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Exploration of Construction Organization for Maintenance of Steam Turbine Equipment in Thermal Power Plants

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Abstract: The continuous development of the power industry has had a positive impact on thermal power plants, helping them maintain a good production form. In the use of steam turbine equipment in thermal power plants, to prolong its lifespan and avoid safety hazards, it is necessary to pay attention to strengthening maintenance and construction organization, better implementing effective organizational work, and effectively applying steam turbine equipment to ensure the sustainable development of thermal power plants. This article discusses the concept of equipment maintenance from the perspective of steam turbine equipment in thermal power plants, analyzes the current situation of equipment maintenance, and proposes a specific construction organization to provide a reference for steam turbine equipment maintenance.

Keywords: Thermal power plant; Steam turbine equipment; Construction organization

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1. Introduction

Steam turbine equipment can provide guarantees for the normal operation of thermal power plants. Due to the high cost of steam turbine equipment, it is necessary to pay attention to the maintenance and upkeep of equipment in daily work. However, maintenance costs for steam turbine equipment in thermal power plants are very high. Simultaneously, due to the lack of professionalism, traditional equipment maintenance activities take a long time. Although routine maintenance can timely detect faults in steam turbine equipment and perform dynamic management, actual maintenance will consume a lot of manpower and material resources. Therefore, the actual maintenance cost is relatively high, which is contrary to the operation of steam turbine equipment in thermal power plants in the new era [1]. In this regard, thermal power plants need to pay attention to the updating of maintenance methods, adopt the formation of construction organization, better play the significance of maintenance activities, and provide guarantees for the normal operation of thermal power plants.

2. Concept of maintenance of steam turbine equipment in thermal power plants

To better carry out the maintenance of steam turbine equipment and play the role of maintenance activities, the most crucial point for thermal power plants is to deepen the understanding of relevant content in this area. The specific concepts include the following: Firstly, thermal power plants adopt activities such as improving maintenance mechanisms and adjusting work methods, implementing comprehensive considerations, and achieving more significant results in steam turbine equipment maintenance, minimizing the occurrence of faults, and better meeting the smooth implementation of production activities in thermal power plants. Secondly, the maintenance of steam turbine equipment focuses on the construction organization of maintenance. By clarifying the key points of organization, the performance of steam turbine equipment can be better optimized, assuring its high-quality operation [2]. In short, turbine equipment maintenance refers to the use of maintenance and repair activities to keep relevant equipment in a normal state at all times, thereby bringing higher economic benefits to thermal power plants.

3. The significance of steam turbine equipment maintenance in thermal power plants

Steam turbine equipment plays an important role in thermal power plants. Conducting maintenance activities can provide guarantees for the normal operation of steam turbine equipment, minimize the occurrence of risk problems, and promote the improvement of business efficiency. From the perspective of cost control in enterprise production, the maintenance of steam turbine equipment often requires a lot of time and energy and does not directly affect operational efficiency. In actual operation, if the maintenance work receives insufficient attention, it is easy to have unreasonable maintenance methods, procedures, and other aspects, leading to an increase in maintenance costs and hindering the achievement of production benefits.

In addition, the maintenance of steam turbine equipment in thermal power plants has systematic characteristics. Therefore, it is necessary to carry out scientific planning, change the previous maintenance methods, significantly shorten the practice of maintenance consumption, and achieve good efficiency in the use of steam turbine equipment [3]. Thermal power plants need to pay attention to the maintenance of steam turbine equipment, design reasonable maintenance time and content, and achieve good maintenance quality while improving maintenance efficiency. From the perspective of steam turbine equipment, it is easy to encounter minor mechanical problems during use. Although these minor problems may not affect the operation of the machinery in the short term, the lack of maintenance and repair can not only have adverse effects on production but also lead to safety accidents. Therefore, it is necessary to strengthen the attention to equipment maintenance activities, adopt dynamic and information-based methods to carry out maintenance activities, timely discover problems, and provide guarantees for the operation of thermal power plants.

