

STRATEGIES OF THE MAINTENANCE ACTIVITY

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Abstract – The analysis of the maintenance activity is not complete if the strategy aspects are not highlighted as well. Considering the specific situations a company might find itself in at a certain moment, the paper presents a few possible strategies for approaching the maintenance activity, highlighting the fact that its organization can be made considering four strategic alternatives:

Keywords – attendance, maintenance, repair, strategy,

I. INTRODUCTION

INDUSTRIAL maintenance represents a set of measures and actions allowing the prevention, the good attendance or the restoring of an equipment in a given state or capable to ensure a given service in the conditions of minimizing costs.

Considering these definitions, the following conclusions can be drawn:

- Here “**to restore**” means “to correct”, a meaning imposed by the change of the initial value of the device’s functioning parameters

- **Appointed state or determined service** involves the predetermination of the functioning parameters or the service to reach, with the quantification of the characteristic levels;

- **To minimize the maintenance costs reflects the business’ economical aspect;**

- **Prevention – a set of operations used in order to avoid the device’s unavailability state;**

- **The good keeping in a given state** consists in the application of some methods, procedures, proceedings and actions which contribute to the progress of maintenance in the four main directions, represented in fig. 1. [2]

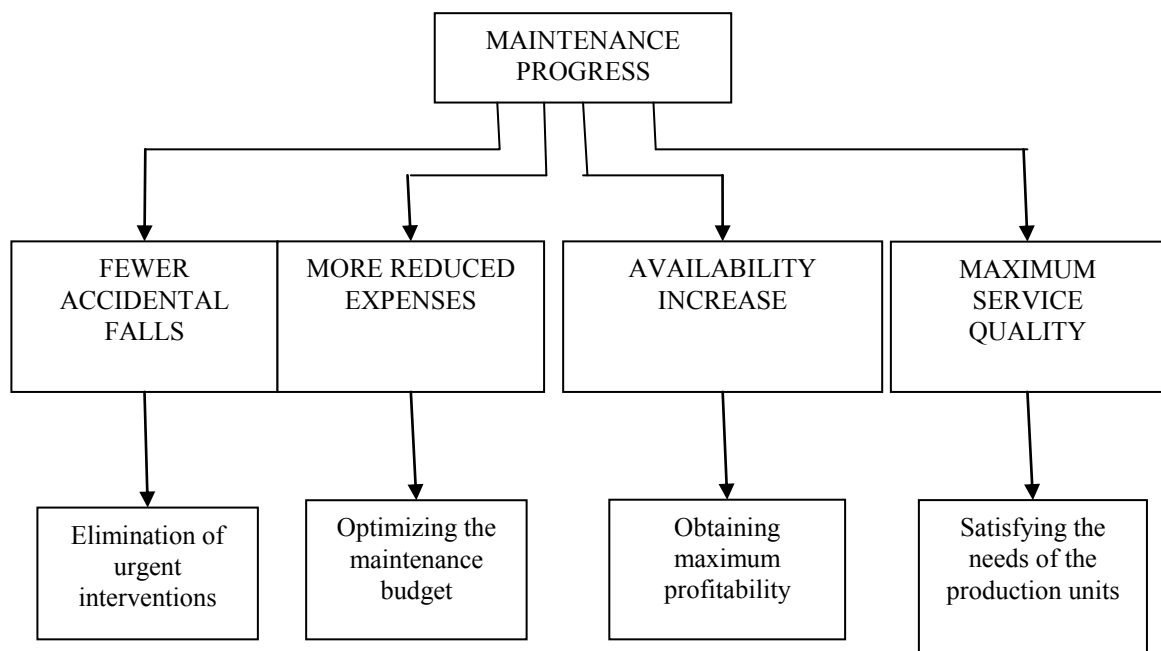


Fig.1. Maintenance progress[2]

The maintenance function evolved within industrial units, being subject to a continuous refining process, considering the compromise which needed to be performed between needs and exigencies, from the technical, economical and human point of view.

Historically speaking, until the 1960s, the maintenance activity remained synonym with the repair

one, improving the equipment as often as possible. Systematic maintenance is applied only in the case of equipments with incidence on the human safety, stopping them for the mere reason of analyzing their wear and tear level, being completely abandoned in case the people's safety was not endangered.

