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“DESIGN OF A QUALITY AND ENVIRONMENT MANAGEMENT SYSTEM”

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SUMMARY

One of the main sources of opportunity of the companies manufacturers, especially those that work for the automotive sector, are to upgrade their System of Administration of the Quality and to implant a System of Environmental Administration for to look for the certification, this is to adapt better to the demanding changes of the organizations of world class and to fulfill the requirements that their clients demand them. In this work we propose a model that Integrates the requirements of the norms ISO / TS 16949 and ISO 14001, giving place to the design of a new System of Administration of Quality and Environmental, therefore the execution of the requirements is carried out in a simultaneous way. When integrating the System of Administration of the Quality and the System of Environmental Administration is created as a unique system taking into accounts that the most important thing is the interrelations of its elements. Key words: Integral administration, systemic vision, ISO/TS 16949.

INTRODUCTION

The objective in this work is to create a model that Integrates the requirements of the norms ISO TS 16949 and ISO 14001, giving place to the design of a new System of Administration of Quality and Environmental, which serves from reference to companies that are devoted to the fabrication of exchange pieces (repairs) for the automotive industry, and that they search to obtain the certification of their company.

The case of a company manufacturer is analyzed, which was denoted by E.T., that it aspires to obtain the certification of its System of Administration of the Quality and Environmental.

To be able to reach these objectives, we Designed the System of Administration of Quality using the systemic thought and the focus of systems, restructuring the processes of the organization to improve their operation. The systemic thought gives us the vision of being able to see the simultaneous operation of four levels: events, behaviour rules, systems and mental models and to integrate them to form the design of the System of Administration of Quality and Environmental.

It is fundamental to establish a new concept of quality and to make it understand to the whole organization since any activity should be guided to fulfill this, For quality we understand the result of the efforts of the company, view like a system, to achieve the execution and to overcome the expectations from the clients to a reasonable cost, without deterioration of the ecological balance.

PROBLEMATIC

In this work we discover the reason that in the two year-old course (2002 and 2003) it has not been possible to carry out the certification, not even with the whole support of the high Direction.

The certification is demanded by organizations clients of Printings and Tubulars, this as a requirement to continue considering it as a reliable supplier.

OBJECTIVES

General objective

To create a model that integrates the requirements of the norms ISO / TS 16949 and ISO 14001 like base for the new System of Administration of Quality and Environmental.

Specific objectives

- To obtain a diagnosis of the existent problem inside the organization regarding the quality.
- To identify processes and their relevance to improve the operation of the company.
- To apply the systemic thought in the design of processes that they improve the quality and the environmental acting of the organization.
- The approaches where are integrated the norm ISO to settle down / TS 16949 and ISO 14001.
- To structure the documentation used in the System of Administration of Quality and Environmental.

CONCEPTUAL MARCO

At the present time the word quality has acquired great importance, thus, many countries have developed their successful economy thanks to it. The adoption of a System of Administration of the Quality should be a strategic decision of the organization. The design and the implementation of a SGC of an organization are influenced by different necessities, particular objectives, the given products, the used processes and the size and structure of the organization. An important option for to adopt a SGC in

the automotive field is the norm ISO / TS 16949:2002. In a same way the organizations of all class are more and more interested in to reach and to demonstrate a proper environmental acting, controlling the impact of their activities, products or services on the atmosphere, for this is important to adopt a System of Environmental Administration following the rules of the norm ISO 14001:1996.

The International Automotive Task Force or IATF were constituted by a group of automotive makers and their respective trade associations to obtain products of quality for the automotive industry at world level. The IATF created the norm ISO / TS 16949 which it was based on four international norms as they are the QS - 9000, AVSQ 94, EAQF 94 and VDA 6.1 that are norms used respectively by Italian, French and German American makers. The ISO / TS 16949 did not come to replace these norms unless the client requires it as in this case.

METHODOLOGY

The following methodology was developed Section of Studies of Posgrado and Investigation of the ESIME – Z, it is the sequential base that will be able to approach the source of opportunities that we face and this is represented in the figure 1.

