MAINTENANCE CONCEPTION AND ITS RELATIONSHIP WITH THE INDUSTRIAL MAINTENANCE MANAGEMENT

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Abstract: *A synthesis of the main forms for the maintenance conception appears in this paper and their characteristics, conditioners for their application, management tools for their development and the relation with the industrial management maintenance are analyzed, all this within the businesses framework objectives for the manufacturing company. The different conceptions including in this study have the purpose of giving to the maintenance analyst a complete vision of the characteristics, objectives, potentialities and the requirements for the implementation of each one of them, with the purpose that the conception selection is informed. For the analyst these conceptions are documented, and its decision will be oriented to define one of them, according to an evaluation of their implementation capacities, are adapted to solve the problem of the maintenance management having in mind the company objective. The most frequent approach to increase the efficiency of the maintenance function is to implement some technique or maintenance conception more disclosed. This includes conceptions like RCM (reliability centered maintenance), TPM (total productive maintenance), or tools like CMB (condition based maintenance), CMMS (computational maintenance management systems) among others. All these techniques will contribute, any form, for the success of the maintenanace organization, but, the accidental or improvised form in which they are introduced it can not be in the optimization of his application.*

Key words: maintenance management, maintenance conception, MCC, TPM, ILS.

1. INTRODUCTION

In this time of fast changes the companies must be looking for by new scenes, new competitors, constant changes in the requirements, changes in the businesses tendencies, innovating technologies, increase of the systems complexity, greater environmental exigencies, among others. All these challenges must be faced by the organization like a whole and with all their resources, that is, nobody and no administrative and productive function can have stay at margin or indifferent, without delivering their better effort, since altogether must deliver the products or services in the indicated time, with the right quality and the projected amount. In other words, it's being spoken of productive system dependability, equipment availability, high maintainability and personnel and environment security.

This subject reflects the maintenance importance in the company's strategic structure and recently it's being boarded by several investigators, who are unanimous for to emphasize the importance that the maintenance function must to have for to reach a suitable positioning in the set of competing companies. Swanson (2001) indicates that more and more companies, for to reach the "World-Class Performance", they are demanding great efforts for to improve the quality, the productivity and to reduce costs, and this way, in a no avoidable form, cross by an effective maintenance.

The maintenance potential impact, at the level of operations and logistic (flexibility, supplying time, quality, etc.), it's significant and, in addition to that, the maintenance implications in the financial area is appreciable. The recognition of the maintenance activity as a potential gains generator it's a recent development since now it's relevant and it must be optimized (Waeyenbergh *et al.*, 2002).

2. THE CONTEXT OF THIS PAPER

It's widely recognized that the maintenance function contributes with profit to the productive organization, when it's making in a suitable form, that is, when their objectives are defined in agreement with the organization business. The companies are discovering the importance of a maintenance structured plan for the equipment by means of the application of the dependability concepts. But, it still exist companies experimenting "homemade solutions" or placing internal equipment to carry out studies, helped by consultants with low level of experience in maintenance applications or few management knowledge applied in maintenance function. The guidelines that the companies adopt to be competitive, in general, vertically cross all the levels in the organization and each level must define its actions to obtain the goal that is fixed by the company. It's perceived then that is necessary to have a methodology and appropriate knowledge to define the maintenance conception for this way to manage the existing resources for to respond to the production requirements.

The most frequent approach to increase the efficiency of the maintenance function is to implement some technique or maintenance conception very disclosed. This includes conceptions like RCM (reliability centered maintenance), TPM (total productive maintenance), or tools like CBM (condition based maintenance), CMMS (computer maintenance management) among others. All these techniques will contribute, of some form, for the success of the maintenance organization, but, the accidental or improvised form in which they are introduced it cannot be in the optimization of his application (Coetzee, 1999). In fig. 1 is described the context in which the team in charge of the maintenance function must develop his task of defining how is the more suitable maintenance conception, for the own characteristics of his company and the environment in which it is developed.