4. Current status of steam turbine equipment maintenance in thermal power plants

Currently, there are many problems in the maintenance of steam turbine equipment carried out by thermal power plants, resulting in poor maintenance efficiency and quality. The following summarizes the current status of steam turbine maintenance. Firstly, equipment maintenance is too formal. During the process of repairing steam turbine equipment, staff are influenced by traditional methods and only carry out maintenance based on time and content, rather than starting from the operation of the steam turbine equipment. The actual maintenance content is rigid, and in most cases, the maintenance work is just a formality, making it difficult

to fully realize the value of maintenance. Secondly, the comprehensive management of maintenance data is insufficient [4]. The maintenance of steam turbine equipment belongs to the process of system maintenance. Only by focusing on the management of maintenance content can the quality of maintenance be guaranteed. However, due to insufficient information management, there is less data in the maintenance process, which increases the maintenance cost. Thirdly, there is a lack of risk prediction management. In the maintenance of steam turbine equipment, although a maintenance plan has been formulated, other operational problems may arise, which not only affect operational efficiency but also lead to safety issues.

5. Practical strategies for organizing maintenance and construction of steam turbine equipment in thermal power plants

5.1. Adjust the construction organization structure and improve the working mechanism

Thermal power plants should focus on the maintenance of steam turbine equipment and adhere to construction requirements. By optimizing the construction organization structure and leveraging application advantages, they can enhance the professionalism of their construction activities and demonstrate a positive development trend [5]. Through improving regulations and optimizing personnel allocation, professional support can be provided for construction organizations to better play their role in turbine equipment maintenance. This ensures the formulation of relevant plans and demonstrates stronger professional implementation to avoid affecting the production efficiency and performance of thermal power plants. In establishing the construction organization structure, it is important to consider the rationality of the construction plan for steam turbine operations. By actively conducting effective maintenance and construction activities and thoroughly analyzing the operation and performance of the steam turbine equipment, valuable reference information can be gathered. This promotes the improvement of production efficiency in thermal power plants and achieves better operational efficiency of the steam turbine equipment.

Furthermore, thermal power plants should take into account the operation of steam turbine equipment, construction organization, and other aspects. To promote the improvement of related work levels, they can take a better approach from an institutional perspective. Firstly, in the process of forming the working mechanism of the construction organization, attention can be paid to the integration of practical experience, work philosophy, and other elements. This aids in improving the system, providing a reference basis for it, making maintenance activities more professional, and promoting the improvement of work level. Secondly, in improving the working mechanism of construction organizations, it is necessary to pay attention to its implementation and better promote the maintenance of steam turbine equipment [6]. Thirdly, from the perspectives of quality, safety, and progress, a good construction organization mechanism can be established to significantly reduce the frequency of construction problems and meet the development needs of thermal power plants.

5.2. Deploying skilled personnel to improve equipment maintenance efficiency

The maintenance of steam turbines in thermal power plants requires advanced skills, and not everyone can complete it. Therefore, power plants need to equip skilled personnel to carry out better maintenance activities and avoid various problems caused by maintenance. Specifically, professional maintenance personnel can be recruited to form an effective team for steam turbine equipment maintenance, control maintenance costs, and improve maintenance quality. Additionally, the training of steam turbine equipment personnel should be strengthened [7]. Steam turbine equipment exhibits high system complexity, necessitating technical personnel to possess proficient skills for conducting effective maintenance activities. Finally, thermal power plants need to clarify the maintenance objectives of steam turbines and clarify the primary and secondary relationships.

Maintenance work is integral to the operational system, where professionals can identify key points and perform effective maintenance activities to prevent increased maintenance costs resulting from decreased efficiency.