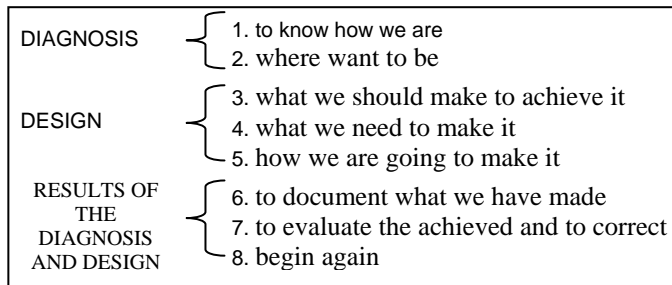


Figure 1. Methodology Used.

DIAGNOSIS.

TO KNOW HOW WE ARE

Under this normativity, (see figure 2), it is like the company works recently, it is the norm QS 9000. That it is derived of the ISO 9001:1994.

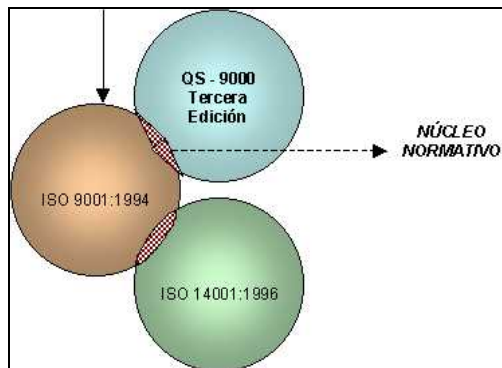


Figure 2. Current normative nucleus

Nowadays in the application of the norms exist an empty in the system, because the QS - 9000 cannot be paged directly with the norm ISO 14001:1996.

The organization has wanted to implant the norms ISO / TS 16949 and ISO 14001 for separated, created manuals and procedures in an individual way for each system, carrying out the transition in a complex way. In the figure 3 the diagram of processes is shown, representing the interaction of the most important processes and how the organization works.

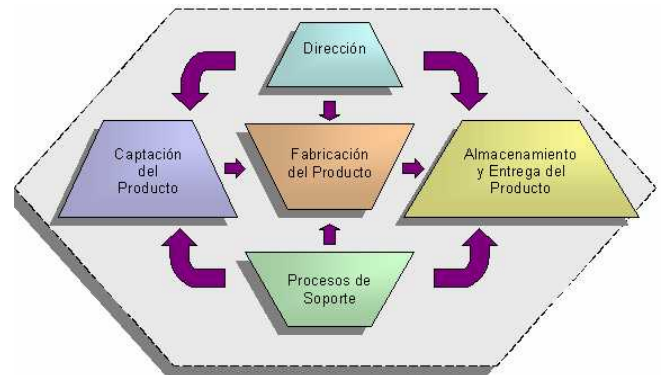


Figure3. Processes Model of ET.

Rain of Ideas

With the group presented in the table 1, we began the diagnosis; these people were gathered to work in a session of 4 hours about the existent problem inside the organization.

No. OF People	Departament	Names
2	Tubería	Esquivel romo Martín Sánchez Martínez Martha
2	Troquelado	Martínez Altamirano Hugo Ramírez Pérez salvador
2	Galvanizado	Espindola Munguia Martín Morales Ramírez Elias
2	M. de Herramientales	Chavero Nieves Rodolfo Díaz Pérez Juan

Table 1. Personnel used in the Diagnosis.

The idea central or motivational generated under consent to begin the work in group was a question realized in the following way:

Why is difficult the development and implantation in a System of Administration of the Quality?

In a session of a rain of ideas and their answers were the following:

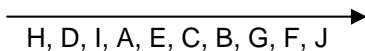
- A. Lack of commitment on the part of the managements
- B. Lack of commitment on the part of the workers.
- C. Delay in the information to the operative.
- D. Training lack on the system and applied normativities.
- E. Little knowledge of the existent documents.

- F. Lack of audits to the system of quality and environmental.
- G. Setbacks to carry out the maintenance.
- H. Lack of installation of the system in all the areas.
- I. Lack of reduction of pollutants and financial investment for the environmental system
- J. Lack of working tools for the toolbox production

Comparison for Pairs

This technique consists on to compare one by one the alternatives and to give them a specific value using a preference qualification. The obtained results are the following ones:

The classification is in the following way:



The activity easier of solving and that it does not influence in a significant way in the acting of the installation of the new system it is the letter J.