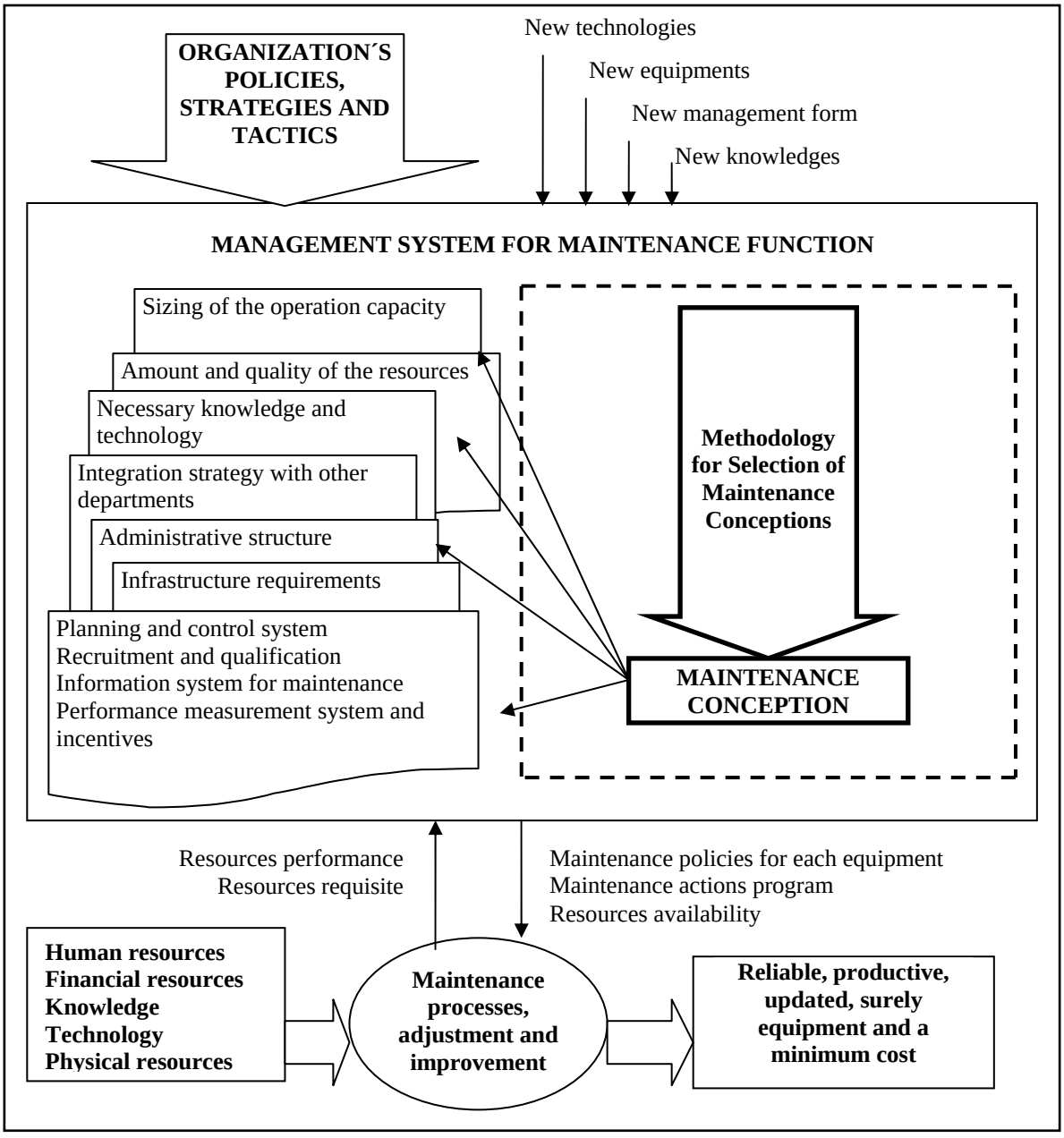

Fig. 1 Knowledge organization for definition of the best management system for the maintenance

The objective is to present the different maintenance conceptions, which have been developed for different applications in the industry, with the purpose that the maintenance administrator can know the individual characteristics of each conception and in this form to select the one that it's more adapted to their requirements, or, to select the tools that each conception proposes, to adapt them to its reality and to generate the necessary administrative structure and thus, to give the service in the way that is request for.

The selection of a maintenance conception must be support in the objectives definition raised for the maintenance function which are derived and made compatible with the strategic company's goals, in the first place, and in the capacity to take care of the market requirements by mean of the machineries park, of the administrative system and the worker's participation in the conception implementation.