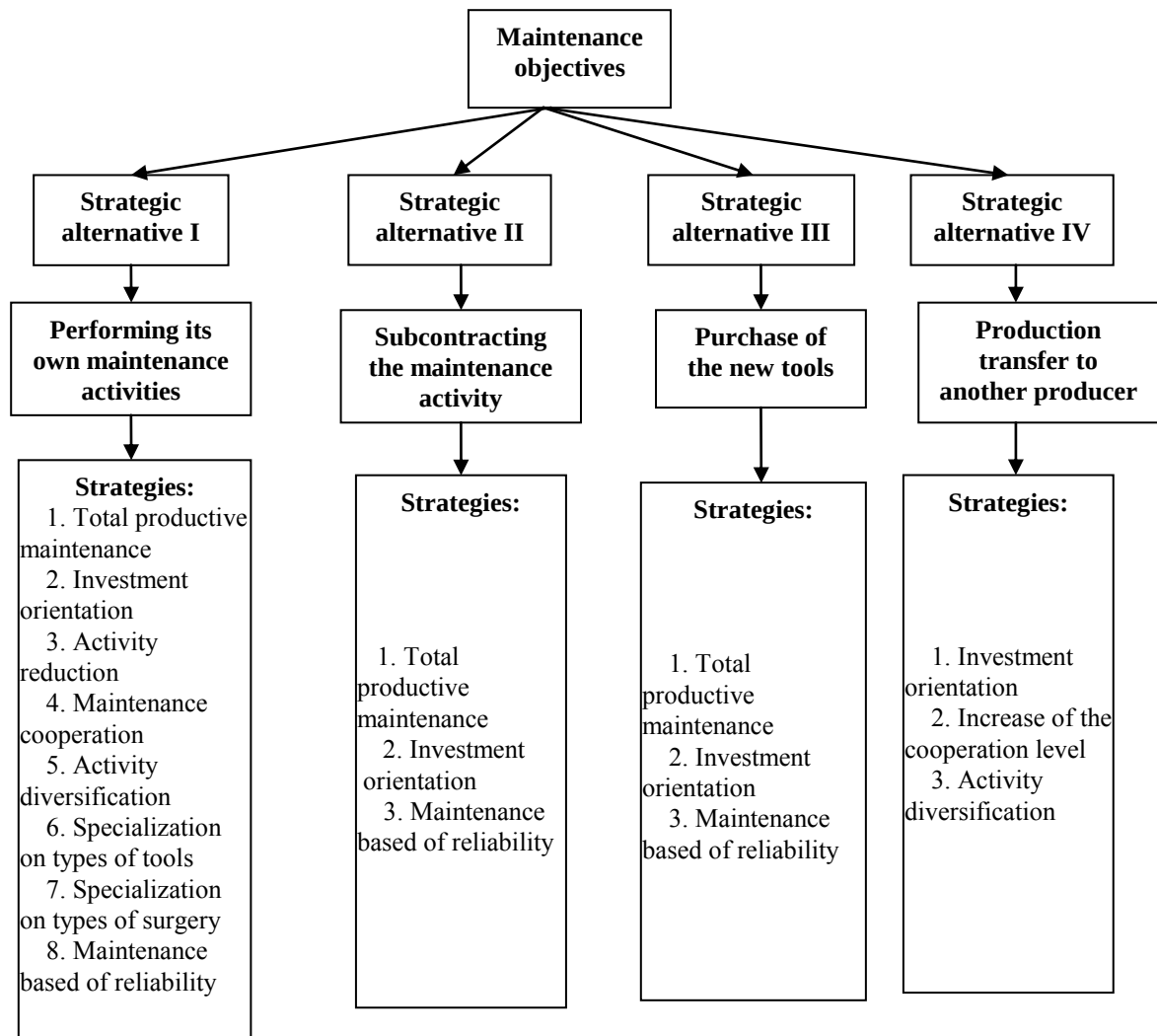


Fig.2. Strategies of the maintenance activities[4]

In its evolution, between 1960-1970 the industrial maintenance notion was enriched with the following new conceptions:

- The *diagnostic maintenance* appeared through the use of non destructive techniques for the vibration control, the fluids' analysis, the surveillance technique appeared, which later led to the *conditional maintenance*;
- The research regarding the *reliability theory* and the processing way of the experimental data on the solicitation, damage and duration were more extended and detailed.

- The following were improved: the risk assessment evaluation method and the damage occurrence probability, the economical effects of the quantity or quality of products, including the hidden costs of the maintenance activity, reflected in the notion of *decrease cost*.

In the field of industrial maintenance, two new concepts appeared after 1970:

- In order to minimize the maintenance costs, in the USA the concept of life cycle cost – L.C.C. was applied, consisting in the highlighting of all the costs related to the research, project, fabrication, exploitation and

maintenance processes on the entire life duration of a machine.