. Lack of working tools for the toolbox production.

On the other hand we can observe that the two more important activities that influence directly in the acting of the installation are respectively D and H:

. Training lack in the system and the applied normativities.

. Lack of installation of the system in all the areas.

Statistical techniques

The use of statistical techniques is indispensable to quantify any activity or process and to obtain information starting from a series of data.

Percentages of the Surveys Percentage average

	Porcentajes de las Encuestas						Porcentaje promedio		
A	10.08	10.37	11.30	8.69	10.78	13.33	11.32	9.70	10.69
B	5.04	9.43	9.32	5.43	11.76	6.66	12.26	6.79	8.33
C	5.88	8.49	7.82	10.86	6.86	9.52	10.37	7.76	8.44
D	19.32	17.92	15.62	18.47	11.76	13.33	16.03	16.50	16.11
E	8.40	13.20	11.30	7.60	8.82	6.66	8.49	6.79	8.90
F	10.92	7.54	6.08	5.43	0.98	0.95	4.71	13.59	6.27
G	7.56	2.83	2.54	8.69	8.82	10.47	2.83	7.76	6.43
H	18.48	16.98	16.94	20.65	17.64	16.19	20.75	17.47	18.13
I	13.44	12.26	9.56	9.78	13.72	16.19	12.26	12.62	12.47
J	0.84	0.94	0.86	4.34	13.72	6.66	0.94	0.97	3.65

Table 2. Extracted averages of the tests comparison for qualified pairs.

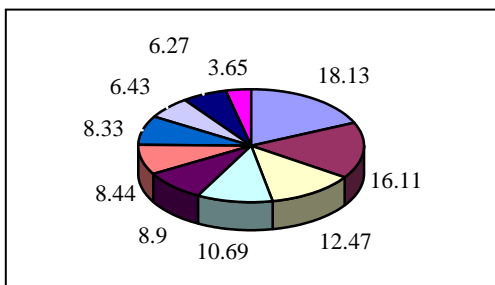


Figure 4. Graph of the obtained percentages

WHERE WANT TO BE

The objective of the organization is to reach the certification in ISO / TS 16949 and ISO 14001 at the same time.

The certification of the SGC in conformity with the norm ISO / TS 16949, it will allow to demonstrate that the organization has procedures that it helps to operate efficiently to reach its strategic objectives of quality. Being focused mainly to the satisfaction of the client, through the continuous improvement, independently of the products or services that are offered. On the other hand the organization has a certification of its SAA according with the norm ISO 14001, helped it to offer trust as much to its clients as to the society that its company has opted to make patent its environmental commitment of to prevent the contamination and to reduce the costs for its control.

In the figure 5, it shows a robust Integral Model of Administration, supported by the norms ISO/TS 16949 and ISO 14000, to achieve the Continuous Improvement of the quality, the productivity and the environmental acting of a feeder organization of automotive parts.

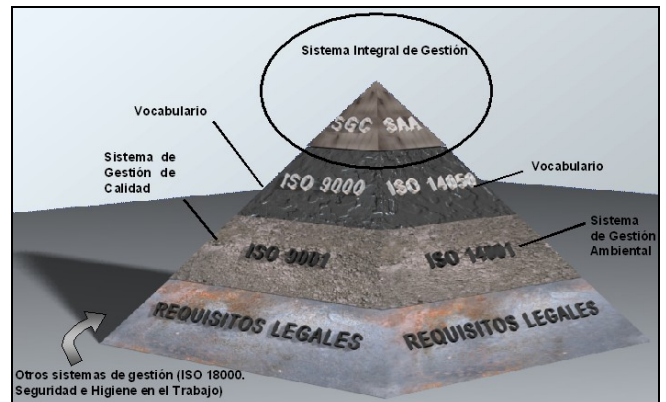


Figure 5: Integral Administration System.