Kononen (2002) and Verma (2002) emphasize the fact that the maintenance is a combination of defined technical actions from a maintenance conception, administrative actions and management during the machine service life in the intention to maintain or to return it to the state where it can doing his function. They give special emphasis to the management condition and they indicate that the high efficiency is obtained by means of three attributes: high reliability, high maintainability and efficient sustainability, parameters to be monitored continuously.

The maintenance function must have a vision, a mission and a defined goal, that is, how that the maintenance function wants to be in the future within the organization, which is the basic necessity that the function tries to replace and, finally, which are the real or self-imposed limitations for the function performance.

The maintenance conception refers about, in essence, to have defined objectives, administrative delineation and procedures for to face and to manage the maintenance tasks that they indicate for to obtain the best performance for the equipment and resources defined for maintenance activities (Gits, 1992). The central subject is related to the volume, amount, complexity and equipment interrelations that must be taken care of. Thus, for unique equipment and a certain necessity, a sophisticated strategy is not necessary to maintain the equipment in operation by the life cycle utility and whose concept was defined in its project, which is known by the user.

The maintenance conception definition reflects that the company hopes of the maintenance function to accompany the attainment of the company's business objectives. The conception's definition is only a small part of all the process of maintenance management.

The task of the maintenance management doesn't finish in the conception definition; this is only the first stage of the process. The management mainly refers about to the set of actions, decisions and definitions about must have, to use, to do, to coordinate and to control for management the resources given to the maintenance function and giving therefore the services that are waited for the function.

The elements that must be taken care of in the maintenance strategy elaboration are: the operation capacity, the resource amount and its availability, necessary knowledge and technology and integration with other company's organizational levels. In addition to the physical and administrative infrastructure elements, you must consider the planning control system, personnel recruitment and qualification, among other so many necessary elements for a good management.

In the selection of the maintenance conception, between the most outstanding aspects it's possible to be considered:

1. Aspects related to the equipment park where the utility life cycle of the company's equipment, in relation to the product evolution that is being given to the market, fixes the limit of time for the conception application.
2. Aspects related to the organization maturity, since the human factor and the organization culture have an important influence for the development and success at the moment for undertaking actions to change to form to make the management.
3. Aspects related to the different maintenance conceptions already defined by diverse authors, that is, it is necessary to include like a stage in his selection the measurement of the preparation level of the present maintenance function for the implementation of these methodologies and then to avoid an incorrect application in reference to the company´s business objectives.
4. Aspects related to the investment of economic resources. This aspect is destined to give information the investment volume and the actions that are necessary to planning for to obtain the total implementation of the conception.

There is an agreement between diverse authors that the engineering and the maintenance management are receiving more and more attention, especially by the necessity to obtain from the high cost equipment a high productivity, and also influencing strongly, by means of an effective maintenance, in the competitive differential of its products. But, the attention that receives the maintenance function is, frequently, result of detached activities without a suitable integration between the varied technical used (Coetzee, 1999). In this sense Coetzee (1999), Waeyenbergh and Pintelon (2002) emphasize that the correct form to give a direction to the necessities for an effective maintenance function within the organization is having a holistic vision for the function. Another point with emphasizes is that to reach a real improvement, exists the necessity to integrate completely the maintenance in the system of the company's businesses (Gits, 1992), specially using information technologies and formulating a conception with theoretical verified support (1996, Pun *et al*., Sherwin, 2000; Vatn *et al.*, 2002; Zhu *et al.*, 2002). In addition to this, the varied methodologies, philosophies and techniques appropriately used and coordinated, the effect it's a successful improvement of the maintenance function.

3. MAINTENANCE CONCEPTION FOR AN INDUSTRIAL SYSTEM

When the maintenance conception it's defined the maintenance management form more adapted for the group of company's assets and the administrative structure under which those actions will be lead, executed and controlled. The conception must be thought in a holistic form (Waeyenbergh *et al*., 2002) since its definition influences, not only in the maintenance activities and their execution, in the coordination, logistical support and data summary, but that also in all the other productive and administrative activities that are present in the organization.

The maintenance conception development for each organization is associated to the information quality that the company has on aspects related to maintenance actions, associated inventories management and costs, in addition to the

knowledge level, personnel experience and commitment with the conception development. This last one requires much taken care of for the analysis of the entrance criteria under which it will be developed, the decision on the types of maintenance to use and the total delivery of "know-how" of each worker, thus to decide on the maintenance form that will be used.

