Centralized versus decentralized maintenance

Maxim Balitki[1]

1. INTRODUCTION

One of the decisive factors for the sustainability and profitability of an organisation is reliable and economical maintenance. The companies' means of development are objectively related to the need for the evolution and improvement of MRO (Maintenance, Repair and Operation) procedures. In this evolution, the framework of qualified teams, with clearly defined functions and responsibilities, plays a key role in the operability of the equipment. One of the key factors in this development is the achievement of a rational level of centralization of the maintenance structure of the different companies or industries.

The purpose of this article is to compare the two classical and main organisational structures present in maintenance.

2. MAIN ORGANIZATIONAL STRUCTURES IN MAINTENANCE

The organizational strategy of maintenance has a direct impact on the efficiency of the plant inventory, and the centralization (or decentralization) of the different duties is traditionally decided based on the intuition [1]. Thus, the two main and extreme organizational structures are listed below:

- Centralized maintenance;
- Decentralized maintenance.

Centralized maintenance (Figure 1) refers to practices of managing and maintaining company's assets such as equipment, facilities and buildings from a central location or department. This approach implies the existence of a dedicated team to carry out different maintenance tasks.

Some of the advantages of this type of structure are:

- Increased supervision of the maintenance function [2];
- Improves utilization of resources such highly skilled crafts and special equipment [3];
- Reducing duplication of effort;
- Consistency in maintenance procedures;
- Better systematization and organization of trainings [3];

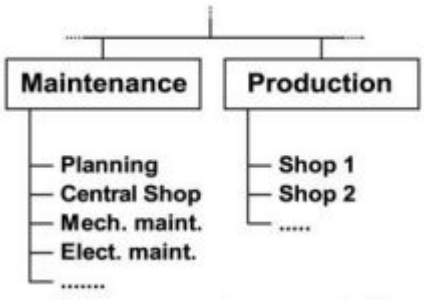

Figure 1 – Centralized maintenance [1]

On the other hand, decentralized maintenance (Figure 2) considers that the maintenance operations for the different items are distributed across the different departments. In this type of approach, these departments manage the maintenance of the items they use or for which they are responsible.

Some of the advantages of this type of strategy are:

- Reduced response and travel time when a maintenance request is made;
- Better communication and coordination in more technically complex environments [4];
- Better relationship between maintenance and production departments [2];
- Mutual assistance between different departments in more demanding situations.

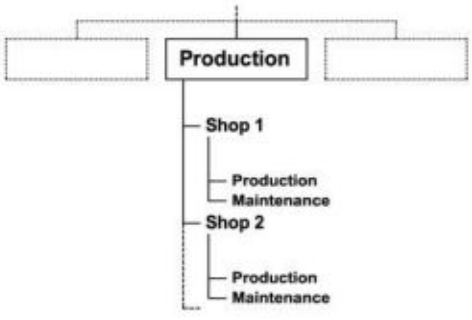

Figure 2 – Decentralized maintenance [1]

It is important to state that there is a third type of organizational strategy (but which will not be analysed in detail in this article), and this results from the combination of the two structures mentioned above, with hybrid characteristics (Figure 3).

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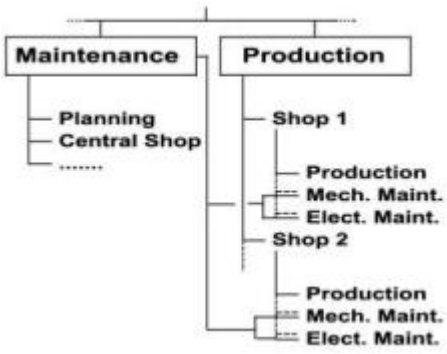

Figure 3 - Semi-centralized maintenance [1]

3. MAIN DIFFERENCES BETWEEN CENTRALIZED AND DECENTRALIZED MAINTENANCE

Despite the various benefits present in each of the frameworks, it is important to understand when and in which situations the different approaches would apply.

Considering a generic organization with a generic plant inventory, and which decides to follow a centralized methodology, can expect to obtain a solid and consistent process of communication and execution of tasks; economic efficiency, since procurement and inventory are carried out through a central entity and, an optimal distribution and allocation of resources (manpower, materials, and tools). The creation of specialized groups could scale back the number of craftsmen in maintenance teams and therefore contribute to a cost reduction. However, this type of approach may cause delays in communication and conveyance of information and even in the maintenance management itself when it is subjected to higher loads and demands.

On the other hand, if the same scenario is applied to decentralized maintenance, the adversities generated by centralized maintenance can be solved due to the rapid response to requests and anomalies (in the event of a spontaneous breakdown of an item, maintenance team can begin the repairing instantly) and to the autonomy of the various teams responsible. Based on these characteristics, implementing this methodology can lead to an increase in the company's productivity. Alternatively, the craftsmen, who have a better knowledge of the equipment in their area, are not always managed rationally. In other words, there are difficulties in coordinating them in a homogeneous and uniform way and according to their qualifications.

However, this methodology may not be fully decentralized. Warehouses with maintenance parts and materials may be shared by different departments. This may create redundancy in the supply of items when there are communication gaps between the different areas.

In addition, decentralized maintenance is distinguished by the ease of some bureaucratic processes, which may show greater motivation on the part of maintenance employees to perform their tasks.

Some authors claim that decentralized maintenance is better suited in large-scale organizations, while centralized maintenance in smaller companies. However, according to Gazprom [5], which has implemented centralized maintenance in its organization, the more centralized MRO system is, the more optimal management is achieved and the more economically efficient it is. In fact, the decision to implement an organizational structure must always consider the company's aims and resources and not only its size.

Table 1 examines the characteristics addressed in this article of the two types of strategy, according to the criteria "Personnel", "Information" and "Resources".

Table 1 - Characteristics of centralized and decentralized maintenance

CRITERIA	ORGANIZATIONAL STRUCTURE	
	Centralized	**Decentralized**
Personnel	- Better oversight and monitoring; - Better systematization and organization of trainings; - Qualified staff in various fields;	- Faster response to maintenance requests; - More intimate knowledge of the equipment for which they are responsible for; - Higher motivation.
Information	- Consistency in the delivery of information and documentation; - Centralized information; - Possibility of transmission delay.	- Greater awareness of production needs; - Inconsistency in reporting and documentation between different departments; - Faster communication.

Resources	- Greater efficiency in resource allocation; - Avoids duplication of materials and purchases.	- Possible duplication of resources; - Increased inefficiency in resource coordination.

4. FINAL REMARKS

The organizational structures of the maintenance area determine how fast and how well the maintenance function is performed, which consequently has a direct impact on the efficiency of the MRO system.

These classic organizational strategies differ in the degree of concentration of manpower, means, economic efficiency and the management of maintenance itself.

Both centralized and decentralized maintenance have their benefits and limitations, however the decision to implement one or the other methodology must always factor in each organization's requirements, priorities, and available resources in order to achieve its objectives and goals.

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