality of the product and therefore offers a better service to the customer. The greatest achievement was the data collection, as is already known this factor provides many possibilities and in turn opens doors to improve many of the processes, while providing visibility to many areas.

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