In the figure 6, the evolution of the ISO 9001 and the normative nucleus formed by ISO is observed / TS 16949 and ISO 14001 that it gives the origin to a new System of Administration of Quality and Environmental, these norms manage a similar outline, which can be integrated and to give execution to their requirements in a simultaneous way, and on the other hand the norm ISO 19011 that it marks the guidelines to carry out audits of quality and environmental to be able to autoevaluate the system before a certification audit.

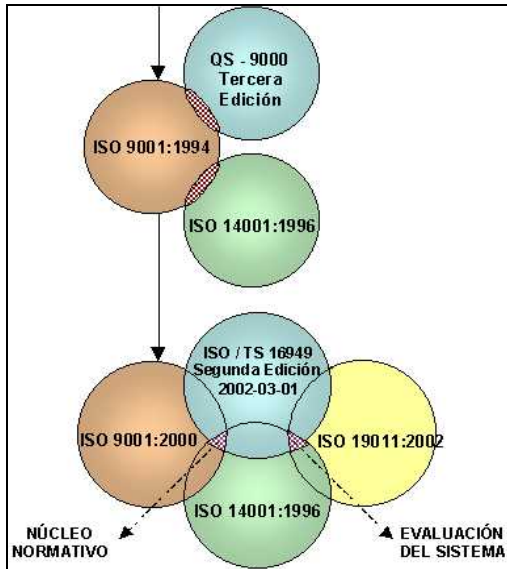


Figure 6. Integrated Normativity Model.

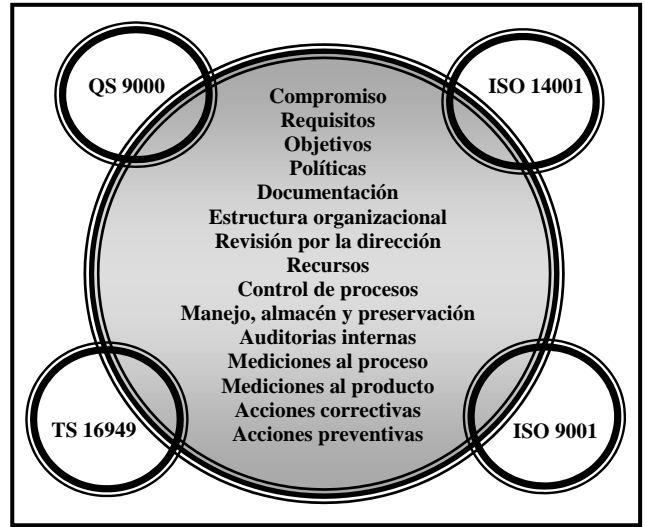


Figure 8, Approaches for the Integral Administration System

DESIGN

WHAT WE SHOULD MAKE TO ACHIEVE IT

Being based on the Principles of Administration of the Quality, the Robust Model of the Integral System has been designed for this organization. This model is presented in the figure 7.



Figure 7. Model of Integral Administration System of ET

The approaches that support the integral system of administration have been obtained of the analysis of the activities key in each one of the productive processes of the organization under study.

Therefore we make a comparison of the proposed models in the norms ISO 14001e ISO / TS 16949.

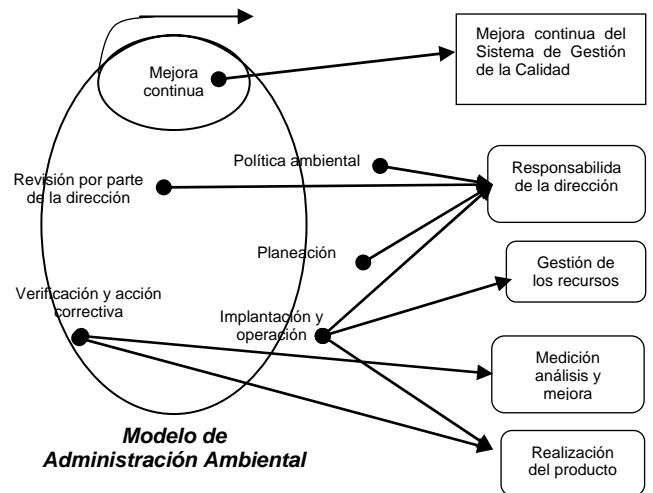


Figure 9. Model of Environmental Administration System and the four fundamental points of the norm ISO / TS 16949.

