



Proposal of The Maintenance Management System for SME`S (Small and Medium-Sized Enterprises) In Plastics Injection for The Auto part Industry in The State of Tlaxcala

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Abstract. The important performance of bars in today’s society imposed the creation of this research work, which is directly focused on the performance of the organizational factors of these companies in the municipalities of Apizaco, Huamantla and Tlaxcala downtown, through a methodology that allowed obtaining a diagnosis considering the main areas that are: management, processes, human resources, sales, accounting and physical facilities and the main organizational factors that intervene for proper performance. Subsequently, a statistical correlation analysis was carried out to determine the link between organizational factors and it was determined that the factors with the highest correlation are: the organizational climate, recruiting staff, the motivation, the quality of services and advertising.

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1. Introduction:

The trend of the world economy and the globalization of the markets are constantly growing. As a consequence, organizations face a new development environment that forces them to adopt the most convenient strategies (Castillo & Castilla, 2020) .

Currently, one of the main goals pursued by companies is to improve the management of their processes, where there is a need to maintain or improve their quality and competitiveness through the implementation of management systems. In this sense, it is necessary to highlight the important application of management control and measurement tools, in terms that allow optimizing the use of resources and guiding the administration of services to make better and timely decisions in achieving their objectives (Hope, 2015) .

The objective of the research is to maximize the use of the assets of the productive area through maintenance actions, as the primary activity of the value chain and fundamental for the continuous improvement of quality and competitiveness, fully satisfying the clients.

2. Description of the Method:

In order to analyze the administrative performance of the company, an investigation was carried out with a qualitative approach to demonstrate the current situation of the maintenance department in the company, case study,

since it does not have historical data and there is no way to compare them.

The study is descriptive because it is described in the facts as they are observed in reality independently, seeking to specify properties that help to analyze and understand the phenomenon.

The study is explanatory because it seeks to answer and explain the reasons for the maintenance department's management problems.

The present investigation is non-experimental because it does not require the performance of tests for its validation, it is a theoretical study for the improvement of management.

To obtain information on the performance of the maintenance department factors that directly impact the study area were determined and they will be evaluated, then presented in the table to 1.

Table 1 Research variables

Area	Factors
Maintenance Department	Organization
	Human resource
	Maintenance
	Security
	Storage
	Technical means



According to the information it was determined that the tool for the serious diagnosis through the instrument questionnaire that was developed based on the above factors with a total of 75 items, both measuring scale were nominal and ordinal; it was validated through expert judgment and through software using the kappa coefficient option, which measures the degree of concordance of the evaluations carried out among judges and results were satisfactory and according to the scale.

The instrument applied was in a personal way that involved the direct participation of the maintenance department manager lasting 30 minutes approximately. Each one.

2.2. Data Interpretation:

In order to know in detail the results of the evaluation of the diagnosis the maintenance department it made the following scales: Variables as the minimum score 56% stock management, human resources in 58% and 63% in safety, it can be classified as regular intra assessment management system. In addition, the areas with the highest scores have 64% general maintenance, 75% organization and 78% technical maintenance means.

2.3. SWOT Analysis

The following research was to identify the main internal and external factors that affect both the company

and maintenance area. The SWOT methodology will allow, based on the analysis, to establish strategies to mitigate factors that involved in good performance, see Table 2 .

Then the identification of factors strategies that contributed to the generation of the maintenance management system proposed settled, presenting all the information on Table 3.

It was used in research to determine the main causes of problems arising in the maintenance department. Figure 1 presents the cause and effect diagram, where it analyzes the most important problem derived from the SWOT.

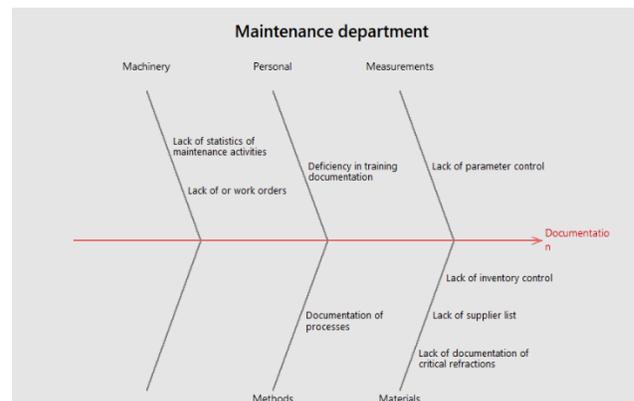


Figure 1. Diagram cause – effect, Department diagnostic

Table 2: SWOT Matrix of the Case study:

