

IMPLEMENTATION OF QUALITY MANAGEMENT STANDARDS IN THE AUTOMOTIVE INDUSTRY

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Rezumat. Într-o industrie foarte competitivă, cum ar fi cea auto, calitatea este cea care face diferența. În momentul în care vrem să lansăm un produs pe piață este important să ne gândim la ceea ce își dorește clientul: un vehicul pe care să-l conducă în condiții de siguranță, confortabil, cu un design atrăgător și competitiv, la un preț pe care să și-l poată permite și pentru care nu să nu fie nevoit să facă frecvente vizite în service. Calitatea unui produs este construită în mod riguros, în conformitate cu reguli și metodologii precise. Această lucrare a apărut ca urmare a evoluției spectaculoase a companiei analizate, care până în urmă cu douăzeci de ani era practic necunoscută, iar astăzi râvnește la premii internaționale, concurând cu mărci aflate în portofoliul giganților din industria auto.

Abstract. In a very competitive industry, such as the automotive industry, the quality is the one that makes the difference. At the moment when it is wanted to launch a new product on the market, it is important to think about what the customer desires: a vehicle that he can safely drive, comfortable, with an attractive and competitive design, at a price that he can afford and which is reliable. The quality of a product is built rigorously in accordance with precise rules and methodologies. This paper appears as a result of a spectacular evolution of the analyzed company, which was practically unknown twenty years ago and, today craves international prizes, competing with giant brands in the automotive industry.

Keywords: standards, management, production, quality control, automotive industry.

1. Introduction

Implementing quality management and new systems to address product quality issues produced by the company reviewed contributes to maximizing profits and reflects on the efficiency of the entire business of the enterprise reviewed.

A broadly accepted definition of Total Quality Management (TQM) is the one formulated by the international standard ISO 9001: 2015: quality is understood as the set of properties and features that give it the ability to meet its expressed or implied needs.

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An organization is successful as it manages to develop very good relationships with customers and provides them with products of the required and expected quality.

An organization is successful to the extent that the capacity and ability to provide that quality level that brings customer satisfaction.

The paper's theme is supported by the activity in the finishing workshop of the company, workshop where the finished product arrives, it is controlled and delivered to the client.

2. Current state

2.1. Presentation of the conceptual framework of quality management

Quality means “the set of properties and features that give it the ability to meet expressed or implied needs.” In accordance with this definition from the standard ISO 9001:2015:

- quality is not expressed by a single characteristic but by a set of characteristics;
- quality is not self-contained, it only exists in relation to customer needs;
- quality is not a continuous and not a discrete variable;
- quality must satisfy not only the expressed but also the implicit needs.

William Edwards Deming believes that “TQM is a set of systematic and effective activities by the entire organization effectively and efficiently; the company's goals are designed to deliver products and services with a level of quality that satisfies customers at the right time and price”.[1]

Quality, which means the quality of processes and results, is and will always be an important, if not the most important factor of competition.[2]

Quality management is a set of activities aimed at achieving goals, through the optimal use of resources. This includes planning, coordination, organization, control and assurance of the quality.

A good quality management system must have the following features [3]:

- to be established in writing;
- ensure customer satisfaction;
- ensure that the organization's requirements are met;
- to be applicable to all activities of the organization.

2.2. Final product assessment. Quality principles perceived.

Perceived quality: *machine watched by the client's eyes*

Perceived quality plays an important role in the process of choosing and purchasing a vehicle. The higher the level of quality, the more loyal the customers, or the opposite, if the vehicle is perceived as mediocre, it can make the customer choose the competition.

What is perceived quality?

Perceived quality is the set of immediate, rational and subjective perceptions that the client feels in the presence of a machine[4].

All the perceived quality makes a machine, beyond being built, well-built and reliable, to create an intelligent and positive impression on the product and brand. Customer perception is immediate.

For the client, the image of quality is built at first glance. There is a talk of the “quarter of an hour” when the customer takes the tour of the vehicle to decide whether to buy it or not. He makes a general impression then looks at the details. All of this to make sure he does not get away with anything serious and that the product is very well designed.