The maintenance conception is materialized in the form of an action´s maintenance plan and this it will be developed from criteria that will be used for their elaboration. This plan, jointly with the management system, is own of each company, because to be successful this it must include, in addition to the technical knowledge, all the administration capacities for the personnel integration, equipment, times and methods in a good project of the maintenance conception.

In order to define the conception one is due to analyze the system operational requirements, the minimum times of operation per period, the maximum time for repairs, the equipment that are more critical, his technological level, personnel capacity required, risk associated to his operation, costs considered for the repair and production loss, jointly with the objective of the company's business and the form as this one appears in face to the client.

The methodology of Reliability Centered Maintenance (RCM), Total Productive Maintenance (TPM), Business Centered Maintenance (BCM) or others can be adopted. Each one of them presents greater or smaller emphasis in some aspects that make the methodology more applicable, within a scope of technical, economic viability and human resource availability.

4. MAIN MAINTENANCE CONCEPTIONS: STATE-OF-THE-ART

The maintenance actions are used to control the faults and to reestablish the equipment in fault to their operational state, of preference, "as good as new". The most important decisions that they are due to take in the maintenance administration they are referred with the subject related to which items must be put under maintenance, that type must be made and when the actions must be executed.

The maintenance conception is manifested like a set of actions necessary to develop the specific maintenance policies in a production organization, which makes relevant to have a defined objective. It's the customized form as the organization thinks on the maintenance paper (function to fulfill), sight like an operational function. Thus, the maintenance conception is translated in a set of several forms of interventions (corrective, preventive, symptomatic, etc.) and of the general structure, in which those interventions will be made (Waeyenbergh, 2005).

In a maintenance conception, it's reflected the emphasis and the perception that the company has on the paper of the maintenance function. For example, if the company decides to integrate the operators in the maintenance equipment to increase the quality registers, it will try to adapt the Total Productive Maintenance conception. Other than more is focused in the maintenance costs control for the service life of a certain product, will decide for the conception supported in the service life cost.

Diverse boarding's maintenance conception have been proposed and each one of them with different degrees from success or failure in their applications. The conceptions more published and used in the companies are: Reliability Centered Maintenance – RCM, Total Productive Maintenance – TPM, Risk Based Maintenance – RBM, Advanced Tero-Tecnology, Strategic Maintenance Conception - SMC, Business Centered Maintenance – BCM, Integrated Logistic Support/Logistic Support Analysis – ILS/LSA and Total Quality Maintenance – TQMain, those that will be summarized in Table 1 showing their main characteristics.

Table 1: Summary of the main maintenance conceptions

	Objetive	**Characteristics**	**Procedure**
Advanced Tero–technology (Sherwin, 2000)	To create a combination of administrative system and communication channels which provide support for the maintenance.	It's a combination of management knowledge, finances, engineering, project, construction and other applied practices to physical assets in the search of an economic service life. It includes: to have assets with maintainability and reliability; application of the best technologies; assets with operability characteristics; use of operative techniques to reduce the shutdowns and to improve the cares of the assets; costs control and monitoring and information of retro feeding; programs of selection and training for the workers.	- To make FMECA analysis. - To make the equipment project. - To define the engineering and economic specifications. - Equipment acquisition, to test, to analyze and to define the equipment installation. - Tests, fits and to receive in conformity. - Training, operators' qualification and maintenance personnel. - Operation and maintenance. - Substitution.