In the figure 9. We show how the fundamental points of the ISO / TS 16949 can absorb to the points of the ISO 14001 without to alter the structure of the models and to give the origin to a new that completes with the requirements of both norms. We take as a base for the new System of Administration of the Quality and Environmental the following model that it was extracted originally of the norm ISO 9001:2000 (figure 10).

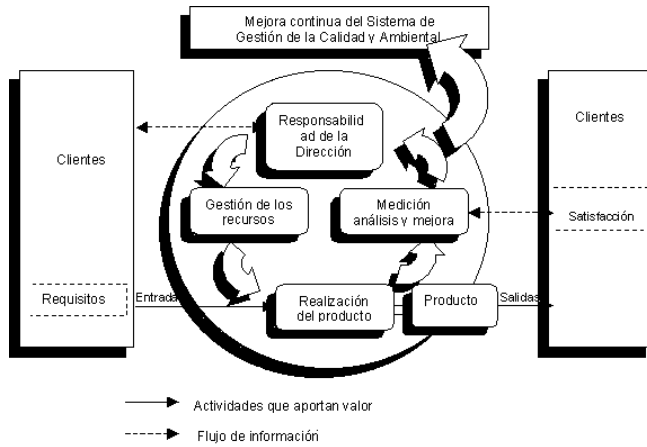


Figure 10. Model of an Administration System of the Quality and Environmental based on processes.

The points of the norms can combine and to intertwine, these take us to the creation of a manual that integrates the requirements of both and it can be taken in a simultaneous way as a single system, figure 11.

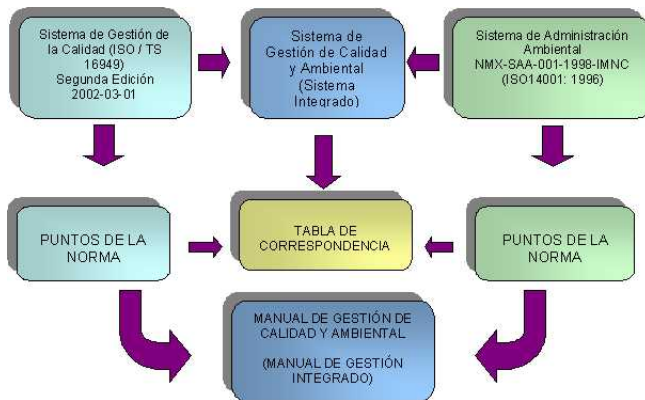


Figure 11. Model of integration of the requirements of the Administration of the Quality and Environmental System (Integrated Manual of Administration)

It is carried out an analysis of the relationship that have the processes, with the purpose of taking a restructuring of the processes so the flow of information is more effective and chord with the new System of Administration of Quality and Environmental.

WHAT WE NEED TO MAKE IT

a) To integrate the requirements of the ISO / TS 16949 Second Edition 2002-03-01 and the ISO 14001:1996.

For these we developed a chart of correspondence where we integrate the common approaches of both norms. This chart of correspondence was included in the Integrated Manual of Administration

b) To restructure processes.

We elaborated an interaction diagram among more complete processes, which is shown in the figure 12 that it

describes the reality of the company, this is, how the processes are carried out that integrate the System of Administration of the Quality and Environmental, so that you can take a control of the receipts and departures to be able to carry out the pursuit, measurement and analysis of the same ones.

This interaction among processes is requested inside the documentation corresponding to the Integrated Manual of Administration.