➤ Unlike LCC, which expresses an economic approach of maintenance, Japan applied the concept of Total Productive Maintenance – T.P.M. which represents a behaviour approach of the maintenance. This concept has as an objective the obtaining of a maximum efficiency for the machines, by involving all the compartments in the maintenance activity, as well as by the increase of employee action autonomy .

II. STRATEGIES OF THE MAINTENANCE ACTIVITIES

The role of the maintenance strategy is the one of obtaining and maintaining the following:

- Optimal availability of the production and auxiliary equipments / systems, for maintaining the company's production capacity to the performance level established;

TABLE I
STRATEGY COMBINATION [4]

N° r	Field of activity	Alternative	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	Obs.
1.	Mecchanical	I		X	X							Company with a tradition in the maintenance activity
2.	Repairs of rolling material	II, III		X		X						In full restructuring process
3.	Energetic	I, III		X							X	Strong research and projecting department in reliability and maintenance
4.	Transportation	I,II,III					X			X		Systematically renewed auto park
5.	Textile confections	II, III		X							X	Modern production management, willing to renew fixed assets
6.	Fabrication of pipes and welded profiles	I, II					X			X		Company with a tradition in the maintenance activity, with very torn and worn machines

- Optimal operation conditions for the production equipments / systems or auxiliary;

- The efficient use at maximum capacity of the maintenance resources;

- Extension of the life span of the equipments / systems;

- Quick reaction in case of damage;

The organization of the maintenance activity is done according to the following strategic alternatives (fig. 2):

1ststrategic alternative: Effectuation of the specific maintenance activities,

2ndstrategic alternative: Sub-contracting maintenance,

3rdstrategic alternative: The purchase of new devices,

4thstrategic alternative: Production transfer to another producer

Finally, the types of strategies described in the figure 2 will be described:

1. The Total Maintenance strategy (S₁) is based on the M.P.T principles, meaning Productive maintenance, auto-maintenance and "5S" applied by all the company's employees, properly trained. It represents a modern form of strategic approach of the maintenance and repairs activity, which ensures the fluent development of the production process, in the conditions of obtaining high quality products. It is the strategy considered to be the newest in the maintenance field.

2. The strategy of company's investment orientation (S₂) – implies the notification of the maintenance staff in what regards the investments in new tools. The purpose of this strategy is to avoid the investment in "second-hand" tools, which on the short term affects financially

the industrial unit, but on the long and average term it leads to the increase of maintenance costs.

3. *The strategy of reduction of the maintenance activity (S_3)* – consists of the reduction or even the cease of the activity in the maintenance compartment. This strategy is applied by the units which cross periods of financial crisis, which leads to short term savings, but which produces serious losses to the industrial unit on the medium and long run.

4. *The strategy of maintenance cooperation (S_4)* – consists of the effectuation of simple maintenance and repair operations by the company's own maintenance department, while the complex operations are done in cooperation with the specialized units. This strategy leads to the decrease of the long term maintenance expenses.

5. *The strategy of diversification of the maintenance activity (S_5)* – is applied by the units which have a strong maintenance and repairs compartment and consists of the performance of the maintenance and repairs operation not only in their own unit, but also in other units with similar profiles.

6. *The strategy of specialization of types of tools (S_6)* – it consists in the formation of maintenance worker teams, each team being specialized in the maintenance and repair of certain types of tools. The advantages of this strategy consists in the increase of the quality of maintenance activities.

7. *The strategy of specialization on types of operations (S_7)* consists in the formation of worker teams, each team being specialized in the effectuation of certain types of operations (RC1, RC2, RK). This strategy will lead to an increase of the intervention quality.

8. *The strategy of new machines (S_8)* – consists of the use of tools only during the period when they are covered by warranty. This strategy is applicable only in the case of industrial units with high financial resources. The advantages of this type of strategy consists of the zero maintenance expense, high productivity and a good quality of the end product.

9. *The strategy of reliability based maintenance (S_9)* – implies the use of funds granted to the maintenance compartment in the purpose of increasing the reliability of the production system in that unit.[4]

In practice it is inefficient to apply a single strategy. The managers of the maintenance compartment must find that combination of strategies that leads to success quickly and efficiently. Table I shows a few examples of frequently applied strategies in the industry.

The maintenance tends to evolve from the technical field, where it was responsible mainly with the technical aspects of maintenance and repair of the tools, towards the strategic side of the unit. Its implications are complex and reach all the functions of the unit, this is why we will take into consideration the implication of the maintenance in a procedure of the type of Total

Productive Management. The practical results obtained prove that the Romanian companies generally do not apply a coherent strategy while performing maintenance, often highlighting the aspects related to the consumed resources and less those related to the direct and indirect earnings obtained.

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