Table 1 (cont.): Summary of the main maintenance conceptions

	Objetive	**Characteristics**	**Procedure**
Reliability Centered Maintenance – RCM (Fleming *et al.* 1997; Carretero *et al*, 2000)	The main objective of RCM is to reduce the maintenance cost, centering the atention in the most important functions of the system and avoiding or removing maintenance actions that are not absolutely necessary. If a maintenance program already exists, the result of the RCM analysis will eliminate inefficient tasks of the preventive maintenance.	In essence, RCM can be presented in a simple form focusing their four elements: - Preservation of the system function; - Identification of the functional faults and the dominant ways of fault; - To give priority at the functional faults in agreement with its consequences; and - Selection of the applicable maintenance tasks and cost - efficiency favorable, by means of a decision diagram.	- Identification of the systems for analysis RCM. - Identification of the functions for each system. - Selection of the systems and subsystems. - Identification of the functional system faults and its level of critically. - Identification and analyses of items that need preventive maintenance. - Selection of the maintenance tasks. - Initial program of maintenance: tasks and intervals. - Implementation and development of the maintenance program.
Total Productive Maintenance - TPM (Tsuchiya, 1992)	This maintenance conception has like primary target the accomplishment of the maintenance equipment with the participation of the production personnel, within a process of continuous improvement and a management of total quality. It considers that does not exist anybody best one than the operator for to know the operation the equipment that is trusted to him.	The main goal of TPM is zero fails and, to obtain it, the specific objectives that must be reached are: elimination of the great losses (stopped by fault, preparation and adjustments, reduction of the production rate, idleness and interruptions, defects and re-work and begin losses), autonomous maintenance; planned maintenance; education and training. One of the most important tools is the Overall Equipment Effectiveness - OEE - which is compound of three parameters that have a relevant role in philosophy TPM: availability of the equipment, the rate of production or efficiency and the product quality.	- Equipment improvements: optimal conditions, reduction of the six great losses. - Ambient, security and hygiene: policies of risks prevention. - Projects of maintenance /cost of the service life: viability of equipment substitution. - Administrative control: implementation of the 5S method - Preventive maintenance: definition of maintenance task, control of inventories and lubrication. - Autonomous maintenance: conscience of the equipment care. - Maintenance of the quality: evaluation of the equipment effect in the quality, monitoring. - Training and qualification: determination and planning of the improvement activities.
Strategic Maintenance Conception – SMC (Murthy *et al.*, 2002)	Strategically to integrate the maintenance conception with other areas of the company based on models for the decision making.	In SMC conception the maintenance is a multidisciplinary activity that it involves the scientific knowledge of the mechanisms degradation. This knowledge based on the analysis of the recollected data in the company evaluates the equipment state, constructs quantitative models for the prediction of the different impacts from the actions (from maintenance and operation) in the equipment degradation and administers the maintenance from a strategic perspective.	-Total knowledge of the equipment. - Planning, of optimized form, the maintenance actions, which implies: to collect and to analyze the relevant data to evaluate the state of the equipment; to construct models to predict the consequences of the maintenance actions and the operation loads and to decide the best actions of maintenance. - Implementation of the actions that optimize the maintenance.

Table 1 (cont.): Summary of the main maintenance conceptions

	Objetive	Characteristics	Procedure
Risk Based Maintenance - RBM (Khan, 2003)	To determine a maintenance plan that it tries to diminish the level of the resulting risk of a fault in the system	In this case the maintenance is based on the risk of an accident and is centered in the search for the reduction of the global risk in productive equipment. In the areas where the risk is high or average the major maintenance is concentrated and in areas with a smaller risk the efforts of the maintenance are smaller with the purpose of diminishing them work and the costs of the maintenance program in a structured and justified form	- Risk determination: scene description, consequences evaluation, probabilities analysis for the occurrence of the faults and risk estimation. - Risk evaluation: to define a criterion so that the risk level is acceptable for each system in study according to their nature and type, and to compare the risk considered with a level defined as acceptable and, thus, defining the maintenance priorities. - Maintenance planning considering the risk factors: optimal interval estimations for the maintenances and a re-estimation and re-evaluation of the risk.
Total Quality Maintenance - TQMain (Sherwin, 2000; Al-Najjar, 1996)	To implement techniques of maintenance supported in the condition, as the analysis of the vibrations to improve the maintenance policies after of each retirement of the part affected by means of the confrontation with the stored historical data on product quality.	In this conception it's considered the equipment and all essential elements that constitute the manufacture process such as the production operations, environmental conditions, quality control, workers, methods and materials. It is based on the intensive use of data and their analysis to detect the causes of each deviation in the product quality and the operation condition of the equipment and monitoring the defect evolution (damage) in the first stages for to increase the equipment life average.	- To define the product characteristics. - To obtain control data chart, limits, deviations, process capacity, normality and attributables causes. - To identify and to analyze the causes behind the deflections. - To classify the elements of the process those are responsible for the deviations. - To determine the best combination of the process elements. - Adjustments of the process elements.
Business Centered Maintenance – BCM (Waeyenbergh, 2002)	To identify the business objectives and these are transferred towards the objectives of the maintenance management. The central axis is put in the guidelines that the maintenance must be visualized like a center of benefits and not like a center of costs.	This conception requires for its development a great amount of information on the production process, production plan, sales predictions, projected service load, product service life and the equipment, waited reliability for the technical system, among other information. The total of the equipment it is divide in multiple production units and each one of them with an own maintenance policy, being similar to the units of businesses, all interconnected.	- To define the company's business objectives. - To make compatible and to internalize. - To define the maintenance objectives. - To identify the critical functional groups and the profile of the productive process. - To divide each functional group in items that needs maintenance. - To determine and to order the maintenance procedures. - To establish methods and times for the defined maintenance works. - To establish a program for the maintenance in line, outside program of production and general shutdowns. - To establish guides for the corrective maintenance.