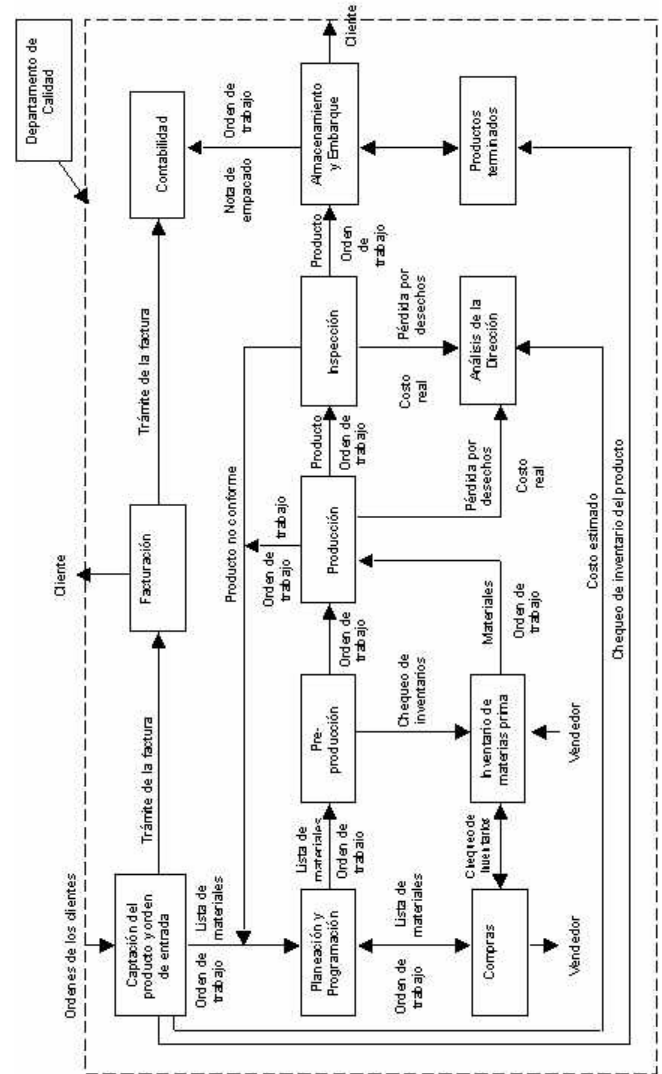


Figure 12. Diagram of iteration among processes.

In the diagram of the figure 13 can observe the production department and how it is taken in four different areas, the identification of environmental aspects, is indispensable to determine that so significant it is for the environment and this way to be able to determine the appropriate control. Some the detected environmental aspects are:

- . Manage and storage of dangerous substances.
- . Manage and storage of dangerous residuals.
- . Manage and storage of metallic waste.
- . Manage and storage of metallic fins.
- . Emission of gases to the atmosphere.
- . Manage of soluble

- . Escape of wear out oils.
- . Muds.

For these pollutants there are applicable legal requirements to the organization, they have to complete and they are divided in:

1. Air.
2. State and municipal air.
3. Federal Water.
4. State and municipal water.
5. Impact environmental.
6. Dangerous residuals.
7. Floor.

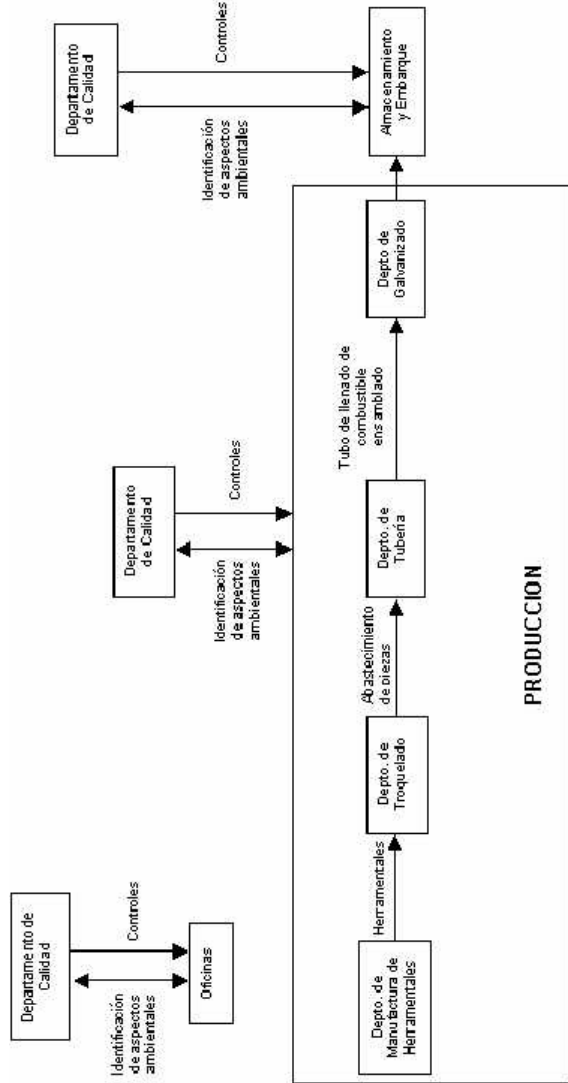


Figure 13. Production Department and identification of environmental aspects.

