

## THE IMPORTANCE OF KNOWING THE ELEMENTS WHICH INFLUENCE THE ORGANIZATION OF THE MAINTENANCE ACTIVITY

Marius ROMOCEA

University of Oradea, mromocea@yahoo.com

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**Abstract:** The paper deals with the main elements which influence the organization of the maintenance activity according to the operators' level of qualification, the resources of basic materials, the technical level of the equipments and the technologies owned by the industrial plant.

### 1). INTRODUCTION

The concept of "maintenance" in industry appeared in USA, in the 1950s, and afterwards, it spread gradually in the Western Europe where it overlapped the term "upkeep" and "repair". The two terms have a similar content but they don't overlap completely, because, according to most of the specialists [4] :

- "upkeep" means to repair an equipment in order to ensure the continuity of the production
- "maintenance" implies to choose the means of prevention, correcting or renovating, in order to monitor the wear of the equipment and its economic efficiency to balance the costs

The industrial maintenance represents, according to the specialists in this field, an ensemble of measures and activities facilitating the prevention, the good maintaining or restoring of an equipment up to a condition which would allow it to ensure a certain performance together with the lowering of the maintenance costs.

The elements that influence the approach of the evolution of the maintenance activity, within the industrial plants, are the following:

### 2). THE TECHNOLOGICAL ELEMENTS

Ensuring a dynamic development of the industrial plants needed, as a basic requirement, the introducing of the technical progress in all domains of their activities. The increase of the industrial plants' competitiveness cannot be obtained but by scientific research and technological development. The increase of the technical and qualitative level of the activity in the industrial plants has been achieved by introducing some new technologies, based on the recent developments in informatics and micro-electronics. The informatics and the micro-electronics have entered the production workshops and departments: the machines are endowed with numerical control, the industrial robots have become familiar, the pliant production workshops are developing, the automatization is everywhere. There are more and more factories where the assembly line is programmed by the computer using the programmes archive of the production department, the manufacture assisted by the computer being achieved in this way.

Due to the progresses of the technology of the components, the electromechanical sub-assemblies need fewer interventions for upkeep and repair, due to the high reliability of the electronic circuits. At the same time, the break-downs of these equipments can be forestalled by the new techniques of detecting the flaws (the sonic analysis, the vibrations analysis etc).

The modern electronic apparatus allows us to use the technique of supervising the new equipments and to apply the conditioned maintenance, in which:

- it is extremely necessary to draw up and rigorously follow the inspection programme, in order to check the observance of the operating standards, to check the technical condition of the equipments which are more and more complex.
- the diagnosis procedures regarding the technical condition of the equipment must be done as accurately as possible

### 3). THE ECONOMIC ELEMENTS

The importance of the maintenance activity is given by the major influences it has upon the most important economic indicators which characterize the activity of an industrial plant, upon its profitableness. The dimension of the expenses needed by the activity of upkeep and repair the equipment is influenced by two elements: the number of repairs which are done and the volume of the proffilactic upkeep activities while operating. In order to reduce the amount of the expenses required by the upkeep and repair of the equipment, we must operate on the two elements.

In order to reduce the expenses with the upkeep and repair activities, the following methods can be used:

1. the centralization and the specialization of the repair activities;
2. the improvement of the methods and forms of repairs, the using of some advanced technologies;
3. the planning of the upkeep and repair activities, so as the period of the equipment's "out of use" state is reduced;
4. providing spare machine parts for repairs by a centralized manufacturing which facilitates the lowering of their costs;
5. establishing the best number of necessary maintenance operators, in order to reduce the costs with the labour;
6. reducing the materials consumption for repairs;
7. the constructive improvement of the equipments in order to make easier and faster the detecting of the flaws, their elimination, the control of the technical condition while operating

Reducing the expenses for upkeep and repair requires the elimination of the repairs of a low quality, because the inferior quality leads to the increasing of the volume of the maintenance activity. The low quality of the repairs could be due to an unadequate technical control, and to a poor endowment of the repair unit regarding the machines and tools necessary for repairs of a high quality.

The increasing of the economic profitableness is realized by setting up and developping *the maintenance companies*, capable of performing several activities, substituting the traditional maintenance departments from the industrial plants [fig.1].

Simultaneously with the development of the services, the maintenance is orientated towards services. Through this, two essential goals are achieved:

- the beneficiary (the user of the maintenance process) doesn't have to keep in *stand-by* some teams of specialists, and, as a concequence, a decrease of the upkeep costs is obtained, together with an increase of the quality level of the maintenance procedures, by being performed by specialists.
- it is possible to form specialized teams in order to perform maintenance activities both in their own factory and in some others

The maintenance activities performed by specialized companies represents one of the most important changes which can be noticed regarding the industrial maintenance

activity. These are more supple, pliant, capable of adjusting to the new requirements, they can provide periodically specialized services, for which, it is not justified from economic point of view, to maintain within the traditional maintenance departments some new maintenance resources.

