

Construction Machinery Fault Detection Technology and Maintenance Measures

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Abstract: present, construction machinery as an important part of engineering construction, and occupies a decisive position. In the process of operation, all kinds of faults often occur in construction machinery. If we want to avoid these faults, we must correctly use the machinery, find out the faults through a variety of detection technologies, and take effective maintenance measures to eliminate the hidden trouble in time, reduce the probability of failure, and ensure the improvement of the operation efficiency of construction machinery. Construction machinery is widely used in infrastructure projects. In order to give full play to its performance in operation, the role of fault detection and maintenance of construction machinery is particularly important. In order to ensure the quality of engineering construction in China, it is necessary to avoid engineering machinery failures as much as possible. Therefore, relevant departments must do a good job in troubleshooting and maintenance of engineering machinery, clarify the impact of mechanical failures on mechanical application, and propose corresponding solutions, thus greatly improving the application effect of machinery and the production efficiency of enterprises.

1. Introduction

With the rapid development of science and technology, construction machinery is becoming more and more complex. It belongs to the organic combination of machine-hydraulic-electricity-optical-information. It gradually increases the difficulty of fault detection and maintenance. Exploring engineering machinery fault detection technology is to use appropriate instruments and scientifically. The technology of systematic detection, analysis and diagnosis detects construction machinery [1]. To troubleshoot in time and effectively reduce downtime, construction machinery is an important part of China's industrial equipment, and it is widely used in infrastructure projects [2]. Mainly used in various fields such as national defense construction, transportation construction, energy production and construction, mountain, mining, agriculture, forestry, industrial and civil construction, urban construction, etc., it is the necessary mechanical equipment for comprehensive mechanized construction projects [3]. For the construction machinery industry, in order to develop stably and long-term, we must do a good job in fault maintenance and technology upgrading. Based on the construction machinery fault detection technology and maintenance measures to carry out a detailed analysis. Therefore, the relevant personnel must attach great importance to the possible faults of construction machinery, and effectively improve the efficiency of fault detection and maintenance of construction machinery [4]. From the perspective of scientific experience

accumulation, we can deeply explore the relationship between fault phenomena and fault causes through dfema and other means, and analyze the control means to optimize the application of construction machinery. When there is a fault, we can quickly analyze the fault causes, formulate maintenance measures in time, and reduce the equipment failure rate [5]. Engineering machinery fault detection technology and maintenance measures are designed to find out the existing or possible faults and problems of engineering machinery in time, analyze and judge the causes of faults by professional means, and take corresponding maintenance measures to minimize the harm caused by engineering machinery faults [6]. In addition, carrying out the fault diagnosis and maintenance of construction machinery can understand the faults and problems that may occur in the construction machinery industry, provide convenience for the lifting and handling of mechanical faults, and promote the development of engineering enterprises [7].

2. The Content of Construction Machinery Fault Detection

2.1 About the Detection of Engineering Machinery Failure

Construction machinery failure detection technology is to discover the failure of construction machinery in time, find out the cause of the failure, and reduce the harm caused by the failure. At present, China's construction machinery monitoring technology mainly uses three aspects: sensing technology, signal extraction and processing, and judging the types of failures as the main ways of judging the cause of the failure. In order to be able to effectively deal with the failure of construction machinery, we must pay attention to the means of mechanical inspection and maintenance. The specific content is: ① Mechanical inspection in various environments. That is, different environmental conditions have different effects on the use of construction machinery. ② For the newly purchased construction machinery and equipment, when they are used for the first time, they must be run in for a period of time before they can operate normally [8]. Therefore, with the passage of time, the probability of mechanical failure of most construction machinery will decrease. Construction machinery and equipment often fail in the operation of enterprises, which will restrict the healthy development of the project.

2.2 Technical Strategy of Fault Diagnosis for Construction Machinery

The failure of construction machinery can be divided into six aspects: first, the components or parts of machinery show signs of looseness. Second, parts are damaged, such as indentation, deformation and corrosion of related materials. Third, leakage failure of construction machinery refers to oil leakage and water leakage during operation. Fourthly, the degradation of materials is mainly due to the aging of materials due to the continuous use of mechanical equipment for a long time. Fifthly, the mechanical equipment is out of balance. In operation, the gap and pressure of the mechanical equipment will change in size, which will lead to equipment imbalance and affect the mechanical operation. Sixth, the lack of functions of mechanical parts. During high-power operation, the parts will have uneven heat dissipation and other problems, which will cause the parts to fail. In the 1990s, the world economy gradually moved towards integration. Industrial automation made production more and more dependent on machinery, and people's expectations for machinery maintenance became higher and higher as shown in Table 1.

Table 1 Evolution Process Of Maintenance Expectation

Stage I	Stage II	The third stage
		Higher facility availability and reliability
		Higher security

		Higher product quality
	Higher facility availability	No harm to the environment
Repair and replace in case of failure	Longer equipment life	Longer equipment life
	Lower cost	Higher cost efficiency

The enterprise should regularly train and assess the relevant staff of maintenance engineering machinery, improve the professional quality and professional level of maintenance staff, so that when the maintenance workers find the mechanical failure, they can quickly and accurately find the causes that affect the mechanical failure and solve them. Before the construction, the construction machinery and equipment should be strictly checked. In order to facilitate the diagnosis and troubleshooting of engineering machinery faults, a special technical diagnosis mechanism can be built to enable the staff to grasp and understand the use of the construction machinery at any time, avoid the factors caused by the engineering machinery failure as far as possible, and affect the normal operation of the project.