c) Organizational Restructuring

We intend a new flowchart included in the Integrated Manual of Administration, which makes that the organization has a better acting besides including a department of having galvanized that it did not take previously into account but it existed. Proposing a new flowchart takes us to elaborate a matrix of responsibilities where each person carries out his roll inside the organization carrying out his tasks of quality and

environmental being owners of his process, this is also included in the Integrated Manual of Administration.

HOW WE ARE GOING TO MAKE IT

It is acceptable to think that the opportunity areas can improve being based on the technology and their human resources; they can be carried out activities:

a) Qualifying the personnel in topics of:

- 1) Introduction to the Company
- 2) Formation of Competitive Operators.
- 3) System TS / 16949 and ISO 14001
- 4) Documentation in the Company
- 5) Statistical control
- 6) Measuring instruments

b) Implementing the required documentation for the System of Administration of Quality and Environmental.

The existent documentation is implemented that is shown in the figure 14, in each one of the workspaces.

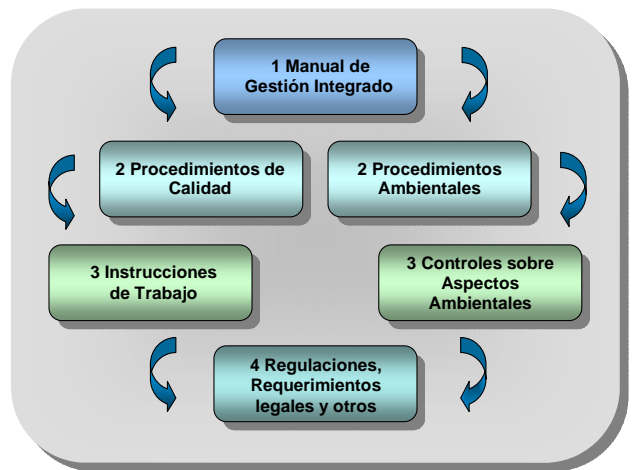


Figure 14. Model of required documentation for the integration systems.

c) Creating expedites communication channels.

To improve the communication we designed a procedure of internal and external communication that establishes the form of how the information is transmitted, what type is, besides the evidence type that it keeps as a registration, this is with the purpose of assisting the correct flow of information related to the System of Administration of the quality and Environmental inside the organization.

RESULTS OF THE DIAGNOSIS AND DESIGN.

TO DOCUMENT WHAT WE HAVE MADE

We can mention that the gathered documentation and elaborated are the structural base of the Integrated System. The documents are:

. Manual of Administration of Quality and Environmental (Integrated Manual)

- . Procedures
- . Registrations
- . Working instructions and operation
- . Identification of Environmental Aspects
- . Regulations and legal requirements
- . Chart of correspondence
- . Mental maps
- . Matrix of responsibility
- . Organizational structures
- . Charts of data, etc.

In the Manual of Administration of Quality and Environmental the reach of the System settles down, that it refers to the procedures settled down by the same system and a description of the interaction among the processes that integrate the organization. The politicians and objectives of quality are declared and environmental. In this manual the requirements that are similar in the norms ISO TS 16949 and ISO 14001 are identified and contained by a rectangle and it refers the point of the norm of quality and environmental that correspond it.

The procedures of quality and environmental settle down how they should be carried out in specific form the activities and what kind of registration you should use in each one of the cases. The procedures of quality that are declared as obligatory in the norm ISO / TS 16949, and that they also apply to the environmental question and are the following ones:

- . Control of the Documents and External Data
- . Control of the Registrations of Quality and Environmental
- . Formation of Personnel
- . Internal audits of Quality
- . Corrective action
- . Preventive action

Also, we make procedures that only are applied to the environmental system and they are:

- . Identification of environmental aspects
- . Identification of legal requirements
- . Environmental revision of projects
- . Preparation and answer to emergencies
- . Control about contractors

The working instructions are a group of orderly steps that they should be carried out an activity not altering their sequence, they put on in a visual way in the workspace or near to a machine.