Table 1 (cont.): Summary of the main maintenance conceptions

	Objective	Characteristics	Procedure
Integrated Logistic Support/Logistic Support Analysis - ILS/LSA (Waeyenberg, 2002)	The main objective of ILS is to assure the integration of varied support elements (resources and personnel, qualification, pieces and parts, tests and support equipment, facilities for the maintenance, transport and computer handling, resources and engineering data). LSA is an analytical process to identify and to evaluate the logistics of support of a new system.	ILS is an administrative function that gives the initial planning, supports and control to assure that the user will receive a system that will obtain its performance requirements, and also could be maintained in economic and expeditious form throughout his economic service life. ILS/LSA analysis is appropriate to investigate the alternatives of strategies for maintenance. Such decisions would have to be influenced by the information of retro feeding of the project, performance and costs that come from the complete life cycle of all the installation.	- Problem definition and identification of the alternatives. - Preparation of the hierarchies costs structure. - Collects cost data and performance; acquisition cost for the product or item; product distribution; operation datas; training; inventories; product discarding; update of the data engineering and maintenance costs. - Calculation of the service life cost. - To compare options and to make a ranking. - To carry out an analysis of scenes and sensitivity. - Investigation of the costs restrictions. - To make the adjustments.

5. EXPERIENCES IN THE APPLICATION OF CONCEPTIONS

Varied studies on the implementation and application of the different maintenance conceptions they indicate improvements in the maintenance management, some of them more successful than others, nevertheless all the forms contribute in the attainment of the objectives proposed for the maintenance. This point is important because the fact to have a conception helps the efforts enormously to introduce improvements in the management.

McKone et al. (2001) they indicate that the TPM can be thought as part important of a strategy of *World Class Manufacture* that also involves Just-in-Time (JIT), Total Quality Management (TQM) and Employees Integration (EI). The author raises the hypothesis that the companies that implement TPM not only are able to improve their practices maintenance, but also to improve his performance in the manufacture.

A more detailed analysis of the TPM implementation is made by Ireland and Dale (2001), that studied this application in three great companies which they had problems (competitiveness reduction, necessity to increase the production and until the possibility of finishing its activities). Conform to the inherent characteristics of TPM decided to implement it with the purpose of diminishing costs, of involving to all the personnel for the company's success and, mainly, to order the administration process.

The most recent study on TPM was made by Chan *et al.* (2005) in a multinational of electronic components, that in a term of two years was able to make a successful implementation, under consultation to the JIPM (Japanese Institute of Preventive Maintenance). But, the success in the application happened in one second attempt.

Prickett (1999) relates on the application of the autonomous maintenance concept of TPM to improve the overall equipment effectiveness (OEE) and the system of flexible manufacture. The application was developed on the basis of: availability rate, performance rate and quality rate. The advantage is in the fact to allow identifying clearly the causes of the lost ones in the manufacture performance and facilitates the continuous monitoring of the most important factors that they influence the performance of the manufacture system.

An application of MCC is analyzed by Deshpande and Modak (2002) in a steel industry. The election of MCC was based on its characteristics that are described in literature which they allow to obtain objectives as the diminution of the maintenance routine tasks to an allowed minimum to sustain the performance of the productive plant without losing quality, security and ambient integrity.

An analysis for the application of MCC, in the marine area, is made by Mokashi *et al*. (2002). These companies also must be efficient, especially in relation to the cost and maintenance has an ample margin of contribution. But, under the conditions that the marine activity it's operated (with scenario in changes, a hierarchic structures that does not foment the work in equipment, workers low prepared technically and administratively, with low reliable information, etc.), the application of MCC is complicated, but it is necessary. Thus, the authors propose a method to apply MCC in the technical part and to do use of the TPM philosophy in the administrative part and human relations.