3. Fault Detection Technology of Construction Machinery

3.1 Fault Diagnosis Technology of Construction Machinery

Condition detection is a relatively simple monitoring method we commonly use. It is a simple detection of construction machinery, which is similar to the above-mentioned manual diagnosis. Usually, the basic parameters such as heat dissipation temperature, pressure and vibration of construction machinery are measured. Then compare its basic parameters, which are mainly limited to a certain range of values within a certain period of time to clarify the problem of operation. Fault diagnosis, as a precise diagnosis technology, is helpful for relevant personnel to understand whether the operation of construction machinery is normal and the location, cause and severity of construction machinery failures in a timely manner. The main contents of fault diagnosis technology are listening, seeing, smelling, touching and testing. The premise of analysis and diagnosis is to have a lot of data accumulation, develop fault sensitive parameters, so as to evaluate its future state and make the judgment of residual life. If the equipment is in normal condition, the remaining life needs to be evaluated. If the equipment fails, it is necessary to analyze the extent of the failure and judge and evaluate the remaining life.

The maintenance process organization of construction machinery has a direct impact on the maintenance quality, maintenance cost, productivity, and maintenance shutdown days. Each enterprise shall organize reasonably according to the specific conditions of its production scale, equipment conditions, technical level, maintenance objects and supply of spare parts and materials. The working methods of engineering machinery repair mainly include on-machine repair method and assembly exchange method. As shown in Figure 1 and Figure 2.

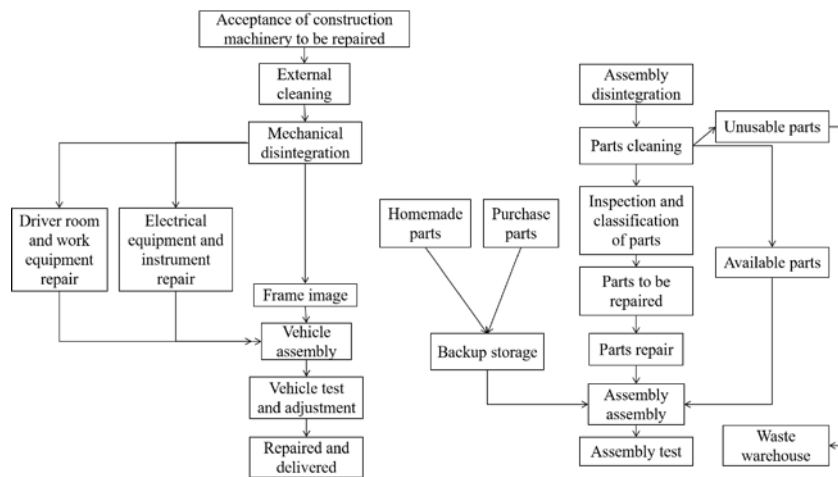


Fig.1 Process of the Machine Repair Method

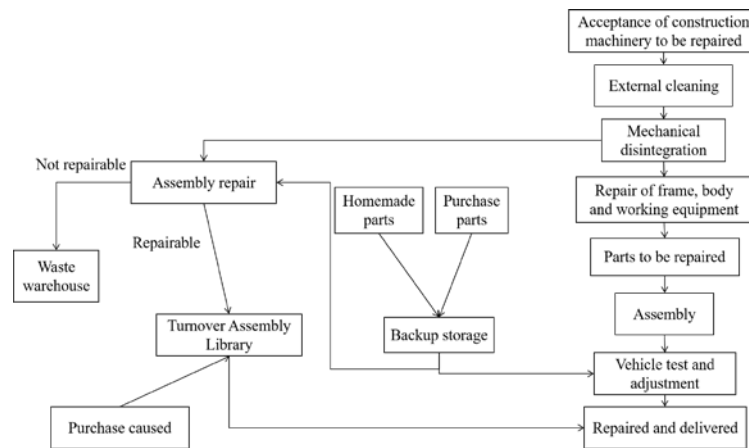


Fig.2 Process of Assembly Interchange Method

With the development of China's engineering field, the demand for related talents is getting higher and higher. Colleges and universities should appropriately expand the selection of talents related to engineering machinery fault diagnosis and maintenance, improve the professionalism of related majors, and promote the improvement of personnel in this industry. , Appropriately raise the barriers to entry for the profession. Safety management is the main method to ensure the quality control of machinery and equipment during operation. Safety management measures should be planned in advance when repairing machinery and equipment to ensure quality and safety. By enhancing maintenance technology, the difficulty of quality control can be reduced, which is conducive to maintaining the normal operation of mechanical equipment engineering.

4. Conclusions

To sum up, the detection and maintenance of construction machinery has the characteristics of strong delicacy and complexity, and the types of technologies involved are also relatively diverse. The common fault detection technologies of construction machinery mainly include state detection, analysis and diagnosis, and the traditional fault diagnosis is still an indispensable method to some extent. The daily inspection and maintenance of construction machinery is to improve the effective utilization of construction machinery, reduce the wear of parts in daily work, and strengthen the normal use of mechanical equipment. Staff should pay attention to maintenance fault diagnosis

technology, understand and master the shortcomings of construction machinery maintenance and fault diagnosis, and properly solve the relevant problems. Making a scientific and reasonable maintenance plan, introducing advanced science and technology, improving the comprehensive quality of workers, ensuring the normal operation of construction machinery, thus improving the quality and efficiency of work, ensuring the safety of engineering operation and promoting the development of diagnosis and maintenance technology of construction machinery. The fault detection and maintenance of construction machinery is a meticulous and complex work, which relies on the technologies of condition detection, analysis and diagnosis, etc. to repair professional faults and emergency faults in a targeted manner, reduce the amount and cost of maintenance work, strengthen green maintenance, meet the needs of environmental protection construction, improve the efficiency of mechanical fault detection and maintenance quality, and provide guarantee for the safe and stable operation of construction machinery, and enhance comprehensive benefits.

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