The Identification of Environmental Aspects is an activity that correspond the Managers of each area.

For the regulations and their requirements are permissions that should be sent by the municipality or town where the company is fulfilling with settled down by the authorities they are declared in the present regulation Law of the dispositions of the Political Constitution of the Mexican United States that they refer to the preservation and restoration of the ecological balance, as well as the protection to the atmosphere in the national territory.

TO EVALUATE THE ACHIEVED AND TO CORRECT

The evaluation and acting of the System of Administration of Quality and Environmental it is carried out by audits, according to the approaches settled down by the organization, the integrated system is implemented and maintained, here is where the norm enters ISO 19011:2002 which shows the approaches to make audits of quality and environmental. This norm is applicable to all the organizations.

The program of audits proposes two internal audits for year and external audits when the client asks.

. Internal audits. Denominated in some cases like audits of first part, they are carried out by the same organization, for the revision for the direction and other internal objectives.

. External audits. These include that is generally denominated audits of second and third part. The second part audits are carried out for the clients' interest. The third part audits carry out for independent organizations and external audits, which provide the registration or the certification of agreement conformity with the requirements of the norms ISO 9001 and ISO 14001 or their equivalent in Mexico.

The auditors are commissioned for evaluating the system and they are qualified and competent.

BEGIN AGAIN

Once carried out the internal audits, in they will show the opportunity areas that are susceptible of improvement and to be able to carry out arrangements in the processes by corrective actions. Beginning again implies the construction or improvement of some aspects that do not fulfill the normativity requirements used in the Administration of Quality and Environmental System or they are susceptible to be improved.

CONCLUSIONS

The importance of this work results in the improvement of fulfilment of the organizations, desirering or not to certify their Systems, increasing their competitiveness in the national and global markets.

Likewise, the Focus of Systems makes that the elements that form the functional structure of the company operate in an Integral way, to achieve the common objectives outlined by the guidelines of the organization and the taking of decisions involves at all the hierarchical levels, therefore all of they define the direction of the organization and not a unite minority that only looks for personal interests.

It is important and indispensable the whole training that the personnel receive, but anything serves to the company if the high Management does not participate openly in the plans and designed programs for the attainment of the established objectives for the organization.

The organization should improve the effectiveness of the Integral Administration System throughout of observing the quality's politic, the objectives of quality, the results of the audits, the analysis of data, the preventive and corrective actions, as well as the revisions on the part of the Direction.

It is important for all those that are involved in the process of improvement, to know the advance for the consecution of the established goals. This is achieved by the correct diffusion of all these achievements, all those involved in the process, unifying capabilities and forces, they will investigate how they can support to the processes that are difficult to fulfil with the quality engagement.

The gradual of the Integral System of Administration, it has allowed to the organization to obtain appraisable results, such as: improvement in the production, productivity, managerial quality and quality in the work, reduction of waste and reworks, decrease of the operative costs and production, also achieving, in simultaneous way, a proper environmental acting, this is, increasing its productivity.

A good beginning for the implantation of the Integral Administration System, resides in the grade of acceptance that the company has of it, for this effect, the company must sensitive the personnel respecting the benefits of the system, due to the incredulity or indifference for lack of knowledge or convincing, they can become an obstacle in the installation of the System.

The satisfaction of the clients and the protection of the environment, it must be the reflection of the Integral System of Administration. To achieve this is not easy; it requires an initial effort of everybody, but fundamentally of the directive squares who should assume the leadership in the road toward the quality so that this ends up becoming the form of being of the company, otherwise, to transform the philosophy of the organization toward the Integral Quality.

RECOMMENDATIONS

Therewith we arrive at the end of the work hoping the presented information there was been of interest and a great help for future works that have something to do with quality norms, environmental administration and integration of systems, we recommend to investigate what norms are those that remain effective, because this work was carried out in 2003, and based on the ISO / TS 16949:2002 and ISO 14001:1996, which can change with the time and to become in obsolete.

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