5.3. Enhancing design and construction organization: optimizing work methods

The design of construction organization refers to the adoption of a comprehensive technical and economic document that can carry out activities such as construction preparation, control, and resource allocation. It can start from the construction process and carry out scientific management activities. Construction organizations can analyze the characteristics of the project, equipment conditions, etc., to formulate specific work policies and ensure the smooth implementation of equipment maintenance. Firstly, considering feasibility and depth of meaning, the design maintenance and construction organization for steam turbine equipment can be defined. From a refined perspective, innovative concepts can be integrated to make this plan more applicable, improving construction organization work efficiency, and providing support for the good development of thermal power plants [8]. Secondly, after determining the design scheme, the construction organization can provide professional guidance based on specific work plans, effectively conduct turbine equipment maintenance, ensure the smooth implementation of related work, lay the foundation for performance, optimization, and efficiency of thermal power plants, and make them have strong development vitality.

Furthermore, when dealing with the maintenance and construction of mechanical energy for steam turbine equipment, it is necessary to pay attention to the improvement of technical content in the work process. From the working mode of the construction organization, attention should be paid to work optimization. This includes attention to the application of information technology, better sorting out the various information resources generated in the maintenance of steam turbine equipment, and implementing good induction and application. These aspects provide technical guarantees for the optimization of construction organization work and improve its application effect [9]. Simultaneously, we attach great importance to the development of refinement work, refining the workflow of steam turbine equipment, forming a work form that meets the needs of power plants, promoting the improvement of work level, and ensuring the correct operation of steam turbine equipment [10].

5.4. Strengthen spare parts application and reduce maintenance costs

The use of steam turbine equipment in thermal power plants is influenced by traditional maintenance methods, resulting in high maintenance costs [11]. From an economic perspective, it is necessary to improve the efficiency of spare parts utilization and strengthen its application according to the following steps: Firstly, staff need to clarify the focus of work, and carry out reasonable numbering activities based on the use of steam turbine equipment. Frequently used parts can be classified as class A, infrequently used parts can be classified as class B, and almost unused parts can be classified as class C [12]. Secondly, thermal power plants should prepare spare parts based on their actual categories, with a focus on purchasing Class A spare parts, to better cope with frequent mechanical problems of steam turbine equipment. Through the application of spare parts, it is possible to significantly reduce the time spent on procurement due to damage to equipment components and reduce maintenance costs.

5.5. Attention to daily maintenance to ensure operational effectiveness

The maintenance of traditional steam turbine equipment often consumes a large amount of manpower and material resources, leading to an increase in maintenance costs. Therefore, to avoid multiple maintenance activities, thermal power plants need to pay attention to the daily maintenance of equipment, promptly identify problems, and eliminate them. Firstly, it is necessary to monitor the steam turbine equipment [13]. Starting from the operation of the steam turbine equipment, it can be found that problems arise during the

operation process, effectively reducing the frequency of maintenance. In this process, thermal power plants can strengthen the application of computers, carry out better detection activities, timely discover problems, and carry out good maintenance and upkeep. Secondly, pay attention to the improvement of the equipment operation status detection system. The operation of steam turbine equipment is influenced by many factors and is prone to various problems, such as clearance between the stator and the rotor. Hence, it is essential to ensure comprehensive testing to promptly identify issues and conduct daily maintenance tasks [14]. Therefore, it is important to pay attention to daily maintenance, such as the application of lubricating oil, equipment cleaning, etc., promptly identify problems, and carry out handling activities to avoid the accumulation of small problems that hinder the normal operation of the equipment.

6. Conclusion

In conclusion, thermal power plants can enhance maintenance results and extend the service life of steam turbine equipment through construction organization, thereby providing guarantees for the development of production plans [15]. Therefore, it is necessary to pay more attention to construction organization, implement organizational work, avoid affecting its safety performance, and significantly reduce the maintenance costs brought by power plant equipment to ensure the normal operation of steam turbine equipment.

Disclosure statement

The author declares no conflict of interest.

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