The three foundations of perceived quality: a good perceived quality means a car well thought out, which gives a valuable impression; well-designed, expressing customer attention; well-manufactured, which demonstrates the technical and industrial skill.

2.3. Project policy in the quality field

The starting point for quality management is the elaboration of a quality policy that includes the general guidelines of the enterprise in this field and the establishment of responsibilities for all the activities involved in the achievement of the quality objectives [5].

Quality policy is the general orientation and the preoccupation of an organization, being transposed into practice by the quality policy which is an integral part of the general policy of the development of the commercial society. The company's management believes that quality and environmental issues are the core elements of responsibility for all employees of the company. Application of the integrated quality-environment system follows[6]:

- improving working conditions, motivating staff to improve quality, encouraging teamwork and assessing employees according to their contribution to quality assurance;
- increasing the professional competence of the personnel and ensuring the irreproachable quality of the company's activities and products that will lead to the permanent maintenance of the company on the list of suppliers with certified quality-environment management system.

2.4. The quality management system

The Quality Management System and the Quality Manual are basic documents specifying the technical and organizational measures, the actual working means, the documents used and the responsibilities of the personnel involved in meeting the requirements of ISO 9001:2015 and ISO 14001:2004.

The first certification of the Dacia Quality Management System was in 1998, in coordination with ISO 9001, the 1994 version. The same system was evaluated in 2003 after the EAQF by the Renault Quality Directorate, when it proved to be in compliance with the requirements of this standard. In September 2018, Dacia obtained ISO 9001 certification, version 2015.

The fulfillment of the requirements of the standards in force by the Quality Management System is confirmed by the surveillance audits of the Certification Association.

Quality assurance also aims at achieving internal and external goals. We can properly speak of “internal insurance” and “external assurance” of quality.

Internal quality assurance is the work done to give the management of the firm confidence that the proposed quality will be achieved.

External quality assurance is the work done to give customers confidence that the quality of the vendor's quality assurance system is such that they can achieve the required quality.

2.5. Quality indicators

► AVES (Allians Vehicles Standard)

The AVES standard allows the assessment of vehicle quality by detecting and classifying the set of flaws found by the customer[7].

Short AVES (SAVES) is a static and dynamic evaluation. This assessment shall be carried out at a rate of 1% on the vehicle model manufactured within eight hours.

The AVES evaluation is based on three main axes which are presented in short further:

- Axis 1- means:
 - appearance and functional control are performed for one hour and 30 minutes;
 - dynamic control, provides a predefined route on the road for 30 minutes;
 - leak-tightness control, the vehicle is kept in a pressurized cabin for 7 minutes.
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- Axis 2 - check-list:
 - this check-list targets about 500 verification operations; the role of the checklist is to be used as an assessment guide and it is followed by two evaluators who jointly determine the degree of penalty for possible flaws.
- Axis 3 - place of evaluation:
 - as far as the place of assessment is concerned, it plays an important role in determining the degree of penalty on the aspect of the vehicle. There are two different locations:
 - inside an artificially lighted building;
 - in natural environment with natural light.

Appearance flaws that have been rated with V1 and V2 in the artificial lighting environment are reassessed in the natural environment, where the final decision on the degree of penalty is taken.

Troubleshooting classification:

- V1 + is a flaw that impedes the use of the vehicle (immobilizer or safety panel); for example: battery discharged; centric safety driver does not insure;
- V1 is a flaw that disables the customer and requires repairs; for example: a scratch on the front of the top caisson;
- V2 is a flaw that bothers the client and expresses your dissatisfaction in an investigation; for example: leak paint caisson left hand door;
- V3 is a flaw discovered by the customer but tolerant; for example: rare paint on the front of the top caisson.

► PESD (Static and Dynamic Evaluation Plan)

PESD evaluation is statically and dynamically realized by a single chopper on the vehicle. The PESD of a vehicle is performed for 30 minutes, functional, and dynamic control, pistol control for the detection of V1 +, V1 and V2 penalties.

This type of assessment, PESD, is carried out daily for at least 10% of the volume of vehicles manufactured from each model.