Strategic analysis under the SWOT matrix	
Internal factors of the company	External factors to the company
<p>Weaknesses</p> <ul style="list-style-type: none"> - There is no clarity of the operating policies regarding the maintenance area - They do not have maintenance procedures - they do not have means of communication by the company - Lack of personal protective equipment and safety signs - Do not have inventory control - Lack of tools and tooling for mold maintenance - They do not statistics record of maintenance activities - Order and cleanliness 	<p>Threats</p> <ul style="list-style-type: none"> - Political changes - Supplies depending on the transport logistics area. - Decreasing the vehicle production. - Increased raw material costs. - Leasing of the facilities due to non-payment of fees. - Water supply. - Lack of personnel. - Theft / quality. - Staff turnover.
<p>Strengths</p> <ul style="list-style-type: none"> - Maintenance personnel are aware of their technical obligations, technical control functions and responsibility for their activities. - It has the instructions for equipment and machinery. - Training the staff based on detecting the need. - Maintenance work follows manufacturer’s instructions to carry out maintenance. - Keep track of tool inventory. - The measurement equipment is calibrated because it has a metrology laboratory. - They have mechanical and electrical tools; they are appropriate for machinery maintenance. 	<p>Opportunities</p> <ul style="list-style-type: none"> - Suppliers nationally and internationally. - Online technical assistance. - Acquisition of new equipment. - Certifications. - Alliance with suppliers. - Strategic location.

Table 3 Strategy matrix

Strategy SO	Strategy WO
<ul style="list-style-type: none"> - Generate a strategic certification plan. - Provider at national and international level. - Prompt resolution of machinery problems - It has highly qualified maintenance personnel. - Generate strategies through good treatment of suppliers. 	<ul style="list-style-type: none"> - Generate maintenance management system - There will be clarity in tasks and assignments - Generate plans and contracts with suppliers to purchase tools on credit, taking advantage of its strategic location
Strategy ST	Strategy WT
<ul style="list-style-type: none"> - Communication with the industrial park for water supply and theft prevention - Having an inventory control will avoid unnecessary purchases, anticipating increases in raw material costs. - Review of profiles and skills of new technical staff 	<ul style="list-style-type: none"> - Generating personnel training matrix, competent personnel are ensured according to maintenance procedures and policies - Promoting contingency plans to prevent lack of supply, transport logistics and theft - Supplier development, to have more purchase options - IATF certification for the implementation of quality, safety and maintenance systems.

From the Ishikawa diagram above, it can be concluded that the main causes are as follows:

Measurements

- Lack of parameter control

Materials

- Absence of documentation of critical refractions
- Lack of supplier list
- Lack of inventory control

Personal

- Deficiency in training documentation

Methods

- Documentation of processes

Machinery

- Lack of statistics of maintenance activities
- Lack of or work orders

This causes identified through diagram , should be taken as the points of improvement on which to base the proposal.

3. Elements of the Management System:

Seven requirements are established to identify some elements into management system to be developed, which have ISO 9001: 2015 as a reference; in order to lead the organization towards improved performance.

1. The organization context

The company determines the external and internal issues that are relevant to its purpose and its strategic direction, they must monitor and review the information.

2. Leadership

Top management must demonstrate leadership and commitment to the quality management system. It also ensures that the management systems, quality policy and

objectives are established and that they are compatible with the context and strategic direction.

3. Planning

When planning the management system, the organization should consider the issues referred to in the understanding of the organization and its content and the requirements of understanding the needs and expectations and determine the risks and opportunities that need to be addressed in order to:

Ensuring the management system to achieve its intended results; increase desirable effects, prevent or reduce unwanted effects and achieve improvement.

4. Support

Organization must determine and provide the necessary resources for the establishment, implementation, maintenance and continuous improvement of the quality management system. So it should consider:

- a) Capacities and limitations of existing internal resources;
- b) They need to be obtained from external providers.

5. Operation

The organization must plan, implement and control the processes and to meet the requirements products and services provisions

6. Performance evaluation

The organization must determine:

- a) Monitoring and measurement that required.
- b) Monitoring, measurement, analysis and evaluation methods must do necessary omit to ensure valid results.
- c) When to monitor and measure .
- d) When the monitoring and measurement results should be analyzed and evaluated. The organization must evaluate the performance and effectiveness of the quality



management system. The organization must retain the appropriate documented information as evidence of the results.

7. Improvement

The company must determine and select opportunities for improvement and implement any action necessary to meet customer requirements and increase customer satisfaction.

4. Conclusion:

This research to undertake the problems in the company case of study, as a result of the analysis was obtained that was that do not have with a management system appropriate in the maintenance area, making decisions made primarily on subjective aspect of management, without taking into account management indicators that allow controlling the growth and operation of the company.

The trend should be towards an increase in scheduled and preventive maintenance and decrease corrective maintenance, allowing the maintenance effort to decrease, optimizing the use of resources and achieving maximum effectiveness rates.

The maintenance management system was proposed with the support of standardization of the requirements of

ISO 9001: 2015 and IATF16949, by applying them to the problem, it can be corroborated that it is the most appropriate for its solution since it provides ordering to the processes for better management and focus of the same towards customer satisfaction.

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