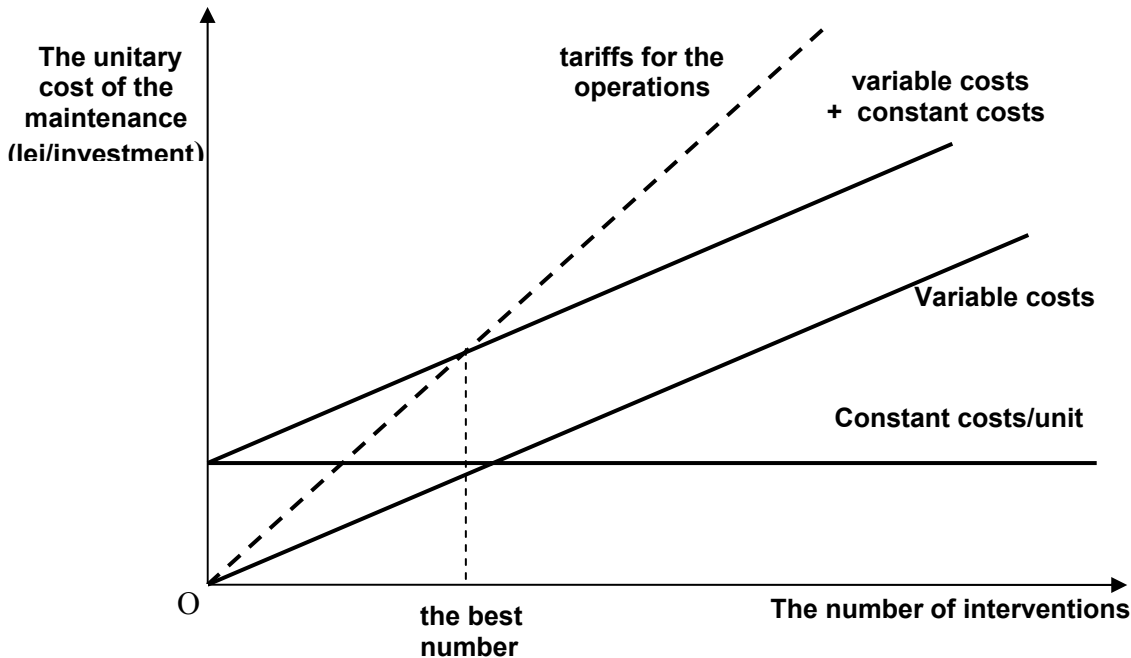


Fig.1 Establishing the best number of interventions

### 3). THE BEHAVIOURAL ELEMENTS

An important element for the efficiency of the upkeep and repair activity is represented by the maintenance and operating staff and the relationships between them as well. Regarding the human relationships, organizing the maintenance activity implies to conceive the predictions regarding the necessary labour for each level of qualification, to select the resources, to clearly establish the working positions and to evaluate correctly the results of the activity, to conceive a programme of professional training, to apply some participative methods, to stimulate the voluntary involvement of the production operators in the maintenance activity, to improve the working conditions etc.

It comes out that all these three influential elements can be found or will be found in all industrial plants and, as a consequence, the maintenance function will get a new dimension characterized by:

**1). A transfer of tasks to the production and to the companies that are specialized in maintenance.** The best maintenance policy adopted by a factory tries to establish an ensemble of measures to be adopted in order to ensure the best functioning of the equipments the factory is endowed with, based on some technical and economic criteria, the most important of which being the safety while functioning and the minimum costs for upkeep and repair.

These goals can be achieved by transferring to the production staff of some maintenance activities of 1<sup>st</sup> level, such as: the cleaning of the equipment and of the working area, the preservation of the tidiness at the working place, the lubricating, the adjustment of some functioning parameters, the checking of the liquids' level, of the

tension of the tightening of the different parts, the checking of the driving belts' stretching, the alert concerning some disfunctions necessary to be solved by specialists etc. These activities which, traditionally used to be done by the maintenance operators, don't require special skills or training, that's why, through an adequate motivation, they can be transferred to the production operators.

The complex maintenance operations will be performed by specialized companies which are endowed with tools, technologic and control equipments of a high performance and specialized staff. The repairs companies specialized in different kinds of equipments, perform any kind of repairs, but only for certain types of equipments such as: lathes, milling machines, drilling machines etc. The staff of the specialized companies know better the equipment which is going to be repaired, the peculiarities of the needed repair, the causes of the breakdown and they are able to eliminate the disfunctions in a short period of time.

Adopting this maintenance policy will lead to a gradual decrease of the staff needed for maintenance operations within the production companies.

## **2). The assignment of new tasks for the maintenance department.**

The co-operation with the specialized companies and the transfer of some maintenance to the production staff lead to a limited decrease of the maintenance staff, but not to the elimination of this department.

The tasks of the maintenance staff will be orientated to the following main directions:

- a). the setting up of some joint teams made of production and maintenance staff, charged for prevention and consulting in case of more difficult situations
- b). the selection of some specialized companies for co-operation, on the economic and quality criterium, the contracting of the interventions
- c). the collecting, systematization and utilization of the information regarding to the behaviour of the equipments during functioning, in order to improve the maintenance programmes, the decrease of the materials consumption, the maximalizing of the supply of spare machine parts, the establishing of the most propitious moment for replacing the equipments.

## **5). CONCLUSIONS**

Knowing the elements that influence the evolution of the maintenance activity is of a great importance for maximalizing this activity, which can be realized by introducing new technologies based on the most recent achievements in the domains of informatics and microelectronics, meant to lead to material and financial savings. Also, the improvement of the maintenance activity can be realized by improving the qualification level of the maintenance operators and by transferring the complex operations to the specialized companies, endowed with perfected apparatus for measure, control and intervention.

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