The PESD assessment is 100% achieved at the beginning of any new vehicle project to be marketed until the market acceptance has been reached, afterwards a 10% for the entire lifetime of the car. The evaluation is a follow-up by the Direction of Quality without any possibility of delegation.

The aim is to evaluate the efficiency of quality transmission quality policy at the manufacturing level.

3. Case study: solving the quality problem ”scaling of paint from left front door”

Following the assessment by SAVES operators was penalized with a non-compliance with a V1 rating of the left front door (Figure 1).

Quality managers are constantly concerned with the continuous improvement of manufactured products. This is why they use a wide range of methods to solve non-conformities in the manufacturing process.

“5 Why” analysis method is a technique used in the analysis phase of the nonconformities identified in a management system. It is applied by repeatedly introducing “Why” (five times, as a rule) until the root of the nonconformity is reached. Due to the fact that the defect was detected in the General Assembly Department, signaled by the quality operators a day later, the head of Quality UEL (Elementary Unit of Labor), has the obligation to analyze cause-and-effect for the elimination of the client effect. Head of UEL will perform an analysis using the “Technique 5 Why”. This analysis resulted in the following conclusion: the quality operator on the last post of the production line and the quality operator on logistics expeditions did not respect one of the key points of the Standard Operations Files [8].

As a corrective measure for the two operators, it was decided:

- flaw animation with operators (defect presentation);
- reforming the operator on the job;
- DOJO appearance operator training;
- training operator dexterity.



Fig. 1. Flaw signaling



Fig. 2. Door swing

This method will also be used by the head of UEL defective generator. Following the analysis, the root flaw was found. The non-conformance, a scratch on the left front door, occurred due to the damage of the swinging rubber rollers carrying the fitted doors to the body mount (Fig. 2).

As a method of improvement, it is proposed to fix the rubber guard (Figure 3) on each door in the area where the piece comes into contact with the rollers on the balancer (Figure 4).

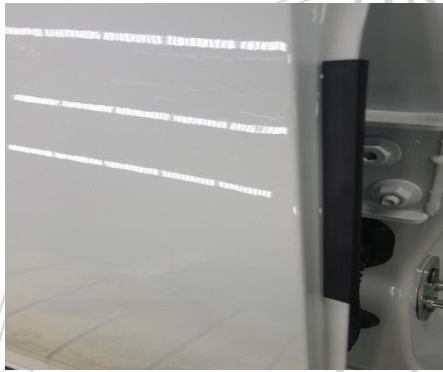


Fig. 3. Rubber protection



Fig. 4. Door swing

This solution is considered to be effective because it attracts a number of advantages:

- removes defect;
- the much lower price for the purchase of rubber protection compared to the price of the roller balls;
- rubber protection is reusable;
- decreasing the quantity of materials used for retouching (repairs);
- eliminates the risk of getting to the customer a defective car.

Conclusions

The successful involvement of employees in the achievement of the objectives leads to the progress of the company and implicitly to maintaining or even increasing the position on the competitive market. A major contribution in this direction is the managerial leadership of society.

The management has defined and implemented a system for continuous improvement of quality management by using quality policy, quality objectives, auditor results, data analysis, corrective and preventive actions and management analyzes.

The effectiveness of corrective, preventive, and continuous improvement of quality by the organization through a concurrent strategy aimed at customer

satisfaction and profit maximization is pursued by the quality of the services provided, achieving satisfactory economic results.

The managers of the analyzed organization are aware of the fact that any activity with strong human participation presents the risk of dysfunctions generating anomalies, which is why they are concerned with their detection and treatment, preventing their appearance is essential.

As a method of improvement, it is proposed to fix a rubber protection guard on each door in the area where the piece comes into contact with the rollers on the balancer. This solution is considered to be effective because it attracts a number of advantages.

Notations / Abbreviations

TQM - Total Quality Management

AVES - Allians Vehicles Standard

SAVES - Short AVES

PESD - Static and Dynamic Evaluation Plan

UEL - Elementary Unit of Labor

DOJO - Training operator specific to this company

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