Methodology MCC also was implemented in a manufacturing company of the automotive branch and it tried itself to find a method with which a maintenance conception could be developed in a efficient form. Pintelon *et al.* (1999) they mention that the center was in the subjet´s difficulty: a machine totally automated, complex and expensive, relatively new with a very low level data for faults and behavior. In addition, the obtained method would be sufficiently robust to be applied in the other equipment defined as critical.

The maintenance application supported in the risk was analyzed by Khan (2003) for a ventilation system, heating and conditioned air in a hospitable center, where a high reliability of the ventilation system due to the negative badly implication of an operation was precise. With the application of the RBM methodology was able to diminish the probability of unexpected fault for a level that is considered acceptable and, therefore it's obtaining a high reliability by means of the maintenance task identification for those items considered critical for the good operation.

Murty *et al.* (2002) they analyzed the application of the strategic maintenance for the cases of line of industrial gas, photocopy and maintenance optimization of the dragger bucket. Their conclusions aim for the convenience of integrating technical, operational and commercial aspects altogether with the maintenance. The key factors for the strategic maintenance are: knowledge of degradation processes, necessity to collect appropriate data, to make a pertinent analysis, use of mathematical models for the alternatives of maintenance strategies and to have a continuous improvement in the businesses performance.

A detailed description to adapt the application of ILS methodology, used by the US and England Armed Forces, to administer all the logistical support for its movable military equipment (terrestrial and aerial) is presented by Galloway (1996) in its work. All the procedure used in the methodology is described, in which there is a point dedicated to the maintenance and as this process can be used in the civil area. It shows the advantages of the application, their effects on the costs, the equipment sustainability during his service life and the requirements of information for the management.

6. FINAL COMMENTARIES

The maintenance conception gives the delineation under which the function´s administrator will define the maintenance actions, that accord with Simeu-Abazi et al. (2001) they can be corrective (direct, postponed, global), preventive (regular, conditional, systematic, cyclical, indicative, critical, limit) or mixed (cyclical or indicative, functional, cellular), for each one of the organization assets, its regularity and necessary technology. All this information is the base to define the process of maintenance management, its human and financial implementation, resources, and the level of commitment required of each actor in the maintenance organization, which emphasizes the importance of selecting the best conception for the individual characteristics of each company.

In order to select the most suitable conception and to obtain from his application the greater potential one it´s due to consider all the aspects related to the technical factors for each equipment, the information flows and the resources that describe the interrelations of the different systems in the organization which they have relation with the maintenance. The aspects related to the company's organizational structure and their strategic planes of development are also added.

To define the best maintenance conception is not a trivial problem, since the variables to be considered vary in accord with the companies, times, analysts and managerial visions. It is not possible to apply a structured system and to decide: this is the best way, since a modeling that looks for an optimal one (in the sense that indicates the operations research) is excessively complex. No investigator gives that solution and to the maximum they indicate which quantitative models can be used to obtain the best solution of some problem where the variables are well characterized.

The different conceptions including in this study have the purpose of giving to the maintenance analyst a complete vision of the characteristics, objectives, potentialities and the requirements for the implementation of each one of them, with the purpose that the selection of one conception will be informed. For the analyst these conceptions are widely documented in the literature, and its decision will be oriented to define as of them, who according to an evaluation of their implementation capacities are adapted to solve the problem of maintenance management having in mind the company's objective.

It is important then, that the maintenance function defines clearly its objectives and as is going to ensure the organization's requirements, to study which is the conception that better gives answer to its management innovation necessities. On the other hand, the conception fixes the emphasis that is due to place in the qualification´s workers, the type of consultant's offices which they need, the time considered for the implementation, the amount of financial resources, strategic alliances with other organizations, redefinitions of the form to manage, etc. If these aspects are not taken care of at the opportune moment the future management it's going to see faced to serious difficulties, and the most probable it's that it becomes to the maintenance form that are practiced previously, losing an opportunity to give greater competitiveness to the company.

Each one of the stages in the application of a selection methodology must give to an evaluation of the present situation of the maintenance function, in the referring to the human aspect, the company's assets management. It's in these points of the evaluation where the analysis models for the decision making on investment in equipment may to define actions of improvement the organization maturity and evaluation of the implemented strategies to attempt the company's requirements, come in support to decide on the convenience of introducing improvements in those aspects that are deficient, according to the vision of the one in charge of the organization for maintenance.

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